GUI USER MANUAL

LGB1152A

GIGABIT MANAGED ENET SWITCH

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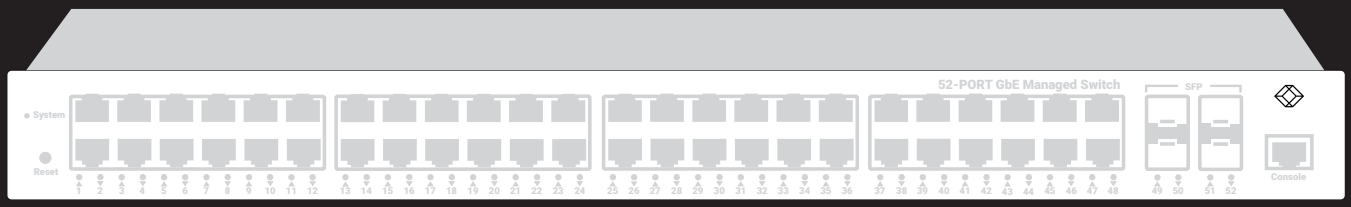

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ABOUT THIS MANUAL

PURPOSE

This GUI user guide gives specific information on how to operate and use the management functions of the LGB1152A via HTTP/HTTPs web browser.

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 Hypertext Transfer Protocol (HTTP).

REVISION HISTORY

Release Number: Initial release

Date: 9/1/2017

Revision: A1

ADDITIONAL DOCUMENTATION

This GUI User Manual and related documents available on the Black Box web site apply to the LGB1152A Gigabit Managed Ethernet Switch.

To download documentation from the Web site:

1. Go to www.blackbox.com
2. Enter the part number (LGB1152A) in the search box.
3. Click on the product in the “Product Results” page.
4. Click on the “Support” tab on the product page, and select the document you wish to download.

If you have any trouble accessing the Black Box site to download the manual, you can contact our Technical Support at 877-877-2269 or info@blackbox.com.

INTRODUCTION

This User Guide explains how to install and connect your network system. It includes step-by-step instructions for configuring and monitoring the LGB1152A through the web via the switch's RJ-45 serial interface and Ethernet ports. It also contains detailed explanations of hardware and software functions as well as examples of the web-based interface operation.

The LGB1152A managed switches offer the 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. The LGB1152A switch provides the ideal combination of affordability and capabilities for entry level networking, including small business or enterprise applications and helps you create a more efficient, better-connected workforce.

LGB1152A Gigabit Managed Ethernet Switch provides 52 ports, and supports the following features:

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

OVERVIEW OF THIS USER MANUAL

- Chapter 1: Operation of Web-based Management
- Chapter 2: System
- Chapter 3: Port Management
- Chapter 4: VLAN Management
- Chapter 5: Quality of Service
- Chapter 6: Spanning tree
- Chapter 7: MAC Address Tables
- Chapter 8: Multicast
- Chapter 9: DHCP
- Chapter 10: Security

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- Chapter 11: Access Control
- Chapter 12: SNMP
- Chapter 13: Event Notification
- Chapter 14: Diagnostics
- Chapter 15: Maintenance

CHAPTER 1: OPERATION OF WEB-BASED MANAGEMENT

INITIAL CONFIGURATION

This chapter explains how to configure and manage the LGB1152A through the web user interface. With this facility, you can easily access and monitor through any one port of the switch 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 LGB1152A are listed in the table below:

IP Address: 192.168.1.1
Subnet Mask: 255.255.255.0
Username: admin
Password:

After the LGB1152A finishes configuration, 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 to input the username and password to login and access authentication.

The default username is “admin” and password is empty. The first time you use the switch, 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 LGB1152A will not give you a shortcut to username automatically. This looks inconvenient, but is safer.

Two or more users using the administrator’s identity can manage this switch.

NOTE: When you log in to the Switch’s web page to manage the switch you must first type the Username of the admin. The Password is blank, so after you type the Username, press enter.

When you log in to LGB1152A series switch Web UI management, you can use both ipv4 ipv6 login to manage the switch.

To optimize the display effect, we recommend that you use Microsoft IE 6.0 or above, Netscape V7.1 or above or Firefox V1.00 or above and set the resolution to 1024 x 768. The switch supports a neutral web browser interface.

NOTE: The LGB1152A has dhcp enabled by default, so If you do not have a DHCP server to provide ip addresses to the switch, use the Switch’s default ip address: 192.168.1.1

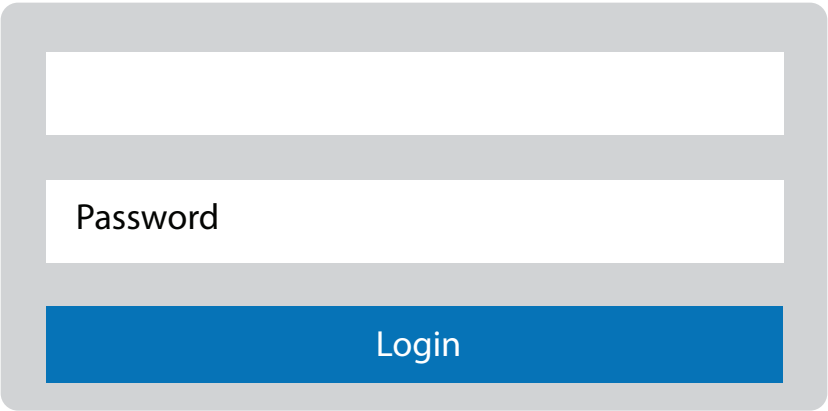

FIGURE 1-1. THE LOGIN PAGE

CHAPTER 2: SYSTEM

This chapter describes basic configuration tasks, including System Information and management functions of the Switch (Time, Account, IP, Syslog and NTP).

2.1 SYSTEM INFORMATION

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

The switch system's contact information is provided here.

WEB INTERFACE

To configure System Information in the web interface:

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

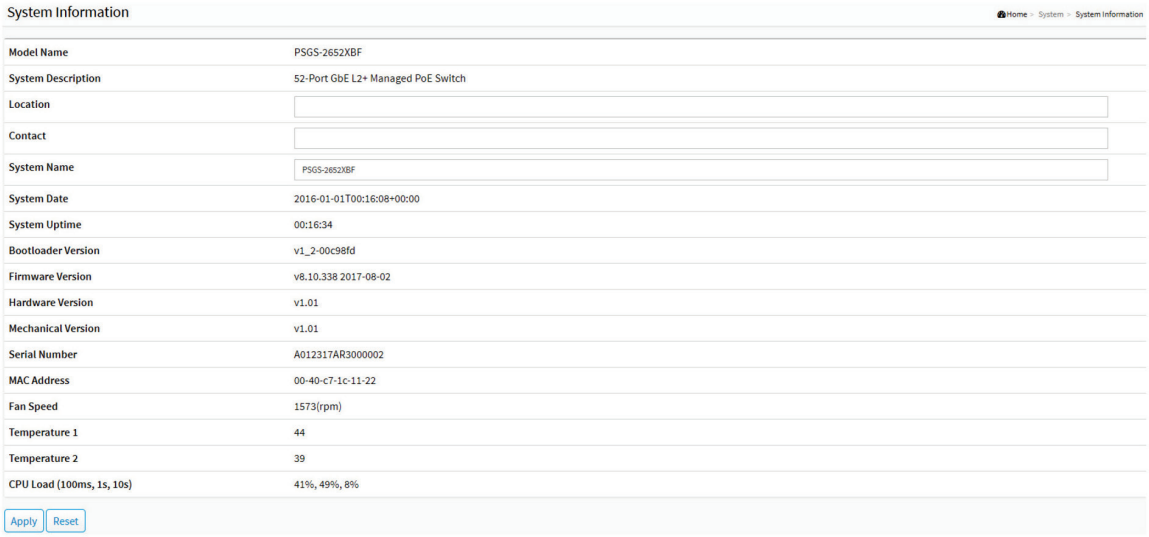

FIGURE 2-1. SYSTEM INFORMATION

PARAMETER DESCRIPTION

- Model Name: Displays the factory defined model name to identify the switch.
- 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 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: The software version of this switch.

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- Hardware Version: Displays the hardware version of the device.
- Mechanical Version: Displays the mechanical version of the device.
- Series Number: The serial number of this switch.
- MAC Address: The MAC Address of this switch.
- Fan Speed: Displays the information about fan speed (rpm).
- Temperature 1: Displays the temperature 1 of the system.
- Temperature 2: Displays the temperature 2 of the system.
- CPU Load (100 ms, 1 s, 10 s): Displays the CPU loading speed (100 ms, 1 s, 10 s) of the system.

Buttons

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

2.2 IP ADDRESS

2.2.1 SETTINGS

The IPv4 address for the switch can be obtained via a 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 IP basic settings.

WEB INTERFACE

To configure IP Settings in the web interface:

1. Click System, IP Address and Settings.
2. Enable or Disable the IPv4 DHCP Client.
3. Specify the IPv4 Address, Subnet Mask and Gateway.
4. Select DNS Server.
5. Click Apply.

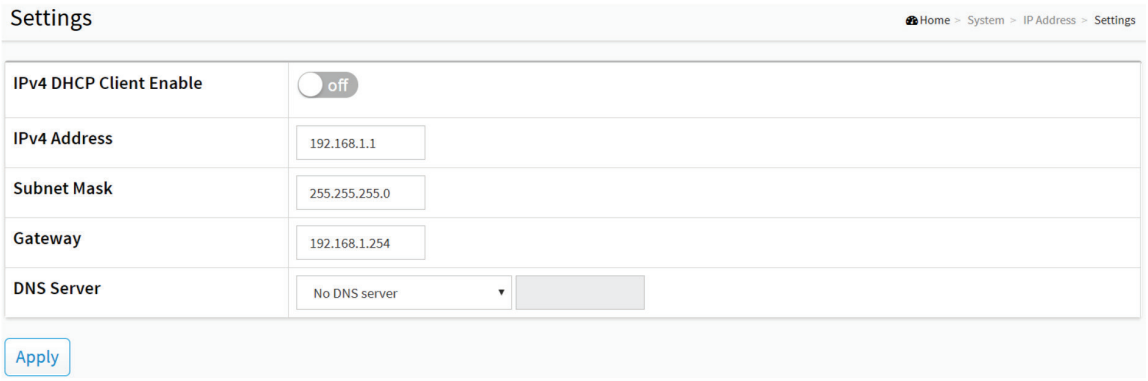

FIGURE 2-2. THE IP SETTINGS

Parameter description:

- IPv4 DHCP Client Enable: 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 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.
- Subnet Mask: User IP subnet mask of the entry.
- 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.
- DNS Server: This setting controls the DNS name resolution done by the switch. There are four servers available for configuration, and the index of the server presents the preference (less index has higher priority) in doing DNS name resolution.The following modes are supported:
  - No DNS server: No DNS server will be used.
  - Configured IPv4
  - Explicitly provide the valid IPv4 unicast address of the DNS Server in dotted decimal notation.
  - Make sure the configured DNS server could be reachable (e.g. via PING) for activating DNS service.
  - Configured IPv6. Explicitly provide the valid IPv6 unicast (except linklocal) address of the DNS Server. Make sure the configured DNS server could be reachable (e.g. via PING6) for activating DNS service.
  - From any DHCPv4 interface: The first DNS server offered from a DHCPv4 lease to a DHCPv4-enabled interface will be used.
  - From this DHCPv4 interface: Specify from which DHCPv4-enabled interface a provided DNS server should be preferred.
  - From any DHCPv6 interface: The first DNS server offered from a DHCPv6 lease to a DHCPv6-enabled interface will be used.
  - From this DHCPv6 interface: Specify from which DHCPv6-enabled interface a provided DNS server should be preferred.

Buttons:

- Apply: Click to save changes.

2.2.2 ADVANCED SETTINGS

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 8.

WEB INTERFACE

To configure Advanced Settings in the web interface:

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

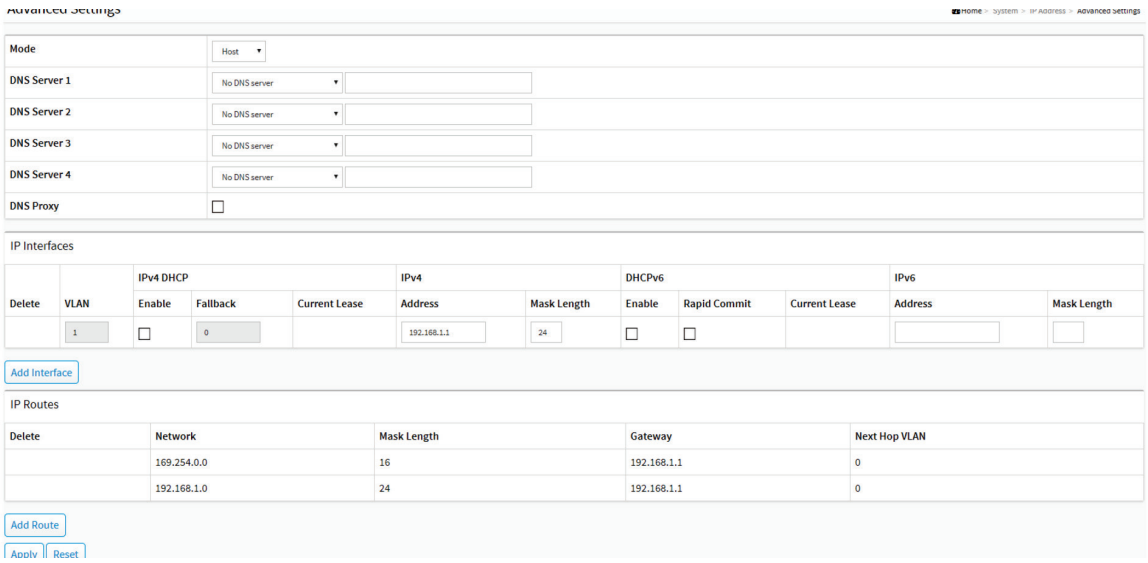

FIGURE 2-3. ADVANCED IP SETTINGS

Parameter description:

Basic Setting

- 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. There are four servers available for configuration, and the index of the server presents the preference (less index has higher priority) in doing DNS name resolution. The following modes are supported:
  - No DNS server: No DNS server will be used.
  - Configured IPv4: Explicitly provide the valid IPv4 unicast address of the DNS Server in dotted decimal notation. Make sure the configured DNS server could be reachable (e.g. via PING) for activating DNS service.
  - Configured IPv6: Explicitly provide the valid IPv6 unicast (except linklocal) address of the DNS Server. Make sure the configured DNS server could be reachable (e.g. via PING6) for activating DNS service.

– From any DHCPv4 interfaces: The first DNS server offered from a DHCPv4 lease to a DHCPv4-enabled interface will be used.

– From this DHCPv4 interface: Specify from which DHCPv4-enabled interface a provided DNS server should be preferred.

– From any DHCPv6 interfaces: The first DNS server offered from a DHCPv6 lease to a DHCPv6-enabled interface will be used.

– From this DHCPv6 interface: Specify from which DHCPv6-enabled interface a provided DNS server should be preferred.

- DNS Proxy: When DNS proxy is enabled, the system will relay DNS requests to the currently configured DNS server, and reply as a DNS resolver to the client devices on the network. Only IPv4 DNS proxy is now supported.

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 an 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 the switch will try 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, so 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 shows 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 a 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.
- DHCPv6 Enable: Enable the DHCPv6 client by checking this box. If this option is enabled, the system will configure the IPv6 address of the interface using the DHCPv6 protocol.
- DHCPv6 Rapid Commit: Enable the DHCPv6 Rapid-Commit option by checking this box. If this option is enabled, the DHCPv6 client terminates the waiting process as soon as a Reply message with a Rapid Commit option is received. This option is only manageable when DHCPv6 client is enabled.
- DHCPv6 Current Lease: For DHCPv6 interface with an active lease, this column shows the interface address provided by the DHCPv6 server.
- IPv6 Address: The IPv6 address of the interface. A 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 a 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 8 routes is supported.
- Apply: Click to save changes.
- Reset: Click to undo any changes made locally and revert to previously saved values.

2.2.3 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 System, IP Address and Status.
2. Display the IP Configuration information.

4. Select DNS Server.
5. Click Apply.

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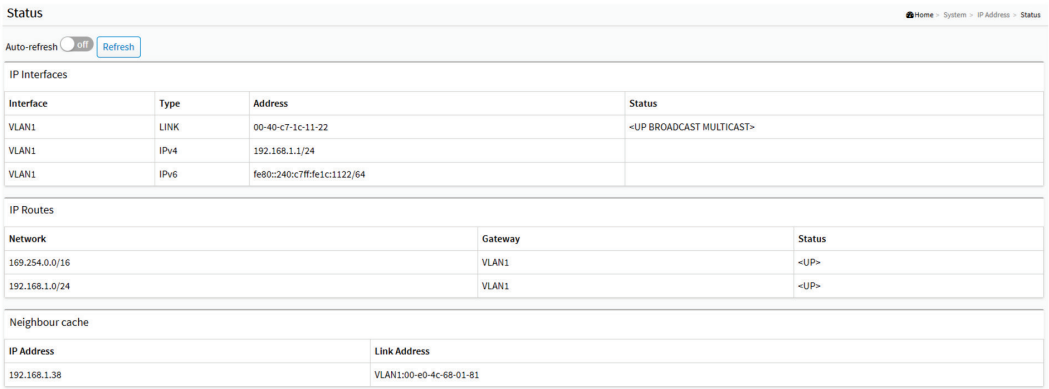

FIGURE 2-4. IP STATUS

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.

Neighbor cache

- 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 exists.

Buttons

FIGURE 2-5. AUTO-REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

2.3 SYSTEM 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 System and System Time.
2. Specify the Time parameter.
3. Click Apply.

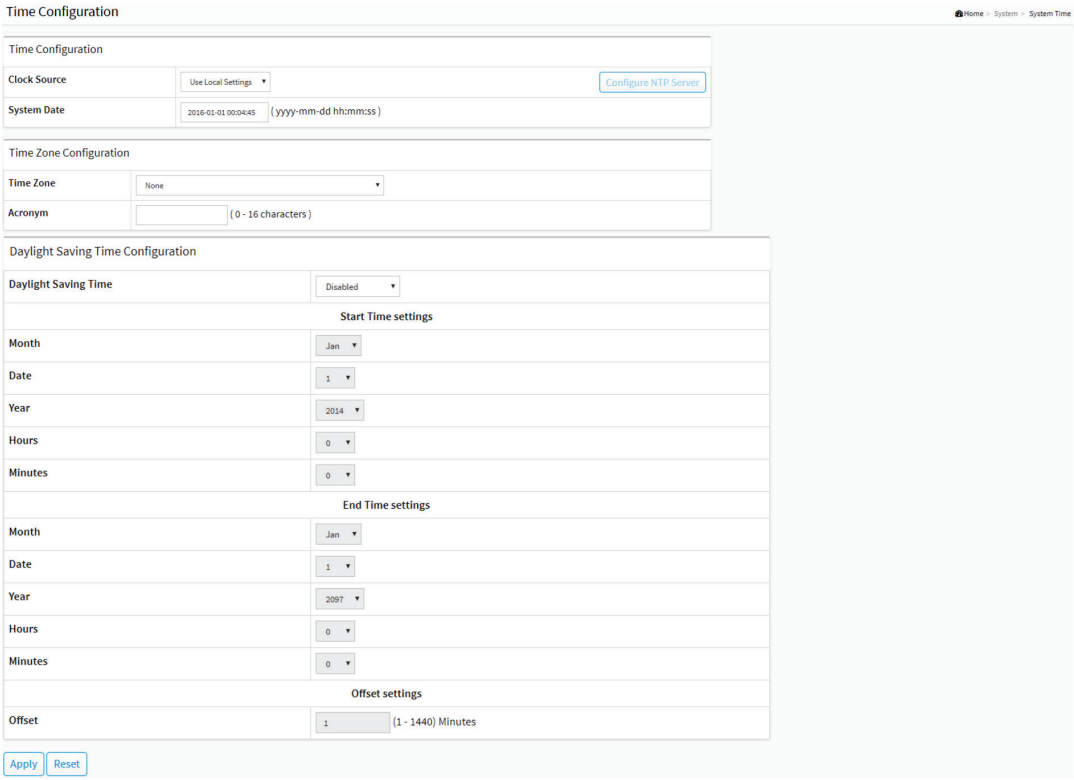

FIGURE 2-6. TIME CONFIGURATION

Parameter description:

Time Configuration

- Clock Source: There are two modes for configuring where the Clock Source is from. Select “Local Settings” to obtain the Clock Source from the Local Time. Select “NTP Server” to obtain the Clock Source from the NTP Server.
- System Date: Show the current time of the system. The year of system date range is between 2000 and 2037.

Time Zone Configuration

- Time Zone: Lists various Time Zones worldwide. Select the appropriate Time Zone from the drop-down list 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 starting minute.
- Offset settings:
  - Offset - Enter the number of minutes to add during Daylight Saving Time. (Range: 1 to 1440)

NOTE: Below “Start Time Settings” and “End Time Settings” displays 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.

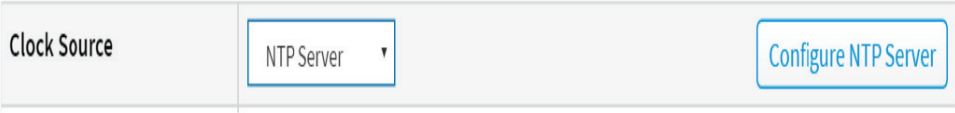

FIGURE 2-7. CONFIGURE NTP SERVER BUTTON

- Configure NTP Server: Click to configure NTP server when Clock Source is selected from NTP Server.

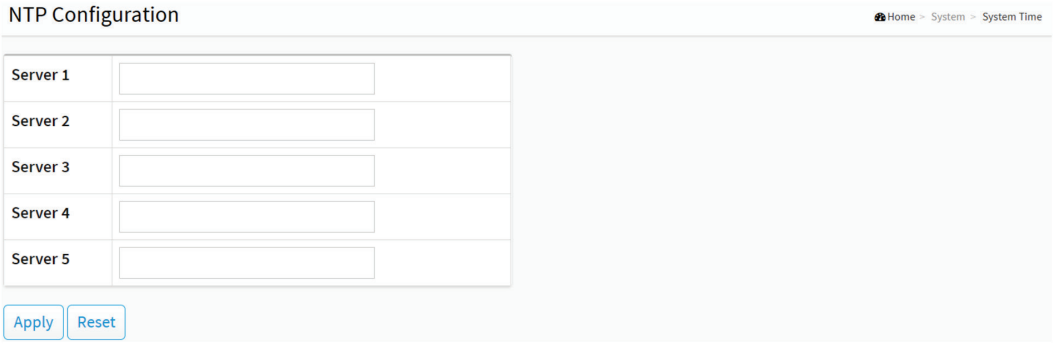

FIGURE 2-8. SNTP CONFIGURATION

NTP is Network Time Protocol and is used to sync the network time based Greenwich Mean Time (GMT). If using the NTP mode, select a built-in NTP time server or manually specify an user-defined NTP server as well as Time Zone, and the switch will sync the time shortly after you press the <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 of 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 result in the local time, otherwise, you will not able to get the correct time. The switch supports configurable time zones from -12 to +13 step 1 hour.

Default Time zone: +8 Hrs.

Parameter description:

- 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

These buttons are displayed on the SNTP page:

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

2.4 LLDP

The switch supports 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 a 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.

2.4.1 LLDP CONFIGURATION

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

WEB INTERFACE

To configure LLDP:

1. Click System, LLDP and LLDP configuration.
2. Modify LLDP timing 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 Apply.

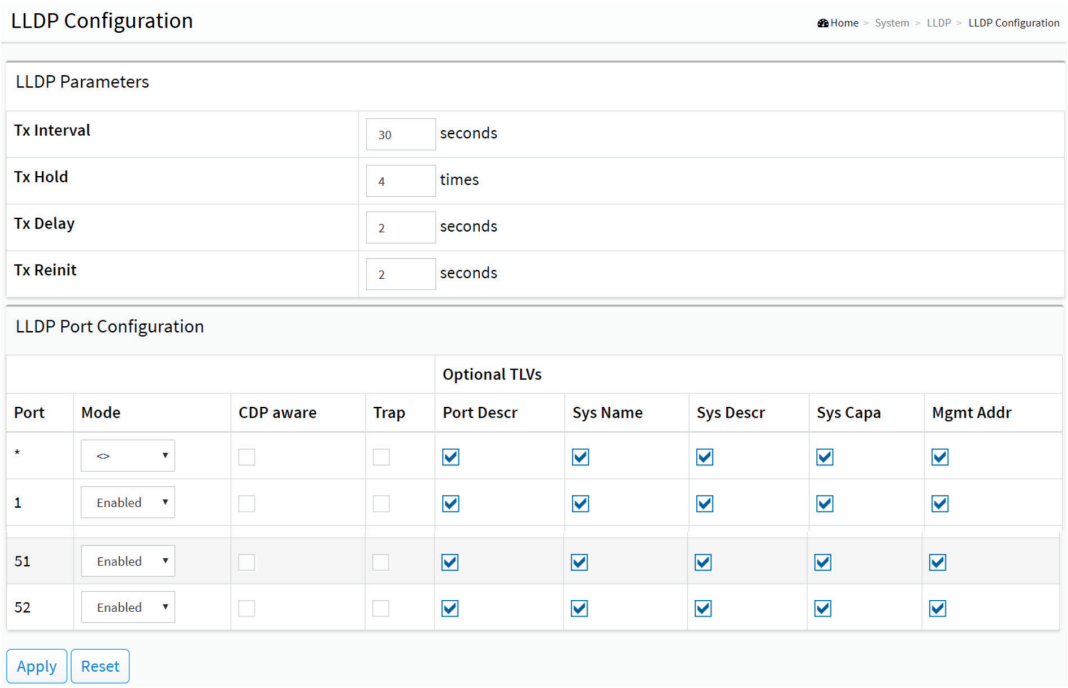

FIGURE 2-9. LLDP CONFIGURATION

Parameter description:

LLDP Parameters:

- Tx Interval: The switch periodically transmits LLDP frames to its neighbors to make 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 will 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 amount of seconds between the shutdown frame and a new LLDP initialization. Valid values are restricted to 1–10 seconds.

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LLDP Port Configuration

The LLDP port settings relate to the currently selected, as reflected by the page header.

- 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 decode 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 is removed when the hold time is exceeded.

- Trap: LLDP trapping notifies events such as newly-detected neighboring devices and link malfunctions.
- 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.

2.4.2 LLDP-MED CONFIGURATION

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 that support LLDP-MED.

WEB INTERFACE

To configure LLDP-MED:

1. Click System, LLDP and LLDP-MED Configuration.
2. Modify Fast start repeat count parameter, default is 4.
3. Modify Transmit TLVs parameters.
4. Modify Coordinates Location parameters.
5. Fill Civic Address Location parameters.
6. Fill Emergency Call Service parameters.
7. Add new policy.
8. Click Apply, will show the following Policy Port Configuration.
9. Select Policy ID for each port.
10. Click Apply.

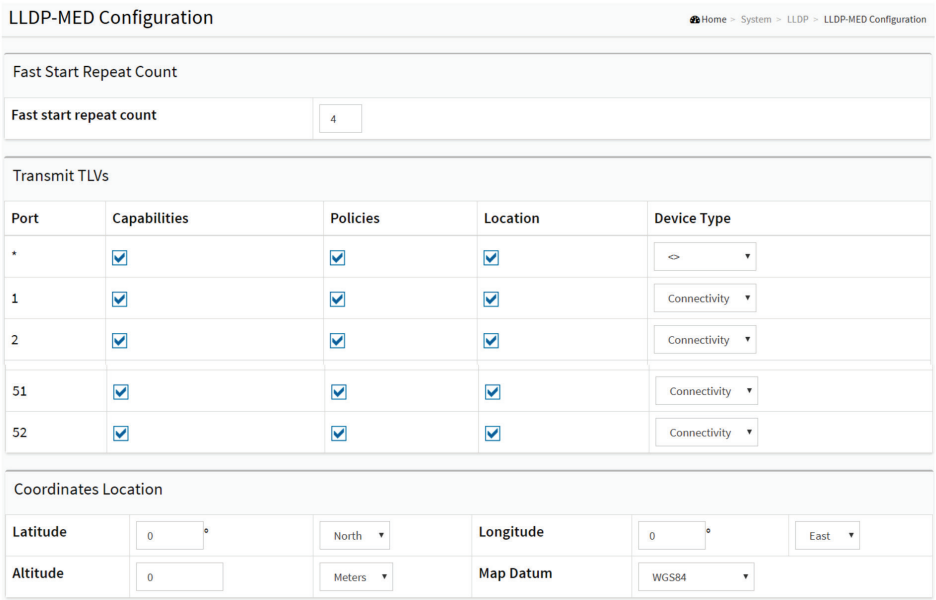


FIGURE 2-10. LLDP-MED CONFIGURATION, PART 1

Civic Address Location

Country code		State/Province		County	
City		City district		Block (Neighborhood)	
Street		Leading street direction		Trailing street suffix	
Street suffix		House no.		House no. suffix	
Landmark		Additional location info		Name	
Zip code		Building		Apartment	
Floor		Room no.		Place type	
Postal community name		P.O. Box		Additional code	

Emergency Call Service

Emergency Call Service	

Emergency Call Service

Emergency Call Service	

Policies

Delete	Policy ID	Application Type	Tag	VLAN ID	L2 Priority	DSCP
Delete	0	Voice	Tagged	1	0	0

Add New Policy

Apply Reset

Policy Port Configuration

Port	Policy ID	
	0	1
1	☐	☐
2	☐	☐
51	☐	☐
52	☐	☐

Apply Reset

FIGURE 2-11. LLDP-MED CONFIGURATION, PART 2

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 that 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 LLDPU 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 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 to 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, we recommend that you repeat the fast start transmission multiple times to increase the possibility of the neighbors receiving the LLDP frame. With Fast start repeat count, you can 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.

NOTE: The 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 does not apply to links between LAN infrastructure elements, including Network Connectivity Devices, or other types of links.

Transmit TLVs

- Port: The interface name to which the configuration applies.
- Capabilities: When checked, the switch's capabilities are included in LLDP-MED information transmitted.
- Policies: When checked the configured policies for the interface are included in LLDP-MED information transmitted.
- Location: When checked the configured location information for the switch is included in LLDP-MED information transmitted.
- Device Type: Any LLDP-MED Device is operating as a specific type of LLDP-MED Device, which may be either a Network Connectivity Device or a specific Class of Endpoint Device, as defined below.
  - A Network Connectivity Device is an LLDP-MED Device that provides 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 that can relay IEEE 802 frames via any method.
  - An Endpoint Device is an LLDP-MED Device that sits at the network edge and provides some aspect of IP communications service, based on IEEE 802 LAN technology.
  - The main difference between a Network Connectivity Device and an Endpoint Device is that only an Endpoint Device can start the LLDP-MED information exchange.
  - Even though a switch always should be a Network Connectivity Device, you can configure it to act as an Endpoint Device, and thereby start the LLDP-MED information exchange (In the case where two Network Connectivity Devices are connected together).

Coordinates Location

- Latitude: Latitude SHOULD be normalized to within 0-90 degrees with a maximum of 4 digits. You can 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 5 digits. You can 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. You can 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 that 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/Province: 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 / Signalling (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.

NOTE: 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.

- Delete: Check to delete the policy. It will be deleted during the next save.
- Policy ID: ID for the policy. This is automatically generated and will be used when selecting the polices that will 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 Signaling (conditional) - for use in network topologies that require a different policy for the voice signaling 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 Signaling (conditional) - for use in network topologies that require a different policy for the guest voice signaling 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 is relevant.
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 Signaling (conditional) - for use in network topologies that require a separate policy for the video signaling 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 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 is relevant.
  - 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.

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 will apply to a given port. The set of policies is selected by check marking the checkboxes that corresponds to the policies.

Buttons

- Adding New Policy: Click to add a new policy. Specify the Application type, Tag, VLAN ID, L2 Priority and DSCP for the new policy. Click “Apply.”
- Apply: Click to save changes.
- Reset: Click to undo any changes made locally and revert to previously saved values.

2.4.3 LLDP 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 show LLDP neighbors:

1. Click System, LLDP and LLDP Neighbor.
2. Click Refresh for manual update web screen.
3. Click Auto-refresh for auto-update web screen.

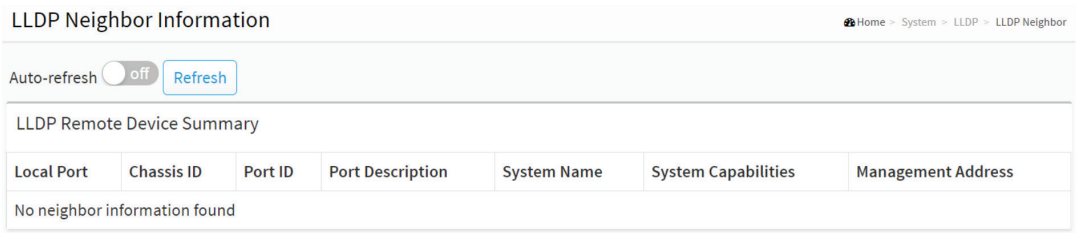


FIGURE 2-12. LLDP NEIGHBOR INFORMATION

NOTE: If there is no device that supports LLDP in your network 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 (-).
- System Description: Displays the system description.
- 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

FIGURE 2-13. AUTO-REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

2.4.4 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 show LLDP-MED neighbor:

1. Click System, LLDP and LLDP-MED Neighbor.
2. Click Refresh for manual update web screen.
3. Click Auto-refresh for auto-update web screen.

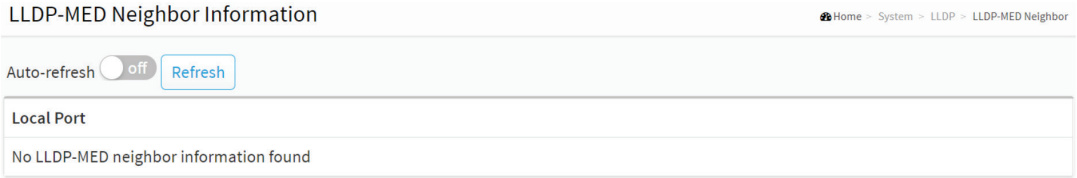


FIGURE 2-14. LLDP-MED NEIGHBOR INFORMATION

NOTE: If there is no device that supports LLDP-MED in your network 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 Signaling - for use in network topologies that require a different policy for the voice signaling 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 Signaling - for use in network topologies that require a different policy for the guest voice signaling 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 Signaling - for use in network topologies that require a separate policy for the video signaling 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 indicates 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

FIGURE 2-15. AUTO-REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

2.4.5 LLDP NEIGHBOR EEE

By using EEE, power savings can be achieved at the expense of traffic latency. This latency occurs because the circuits EEE turn off to save power, then need time to boot up before sending traffic over the link. This time is called "wakeup time." To achieve minimal latency, devices can use LLDP to exchange information about their respective tx and rx "wakeup time," as a way to agree upon the minimum wakeup time they need.

This page provides an overview of EEE information exchanged by LLDP.

WEB INTERFACE

To show LLDP neighbor EEE:

1. Click System, LLDP and LLDP Neighbour EEE.
2. Click Refresh for manual update web screen.
3. Click Auto-refresh for auto-update web screen.

FIGURE 2-16. LLDP NEIGHBOR EEE INFORMATION

Parameter description

- Local Port: The interface at which LLDP frames are received or transmitted.
- Tx Tw: The link partner's maximum time that transmit path can hold-off sending data after deassertion 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 receive 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 partner's 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 partner's 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

FIGURE 2-17. AUTO-REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

2.4.6 LLDP 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 show LLDP Statistics:

1. Click System, LLDP and LLDP Statistics.
2. Click Refresh to manually update the web screen.
3. Click Auto-refresh to auto-update the web screen.
4. Click Clear to clear all counters.

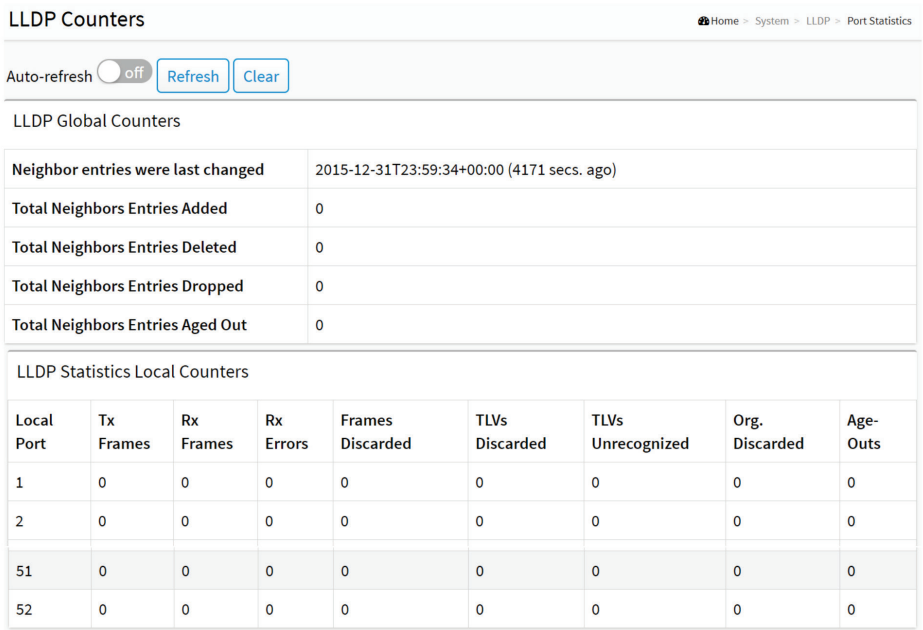


FIGURE 2-18. LLDP STATISTICS INFORMATION

Parameter description:

Global Counters

- Neighbor entries were last changed at: 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 is 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

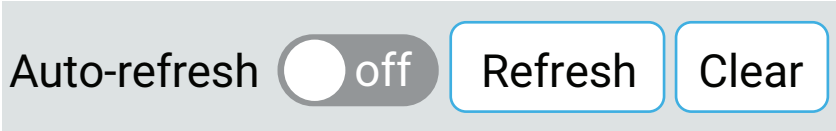


FIGURE 2-19. AUTO-REFRESH/REFRESH/CLEAR BUTTONS

- 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 port.

2.5 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 System 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, click the Reset button. It will revert to previously saved values.

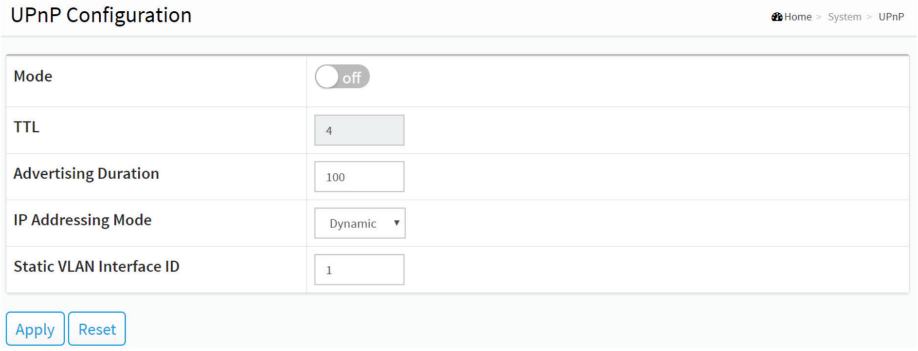


FIGURE 2-20. UPNP CONFIGURATION

Parameter description: These parameters are displayed on the UPnP Configuration page:

- Mode: Indicates the UPnP operation mode. Possible modes are:
  - on: Enable UPnP mode operation.
  - off: 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, we recommend that you refresh advertisements 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.
- IP Addressing Mode: IP addressing mode provides two ways to determine IP address assignment:
  - Dynamic: Default selection for UPnP. UPnP module helps users choosing the IP address of the switch device. It finds the first available system IP address.
  - Static: User specifies the IP interface VLAN for choosing the IP address of the switch device.
- Static VLAN Interface ID: The index of the specific IP VLAN interface. It will only be applied when IP Addressing Mode is static. Valid configurable values range from 1 to 4095. Default value is 1.

Buttons

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

CHAPTER 3: PORT MANAGEMENT

The section describes how to configure the Port detail parameters of the switch. You can use the Port configure to enable or disable the switch port and monitor the port's content or status.

3.1 PORT CONFIGURATION

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 Port Management and Port Configuration.
2. Specify the detail Port alias or description via an alphanumeric string describing the full name and version identification for the system's hardware type, software version, and networking application.
3. Specify the Speed Configured, Flow Control, Maximum Frame Size.
4. Click Apply.

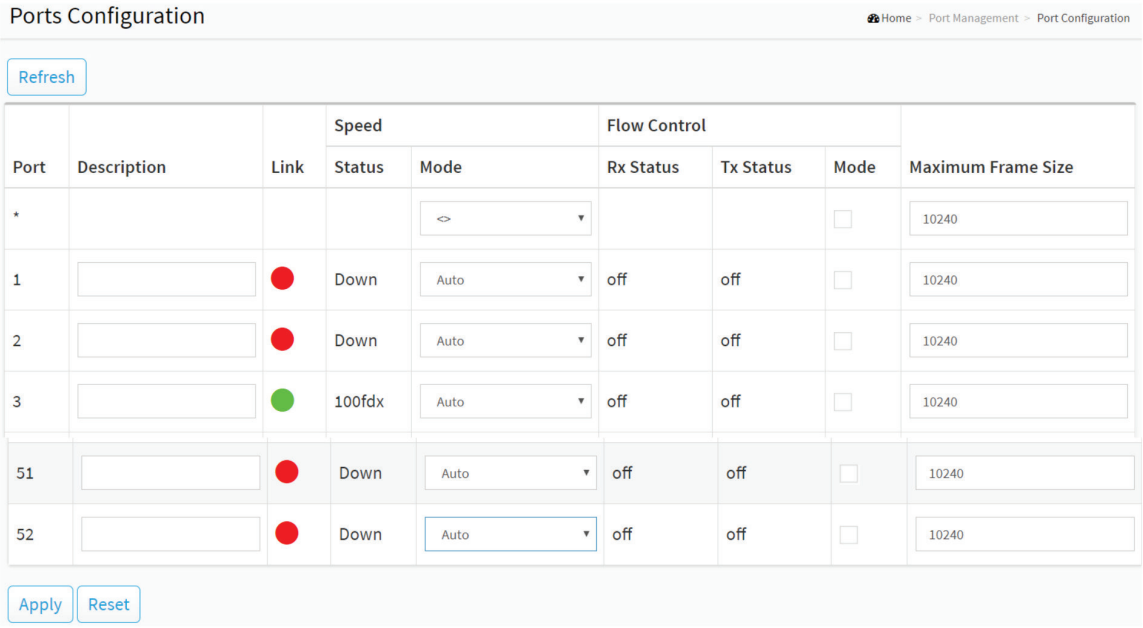


FIGURE 3-1. PORT CONFIGURATION

Parameter description:

- Port: This is the logical port number for this row.
- Description: Enter up to 63 characters to be descriptive name that identifies this port.
- Link: The current link state is displayed graphically. Green indicates the link is up and red that it is down.
- Current Link Speed Status: 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 are 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.

– 10 Mbps HDX - Forces the copper port in 10 Mbps half-duplex mode.

– 10 Mbps FDX - Forces the copper port in 10 Mbps full-duplex mode.

– 100 Mbps HDX - Forces the copper port in 100 Mbps half-duplex mode.

– 100 Mbps FDX - Forces the copper port in 100 Mbps full-duplex mode.

– 1 Gbps FDX - Forces the port in 1 Gbps full-duplex 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. The range is 1518-10240 bytes.

Buttons

- Refresh: Click to refresh the Port link Status manually.
- Apply: Click to save changes.
- Reset: Click to undo any changes made locally and revert to previously saved values.

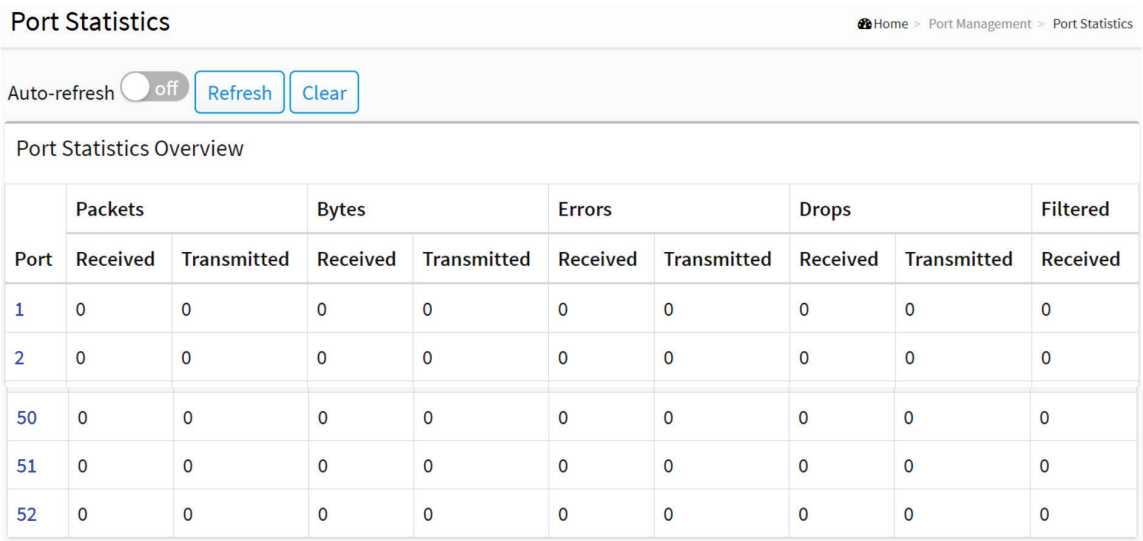
3.2 PORT STATISTICS

The section describes the Port statistics information and provides overview of general traffic statistics for all switch ports.

WEB INTERFACE

To Display the Port Statistics Overview in the web interface:

1. Click Port Management and Port Statistics.
2. If you want to auto-refresh, click “Auto-refresh.”
3. Click “ Refresh“ to refresh the port statistics or clear all information when you click “ Clear.”
4. To see detailed port statistics, then you need to click that port.



	Packets		Bytes		Errors		Drops		Filtered
Port	Received	Transmitted	Received	Transmitted	Received	Transmitted	Received	Transmitted	Received
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0

FIGURE 3-2. PORT STATISTICS 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 process.

Buttons

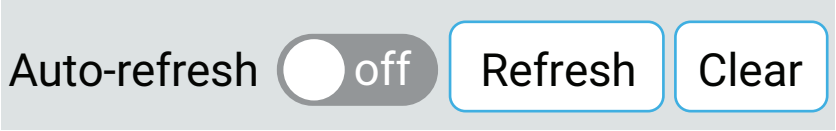
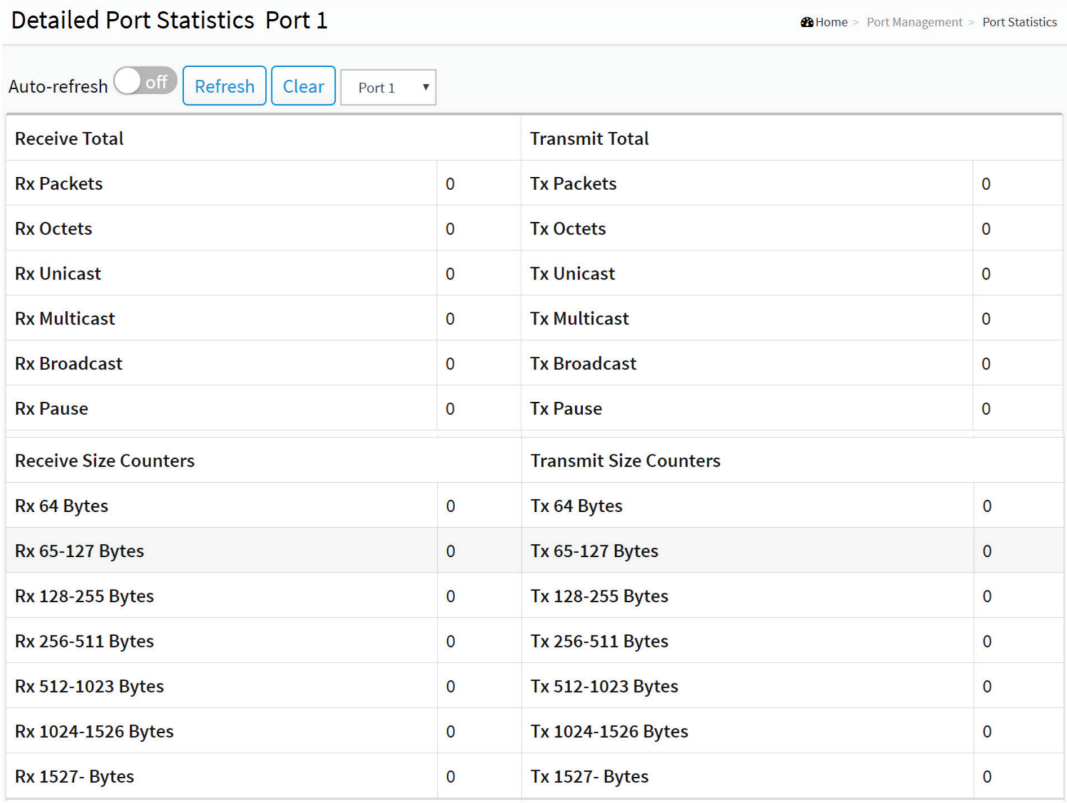


FIGURE 3-3. AUTO-REFRESH/REFRESH/CLEAR BUTTONS

- 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.

If you want to see the detailed statistics for a port, then you need to click that port. 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.



Receive Total		Transmit Total	
Rx Packets	0	Tx Packets	0
Rx Octets	0	Tx Octets	0
Rx Unicast	0	Tx Unicast	0
Rx Multicast	0	Tx Multicast	0
Rx Broadcast	0	Tx Broadcast	0
Rx Pause	0	Tx Pause	0
Receive Size Counters		**Transmit Size Counters**	
Rx 64 Bytes	0	Tx 64 Bytes	0
Rx 65-127 Bytes	0	Tx 65-127 Bytes	0
Rx 128-255 Bytes	0	Tx 128-255 Bytes	0
Rx 256-511 Bytes	0	Tx 256-511 Bytes	0
Rx 512-1023 Bytes	0	Tx 512-1023 Bytes	0
Rx 1024-1526 Bytes	0	Tx 1024-1526 Bytes	0
Rx 1527- Bytes	0	Tx 1527- Bytes	0

FIGURE 3-4. DETAILED PORT STATISTICS, PORT 1

Receive Queue Counters		Transmit Queue Counters	
Rx Q0	0	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	0
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	0		

FIGURE 3-5. DETAILED PORT STATISTICS

Parameter description:

- Upper left scroll bar: To scroll to the port to display the Port statistics with “Port-1”, “Port-2”, ...

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 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.

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.
- Tx Oversize: The number of frames dropped due to frame oversize.

Buttons

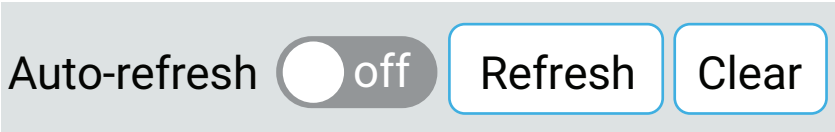


FIGURE 3-6. AUTO-REFRESH/REFRESH/CLEAR BUTTONS

- 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 port.

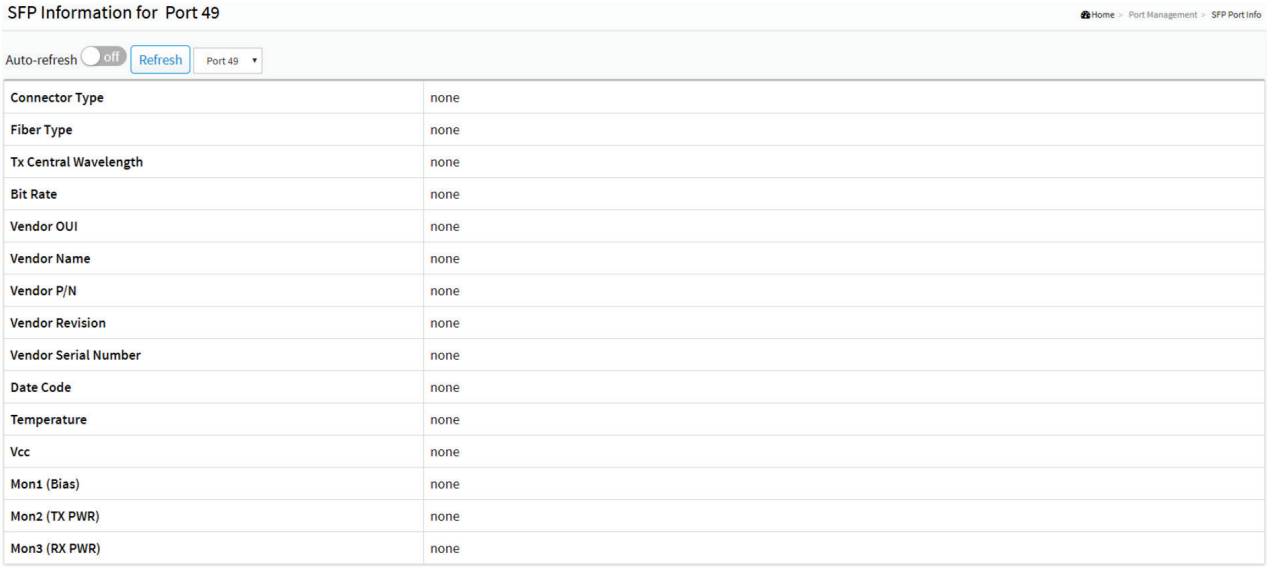
3.3 SFP PORT INFO

This section describes how the switch can display detailed information for the SFP module connected to the switch. The information includes: Connector type, Fiber type, wavelength, bit rate and Vendor OUI, etc.

WEB INTERFACE

To Display the SFP information in the web interface:

1. Click Port Management and SFP Port Info.
2. Display the SFP Information.



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 3-7. SFP PORT INFORMATION

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Parameter description:

- Upper left scroll bar: To scroll to the specific port to display the Port statistics.
- Connector Type: Display the connector type, for instance, UTP, SC, ST, LC and so on.
- Fiber Type: Display the fiber mode, for instance, Multimode, 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 that is assigned by IEEE.
- Vendor Name: Display the company name of the module manufacturer.
- Vendor P/N: Display the product name given by the 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 the SFP module.
- Vcc: Show the working DC voltage of the SFP module.
- Mon1(Bias) mA: Show the Bias current of the SFP module.
- Mon2(TX PWR): Show the transmit power of the SFP module.
- Mon3(RX PWR): Show the receiver power of SFP module.

Buttons

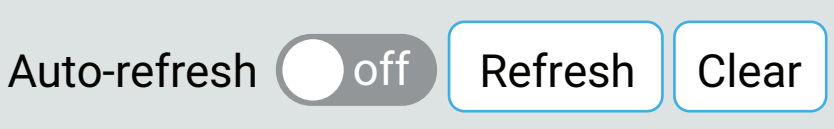

FIGURE 3-8. AUTO-REFRESH/REFRESH/CLEAR BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page.

3.4 ENERGY EFFICIENT ETHERNET

EEE is an abbreviation for Energy Efficient Ethernet defined in IEEE 802.3az.

This page allows the user to inspect and configure the current EEE port settings.

EEE is a power saving option that reduces the power usage when there is very low traffic use (or no traffic).

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 μs for 1 Gbit links and 30 μs for other link speeds. EEE devices must agree upon the value of the wakeup time to make sure that both the receiving and transmitting device have all circuits powered up when traffic is transmitted. The devices can exchange information about the device's wakeup time using the LLDP protocol.

WEB INTERFACE

To configure an Energy Efficient Ethernet in the web interface:

1. Click Port Management and Energy Efficient Ethernet.
2. Select enable or disable Energy Efficient Ethernet by the port.
3. Click apply to save the setting.
4. To cancel the setting, click the Reset button. It will revert to previously saved values.

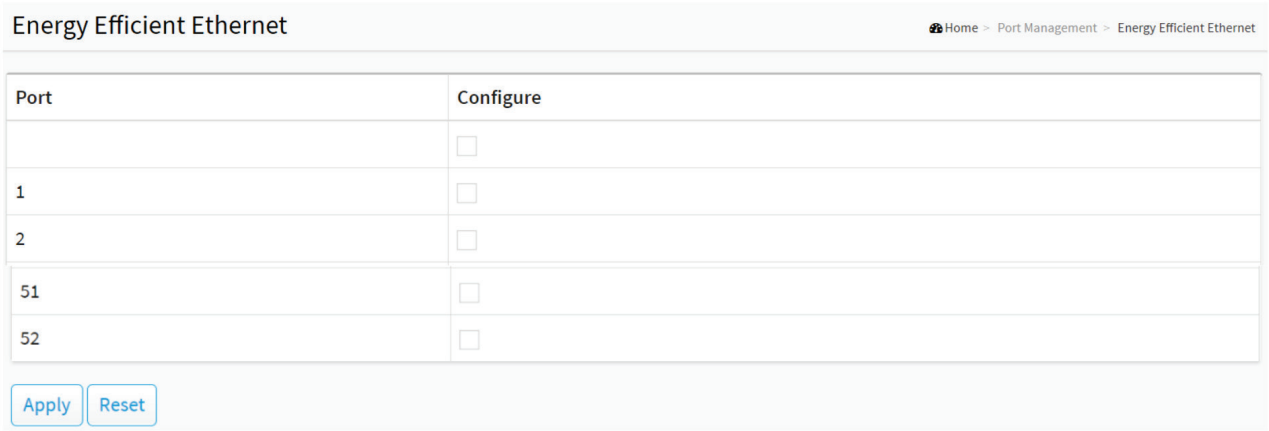

FIGURE 3-9. ENERGY EFFICIENT ETHERNET CONFIGURATION

Parameter description:

- Port: The switch port number of the logical EEE port.
- Configure: Controls whether EEE is enabled for this switch port.

Buttons

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

3.5 LINK AGGREGATION

3.5.1 STATIC CONFIGURATION

This page is used to configure the Aggregation hash mode and the aggregation group.

WEB INTERFACE

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

1. Click Port Management, Link Aggregation and Static Configuration.
2. Enable or disable the aggregation mode function.
3. Choose Aggregation Group ID and Port members.
4. Click Apply to save the setting.
5. To cancel the setting, click the reset button. It will revert to previously saved values.

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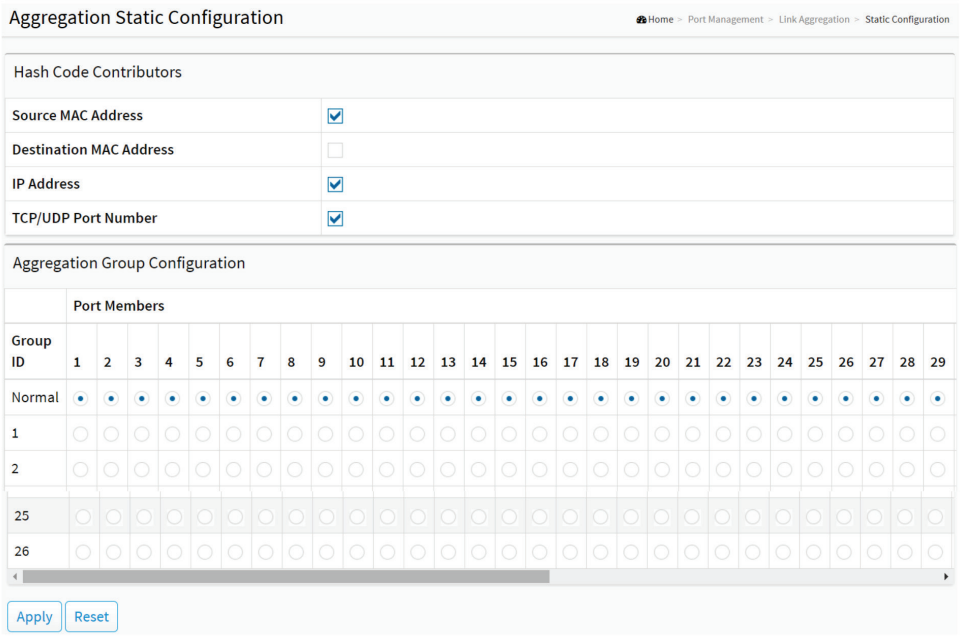


FIGURE 3-10. STATIC CONFIGURATION

Parameter description :

Hash Code Contributors

- Source MAC Address: Use the Source MAC address 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: Use the IP address 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: Use the TCP/UDP port number 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.

3.5.2 LACP CONFIGURATION

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

WEB INTERFACE

To configure the LACP Port Configuration in the web interface:

1. Click Port Management, Link Aggregation and LACP Configuration.
2. Enable or disable the LACP on the port of the switch.
3. Scroll to the Key parameter with Auto or Specific. Default is Auto.
4. Scroll to the Role with Active or Passive. Default is Active.
5. Click Apply to save the setting.
6. To cancel the setting, click the reset button. It will revert to previously saved values.

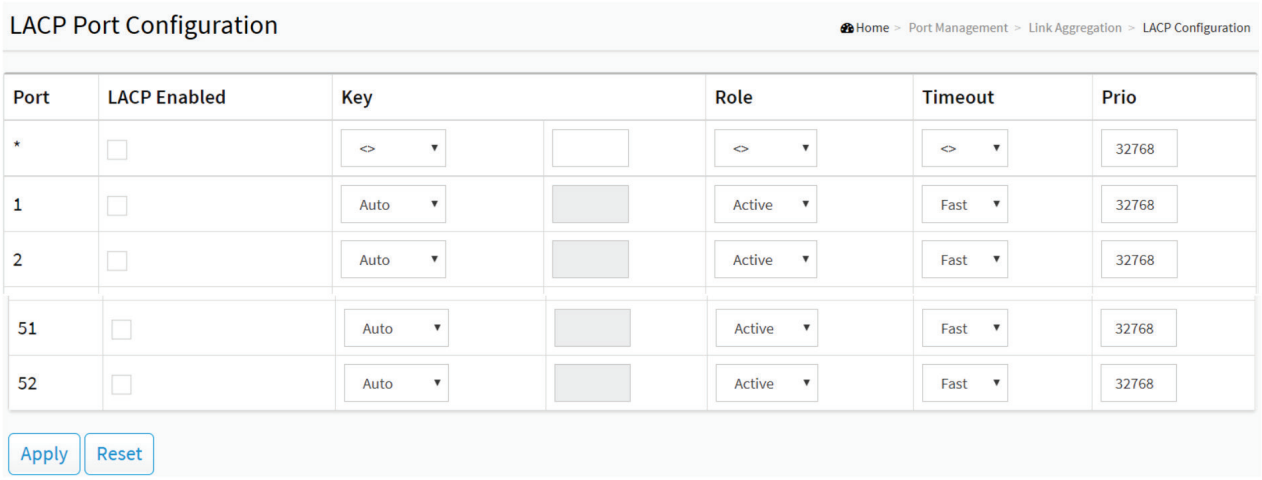


FIGURE 3-11. LACP CONFIGURATION

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, 10 Mb = 1, 100 Mb = 2, 1 Gb = 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

3.5.3 SYSTEM STATUS

This section describes how to set LACP function on the switch to provide a status overview for all LACP instances.

WEB INTERFACE

To display the LACP System status in the web interface:

1. Click Port Management, Link Aggregation and System Status.
2. Check “Auto-refresh.”
3. Click “Refresh” to refresh the detailed port statistics.

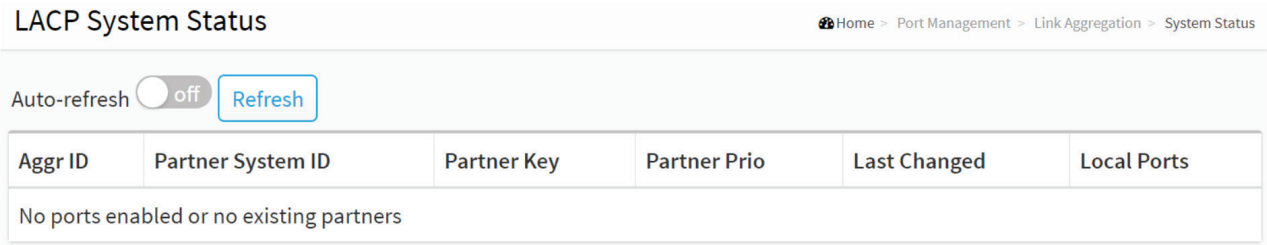


FIGURE 3-12. LACP SYSTEM STATUS

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.
- Partner Prio: The priority 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

FIGURE 3-13. AUTO-REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page.

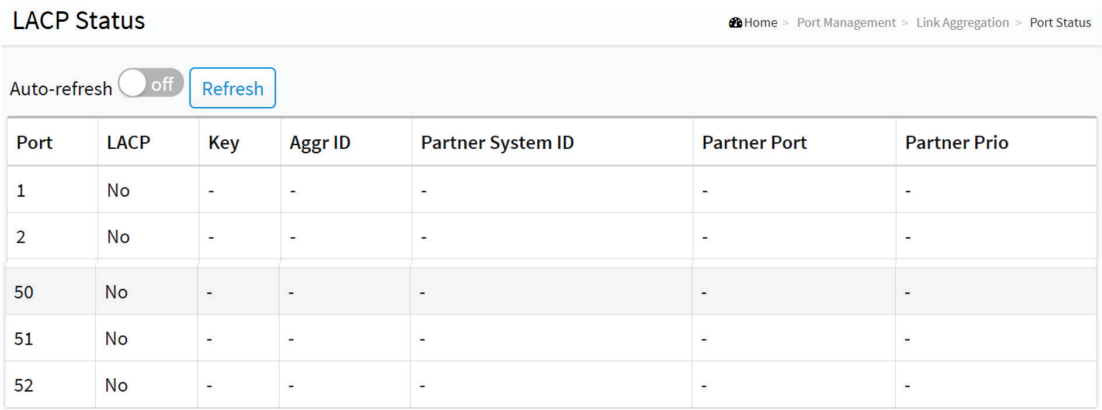
3.5.4 PORT STATUS

This section describes how to set LACP function on the switch to provide a Port Status overview for all LACP instances.

WEB INTERFACE

To display the LACP Port status in the web interface:

1. Click Port Management, Link Aggregation and Port Status.
2. If you want to auto-refresh the information, then you need to select “Auto-refresh.”
3. Click “Refresh” to refresh the LACP Port Status.



Port	LACP	Key	Aggr ID	Partner System ID	Partner Port	Partner Prio
1	No	-	-	-	-	-
2	No	-	-	-	-	-
50	No	-	-	-	-	-
51	No	-	-	-	-	-
52	No	-	-	-	-	-

FIGURE 3-14. 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 another port leaves. Meanwhile, its 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

FIGURE 3-15. AUTO-REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page.

3.6 LOOP PROTECTION

3.6.1 CONFIGURATION

Loop Protection is used to detect the presence of traffic. When a switch receives a packet's (looping detection frame) with a MAC address the same as its own from a port, show Loop Protection happens. The port will be locked when it receives the looping Protection frames. To resume the locked port, find out the looping path and remove the looping path, then select to resume the locked port and click on "Resume" to turn on the locked ports..

WEB INTERFACE

To configure the Loop Protection parameters in the web interface:

1. Click Port Management, Loop Protection and Configuration.
2. Select enable or disable the port loop Protection.
3. Click apply to save the setting.
4. To cancel the setting, click the Reset button. It will revert to previously saved values.

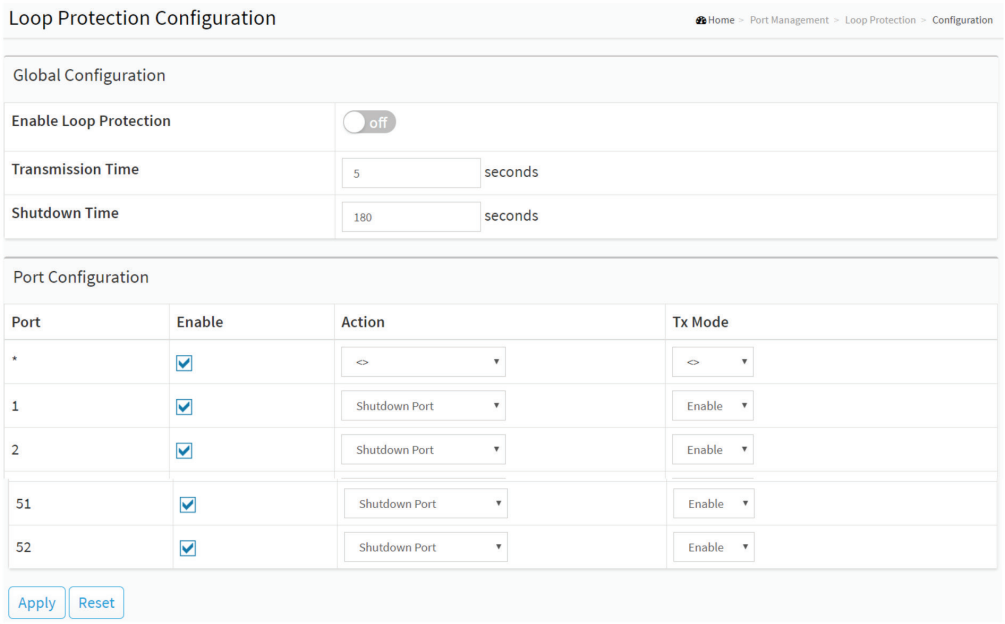


FIGURE 3-16. LOOP PROTECTION CONFIGURATION

Parameter description:

Global Configuration

- Enable Loop Protection: Controls whether loop protections is 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 if a loop is detected (and the port action shuts down the port). Valid values are 10 to 604800 seconds (7 days).

Port Configuration

- Port: 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 PDUs, or whether it is just passively looking for looped PDUs.

Buttons

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

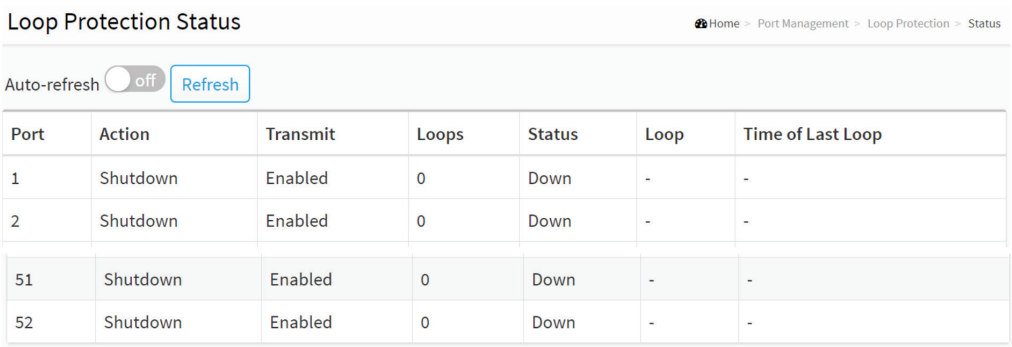
3.6.2 STATUS

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 Port Management, Loop Protection and Status.
2. To auto-refresh the information, select “Auto refresh.”
3. Click “Refresh” to refresh the Loop Protection Status.



Port	Action	Transmit	Loops	Status	Loop	Time of Last Loop
1	Shutdown	Enabled	0	Down	-	-
2	Shutdown	Enabled	0	Down	-	-
51	Shutdown	Enabled	0	Down	-	-
52	Shutdown	Enabled	0	Down	-	-

FIGURE 3-17. 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.

FIGURE 3-18. AUTO-REFRESH/REFRESH BUTTONS

Buttons:

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

3.7 UDLD

3.7.1 CONFIGURATION

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

WEB INTERFACE

To configure the UDLD parameters in the web interface:

1. Click Port Management, UDLD and UDLD Configuration.
2. Select to enable or disable the port UDLD.
3. Specify the Message Interval.
4. Click apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

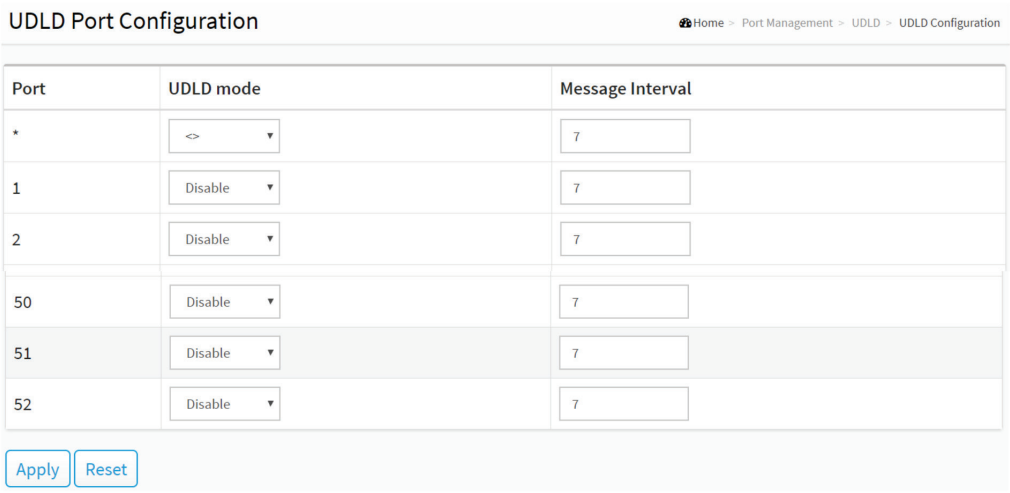


FIGURE 3-19. UDLD CONFIGURATION

Parameter description:

- Port: Port number of the switch.
- UDLD Mode: Configures the UDLD mode on a port. Valid values are Disable, Normal and Aggressive. Default mode is Disable.
  - Disable: In disabled mode, UDLD functionality doesn't exists on port.
  - Normal: In normal mode, if the link state of the port was determined to be unidirectional, it will not affect the port state.
  - Aggressive: In aggressive mode, unidirectional detected ports will get shutdown. To bring back the ports up, need to disable UDLDon that port.
- Message Interval: Configures the period of time between UDLD probe messages on ports that are in the advertisement phase and are determined to be bidirectional. The range is from 7 to 90 seconds(Default value is 7 seconds)(Currently default time interval is supported, due to lack of detailed information in RFC 5171).

Buttons

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

3.7.2 UDLD STATUS

This page displays the UDLD status of the ports.

WEB INTERFACE

To display the Loop Protection status in the web interface:

1. Click Port Management, UDLD and UDLD Status.
2. Select port that you want to display the UDLD Status.
3. To auto-refresh the information, select "Auto refresh."
4. Click "Refresh" to refresh the Loop Protection Status.

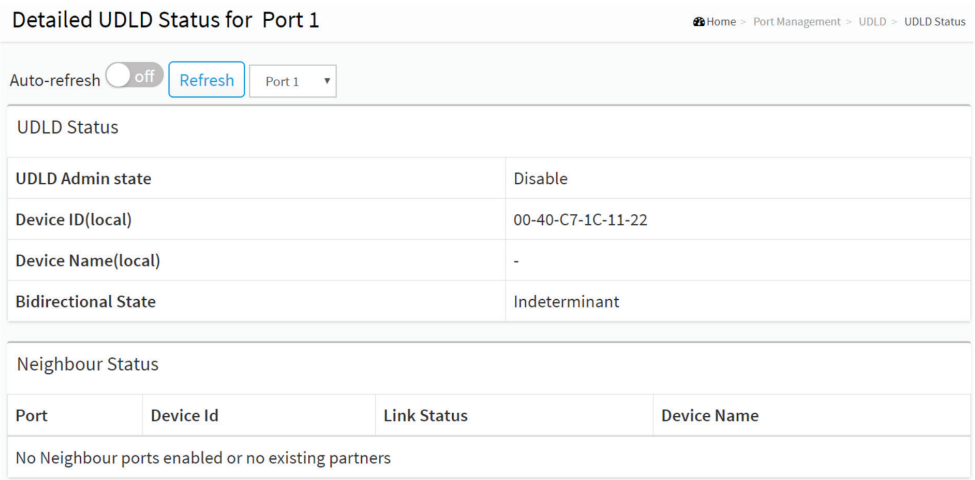


FIGURE 3-20. UDLD STATUS

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Parameter description:

UDLD port status

- UDLD Admin State: The current port state of the logical port, Enabled if any of state (Normal,Aggressive) is Enabled.
  - Device ID(local): The ID of Device.
  - Device Name(local): Name of the Device.
  - Bidirectional State: The current state of the port.

Neighbor Status

- Port: The current port of the neighbor device.
- Device ID: The current ID of the neighbor device.
- Link Status: The current link status of the neighbor port.
- Device Name: Name of the Neighbor Device.

Buttons

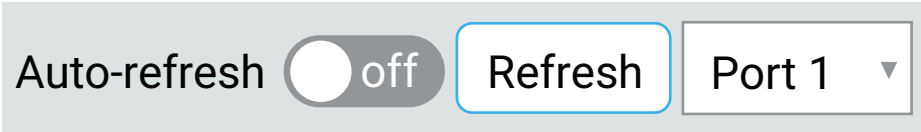

FIGURE 3-21. UDLD STATUS BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- Port 1: Select the port that you want to display the DHCP Detailed Statistics.

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4.1 VLAN CONFIGURATION

You can 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. Make sure you 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 VLAN Management and VLAN Configuration.
2. Modify Global VLAN Configuration parameter.
3. Scroll the Mode, Port VLAN and Port Type to enable the Port VLAN Configuration parameter.
4. Click Apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

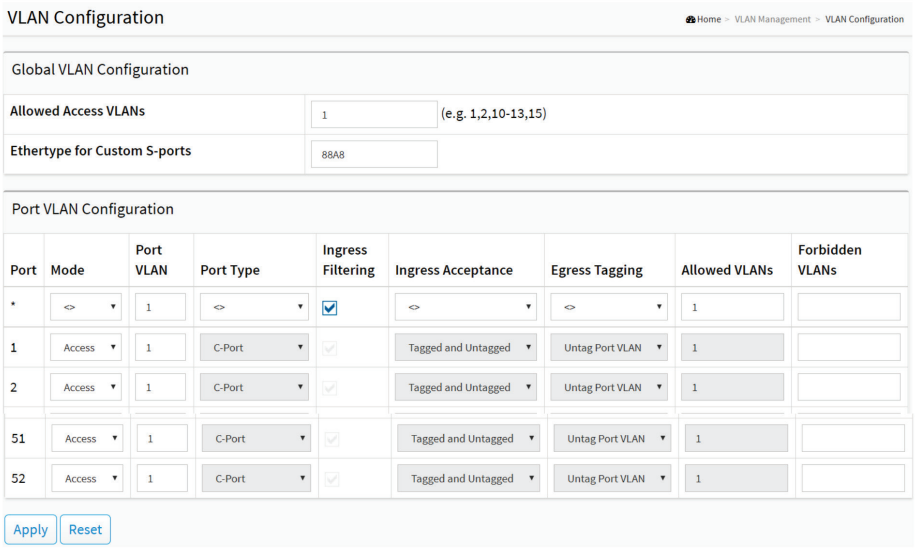

FIGURE 4-1. VLAN CONFIGURATION

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Parameter description:

Global VLAN Configuration

- Allowed Access VLANs: This field shows the VLANs that are created on the switch.
  - By default, only VLAN 1 exists. 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.
  - 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.
  - 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.
  - Hybrid: Hybrid ports resemble trunk ports in many ways, but add 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 is 1.
  - On ingress, frames get classified to the Port VLAN if the port is configured as VLAN unaware, the frame is untagged, or VLAN awareness is enabled on the port, but the frame is priority tagged (VLAN ID = 0).
  - On egress, frames classified to the Port VLAN do not get tagged if Egress Tagging configuration is set to untag Port VLAN.
  - The Port VLAN is called an "Access VLAN" for ports in Access mode and Native VLAN for ports in Trunk or Hybrid mode.

- Port Type: Ports in hybrid mode allow for changing the port type, that is, whether a frame's VLAN tag is used to classify the frame on ingress to a particular VLAN, and if so, which TPID it reacts on. Likewise, on egress, the Port Type determines the TPID of the tag, if a tag is required.
  - Unaware: On ingress, all frames, whether carrying a VLAN tag or not, get classified to the Port VLAN, and possible tags are not removed on egress.
  - C-Port: On ingress, frames with a VLAN tag with TPID = 0x8100 get classified to the VLAN ID embedded in the tag. If a frame is untagged or priority tagged, the frame gets classified to the Port VLAN. If frames must be tagged on egress, they will be tagged with a C-tag.
  - S-Port: On ingress, frames with a VLAN tag with TPID = 0x8100 or 0x88A8 get classified to the VLAN ID embedded in the tag. If a frame is untagged or priority tagged, the frame gets classified to the Port VLAN. If frames must be tagged on egress, they will be tagged with an S-tag.
  - S-Custom-Port: On ingress, frames with a VLAN tag with a TPID = 0x8100 or equal to the Ethertype configured for Custom-S ports get classified to the VLAN ID embedded in the tag. If a frame is untagged or priority tagged, the frame gets classified to the Port VLAN. If frames must be tagged on egress, they will be tagged with the custom S-tag.
- Ingress 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.
- Ingress Acceptance: Hybrid ports allow for changing the type of frames that are accepted on ingress.
  - Tagged and untagged: both tagged and untagged frames are accepted.
  - Tagged Only: Only tagged frames are accepted on ingress. Untagged frames are discarded.
  - Untagged Only: Only untagged frames are accepted on ingress. Tagged frames are discarded.
- Egress Tagging: Ports in Trunk and Hybrid mode may control the tagging of frames on egress.
  - Untag Port VLAN: Frames classified to the Port VLAN are transmitted untagged. Other frames are transmitted with the relevant tag.
  - Tag All: All frames, whether classified to the Port VLAN or not, are transmitted with a tag.
  - Untag All: All frames, whether classified to the Port VLAN or not, are transmitted without a tag. This option is only available for ports in Hybrid mode.
- Allowed VLANs: Ports in Trunk and Hybrid mode may control which VLANs they are allowed to become members of. Access ports can only be member of one VLAN, the Access VLAN.
  - The field's syntax is identical to the syntax used in the Existing VLANs field. By default, a port may become a 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 Enabled 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.

4.2 VLAN MEMBERSHIP

This page provides an overview of membership status of VLAN users.

The ports belong to the currently selected stack unit, as reflected by the page header

WEB INTERFACE

To configure VLAN membership configuration in the web interface:

1. Click VLAN Management and VLAN membership.
2. Scroll the bar to choose the VLANs.
3. Click Refresh to update the state.

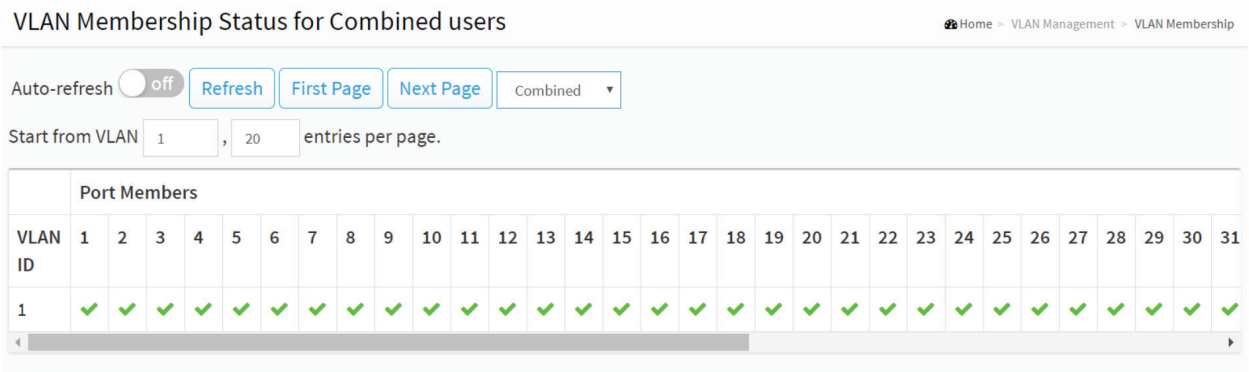

FIGURE 4-2. VLAN MEMBERSHIP FOR COMBINED USERS

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 User module uses services of the VLAN management functionality to configure VLAN memberships and VLAN port configurations such as PVID and UVID. Currently, we support the following VLAN user types:

  – NAS: NAS provides port-based authentication, which involves communications between a Supplicant, Authenticator, and an Authentication Server.

  – GVRP: Adjacent VLAN-aware devices can exchange VLAN information with each other by using Generic VLAN Registration Protocol (GVRP). GVRP is based on the Generic Attribute Registration Protocol (GARP) and propagates VLAN information throughout a bridged network.

  – 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.

  – Voice VLAN: Voice VLAN is a VLAN configured specially for voice traffic typically originating from IP phones.

  – MSTP: The 802.1s Multiple Spanning Tree protocol (MSTP) uses VLANs to create multiple spanning trees in a network, which significantly improves network resource use while maintaining a loop-free environment.

  – DMS: Shows DMS VLAN membership status.

  – VCL: Shows MAC-based VLAN entries configured by various MAC-based VLAN users.

- 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 U and T will be displayed. Shows egress filtering frame status whether tagged or untagged. Frames classified to the Port VLAN are transmitted tagged (T) or untagged (U).
- VLAN Membership :The VLAN Membership Status Page will show the current VLAN port members for all VLANs configured by a selected VLAN User (selection shall be allowed by a Combo Box). When combined Users are selected, it will 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.
- Show entries: You can choose how many items you want to show up.
- Admin: You can choose the Vlan User.

Buttons:

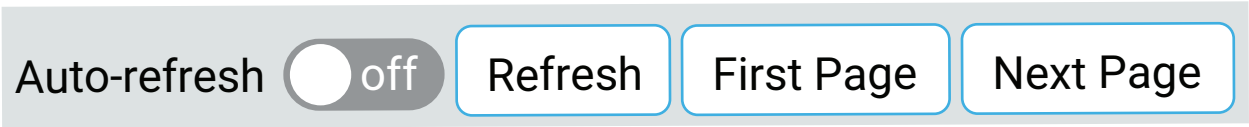

FIGURE 4-3. VLAN MEMBERSHIP BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page.
- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the system log entries, turn to the next page.

4.3 VLAN PORT STATUS

The function Port Status gathers the information of all VLAN status and reports it by the order of Combined, Admin, NAS, GVRP, MVR, Voice VLAN, MSTP, DMS, VCL.

WEB INTERFACE

To Display VLAN Port Status in the web interface:

1. Click VLAN Management and VLAN Port Status.
2. Specify the Combined, Admin, NAS, GVRP, MVR, Voice VLAN, MSTP, DMS, VCL, RMirror.
3. Display Port Status information.

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VLAN Port Status for Combined users

Home > VLAN Management > VLAN Port Status

Auto-refresh off Refresh Combined

Port	Port Type	Ingress Filtering	Frame Type	Port VLAN ID	Tx Tag	Untagged VLAN ID	Conflicts
1	C-Port	✔	All	1	Untag All		No
2	C-Port	✔	All	1	Untag All		No
3	C-Port	✔	All	1	Untag All		No
51	C-Port	✔	All	1	Untag All		No
52	C-Port	✔	All	1	Untag All		No

FIGURE 4-4. VLAN PORT STATUS

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 the following VLAN User types:
  - NAS: NAS provides port-based authentication, which involves communications between a Supplicant, Authenticator, and an Authentication Server.
  - GVRP: Adjacent VLAN-aware devices can exchange VLAN information with each other by using Generic VLAN Registration Protocol (GVRP). GVRP is based on the Generic Attribute Registration Protocol (GARP) and propagates VLAN information throughout a bridged network.
  - 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.
  - Voice VLAN: Voice VLAN is a VLAN configured specially for voice traffic typically originating from IP phones.
  - MSTP: The 802.1s Multiple Spanning Tree protocol (MSTP) uses VLANs to create multiple spanning trees in a network, which significantly improves network resource use while maintaining a loop-free environment.
  - DMS: Shows DMS VLAN membership status.
  - VCL: shows MAC-based VLAN entries configured by various MAC-based VLAN users.
- 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.
- Untagged VLAN ID: If Tx Tag is overridden by the selected user and is set to Tag or Untag UVID, then this field will show the VLAN ID the user wants to tag or untag on egress. The field is empty if not overridden by the selected user.

- Conflicts: Two users may have conflicting requirements for a port's configuration. For instance, one user may require all frames to be tagged on egress while another requires all frames to be untagged on egress.

  Since both users cannot win, this gives rise to a conflict, which is solved in a prioritized way. The Administrator has the least priority. Other software modules are prioritized according to their position in the drop-down list: The higher in the list, the higher priority.

  If conflicts exist, it will be displayed as "Yes" for the "Combined" user and the offending software module.

  The "Combined" user reflects what is actually configured in hardware.
- Admin: You can choose the Vlan User.

Buttons

FIGURE 4-5. AUTO REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page.

4.4 MAC-BASED VLAN

4.4.1 CONFIGURATION

The MAC address to VLAN ID mappings can be configured here. This page allows adding and deleting MAC-based VLAN Classification List entries and assigning the entries to different ports.

WEB INTERFACE

To configure MAC address-based VLAN configuration in the web interface:

1. Click VLAN Management, MAC-based VLAN and Configuration.
2. Click "Add New Entry."
3. Specify the MAC address and VLAN ID.
4. Click Apply.

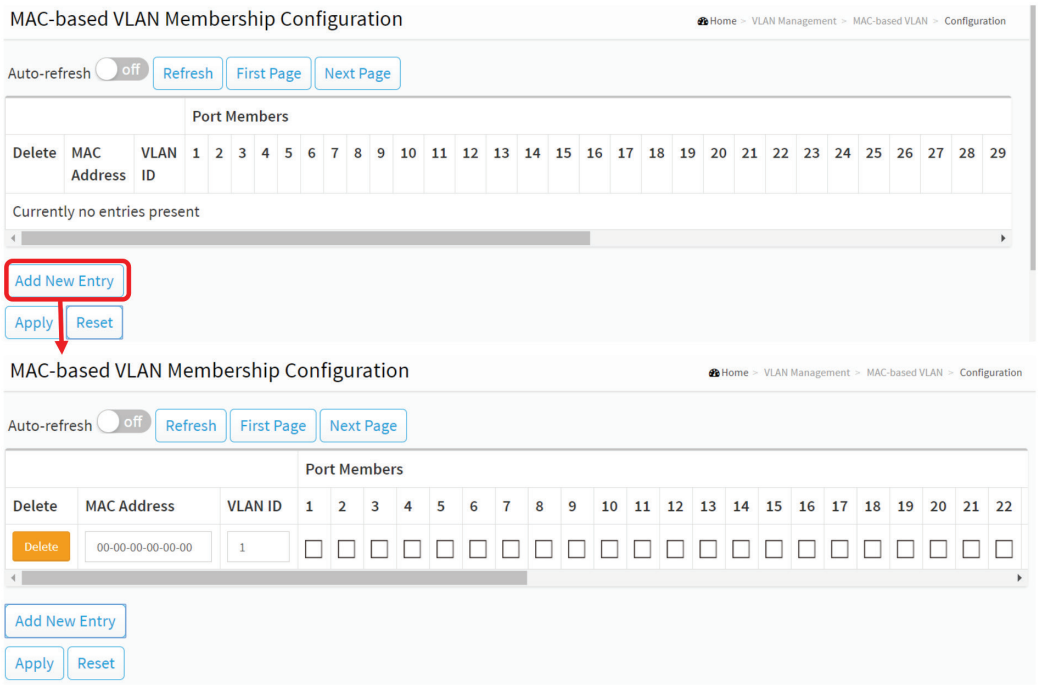

FIGURE 4-6. MAC-BASED VLAN CONFIGURATION

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 to VLAN ID mapping entry. To include a port in the 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

- Adding New Entry: Click 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.
- Delete: To delete a MAC-based VLAN entry, check this box and press apply. The entry will be deleted on the selected switch in the stack.
- Apply: Click to save changes.
- Reset: Click to undo any changes made locally and revert to previously saved values.

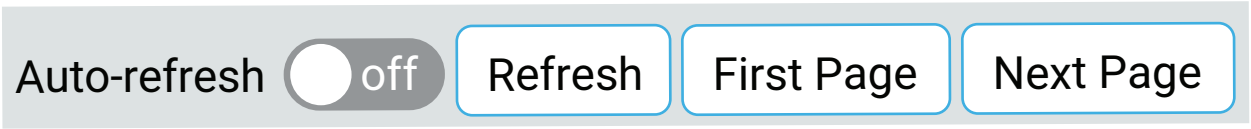

FIGURE 4-7. AUTO-REFRESH/REFRESH/FIRST PAGE/NEXT PAGE BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page.
- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the system log entries, turn to the next page.

4.4.2 STATUS

Show the MAC-based VLAN status.

WEB INTERFACE

To Display MAC-based address VLAN configuration in the web interface:

1. Click VLAN Management, MAC-based VLAN and Status.
2. To auto-refresh the information, select “Auto-refresh.”
3. Click “Refresh” to refresh the MAC-based VLAN Membership Status.

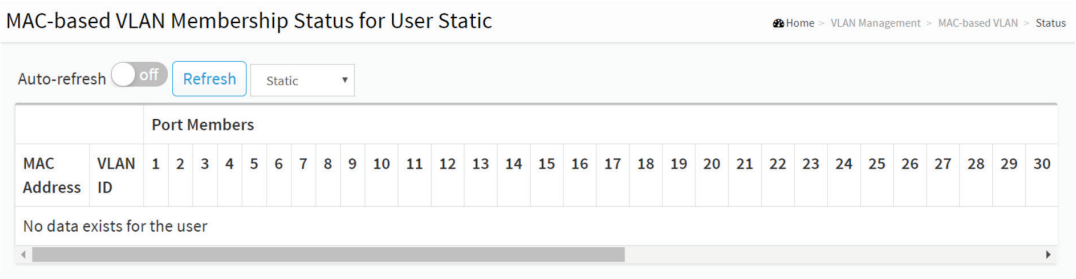

FIGURE 4-8. MAC-BASED VLAN STATUS

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

FIGURE 4-9. AUTO REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

4.5 PROTOCOL-BASED VLAN

This section describes Protocol-based VLANs. The switch's supported protocols 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, Decent 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.

4.5.1 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 -based VLAN configuration in the web interface:

1. Click VLAN Management, Protocol-based VLAN and Protocol to Group.
2. Click "Add New Entry."
3. Specify the Frame Type, Value and Group Name.
4. Click Apply.

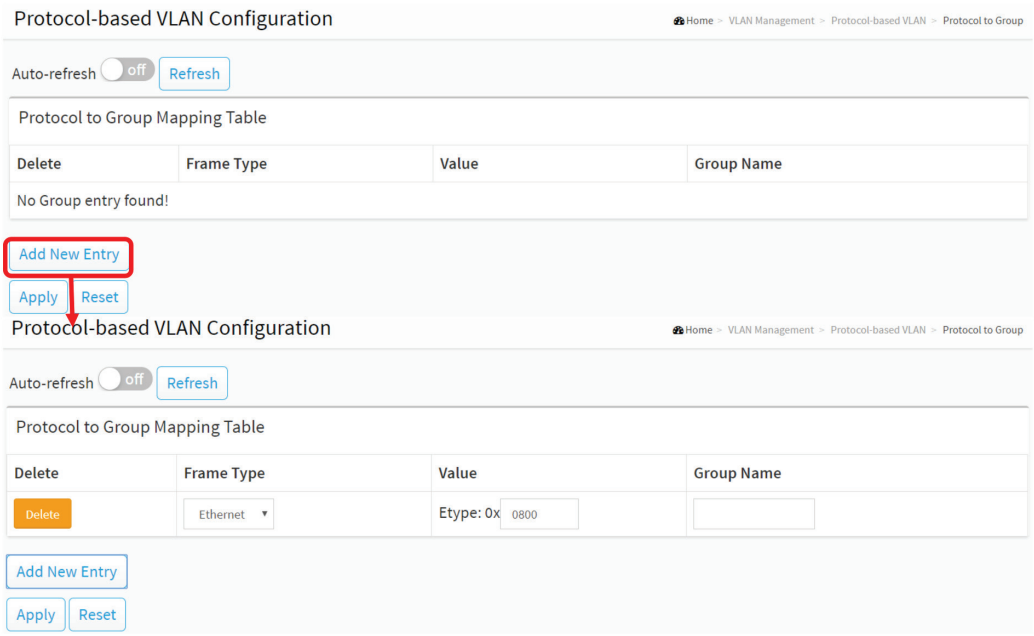

FIGURE 4-10. PROTOCOL TO GROUP MAPPING TABLE

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, a valid value of the following text field will vary depending on the new frame type you selected.

- Value: A valid value that can be entered in this text field depends on the option selected from the preceding Frame Type selection menu. Below is the criteria for three different Frame Types:
  1. For Ethernet: Values in the text field when Ethernet is selected as a Frame Type are called etype. Valid values for etype range from 0x0600-0xffff
  2. For LLC: A 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: A valid value in this case also is comprised of two different sub-values.
     a. OUI: OUI (Organizationally Unique Identifier) is a value in format of xx-xx-xx where each pair (xx) in string is a hexadecimal value ranges 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.
- Group Name: A valid Group Name is a unique 16-character long string.

Buttons

- 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.
- Add New Entry: Click to add a new entry in a 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 a new entry.
- Apply: Click to save changes.
- Reset: Click to undo any changes made locally and revert to previously saved values.

4.5.2 GROUP TO VLAN

This section allows you to map an already configured Group Name to a VLAN for the selected stack switch unit switch

WEB INTERFACE

To configure the Group Name to VLAN mapping table configured in the web interface:

1. Click VLAN Management, Protocol-based VLAN and Group to VLAN.
2. Click “Add New Entry.”
3. Specify the Group Name and VLAN ID.
4. Click Apply.

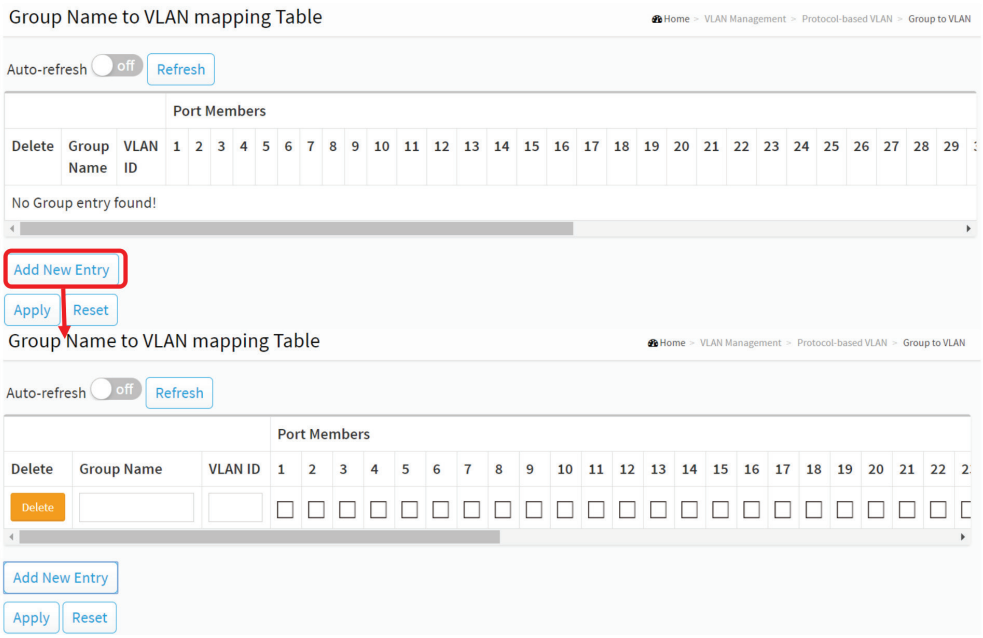

FIGURE 4-11. GROUP NAME TO VLAN MAPPING TABLE

Parameter description:

- Group Name: A valid Group Name is a string of up to 16 characters.
- 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

- 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
- Add New Entry: Click to add a new entry in the mapping table. An empty row is added to the table, and the Group Name, VLAN ID and port members can be configured as needed. Legal values for a VLAN ID are 1 through 4095. The button can be used to undo the addition of new entry.
- Apply: Click to save changes.
- Reset: Click to undo any changes made locally and revert to previously saved values.

FIGURE 4-12. AUTO REFRESH/REFRESH BUTTONS

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

4.6 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.

WEB INTERFACE

To configure IP subnet-based VLAN Membership in the web interface:

1. Click VLAN Management and IP Subnet-based VLAN.
2. Click “Add New Entry.”
3. Specify IP Address, Mask Length, VLAN ID.
4. Click Apply.

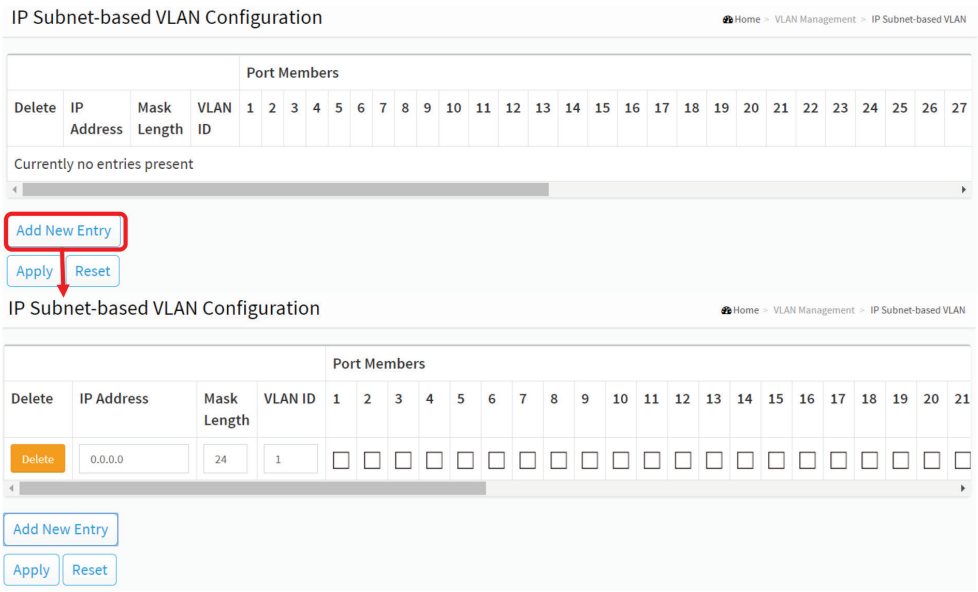

FIGURE 4-13. IP SUBNET-BASED VLAN MEMBERSHIP CONFIGURATION

Parameter description:

- 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 to VLAN ID mapping entry. To include a port in a mapping, simply 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

- Delete: To delete a IP subnet-based VLAN entry, check this box and press save. The entry will be deleted on the selected switch in the stack.
- Add New Entry: 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.

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

4.7 GVRP

The Generic Attribute Registration Protocol (GARP) provides a generic framework where 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.

WEB INTERFACE

To configure the GVRP in the web interface:

1. Click VLAN Management and GVRP.
2. Enable or disable the GVRP.
3. Specify Join-time, Leave-time, Leave All-time, Max VLANs.
4. Enable or disable the Mode.
5. Click apply to save the setting.
6. To cancel the setting, click the Reset button. It will revert to previously saved values.

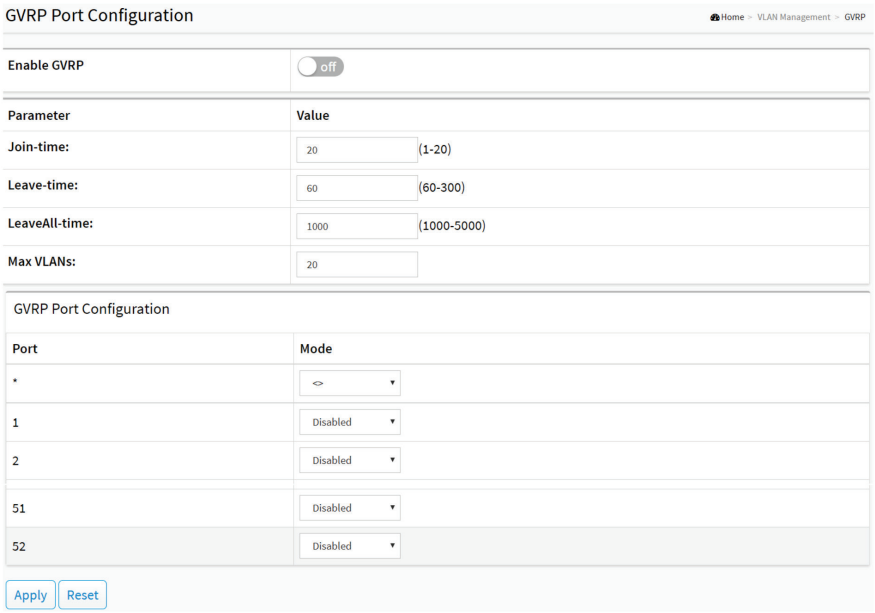

FIGURE 4-14.GVRP CONFIGURATION

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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 centiseconds, 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 centiseconds, 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 centiseconds, i.e. in units of one hundredth of a second. The default is 1000.
- Max 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.
- 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.

4.8 PRIVATE VLAN

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.

VLAN Priority: Voice VLAN > MAC based VLAN > Protocol based VLAN > Tag based VLAN

WEB INTERFACE

To configure Port Isolation configuration in the web interface:

1. Click VLAN Management and Private VLAN.
2. Configure the Private VLAN membership configurations for the switch.
3. Click Apply.

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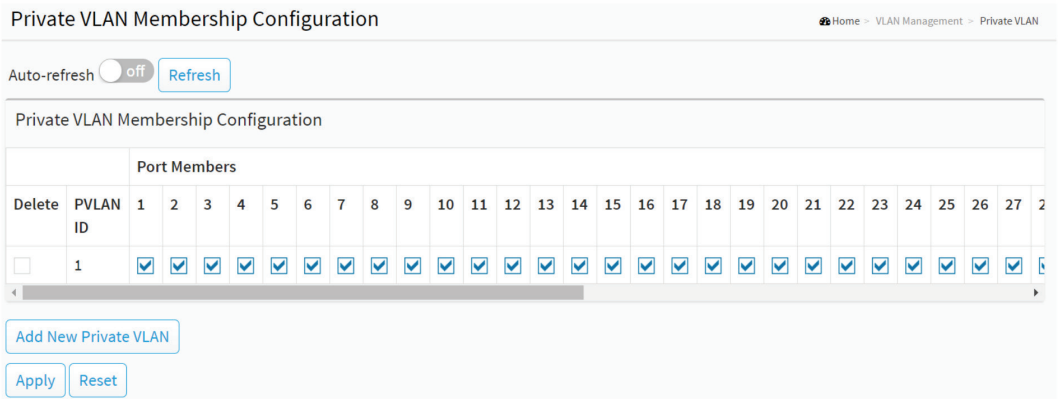

FIGURE 4-15. PRIVATE VLAN CONFIGURATION

Parameter description:

- Delete: To delete a private VLAN entry, check this box. The entry will be deleted during the next apply.
- 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.
- Add New Private VLAN: Click 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 "Apply."
  - The button can be used to undo the addition of new Private VLANs.

Buttons

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

4.9 PORT ISOLATION

Port Isolation provides for an apparatus and method to isolate ports on layer 2 switches on the same VLAN to restrict traffic flow. The apparatus comprises a switch having said plurality of ports, each port configured as a protected port or a non-protected port. An address table memory stores an address table having a destination address and port number pair. A forwarding map generator generates a forwarding map that is responsive to a destination address of a data packet. The method for isolating ports on a layer 2 switch comprises configuring each of the ports on the layer 2 switch as a protected port or a non-protected port. A destination address on a data packet is matched with a physical address on said layer 2 switch and a forwarding map is generated for the data packet based upon the destination address on the data packet. The data packet is then sent to the plurality of ports pursuant to the forwarding map generated based upon whether the ingress port was configured as a protected or non-protected port.

This page is used for enabling or disabling port isolation on ports in a Private VLAN.A port member of a VLAN can be isolated to other isolated ports on the same VLAN and Private VLAN.

WEB INTERFACE

To configure Port Isolation configuration in the web interface:

1. Click VLAN Management and Port Isolation.
2. Select the port you want to enable Port Isolation.
3. Click Apply.

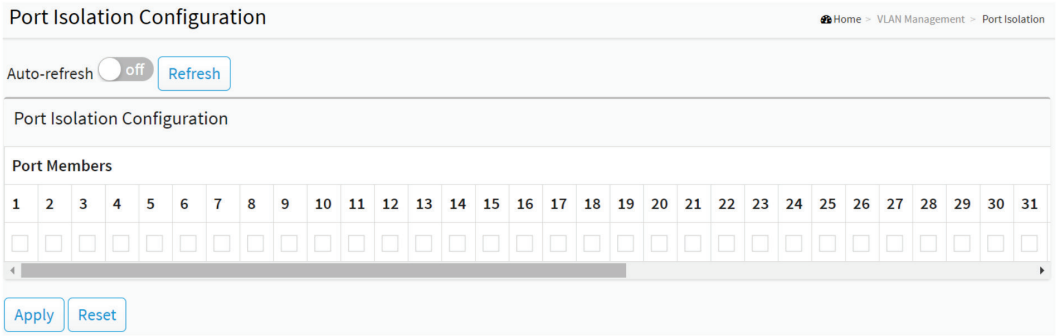

FIGURE 4-16. PORT ISOLATION CONFIGURATION

Parameter description:

- Port Numbers: 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.

4.10 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.

4.10.1 CONFIGURATION

The Voice VLAN feature enables voice traffic forwarding on the Voice VLAN, then the switch can classify and schedule network traffic. We recommend 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 VLAN Management, Voice VLAN and Configuration.
2. Select “on” in the Voice VLAN Configuration.
3. Specify VLAN ID, Aging Time and Traffic Class.
4. Select Port Members in the Voice VLAN Configuration.

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5. Specify Mode, Security, Discovery Protocol in the Port Configuration.
6. Click Apply to save the setting.
7. To cancel the setting, click the Reset button. It will revert to previously saved values.

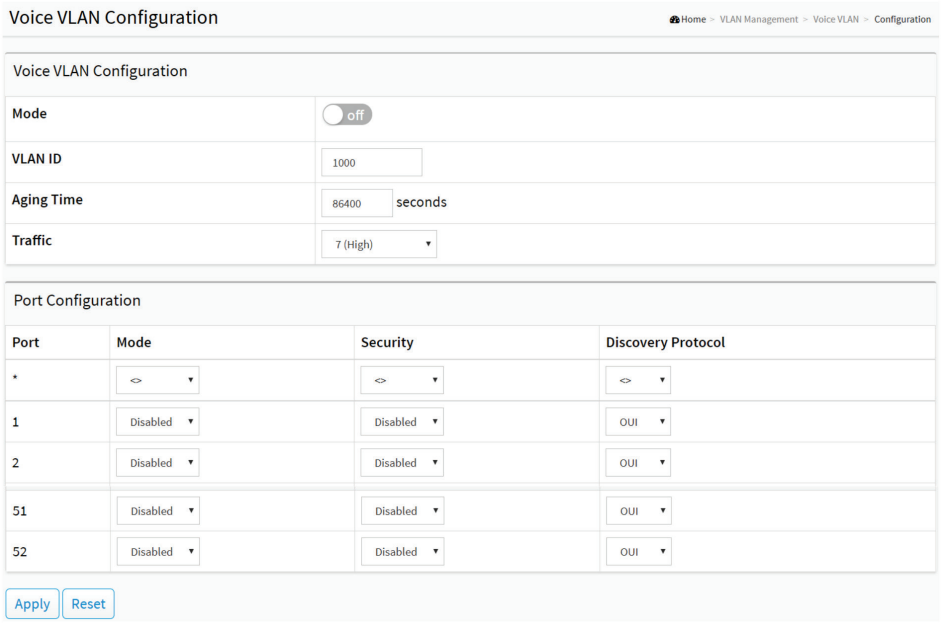

FIGURE 4-17. VOICE VLAN CONFIGURATION

Parameter description:

- Mode: Indicates the Voice VLAN mode operation. We must disable MSTP feature before we enable Voice VLAN to avoid the conflict of ingress filtering. Possible modes are:
  - on: Enable Voice VLAN mode operation.
  - off: 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 the 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: The switch port number of the Voice VLAN port.
- 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 is set to a 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 the LLDP feature before configuring discovery protocol to “LLDP” or “Both.” Changing the discovery protocol to “OUI” or “LLDP” will restart the 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.

4.10.2 OUI

This section describes how to configure the VOICE VLAN OUI table. The maximum entry number is 16. Modifying the OUI table will restart auto detection of the OUI process

WEB INTERFACE

To configure the Voice VLAN OUI Table in the web interface:

1. Click VLAN Management, Voice VLAN and OUI.
2. Select “Add new entry,” “delete” in the Voice VLAN OUI table.
3. Specify Telephony OUI, Description.
4. Click Apply.

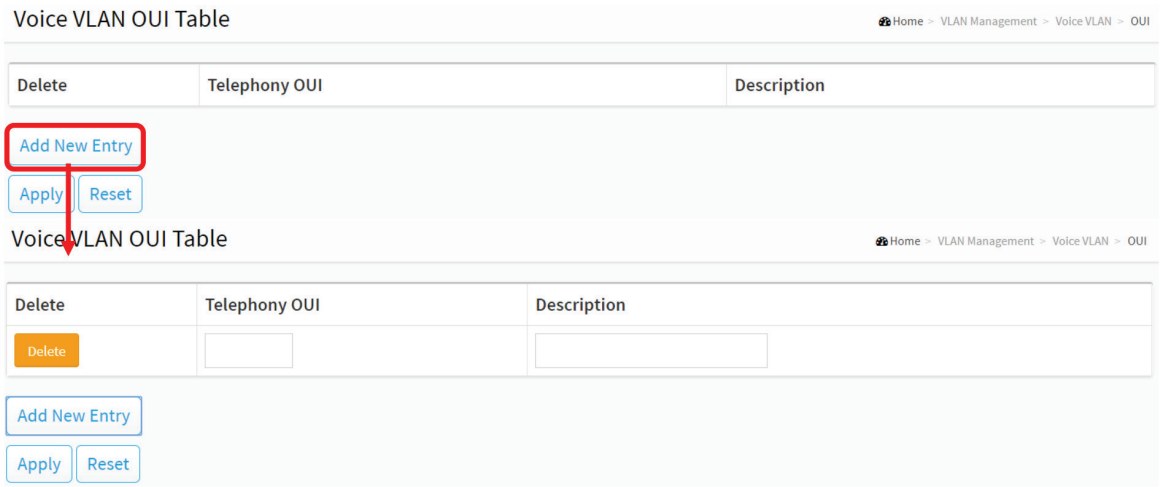

FIGURE 4-18. VOICE VLAN OUI TABLE

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Parameter description:

- Delete: Check to delete the entry. It will be deleted during the next save.
- 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 the OUI address. Normally, it describes which vendor telephony device it belongs to. The allowed string length is 0 to 32.
- Add New entry: Click to add a new entry in the Voice VLAN OUI table. An empty row is added to the table, the Telephony OUI, Description.

Buttons

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

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The switch supports 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.

The switch delivers 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 supports advanced memory control mechanisms providing excellent performance of all QoS classes under any traffic scenario, including jumbo frame. It uses 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

5.1 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 Quality of Service and Port Classification.
2. Scroll to select QoS Ingress Port parameters.
3. Click Apply to save the setting.
4. To cancel the setting, click the Reset button. It will revert to previously saved values.
5. Click “PCP Classification“ to go to the next page, “Port PCP Classification.”

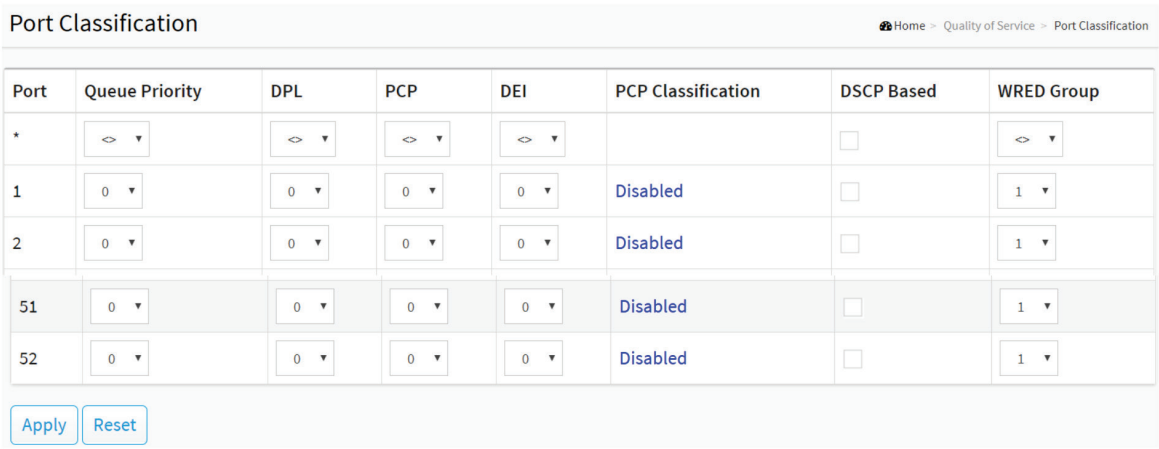

FIGURE 5-1. QOS INGRESS PORT CLASSIFICATION

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Parameter description:

- Port: The port number for which the configuration below applies.
- Queue Priority: Controls the default CoS value.
  - 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, the frame is tagged and Tag Class. is enabled, then the frame is classified to a CoS that is mapped from the PCP and DEI value in the tag. Otherwise, the frame is classified to the default CoS.
  - 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.
- PCP: Controls the default PCP value.
  - All frames are classified to a PCP value.
  - If the port is VLAN aware and the frame is tagged, then the frame is classified to the PCP value in the tag. Otherwise, the frame is classified to the default PCP value.
- DEI: Controls the default DEI value.
  - All frames are classified to a DEI value.
  - If the port is VLAN aware and the frame is tagged, then the frame is classified to the DEI value in the tag. Otherwise, the frame is classified to the default DEI value.
- DSCP Based: Click to Enable DSCP Based QoS Ingress Port Classification.
- WRED Group: Controls the WRED group membership.

Buttons

- Apply: Click to save changes.
- Reset: Click to undo any changes made locally and revert to previously saved values.
- PCP Classification: Shows the classification mode for tagged frames on this port.
  - Disabled: Use default CoS and DPL for tagged frames.
  - Enabled: Use mapped versions of PCP and DEI for tagged frames.

  Click on the mode in order to configure the mode and/or mapping.

NOTE: This setting has no effect if the port is VLAN unaware. Tagged frames received on VLAN unaware ports are always classified to the default CoS and DPL.

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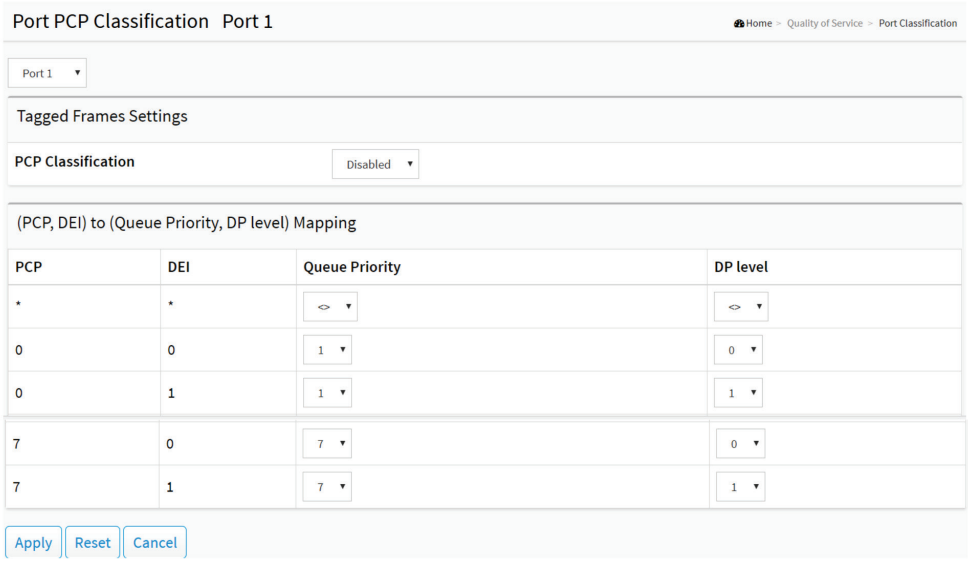

FIGURE 5-2. PORT PCP CLASSIFICATION

Parameter description:

- PCP Classification: Controls the classification mode for tagged frames on this port.
  - Disabled: Use default CoS and DPL for tagged frames.
  - Enabled: Use mapped versions of PCP and DEI for tagged frames.
- (PCP, DEI) to (Queue Priority, DPL level) Mapping: Controls the mapping of the classified (PCP, DEI) to (Queue Priority, DPL level) values when Tag Classification is set to Enabled.

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.

5.2 PORT POLICERS

This section provides an overview of QoS Ingress Port Policers for all switch ports. 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 Port Policers in the web interface:

1. Click Quality of Service and Port Policers.
2. Click the port to enable the QoS Ingress Port Policers, and configue the Rate limit condition.
3. Scroll to select the column Rate and Unit.
4. Click Apply to save the configuration.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

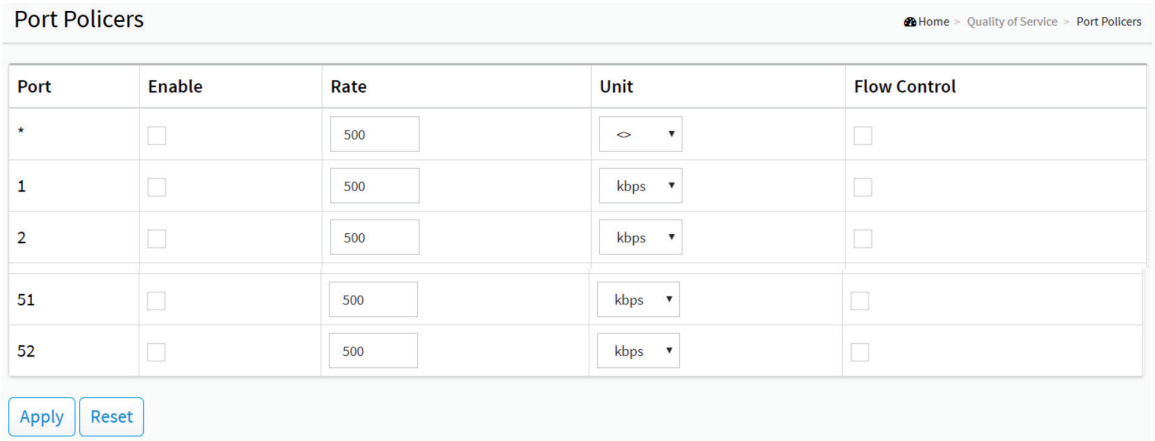

FIGURE 5-3. QOS INGRESS PORT POLICERS CONFIGURATION

Parameter description:

- Port: The logical port for the settings contained in the same row. Click on the port number to configure the schedulers.
- Enabled: Select the Port for which to enable the QoS Ingress Port Policers function.
- Rate: To set the Rate limit value for this port, the default is 1000000.
- 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.

5.3 PORT SHAPERS

This section provides an overview of QoS Egress Port Shapers for all switch ports. The user can get detailed information for the ports that belong to the currently selected stack unit, as reflected by the page header

WEB INTERFACE

To configure the QoS Port Shapers in the web interface:

1. Click Quality of Service and Port Shapers.
2. Click the Port and display the Qos Egress Port Shapers.
3. Scroll through the Port and Scheduler Mode and specify the Queue Shaper parameter.
4. Click Apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

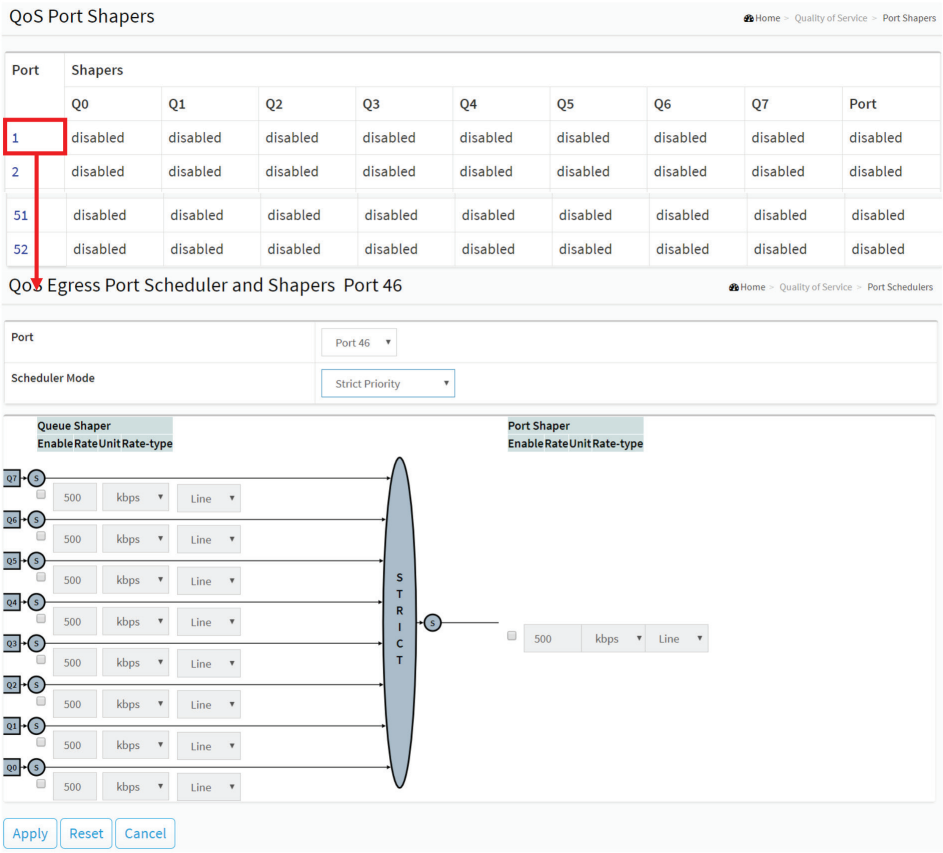

FIGURE 5-4. QOS EGRESS PORT SHAPER

Parameter description:

- Port: The logical port for the settings contained in the same row. Click on the port number to configure the shapers.
- Shapers – Qn: Shows disabled or actual queue shaper rate - e.g. “800 Mbps.”
- Shapers – Port: Shows disabled or actual port shaper rate - e.g. “800 Mbps.”
- Scheduler Mode: Controls how many of the queues are scheduled as strict and how many are scheduled as 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. This value is restricted to 100–13107100 when “Unit” is kbps, and 1–13107 when “Unit” is Mbps. The rate is internally rounded up to the nearest value supported by the queue shaper.
- Queue Shaper Unit: Controls the unit of measure for the queue shaper rate as kbps or Mbps.
- Queue Shaper Rate-type: The rate type of the queue shaper. The allowed values are:
  - Line: Specify that this shaper operates on line rate.
  - Data: Specify that this shaper operates on data rate.
- Queue Scheduler Weight: Controls the weight for this queue. 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.”

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- Port Shaper Enable: Controls whether the port shaper is enabled for this switch port.
- Port Shaper Rate: Controls the rate for the port shaper. This value is restricted to 100-13107100 when “Unit” is kbps, and 1-13107 when “Unit” is Mbps. The rate is internally rounded up to the nearest value supported by the port shaper.
- Port Shaper Unit: Controls the unit of measure for the port shaper rate as kbps or Mbps.
- Port Shaper Rate-type: The rate type of the port shaper. The allowed values are:
  - Line: Specify that this shaper operates on line rate.
  - Data: Specify that this shaper operates on data rate.

Buttons

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

5.4 STORM CONTROL

This section explains how to configure the Storm control for the switch. There is a destination lookup failure 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 Quality of Service and Storm Control.
2. Select the frame type to enable storm control.
3. Scroll to set the Rate Parameters and Unit.
4. Click the port to enable, and configure the Rate limit condition.
5. Click Apply to save the setting.
6. To cancel the setting, click the Reset button. It will revert to previously saved values.

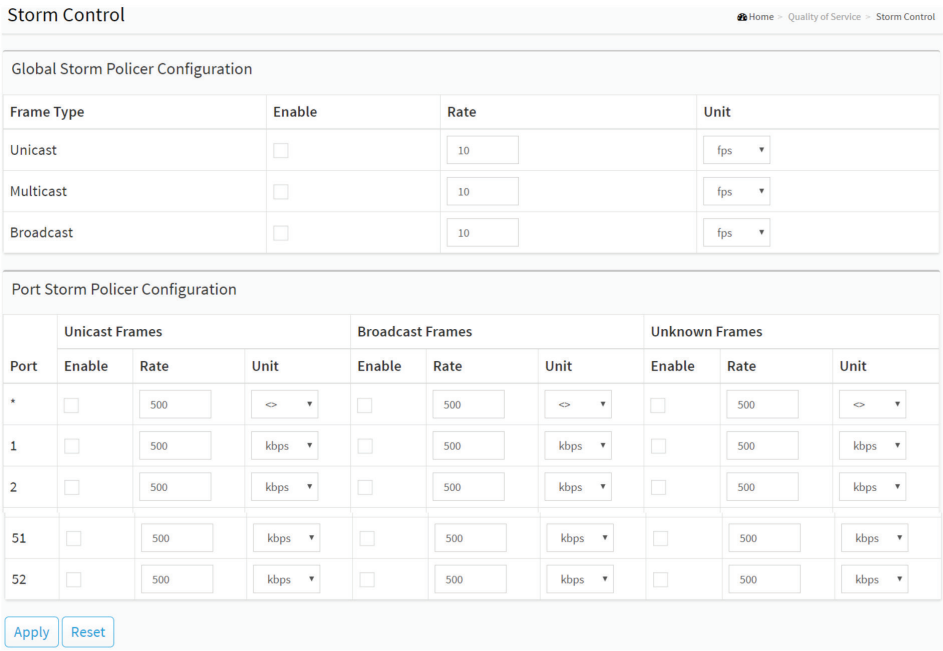

FIGURE 5-5. STORM CONTROL CONFIGURATION

Parameter description:

Global Storm Policer Configuration: Global storm policers for the switch are configured on this page.

There is a unicast storm policer, multicast storm policer, and a broadcast storm policer.

These only affect flooded frames, i.e. frames with a (VLAN ID, DMAC) pair not present in the MAC Address table.

- Frame Type: The frame type for which the configuration below applies.
- Enable: Enable or disable the global storm policer for the given frame type.
- Rate: Controls the rate for the global storm policer. This value is restricted to 10-13128147 when “Unit” is fps or kbps, and 1-13128 when “Unit” is kfps or Mbps. The rate is internally rounded up to the nearest value supported by the global storm policer. Supported rates are divisible by 10 fps or 25 kbps.
- Unit: Controls the unit of measure for the global storm policer rate as fps, kfps, kbps or Mbps.

Port Storm Policer Configuration Help: Port storm policers for all switch ports are configured on this page.

There is a storm policer for known and unknown unicast frames, known and unknown broadcast frames and unknown (flooded) unicast, multicast and broadcast frames.

- Port: The port number for which the configuration below applies.
- Enable: Enable or disable the storm policer for this switch port.
- Rate: Controls the rate for the port storm policer. This value is restricted to 10-13128147 when “Unit” is fps or kbps, and 1-13128 when “Unit” is kfps or Mbps. The rate is internally rounded up to the nearest value supported by the port storm policer. Supported rates are divisible by 10 fps or 25 kbps.
- Unit: Controls the unit of measure for the port storm policer rate as fps, kfps, kbps or Mbps.

Buttons

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

5.5 PORT SCHEDULER

This section provides an overview of QoS Egress Port Scheduler for all switch ports and the ports belonging to the currently selected stack unit, as reflected by the page header.

WEB INTERFACE

To configure the QoS Port Schedulers in the web interface:

1. Click Quality of Service and Port Scheduler.
2. Click the Port and display the QoS Egress Port Schedulers.
3. Scroll Port and Scheduler Mode, specify the Queue Shaper parameter.
4. Click Apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

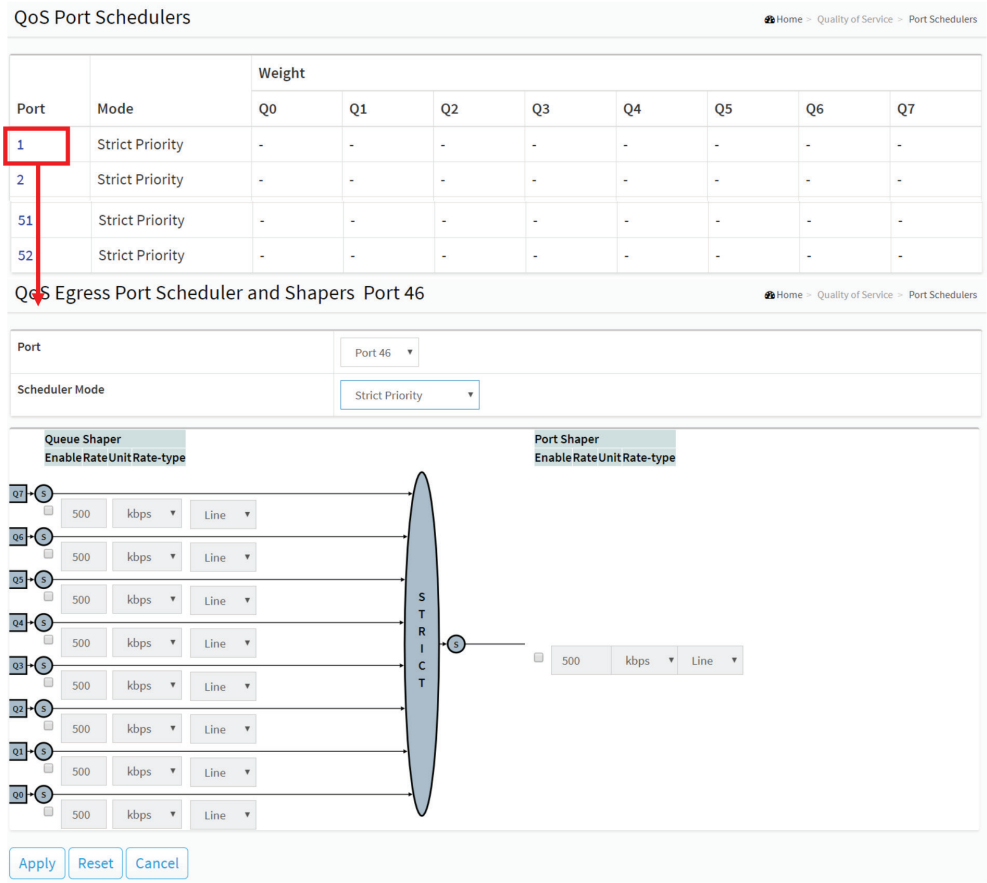

FIGURE 5-6. QOS EGRESS PORT SCHEDULES

Parameter description:

- Port: The logical port for the settings contained in the same row.
- Mode: Shows the scheduling mode for this port.
- Qn: Shows the weight for this queue and port.

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- Scheduler Mode: Controls how many of the queues are scheduled as strict and how many are scheduled as 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. This value is restricted to 100-13107100 when “Unit” is kbps, and 1-13107 when “Unit” is Mbps. The rate is internally rounded up to the nearest value supported by the queue shaper.
- Queue Shaper Unit: Controls the unit of measure for the queue shaper rate as kbps or Mbps.
- Queue Shaper Rate-type: The rate type of the queue shaper. The allowed values are:
  - Line: Specify that this shaper operates on line rate.
  - Data: Specify that this shaper operates on data rate.
- Queue Scheduler Weight: Controls the weight for this queue. 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. This value is restricted to 100-13107100 when “Unit” is kbps, and 1-13107 when “Unit” is Mbps. The rate is internally rounded up to the nearest value supported by the port shaper.
- Port Shaper Unit: Controls the unit of measure for the port shaper rate as kbps or Mbps.
- Port Shaper Rate-type: The rate type of the port shaper. The allowed values are:
  - Line: Specify that this shaper operates on line rate.
  - Data: Specify that this shaper operates on data rate.

Buttons

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

5.6 PORT PCP REMARKING

This section describes QoS Egress Port PCP Remarking for all switch ports. The ports belong to the currently selected stack unit, as reflected by the page header.

WEB INTERFACE

To configure the QoS Port PCP Remarking in the web interface:

1. Click Quality of Service and Port PCP Remarking.
2. Click the Port and display the QoS Port PCP Remarking.
3. Scroll the Port and PCP Remarking Mode and specify the Queue Shaper parameter.
4. Click Apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values

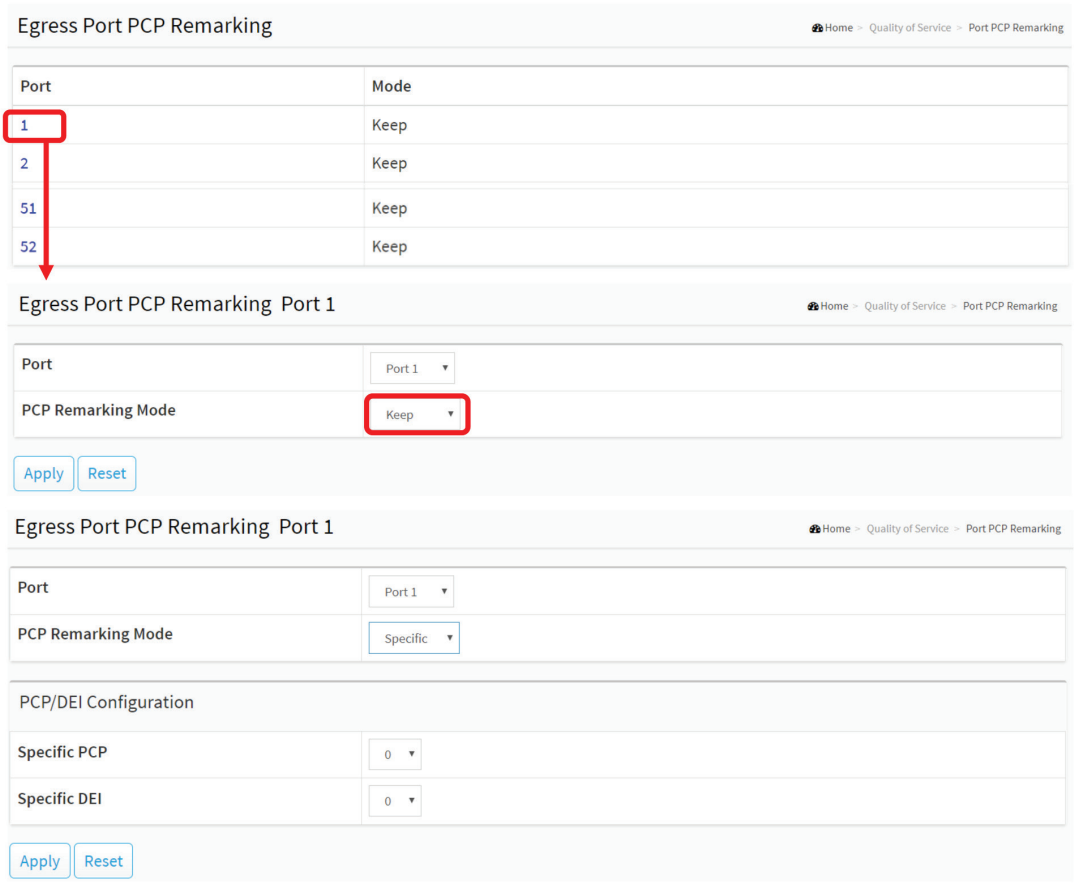

FIGURE 5-7. EGRESS PORT PCP REMARKING, SCREEN 1

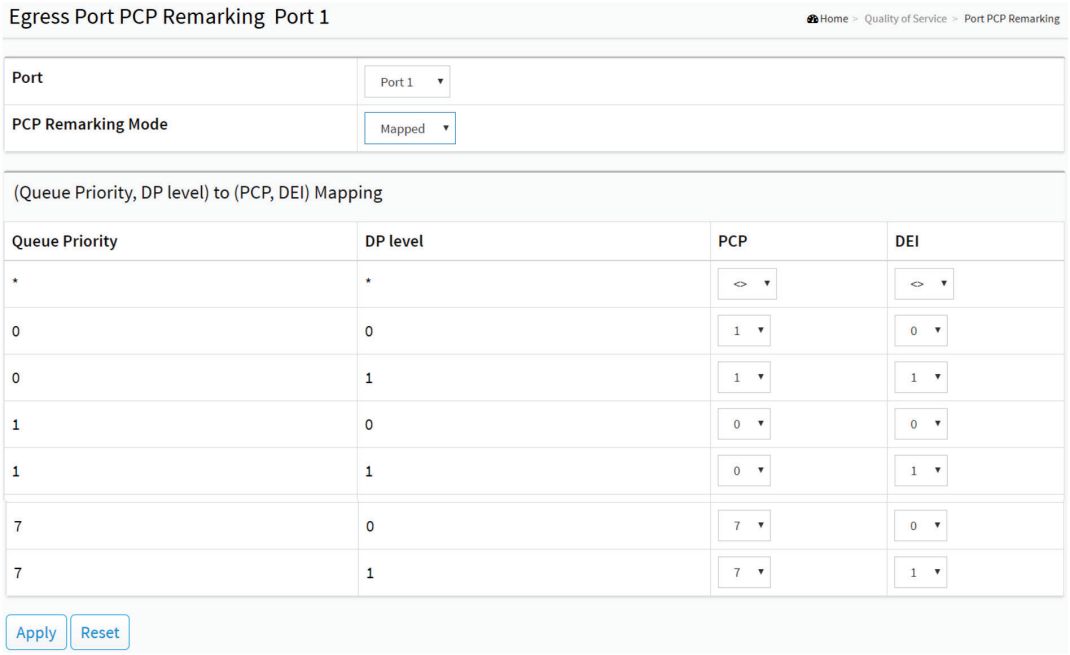

FIGURE 5-8. EGRESS PORT PCP REMARKING, SCREEN 2

Parameter description:

- Port: The logical port for the settings contained in the same row. Click on the port number to configure PCP remarking.
- Mode: Shows the PCP remarking mode for this port.
  - Keep: Use classified PCP/DEI values.
  - Specific: Use default PCP/DEI values.
  - Mapped: Use mapped versions of CoS and DPL.
- 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.

5.7 DSCP

5.7.1 PORT DSCP

This section explains how to set the QoS Port DSCP configuration for all switch ports. 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 Quality of Service, DSCP and Port DSCP.
2. Enable or disable the Ingress Translate and Scroll the Classify parameter.
3. Scroll to select Egress Rewrite parameters.
4. Click apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

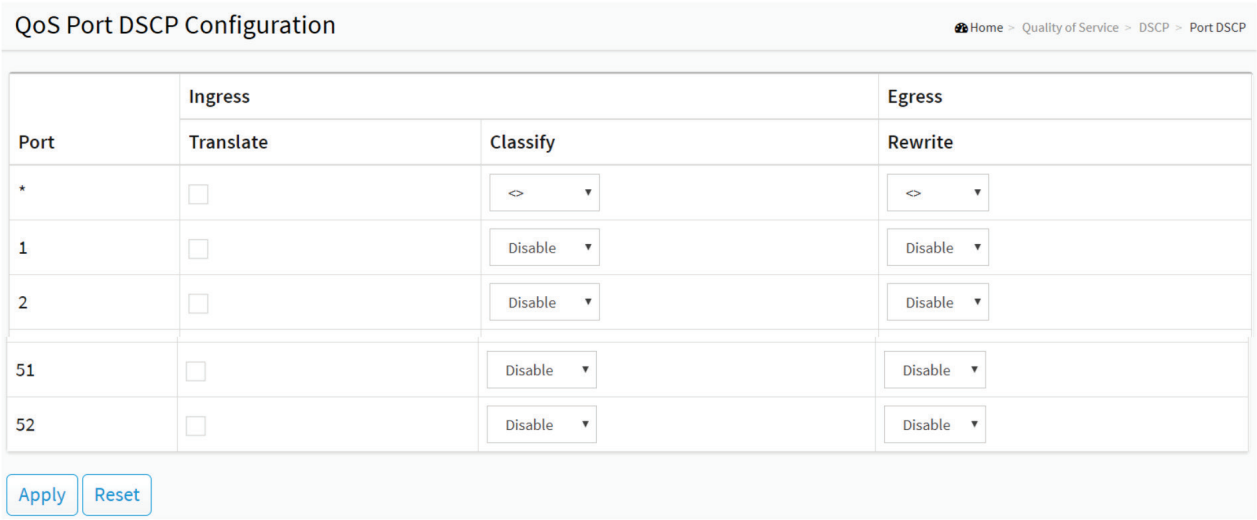

FIGURE 5-9. QOS PORT DSCP CONFIGURATION

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.

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- Egress: Port Egress Rewriting can be one of the parameters below:
  - Disable: No Egress rewrite.
  - Enable: Rewrite enable without remapping.
  - 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.

5.7.2 DSCP TRANSLATION

This 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 Quality of Service, DSCP and DSCP Translation.
2. Scroll to set the Ingress Translate and Egress Remap Parameters.
3. Enable or disable Classify.
4. Click apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

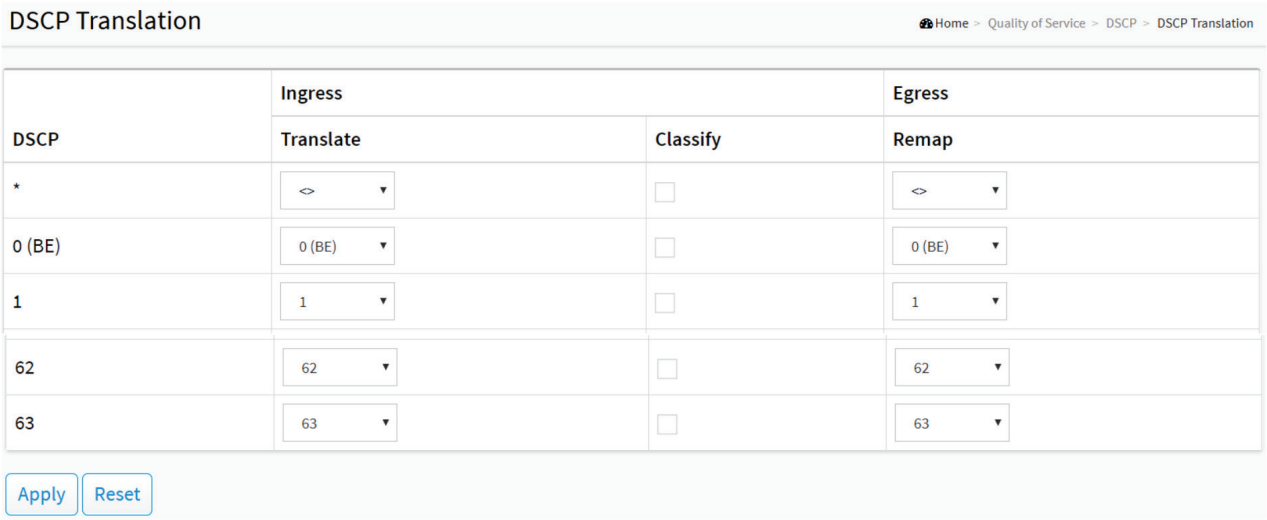

FIGURE 5-10. DSCP TRANSLATION CONFIGURATION

Parameter description:

- DSCP: Maximum number of supported DSCP values are 64 and valid DSCP values range 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.

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There are two configuration parameters for DSCP Translation –

– Translate: DSCP at Ingress side can be translated to any of (0-63) DSCP values.

– Classify: Click to enable Classification at Ingress side.

- Egress: Select the DSCP value from the 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.

5.7.3 DSCP CLASSIFICATION

This section explains how to configure and allows you to map a DSCP value to a QoS Class and DPL value. 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 Quality of Service, DSCP and DSCP Translation.
2. Scroll to set the DSCP Parameters.
3. Click apply to save the setting.
4. To cancel the setting, click the Reset button. It will revert to previously saved values.

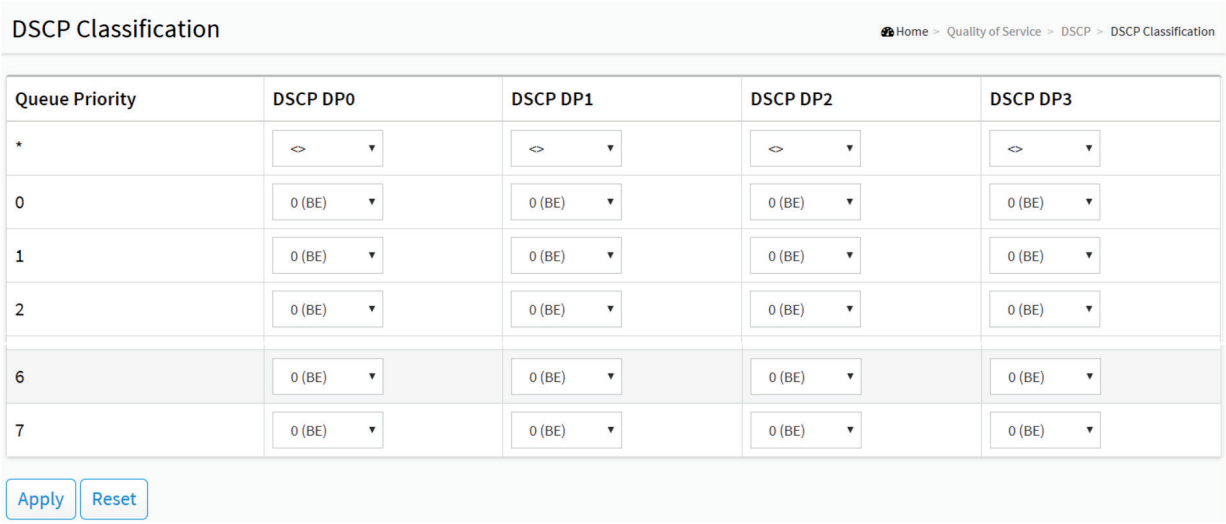

FIGURE 5-11. DSCP CLASSIFICATION CONFIGURATION

Parameter description:

- Queue Priority: Actual Class of Service.
- DSCP DP0: Select the classified DSCP value (0-63) for Drop Precedence Level 0.
- DSCP DP1: Select the classified DSCP value (0-63) for Drop Precedence Level 1.
- DSCP DP2: Select the classified DSCP value (0-63) for Drop Precedence Level 2.

- DSCP DP3: Select the classified DSCP value (0-63) for Drop Precedence Level 3.

Buttons

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

5.7.4 DSCP-BASED QOS

This section explains how to configure the DSCP-Based QoS mode. 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 Quality of Service, DSCP and DSCP-Based QoS.
2. Enable or disable the DSCP for Trust.
3. Scroll to select Queue Priority and DPL parameters.
4. Click save to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

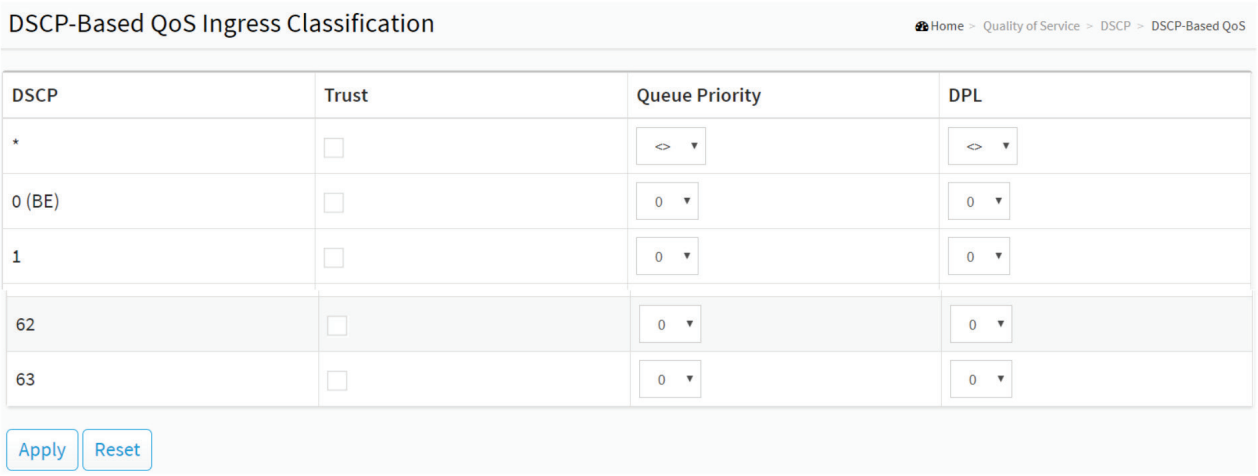

FIGURE 5-12. DSCP-BASED QOS INGRESS CLASSIFICATION CONFIGURATION

Parameter description:

- DSCP: Maximum number of supported DSCP values are 64.
- Trust: Click to check if the DSCP value is trusted.
- Queue Priority: Queue Priority value can be any between 0 and 7. 7 is the highest.
- 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.

5.8 QOS CONTROL LIST

5.8.1 CONFIGURATION

This section shows the QoS Control List (QCL), which is made up of the QCEs. Each row describes a QCE that is defined. The maximum number of QCEs is 256 on each switch. Click on the lowest plus sign to add a new QCE to the list.

WEB INTERFACE

To configure the QoS Control List parameters in the web interface:

1. Click Quality of Service, QoS Contol List and Configuration.
2. Click the plus sign to add a new QoS Control List.
3. Scroll all parameters and select the Port Member to join the QCE rules.
4. Click apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

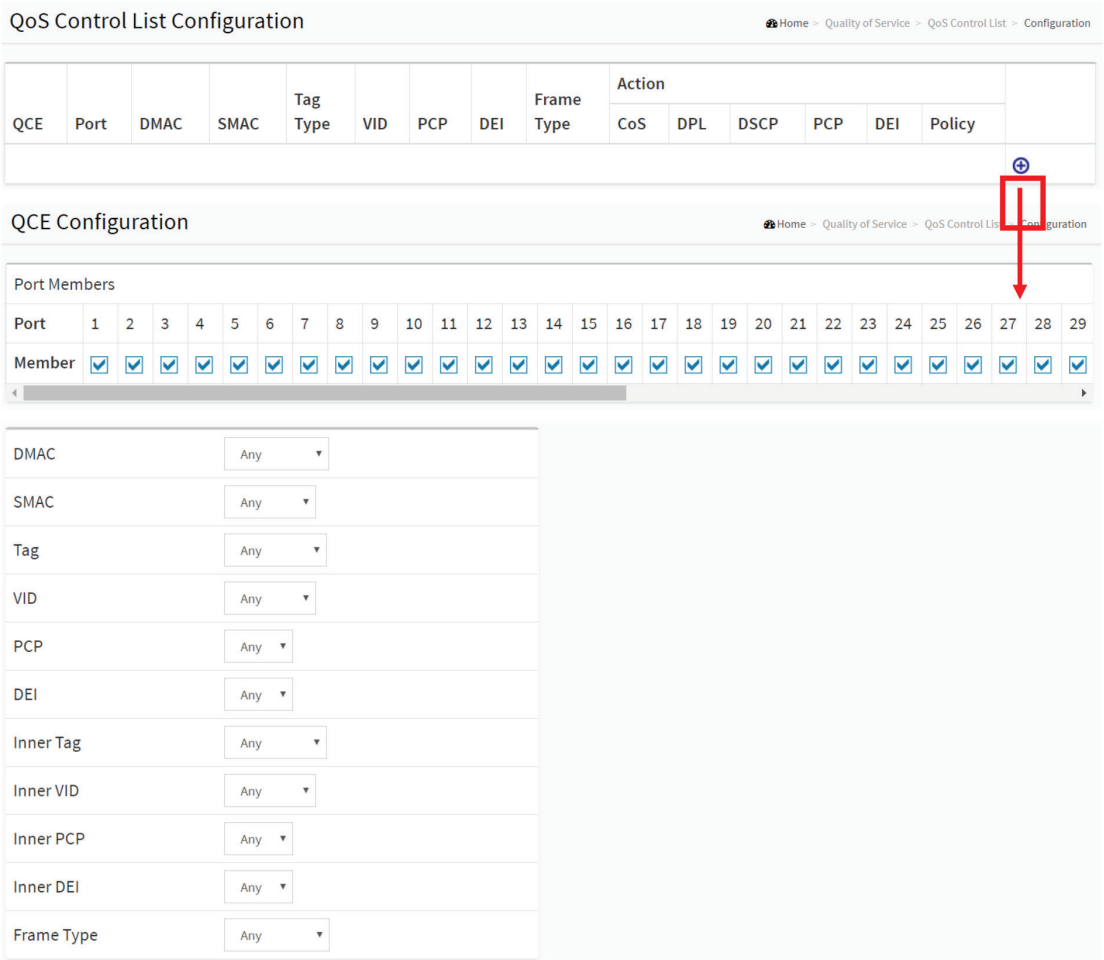

FIGURE 5-13. QOS CONTROL LIST CONFIGURATION, SCREEN 1

FIGURE 5-14. QOS CONTROL LIST CONFIGURATION, SCREEN 2

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. Possible actions are:
  – CoS: Classify Class of Service.
  – DPL: Classify Drop Precedence Level.
  – DSCP: Classify DSCP value.
  – PCP: Classify PCP value.
  – DEI: Classify DEI value.
  – Policy: Classify ACL Policy number.
- 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.
  (e) : Edits the QCE.
  (↑) : Moves the QCE up the list.
  (↓) : Moves the QCE down the list.
  (x) : Deletes the QCE.
  (+) : The lowest plus sign adds a new entry at the bottom of the QCE listings.
- Port Members: Check the checkbox button to include the port in the QCL entry. By default, all ports are included.
- Key Parameters: Key configuration is described below:
  – DMAC Destination MAC address: Possible values are 'Unicast', 'Multicast', 'Broadcast', 'Specific' (xx-xx-xx-xx-xx-xx) or 'Any'.
  – SMAC Source MAC address: xx-xx-xx-xx-xx-xx or 'Any'.
  – Tag Value of Tag field can be 'Untagged', 'Tagged', 'C-Tagged', 'S-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'.
  – Inner Tag Value of Inner Tag field can be 'Untagged', 'Tagged', 'C-Tagged', 'S-Tagged' or 'Any'.
  – Inner VID Valid value of Inner 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.
  – Inner PCP Valid values of Inner 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'.
  – Inner DEI Valid value of Inner DEI can be '0', '1' or 'Any'.
  – Frame Type Frame Type can have any of the following values:
    Any
    EtherType
    LLC
    SNAP
    IPv4
    IPv6

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NOTE: All frame types are explained below.

- Any: Allow all types of frames.
- EtherType: Ether Type Valid Ether Type can be 0x600-0xFFFF excluding 0x800(IPv4) and 0x86DD(IPv6) or 'Any'.
- LLC:
  - DSAP Address Valid DSAP(Destination Service Access Point) can vary from 0x00 to 0xFF or 'Any'.
  - SSAP Address Valid SSAP(Source Service Access Point) can vary from 0x00 to 0xFF or 'Any'.
  - Control Valid Control field can vary from 0x00 to 0xFF or 'Any'.
- SNAP: PID Valid PID(a.k.a Ether Type) can be 0x0000-0xFFFF or 'Any'.
- 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.
  - Destination IP Specific Destination IP address in value/mask format or 'Any'.
  - IP Fragment IPv4 frame fragmented option: 'Yes', 'No' or 'Any'.
  - DSCP Diffserv Code Point value (DSCP): It can be a specific value, range of values 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.
- IPv6: Protocol IP protocol number: (0-255, 'TCP' or 'UDP') or 'Any'.
  - Source IP 32 LS bits of IPv6 source address in value/mask format or 'Any'.
  - Destination IP Specific Destination IP address in value/mask format or 'Any'.
  - DSCP Diffserv Code Point value (DSCP): It can be a specific value, range of values 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 Parameters:
  - CoS Class of Service: (0-7) or 'Default'.
  - DPL Drop Precedence Level: (0-3) or 'Default'.
  - DSCP DSCP: (0-63, BE, CS1-CS7, EF or AF11-AF43) or 'Default'.
  - PCP PCP: (0-7) or 'Default'. Note: PCP and DEI cannot be set individually.
  - DEI DEI: (0-1) or 'Default'.
  - Policy ACL Policy number: (0-127) or 'Default' (empty field).

'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.

5.8.2 STATUS

This section will explain how to configure and show 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 Quality of Service, QoS Contol List and Status.
2. To auto-refresh the information, select “Auto-refresh.”
3. Scroll to select the combined, static, Voice VLAN and conflict.
4. Click “Refresh” to refresh an entry of the MVR Statistics Information.

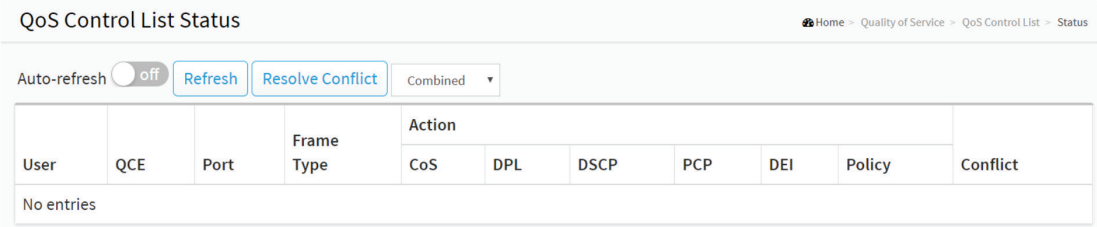


FIGURE 5-15. QOS CONTROL LIST STATUS

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. Possible values are:
  - Any: Match any frame type.
  - Ethernet: Match EtherType frames.
  - LLC: Match (LLC) frames.
  - SNAP: Match (SNAP) frames.
  - IPv4: Match IPv4 frames.
  - IPv6: Match IPv6 frames.
- Action: Indicates the classification action taken on ingress frame if parameters configured are matched with the frame’s content. Possible actions are:
  - CoS: Classify Class of Service.
  - DPL: Classify Drop Precedence Level.
  - DSCP: Classify DSCP value.
  - PCP: Classify PCP value.
  - DEI: Classify DEI value.
  - Policy: Classify ACL Policy number.

– Ingress Map: Classify Ingress Map ID.

- Conflict: Displays Conflict status of QCL entries. It may happen that resources required to add a QCE may not 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

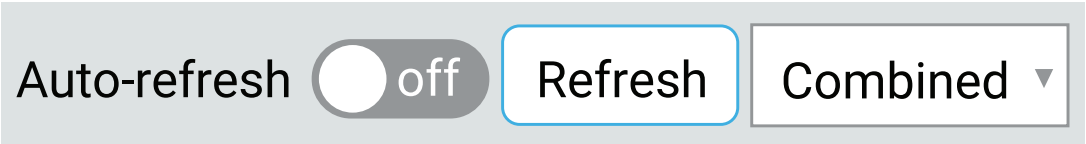


FIGURE 5-16. REFRESH/RESOLVE CONFLICT BUTTONS

- 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 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."

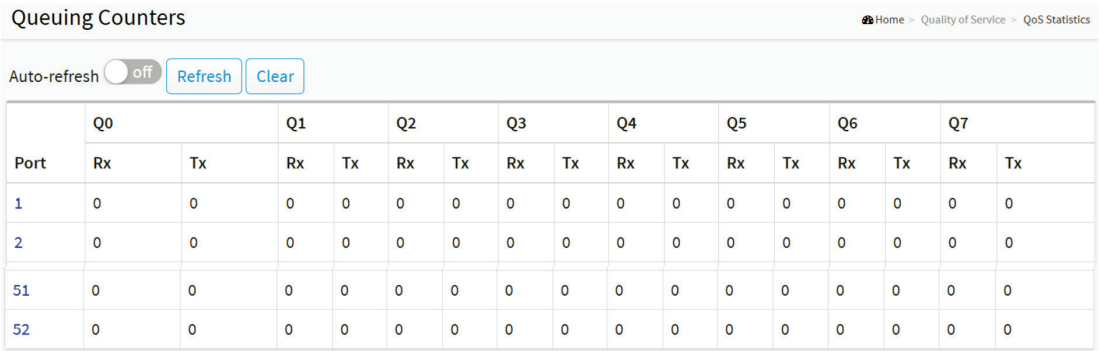
5.9 QOS STATISTICS

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 Quality of Service and QoS Statistics.
2. To auto-refresh the information, select "Auto-refresh."
3. Click "Refresh" to refresh the Queuing Counters or clear all information when you click "Clear."



	Q0		Q1		Q2		Q3		Q4		Q5		Q6		Q7	
Port	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx	Tx
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 5-17. QUEUING COUNTERS OVERVIEW

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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

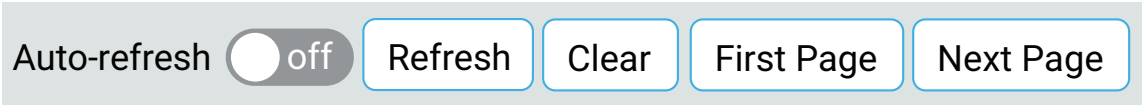

FIGURE 5-18. REFRESH/CLEAR/FIRST PAGE/LAST PAGE BUTTONS

- 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 clear the page.

CHAPTER 6: 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 that 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) that 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 that 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.

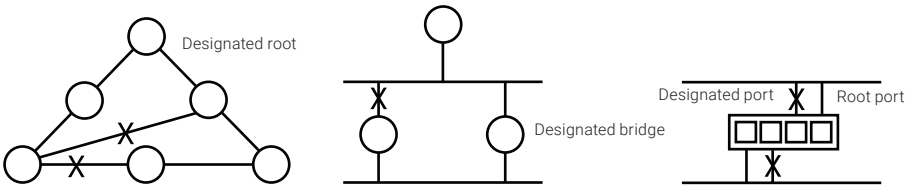

FIGURE 6-1. SPANNING TREE PROTOCOL

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.

6.1 STP CONFIGURATION

The section describes how to enable or disable spanning tree protocol. You can select the protocol version you need.

WEB INTERFACE

To configure the Spanning Tree Protocol version in the web interface:

1. Click Spanning Tree and STP Configuration.
2. Scroll to select the parameters and enter the available value of parameters in the blank field in Basic Settings.
3. Enable or disable the parameters and enter the available value of parameters in the blank field in Advanced settings.
4. Click apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values

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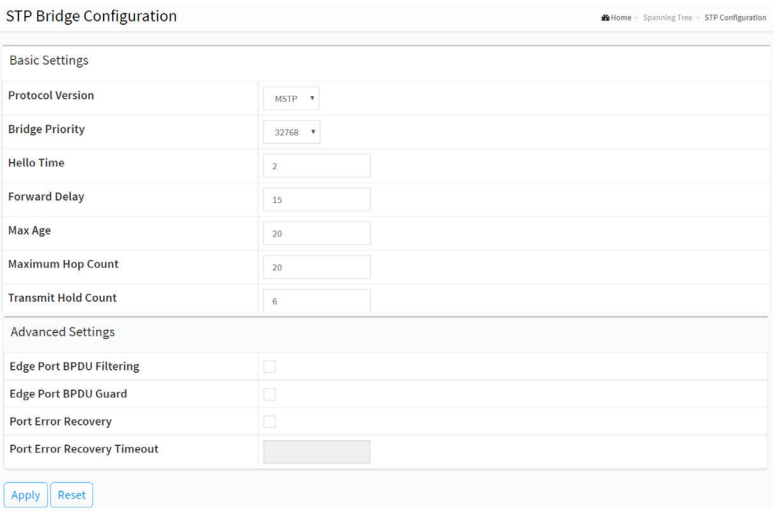

FIGURE 6-2. STP BRIDGE CONFIGURATION SCREEN

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.
- Hello Time: The interval between sending STP BPDU's. Valid values are in the range 1 to 10 seconds, default is 2 seconds.

NOTE: We do NOT recommend changing this parameter from the default value, and this may have adverse effects on your network.

- Forward Delay: The delay used by STP Bridges to transmit 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 <= (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.

6.2 MSTI CONFIGURATION

You can implement a Spanning Tree protocol on the switch for a the bridge instance. The CIST is not available for explicit mapping, as it will receive the VLANs not explicitly mapped. You need to set the list of VLANs mapped to the MSTI. The VLANs must be separated with a comma and/or space. A VLAN can only be mapped to one MSTI. An unused MSTI should just be left empty. (i.e., with no VLANs mapped to it).

This section describes how to inspect the current STP MSTI bridge instance priority configurations, and possibly change them.

WEB INTERFACE

To configure the Spanning Tree MSTI in the web interface:

1. Click Spanning Tree and MSTI Configuration.
2. Specify the configuration identification parameters in the field. Specify the VLANs Mapped blank field.
3. Click Apply to save the setting.
4. To cancel the setting, click the Reset button. It will revert to previously saved values.
5. Click Edit to configure the STP CIST Port Configuration.

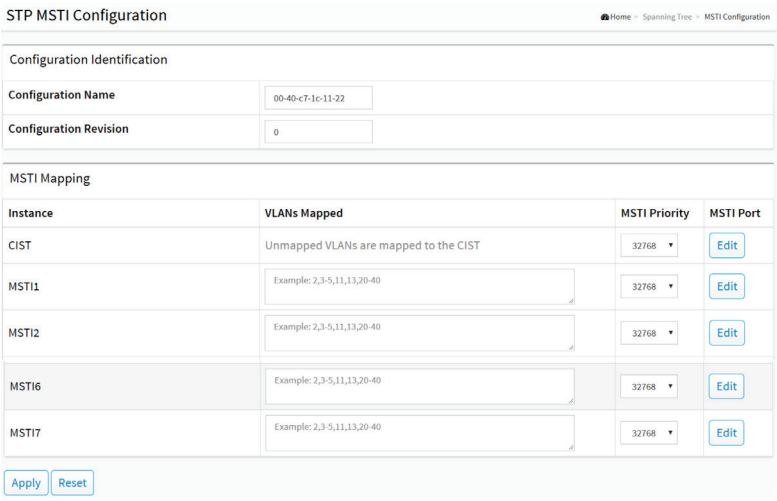

FIGURE 6-3. STP MSTI CONFIGURATION SCREEN

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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 to share spanning trees for MSTI's (Intra-region). The name can be up to 32 characters long.
- Configuration Revision: The revision of the MSTI configuration named above. This must be an integer between 0 and 65535.

MSTI Mapping

- Instance: 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., no VLANs mapped to it). Example: 2,5,20-40.
- MSTI 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.
- MSTI Port: Click to configure the STP CIST Port Configuration.

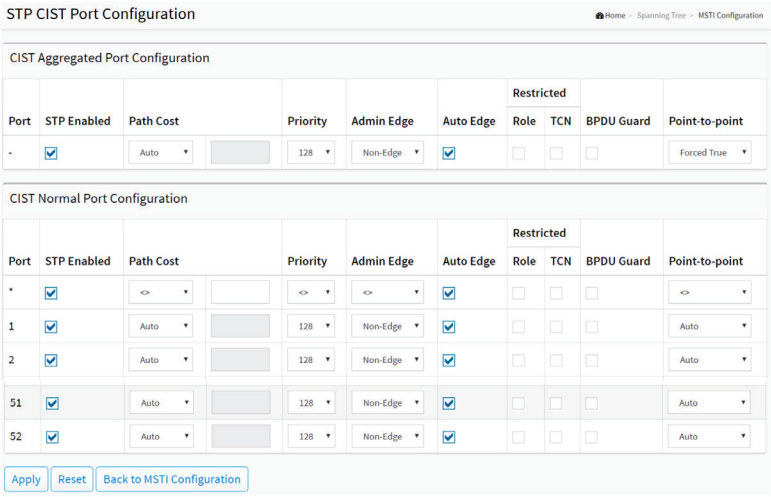

FIGURE 6-4. STP CIST CONFIGURATION SCREEN

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 read only if Voice VLAN feature is enabled. The Voice VLAN port mode will be read only 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 that have identical port cost. (See above).
- 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 a 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.

6.3 STP STATUS

This page 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 Spanning Tree and STP Status.
2. If you want to auto-refresh the information, select "Auto-refresh."
3. Click "Refresh" to refresh the STP Bridges.
4. Click "CIST "to go to the next page "STP Detailed Bridge Status."

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STP Status

Home > Spanning Tree > STP Status

Auto-refresh off Refresh

MSTI	Bridge ID	Root ID	Root Port	Root Cost	Topology Flag	Topology Change Last
CIST	32768.00-40-C7-1C-11-22	32768.00-40-C7-1C-11-22	-	0	Steady	-

STP Port Status

Port	CIST Role	CIST State	Uptime
1	Disabled	Discarding	-
2	Disabled	Discarding	-
50	Disabled	Discarding	-
51	Disabled	Discarding	-
52	Disabled	Discarding	-

FIGURE 6-5. STP STATUS SCREEN

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 selected 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 the last Topology Change occurred.

STP Port Status

- 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 or 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.
- CIST: Click to next page “STP Detailed Bridge Status.”

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PARAMETER DESCRIPTION

STP Bridge Status

- Bridge Instance: The Bridge instance - CIST, MST1, ...
- Bridge ID: The Bridge ID of this Bridge instance.
- Root ID: The Bridge ID of the currently elected root bridge.
- Root Cost: Root Path Cost. For the Root Bridge this is zero. For all other Bridges, it is the sum of the Port Path Costs on the least cost path to the Root Bridge.
- Root Port: The switch port currently assigned the root port role.
- Regional Root: The Bridge ID of the currently elected regional root bridge, inside the MSTP region of this bridge. (For the CIST instance only).
- Internal Root Cost: The Regional Root Path Cost. For the Regional Root Bridge this is zero. For all other CIST instances in the same MSTP region, it is the sum of the Internal Port Path Costs on the least cost path to the Internal Root Bridge. (For the CIST instance only).
- Topology Flag: The current state of the Topology Change Flag of this Bridge instance.
- Topology Change Count: The number of times where the topology change flag has been set (during a one-second interval).
- Topology Change Last: The time passed since the Topology Flag was last set.

CIST Ports & Aggregations State

- Port: The switch port number of the logical STP port.
- Port ID: The port id as used by the STP protocol. This is the priority part and the logical port index of the bridge port.
- Role: The current STP port role. The port role can be one of the following values: AlternatePort BackupPort RootPortDesignatedPort.
- State: The current STP port state. The port state can be one of the following values: Discarding Learning Forwarding.
- Path Cost: The current STP port path cost. This will either be a value computed from the Auto setting, or any explicitly configured value.
- Edge: The current STP port (operational) Edge Flag. An Edge Port is a switch port to which no Bridges are attached. The flag may be automatically computed or explicitly configured. Each Edge Port transits directly to the Forwarding Port State, since there is no possibility of it participating in a loop.
- Point-to-Point: The current STP port point-to-point flag. A point-to-point port connects to a non-shared LAN media. The flag may be automatically computed or explicitly configured. The point-to-point properties of a port affect how fast it can transit to STP state.
- 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 immediately.

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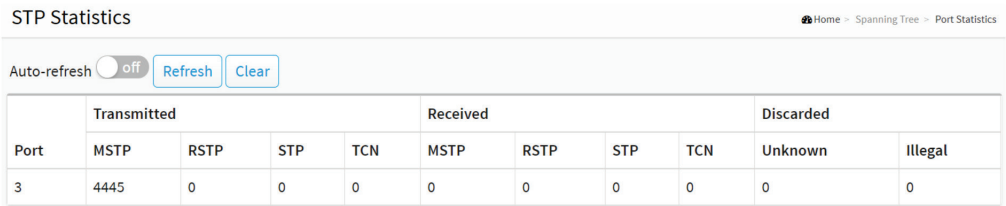
6.4 PORT STATISTICS

This page displays the STP port statistics counters of bridge ports in the switch

WEB INTERFACE

To display the STP Port Statistic in the web interface:

1. Click Spanning Tree and Port Statistics.
2. If you want to auto-refresh the information, then you need to click the “Auto-refresh” button.
3. Click “Refresh” to refresh the STP Bridges.



	Transmitted				Received				Discarded	
Port	MSTP	RSTP	STP	TCN	MSTP	RSTP	STP	TCN	Unknown	Illegal
3	4445	0	0	0	0	0	0	0	0	0

FIGURE 6-6. STP PORT 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 immediately.

7.1 CONFIGURATION

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 have been seen after a configurable age time.

WEB INTERFACE

To configure MAC Address Table in the web interface:

1. Click MAC Address Tables and Configuration.
2. Specify the Disable Automatic Aging and Aging Time.
3. Specify the Port Members (Auto, Disable, Secure).
4. Specify the Learning-disabled VLANs.
5. Add new Static entry, Specify the VLAN IP and Mac address, Port Members.
6. Click Apply.

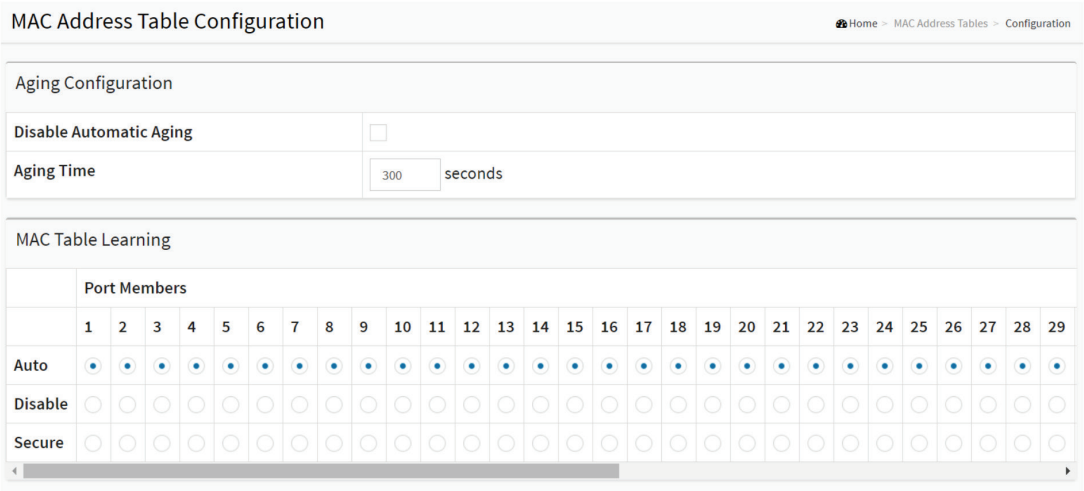


FIGURE 7-1. MAC ADDRESS TABLE CONFIGURATION SCREEN #1

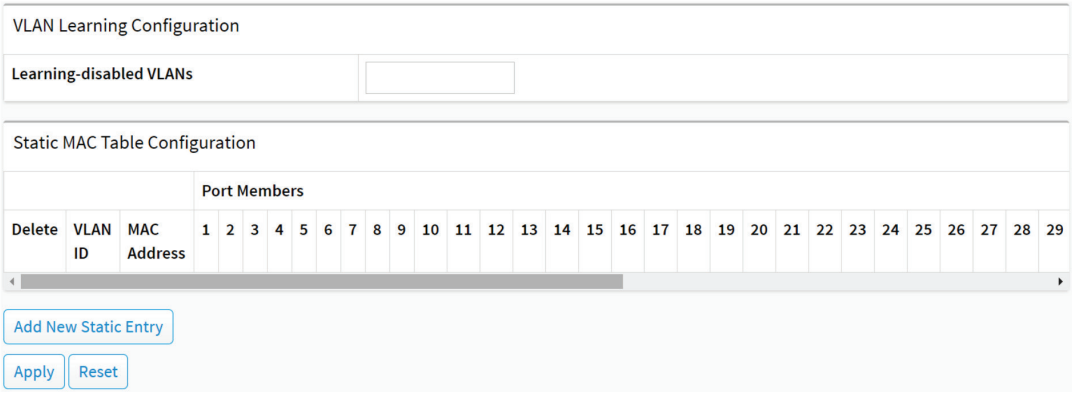


FIGURE 7-2. MAC ADDRESS TABLE CONFIGURATION SCREEN #2

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 the checkbox. 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.

VLAN Learning Configuration:

- Learning-disabled VLANS: This field shows the Learning-disabled VLANs. When a NEW MAC arrives into a learning-disabled VLAN, the MAC won't be learned. By the default, the field is empty. 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.

Static MAC Table Configuration

The static entries in the MAC table are shown in this table. The static MAC table can contain 128 entries. The maximum of 128 entries is for the whole stack, and not per switch.

- 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

- Add a New Static Entry: Click 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."
- 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.

7.2 INFORMATION

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 MAC Address Table and Information.
2. If you want to auto-refresh the information, select "Auto-refresh."
3. Click "Refresh" to refresh the MAC Address Table.

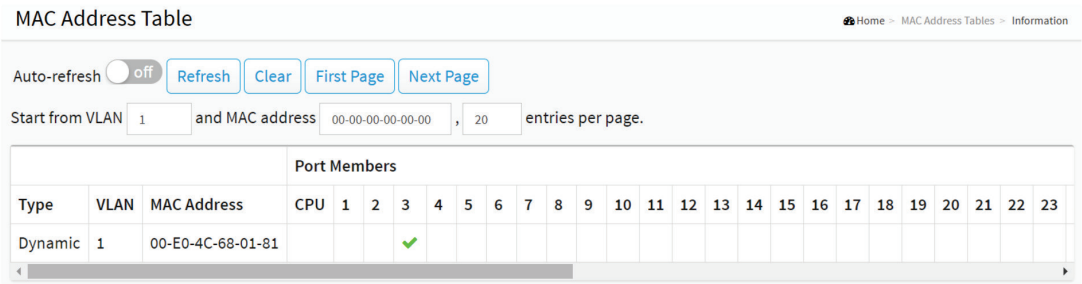


FIGURE 7-3. MAC ADDRESS TABLE

PARAMETER DESCRIPTION

Navigating the MAC Table

Each page shows up to 999 entries from the MAC table, default is 10, selected through the "entries per page" input field. When first visited, the web page will show the first 10 entries from the beginning of the MAC Table. The first displayed will be the one with the lowest VLAN ID and the lowest MAC address found in the MAC Table.

- Type: Indicates whether the entry is a static or a dynamic entry, 802.1x, DMS.
- 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: Click to refresh the page.
- Clear: Click to clear the page.

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- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the system log entries, turn to the next page.

NOTES:

00-40-C7-73-01-29: 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.

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8.1 IGMP SNOOPING

This function is used to establish the multicast groups to forward the multicast packet to the member ports. It 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 a multicast packet from a broadcast packet, so it can only treat them all as broadcast packets. Without IGMP Snooping, the multicast packet forwarding function is not active and nothing is different from a broadcast packet.

A switch supporting 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 previously joined in a specified IP multicast group.

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 an IGMP function that you enable via 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.

8.1.1 BASIC CONFIGURATION

This section describes how to set the basic IGMP 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.

WEB INTERFACE

To configure the IGMP Snooping parameters in the web interface:

1. Click Multicast, IGMP Snooping and Basic Configuration.
2. Select enable or disable Global configuration.
3. Select which port will become a Router Port or enable/ disable the Fast Leave function.
4. Scroll to set the Throtting and Profile.
5. Click Apply to save the setting.
6. To cancel the setting, click the Reset button. It will revert to previously saved values.

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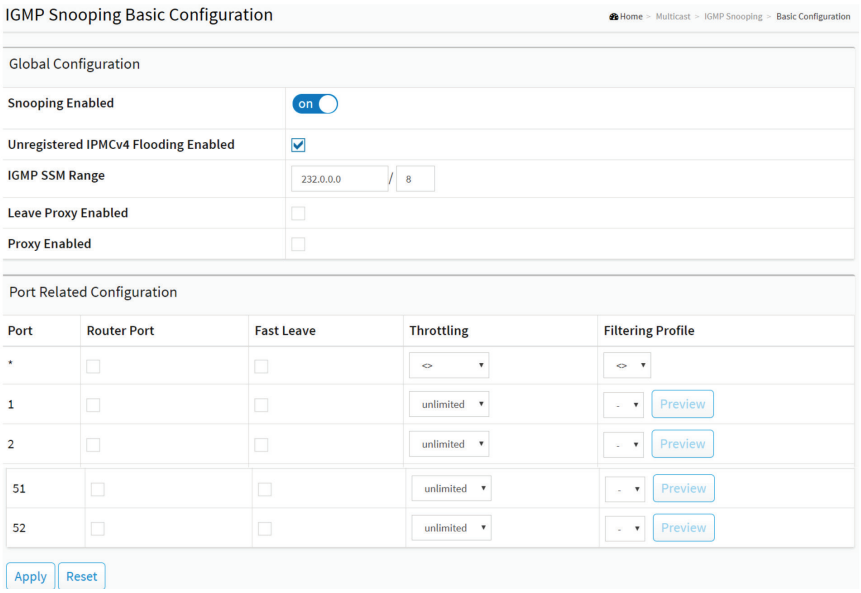

FIGURE 8-1. IGMP SNOOPING CONFIGURATION

PARAMETER DESCRIPTION

Global Configuration

- Snooping Enabled: Enable Global IGMP Snooping.
- Unregistered IPMCv4 Flooding enabled: Enable unregistered IPMCv4 traffic flooding. Unregistered IPMCv4 traffic is so-called unknown multicast. After selected, the unregistered multicast stream will be forwarded like normal packets. Once you de-select it, the stream will be discarded.
- IGMP SSM Range: SSM (Source-Specific Multicast) Range allows the SSM-aware hosts and routers to run the SSM service model for the groups in the address range. Format: (IP address/ sub mask)
- 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.

Port Related Configuration

- Port: This shows the physical Port index of switch.
- 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 fast leave on the port.
- Throttling: Limit the number of multicast groups to which a switch port can belong.
- Profile: Select the profile for this port. Click to preview the page that lists the rules associated with the selected profile.

Buttons

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

8.1.2 VLAN CONFIGURATION

This section describes the VLAN configuration setting process integrated with the IGMP Snooping function. Each setting page shows up to 99 entries from the VLAN table, default is 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 Multicast, IGMP Snooping and VLAN Configuration.
2. Click to add new IGMP VLAN.
3. Click Apply to save the setting.
4. To cancel the setting, click the Reset button. It will revert to previously saved values.

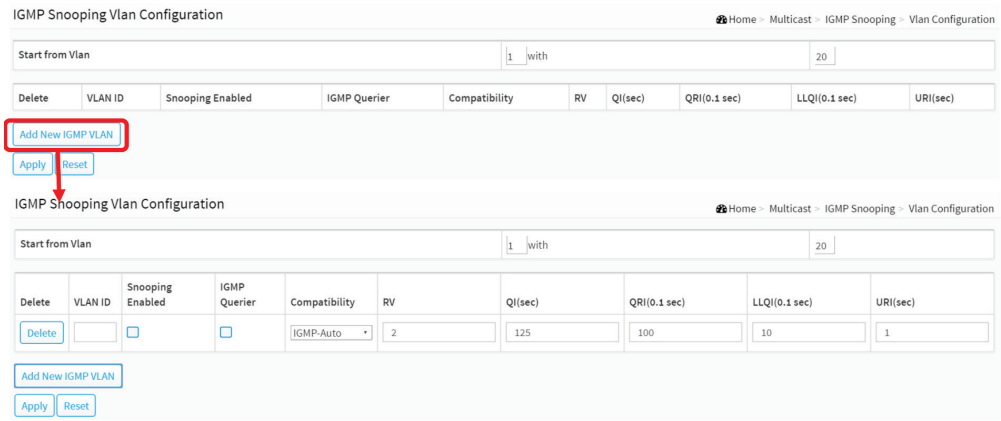

FIGURE 8-2. IGMP SNOOPING VLAN CONFIGURATION

PARAMETER DESCRIPTION

- Start from Vlan: Click to Refresh the displayed table starting from the “VLAN” input fields.
- Delete: Check to delete the entry. The designated entry will be deleted during the next save.
- VLAN ID: This displays the VLAN ID of the entry.
- Snooping Enabled: Enable the per-VLAN IGMP Snooping. Only up to 32 VLANs can be selected.
- IGMP Querier: Enable to join the IGMP Querier election in the VLAN. Disable to act as an IGMP Non-Querier.
- 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; the default compatibility value is IGMP-Auto.
- 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(sec): 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.

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- QRI (0.1 sec): 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 (0.1 sec): 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 (sec): 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.

8.1.3 STATUS

After you complete the IGMP Snooping configuration, the switch can display the IGMP Snooping Status. The Section explains how to display the IGMP Snooping detail status.

WEB INTERFACE

To display the IGMP Snooping status in the web interface:

1. Click Multicast, IGMP Snooping and Status.
2. To auto-refresh the information automatically, select "Auto-refresh."
3. Click "Refresh" to refresh the IGMP Snooping Status.

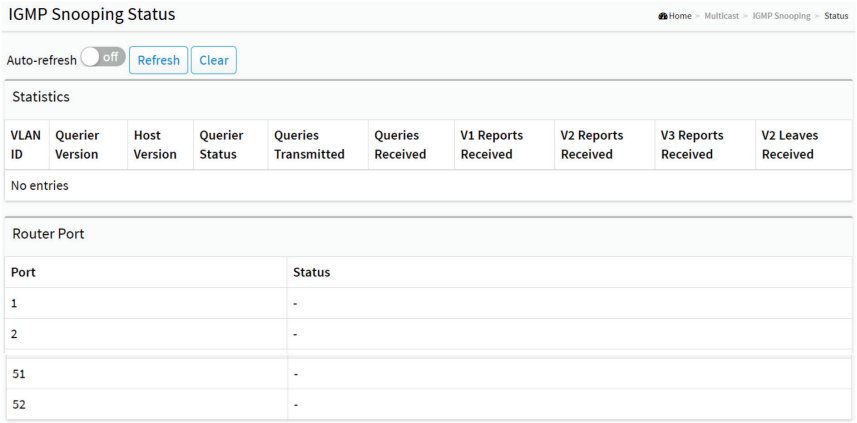

FIGURE 8-3. IGMP SNOOPING STATUS

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PARAMETER DESCRIPTION

Statistic

- 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 a 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: Click to clear the page.

8.1.4 GROUP INFORMATION

After you set the IGMP Snooping function, then the switch can 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. This 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 Multicast, IGMP Snooping and Group Information.
2. Specify how many entries to show in one page.
3. To auto-refresh the information, select “Auto-refresh.”
4. Click “Refresh” to refresh an entry of the IGMP Snooping Groups Information.
5. Click First/Next Page to change the page.

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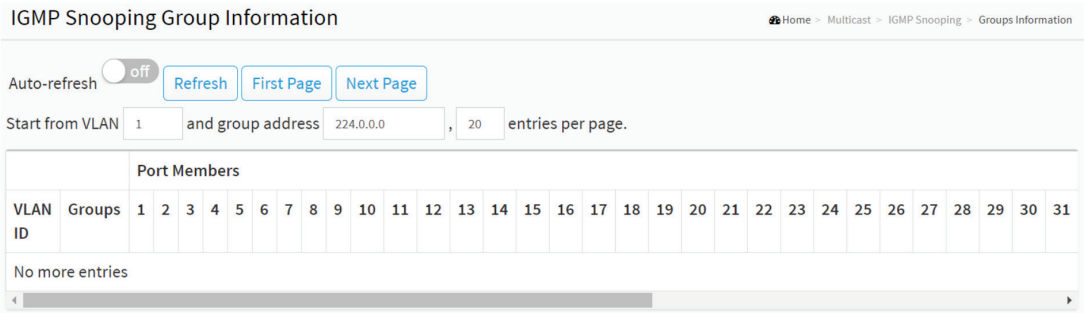

FIGURE 8-4. IGMP SNOOPING GROUP INFORMATION

PARAMETER DESCRIPTION

Navigating the IGMP Group Table

Each page shows up to 99 entries from the IGMP Group table, default is 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 IGMP Group Table.

The “Start from VLAN”, and “group” input fields allow the user to select the starting point in the IGMP Group Table. Clicking the Refresh button will update the displayed table starting from that or the closest next IGMP Group Table match. In addition, the two input fields will—upon a Refresh button click—assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

The Next Page 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 First Page button to start over.

- Show entries: You can choose how many items you want to show up.
- 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.
- First Page: Updates the system log entries, turn to the first page.
- Next Page Updates the group information entries, turn to the next page.

8.1.5 IGMP 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 IGMP SFM Information in the web interface:

1. Click Multicast, IGMP Snooping and IGMP SFM Information
2. To auto-refresh the information, select “Auto-refresh.”
3. Click “Refresh” to refresh an entry of the IGMP Snooping Groups Information.
4. Click First/Next Page to change page.

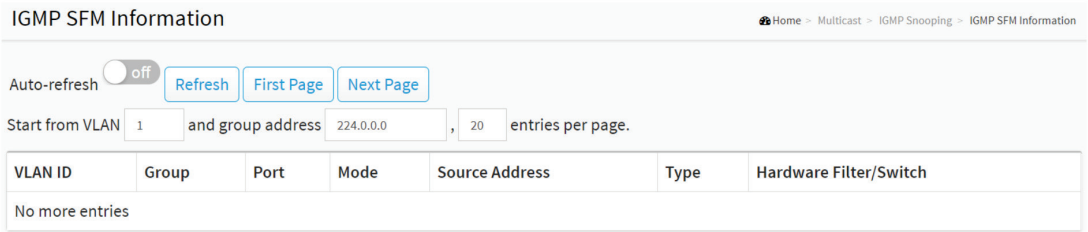

FIGURE 8-5. IGMP SFM INFORMATION

PARAMETER DESCRIPTION

Navigating the IGMP SFM Information Table

Each page shows up to 99 entries from the IGMP SFM Information 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 IGMP SFM Information Table.

The “Start from VLAN”, and “group” input fields allow the user to select the starting point in the IGMP SFM Information Table. Clicking the Refresh button will update the displayed table starting from that or the closest next IGMP SFM Information Table match. In addition, the two input fields will - upon a Refresh button click - assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

The Next Page 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 First Page button to start over.

- Show entries: You can choose how many items you want to show up.
- 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, the system limits the total number of IP source addresses for filtering to 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 can 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.

- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the group information entries, turn to the next page.

8.2 MLD SNOOPING

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: This is a function of the application software, not of MLD.)

When MLD snooping is enabled on a VLAN, the switch minimizes 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.

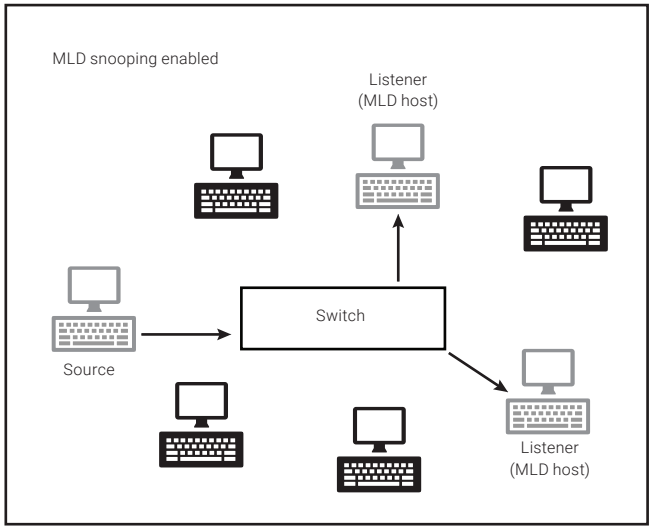

FIGURE 8-6.

8.2.1 BASIC CONFIGURATION

The section will explain 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 Multicast, MLD Snooping and Basic Configuration.
2. Select to turn on or off the Global configuration parameters.
3. Select the port to join Router port and Fast Leave.
4. Scroll to select the Throtting mode with unlimited or 1 to 10.

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5. Scroll to set the Profile.
6. Click the apply to save the setting.
7. To cancel the setting, click the Reset button. It will revert to previously saved values.

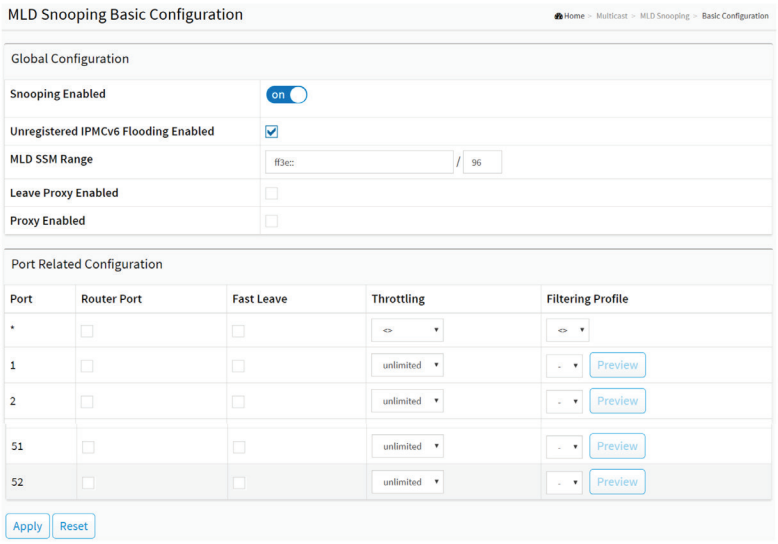

FIGURE 8-7. MLD SNOOPING BASIC CONFIGURATION

PARAMETER DESCRIPTION

Global Configuration

- 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 to 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.

Port Related Configuration

- 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.
- Fast Leave: Enablethe fast leave on the port.
- Throttling: Enable to limit the number of multicast groups to which a switch port can belong.
- Filtering Profile: You can select profile when you edit in Multicast Filtering Profile.

Buttons

- Apply: Click to save changes.

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

8.2.2 VLAN CONFIGURATION

When MLD snooping is enabled on a VLAN, the switch minimizes 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

The switch 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 Multicast, MLD Snooping and VLAN Configuration.
2. Click Add New MLD VLAN.
3. Specify the VLAN ID with entries per page.

FIGURE 8-8. MLD SNOOPING VLAN CONFIGURATION

PARAMETER DESCRIPTION

- Delete: Check to delete the entry. The designated entry will be deleted during the next save.
- VLAN ID: This displays the VLAN ID of the entry.
- Snooping Enabled: Enable the per-VLAN IGMP Snooping. Up to 32 VLANs can be selected.
- MLD Querier: Enable to join IGMP Querier election in the VLAN. Disable to act as an IGMP Non-Querier.
- 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; the default compatibility value is IGMP-Auto.
- RV: Robustness Variable. The Robustness Variable allows tuning for the expected packet loss on a network. The allowed range is 1 to 255; the default robustness variable value is 2.
- QI(sec): Query Interval. The Query Interval is the interval between General Queries sent by the Querier. The allowed range is 1 to 31744 seconds; the default query interval is 125 seconds.
- QRI(0.1sec): 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; the 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; the default last member query interval is 10 in tenths of seconds (1 second).
- URI(sec): 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; the 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.

8.2.3 STATUS

This section describes how to display the MLD Snooping Status and detail information. It will help you to find out detailed information for MLD Snooping status.

WEB INTERFACE

To display the MLD Snooping Status in the web interface:

1. Click Multicast, MLD Snooping and Status.
2. To auto-refresh the information, select "Auto-refresh."
3. Click "Refresh" to refresh an entry of the MLD Snooping Status Information.

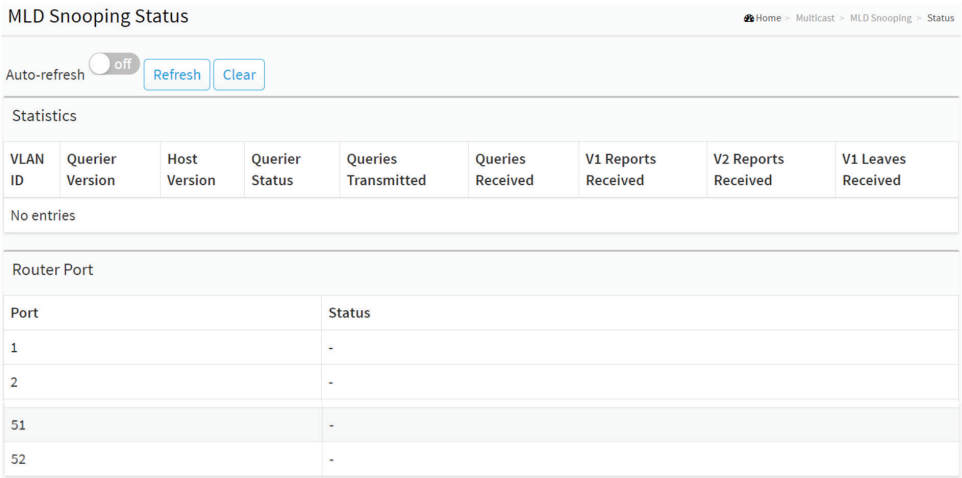

FIGURE 8-9. MLD SNOOPING STATUS

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 learned to be a router port. Both denote the specific port is configured or learned to be a router port.
- Port: Switch port number.
- Status: Indicates 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 the counters for the selected port.

8.2.4 GROUPS INFORMATION

Entries in the MLD Group Table are shown on this page. The MLD Group Table is sorted first by VLAN ID, and then by group.

WEB INTERFACE

To display the MLD Snooping Group information in the web interface:

1. Click Multicast, MLD Snooping and Group Information.
2. To auto-refresh the information, select“Auto-refresh.”
3. Click “Refresh” to refresh an entry of the MLD Snooping Group Information.
4. Click First/Next Page to change page.

PARAMETER DESCRIPTION

Navigating the MLD Group Table

Each page shows up to 99 entries from the MLD Group table, default is 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 MLD Group Table.

The “Start from VLAN”, and “group” input fields allow the user to select the starting point in the MLD Group Table. Clicking the Refresh button will update the displayed table starting from that or the closest next MLD Group Table match. In addition, the two input fields will —upon a Refresh button click— assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

The Next Page 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 First Page button to start over.

- VLAN ID: VLAN ID of the group.
- Groups: Group address of the group displayed.
- Port Members: Ports under this group.

- Show entries: You can choose how many items you want to show up.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- First Page: Updates the system log entries, turns to the first page.
- Next Page: Updates the group information entries, turns to the next page.

8.2.5 MLD 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 that belong to the same group are treated as single entry.

WEB INTERFACE

To display the MLD SFM Information in the web interface:

1. Click Multicast, MLD Snooping and MLD SFM Information.
2. To auto-refresh the information, select “Auto-refresh.”
3. Click “Refresh” to refresh an entry of the MLD SFM Information.
4. Click First/Next Page to change the page.

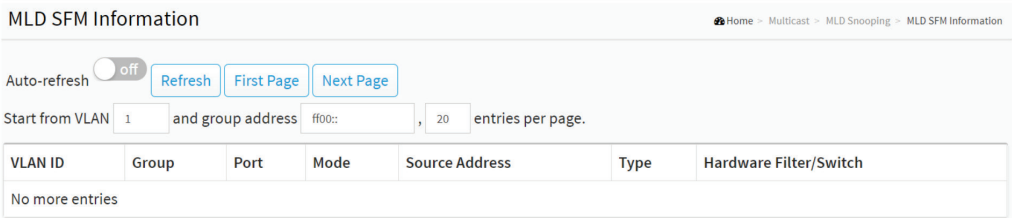

FIGURE 8-10. MLD SFM CONFIGURATION

PARAMETER DESCRIPTION

Navigating the MLD SFM Information Table

Each page shows up to 99 entries from the MLD SFM Information 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 MLD SFM Information Table.

The “Start from VLAN”, and “group” input fields allow the user to select the starting point in the MLD SFM Information Table. Clicking the Refresh button will update the displayed table starting from that or the closest next MLD SFM Information Table match. In addition, the two input fields will - upon a Refresh button click - assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

The Next Page 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 First Page button to start over.

- VLAN ID: VLAN ID of the group.
- Group: IP Multicast Group address.
- 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, the system limits the total number of IP source addresses for filtering to 128.
- Type: Indicates the Type. It can be either Allow or Deny.
- Hardware Filter/Switch: Indicates whether the data plane destined for the specific group address from the source IPv6 address can 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.
- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the group information entries, turn to the next page.

8.3 MVR

The MVR feature enables multicast traffic forwarding on the Multicast VLAN. In a multicast television application, a PC or a television with 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 join message to Switch A to join the appropriate multicast. Uplink ports that send and receive multicast data to and from the multicast VLAN are called MVR source ports.

8.3.1 BASIC INFORMATION

WEB INTERFACE

To configure the MVR Configuration in the web interface:

1. Click Multicast, MVR and Basic Configuration.
2. Scroll the MVR mode to enable or disable and Scroll to set all parameters.
3. Click “Add New MVR VLAN.”
4. Specify MVR VID, MVR Name, IGMP Address, Mode, Tagging, Priority, LLQI, Interface Channel Profile.
5. Select the port to Click Immediate Leave.
6. Click apply to save the setting
7. To cancel the setting, click the Reset button. It will revert to previously saved values.

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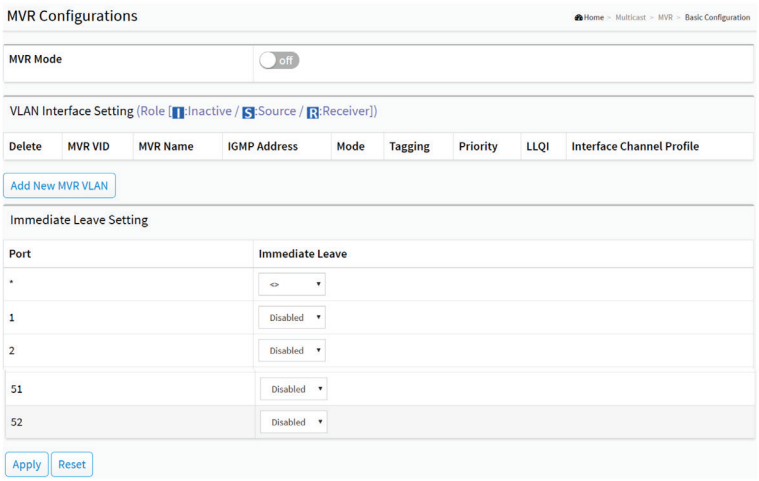

FIGURE 8-11. MVR CONFIGURATION

PARAMETER DESCRIPTION

- MVR Mode: Enable/Disable the Global MVR. The Unregistered Flooding control depends on the current configuration in IGMP/MLD Snooping. We recommend that you enable Unregistered Flooding control when the MVR group table is full.
- MVR VID: Specify the Multicast VLAN ID.

CAUTION: We do NOT recommend overlapping MVR source ports with management VLAN ports.

- MVR Name: MVR Name is an optional attribute to indicate the name of the specific MVR VLAN. The maximum length of the MVR VLAN Name string is 32. The MVR VLAN Name can only contain alphabets or numbers. The 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 the source address used in an IP header for IGMP control frames.

  The default IGMP address is not set (0.0.0.0).

  When the IGMP address is not set, the 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, the 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 seconds. The range is from 0 to 31744. The default LLQI is 5 tenths or one-half second.
- Interface Channel Profile: When the MVR VLAN is created, select the profile to expand the corresponding multicast channel settings for the specific MVR VLAN. The file is established on the Filtering Profile Table.
- 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 in 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.

CAUTION: We do NOT recommend overlapping MVR source ports with management VLAN ports. Select the port role by clicking the Role symbol to switch the setting. I indicates Inactive; S indicates Source; R indicates Receiver. The default Role is Inactive.

- Immediate Leave: Enable fast leave on the port.

Buttons

- Add New MVR VLAN: Click to add new mvr vlan. Specify MVR VID, MVR Name, IGMP Address, Mode, Tagging, Priority, LLQI, Interface Channel Profile. Click "Apply."
- Delete: Check to delete the entry. The designated entry 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.

8.3.2 STATISTICS

This section describes how the switch will display the MVR detail Statistics after you configure MVR. It provides detailed MVR Statistics Information.

WEB INTERFACE

To display the MVR Statistics Information in the web interface:

1. Click Multicast, MVR and Statistics.
2. To auto-refresh the information, select "Auto-refresh."
3. Click "Refresh" to refresh an entry of the MVR Statistics Information.

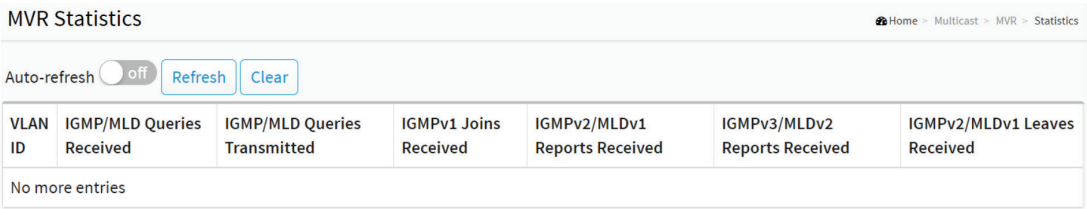

FIGURE 8-12. MVR STATISTICS INFORMATION

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 Joins.

- IGMPv2/MLDv1 Reports Received: The number of Received IGMPv2 Joins and MLDv1 Reports, respectively.
- IGMPv3/MLDv2 Reports Received: The number of Received IGMPv3 Joins and MLDv2 Reports, respectively.
- IGMPv2/MLDv1 Leaves Received: The number of Received IGMPv2 Leaves and MLDv1 Dones, respectively.

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.

8.3.3 MVR GROUPS INFORMATION

This section describes how to 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 Multicast, MVR and Groups Information.
2. To auto-refresh the information, select “Auto-refresh.”
3. Click “Refresh” to refresh an entry of the MVR Groups Information.
4. Click First/Next Page to change the page.

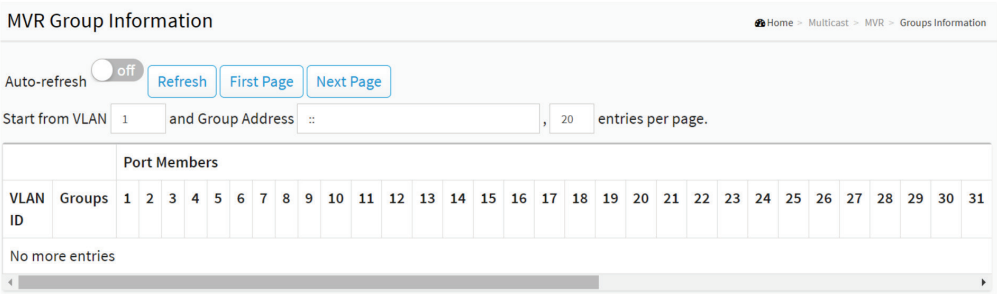

FIGURE 8-13. MVR GROUP INFORMATION

PARAMETER DESCRIPTION

Navigating the MVR Channels (Groups) Information Table

Each page shows up to 99 entries from the MVR Group table, default is 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 MVR Channels (Groups) Information Table.

The “Start from VLAN”, and “Group Address” input fields allow the user to select the starting point in the MVR Channels (Groups) Information Table. Clicking the Refresh button will update the displayed table starting from that or the closest next MVR Channels (Groups) Information Table match. In addition, the two input fields will—upon a Refresh button click—assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

The Next Page 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 First Page button to start over.

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MVR Channels (Groups) Information Table Columns

- Show entries: You can choose how many items you want to show up.
- 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.
- First Page: Updates the system log entries, turns to the first page.
- Next Page: Updates the group information entries, turns to the next page.

8.3.4 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 Multicast, MVR and MVR SFM Information.
2. To auto-refresh the information, select “Auto-refresh.”
3. Click “Refresh” to refresh an entry of the MVR Groups Information.
4. Click First/Next Page to change the page.

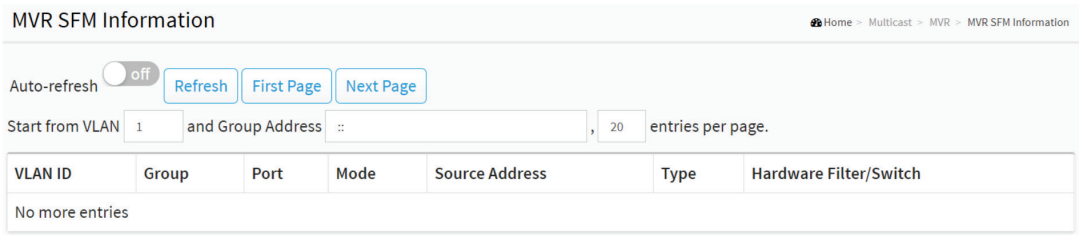

FIGURE 8-14. MVR SFM INFORMATION SCREEN

PARAMETER DESCRIPTION

Navigating the MVR SFM Information Table

Each page shows up to 99 entries from the MVR SFM Information Table, default is 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 MVR SFM Information Table.

The “Start from VLAN”, and “Group Address” input fields allow the user to select the starting point in the MVR SFM Information Table. Clicking the Refresh button will update the displayed table starting from that or the closest next MVR SFM Information Table match. In addition, the two input fields will— upon a Refresh button click—assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

The Next Page 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 First Page button to start over.

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MVR SFM Information Table Columns

- Show entries: You can choose how many items you want to show up.
- VLAN ID: VLAN ID of the group.
- Group: IP Multicast Group address.
- 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, the system limits the total number of IP source addresses for filtering to be 128. When there is not 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 the data plane destined to the specific group address from the source IPv4/IPv6 address could be handled by a 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.
- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the group information entries, turn to the next page.

8.4 MULTICAST FILTERING PROFILE

This page provides Multicast Filtering Profile related configurations.

8.4.1 FILTERING PROFILE TABLE

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

WEB INTERFACE

To configure the IPMC Profile Configuration in the web interface:

1. Click Multicast, Multicast Filtering Profile and Filtering Profile Table.
2. Scroll the Multicast Filtering Profile mode to enable or disable.
3. Click "Add New Filtering Profile."
4. Specify Profile Name, Profile Description and Rule.
5. Click apply to save the setting.
6. To cancel the setting, click the Reset button. It will revert to previously saved values.

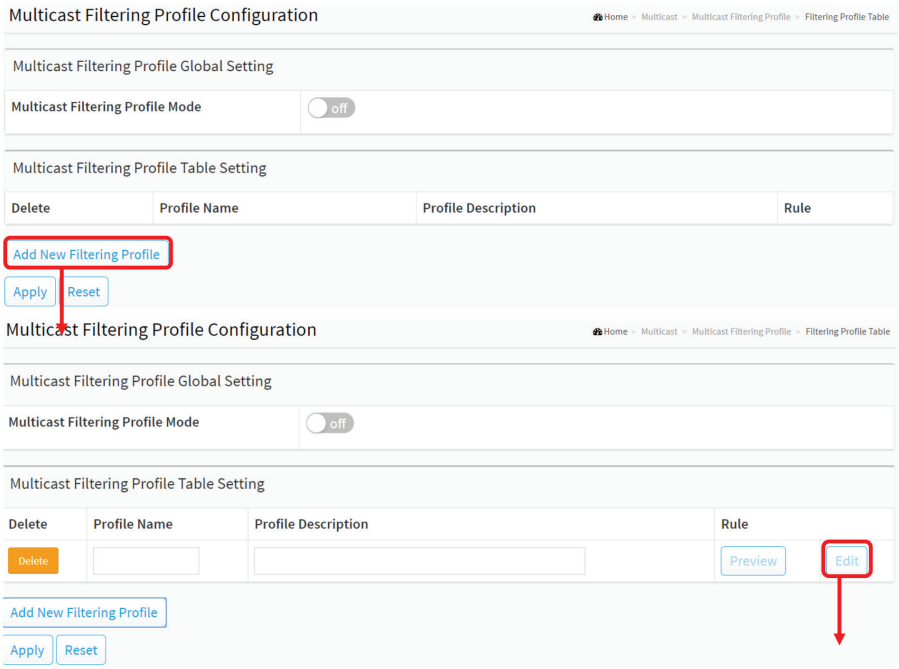

FIGURE 8-15. MULTICAST FILTERING PROFILE CONFIGURATION

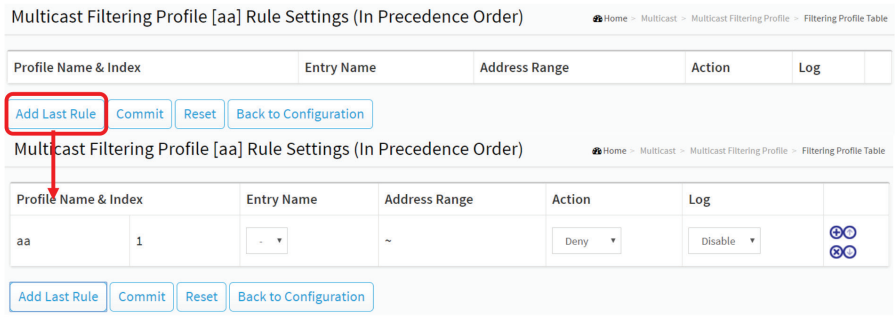

FIGURE 8-16. IPMC PROFILE CONFIGURATION

PARAMETER DESCRIPTION

- Multicast Filtering Profile Mode: Enable/Disable the Multicast Filtering Profile. System starts to do filtering based on profile settings only when the global profile mode is enabled.
- Profile Name: The name used for indexing the profile table. Each entry has the unique name which is composed of up to 16 alphabetic and numeric characters.
- Profile Description: Additional description, which is composed of up to 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.
- 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:
  - Preview: Preview the rules associated with the designated profile.
  - Edit: Adjust the rules associated with the designated profile.

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- Profile Name & Index: 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.
- 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.

  X: Delete the current entry of rule.

  arrow up: Moves the current entry of rule up in the list.

  arrow down: Moves the current entry of rule down in the list.

Buttons

- Add New Filtering Profile: Click to add new IPMC profile. Specify the name and configure the new entry. Click "Save."
- Delete: Check to delete the entry. The designated entry 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 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 "Apply."

8.4.2 FILTERING 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 up to 128 address entries in the system.

WEB INTERFACE

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

1. Click Multicast, Multicast Filtering Profile and Filtering Address Entry.
2. Click "Add New Address (Range) Entry."
3. Specify Entry Name, Start Address and End Address.
4. Click apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.
6. Click "Refresh" to refresh an entry of the MLD Snooping Group Information.

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7. Click First Entry/Next Entry to change the Entry.

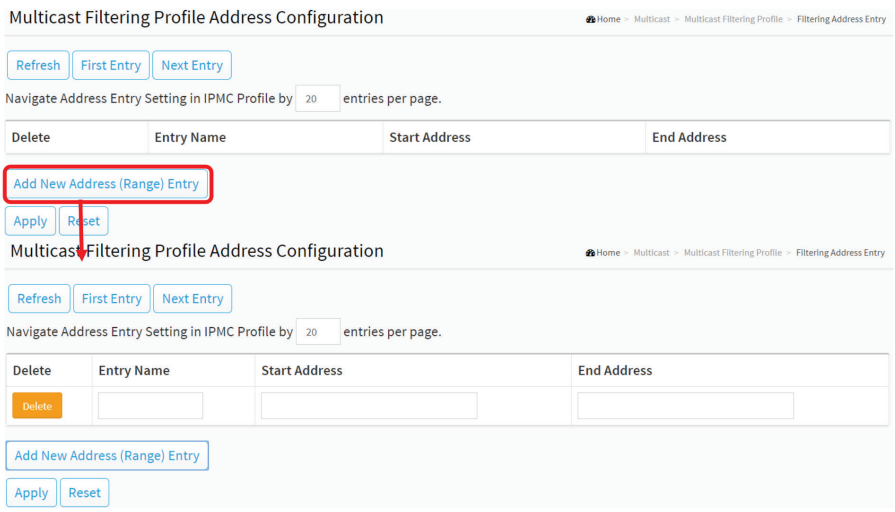

FIGURE 8-17. IPMC PROFILE ADDRESS CONFIGURATION

PARAMETER DESCRIPTION

- Entry Name: The name used for indexing the address entry table. Each entry has the unique name which is composed of up to 16 alphabetic and numeric characters.
- 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

- Add New Address (Range) Entry: Click to add new address range. Specify the name and configure the addresses. Click “Apply.”
- Delete: Check to delete the entry. The designated entry 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.
- First Entry: Updates the table starting from the first entry in the IPMC Profile Address Configuration.
- Next Entry: Updates the table, starting with the entry after the last entry currently displayed.

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

9.1 DHCP

9.1.1 CONFIGURATION

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

This section describes how to configure the DHCP Snooping parameters of the switch. 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 DHCP, Snooping and Configuration.
2. Select “on” in the Mode of DHCP Snooping Configuration.
3. Select “Trusted” for the specific port in the Mode of Port Mode Configuration.
4. Click Apply.

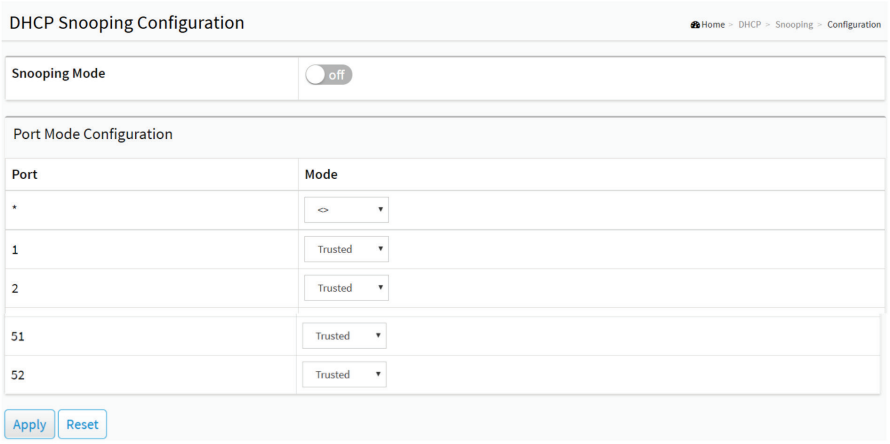

FIGURE 9-1. DHCP SNOOPING CONFIGURATION

PARAMETER DESCRIPTION

- Snooping Mode: Indicates the DHCP snooping mode operation. Possible modes are:
  - on: 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.
  - off: 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. A trusted port can forward DHCP packets normally.
  - Untrusted: Configures the port as untrusted source of the DHCP messages. An untrusted port will discard the packets when it receives DHCP packets.

Buttons

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

9.1.2 SNOOPING TABLE

This page displays the dynamic IP assigned information after DHCP Snooping mode is enabled. 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 monitor a DHCP in the web interface:

1. Click DHCP, Snooping and Snooping table.
2. To auto-refresh the information, select “Auto-refresh.”
3. Click “Refresh” to refresh an entry of the MVR Groups Information.
4. Click First/Next Page to change the page.

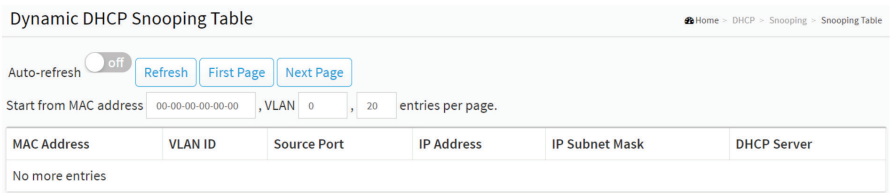

FIGURE 9-2. DHCP SNOOPING TABLE

PARAMETER DESCRIPTION

- Show entries: You can choose how many items you want to show up.
- 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: DHCP Server address of the entry.

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Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the group information entries, turn to the next page.

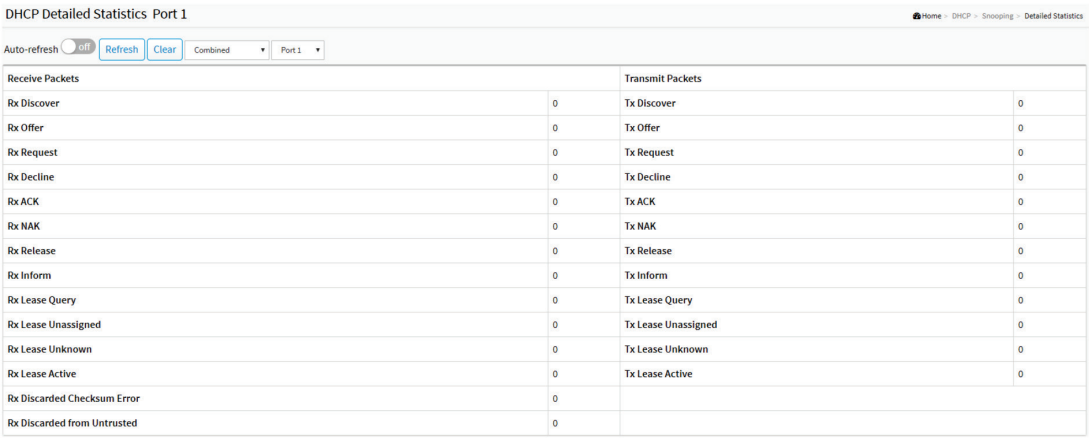
9.1.3 DETAILED STATISTICS

This page provides statistics for DHCP snooping. Normal forward per-port TX statistics isn't increased if the incoming DHCP packet is processed by the L3 forwarding mechanism. Clearing the statistics on a specific port may not take effect on global statistics since it gathers a different layer overview.

WEB INTERFACE

To display a DHCP Relay statistics in the web interface:

1. Click DHCP, Snooping and Detailed Statistics.
2. Select that port for which you want to display the DHCP Detailed Statistics.
3. To auto-refresh the information, select "Auto-refresh."
4. Click "Refresh" to refresh an entry of the DHCP Detailed 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 9-3. 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 discarded packet that have IP/UDP checksum errors.
- Rx Discarded from Untrusted: The number of discarded packets that are coming from untrusted ports.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- Port 1: Select the port for which you want to display the DHCP Detailed Statistics.

9.2 RELAY

9.2.1 CONFIGURATION

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 this condition, make sure the switch configuration of VLAN interface IP address and PVID(Port VLAN ID) is set correctly.

WEB INTERFACE

To configure DHCP Relay in the web interface:

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

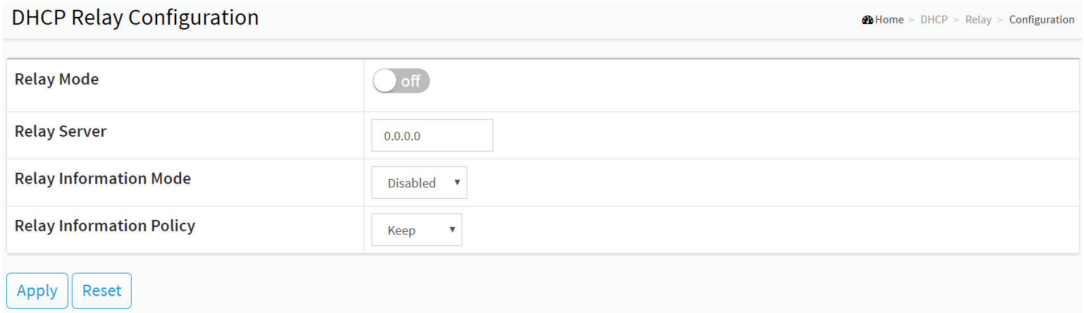


FIGURE 9-4. DHCP RELAY CONFIGURATION

PARAMETER DESCRIPTION

- Relay Mode: Indicates the DHCP relay mode operation.

  Possible modes are:

  - on: 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. The DHCP broadcast message won't be flooded for security considerations.
  - off: 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 is "[vlan_id][module_id][port_no]". The first four characters represent the VLAN ID, the fifth and sixth characters are the module ID (in a standalone device it always equal 0, in a stackable device it means switch ID), and the last two characters are the port number. For example, "00030108" means the DHCP message is received from VLAN ID 3, switch ID 1, port No 8. And the option 82 remote ID value equals 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 packet 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.

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9.2.2 STATISTICS

This page provides statistics for DHCP relay.

WEB INTERFACE

To monitor a DHCP Relay statistics in the web interface:

1. Click DHCP, Relay and Statistics.
2. Display DHCP relay statistics.
3. To auto-refresh the information, select “Auto-refresh.”
4. Click “Refresh” to refresh an entry of the DHCP Detailed Statistics.

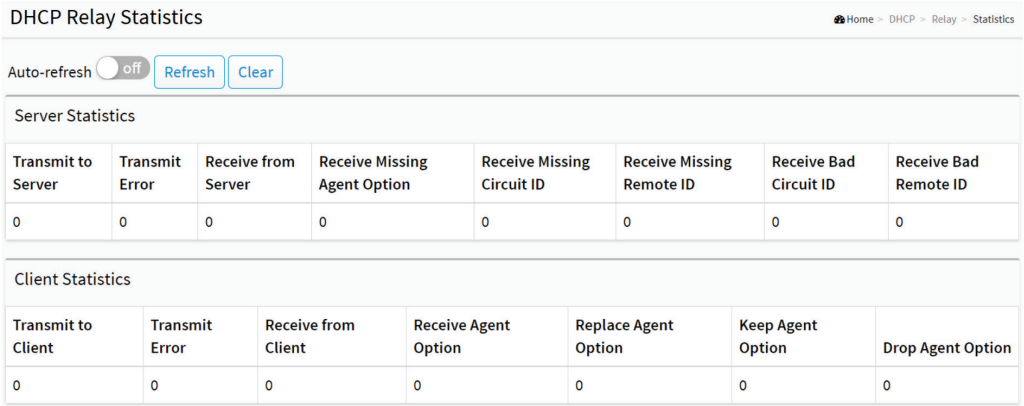

FIGURE 9-5. DHCP RELAY STATISTICS

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 a 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 a known circuit ID.
- Receive Bad Remote ID: The number of packets whose Remote ID option did not match a 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 a 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 that 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 immediately.
- Clear: Clear all statistics.

9.3 SERVER

9.3.1 CONFIGURATION

This page configures the mode to enable/disable DHCP server per system and per VLAN. It also configures Start IP and End IP addresses. A DHCP server will allocate these IP addresses to a DHCP client. and deliver configuration parameters to the DHCP client.

WEB INTERFACE

To configure DHCP server Configuration in the web interface:

1. Click DHCP, Server and Configurtion.
2. Click “Add Interface.”
3. Specify VLAN, Mode, Start IP, End IP, Lease time, Subnet mask, Default router, DNS server.
4. Click Apply.

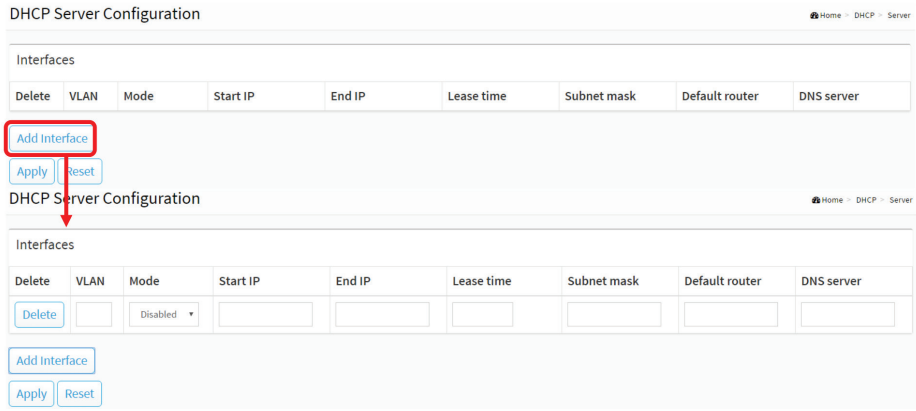

FIGURE 9-6. DHCP SERVER CONFIGURATION

PARAMETER DESCRIPTION

- VLAN: Configure the VLAN for which the DHCP server is enabled or disabled. Allowed VLANs are in the range 1 through 4095.
- Mode: Indicate the operation mode per VLAN. Possible modes are:
  - Enable: Enable DHCP server per VLAN.
  - Disable: Disable DHCP server pre VLAN.
- Start IP and End IP: Define the IP range. The Start IP must be smaller than or equal to the End IP.
- Lease Time: Display the lease time of the pool.
- Subnet Mask: Configure the subnet mask of the DHCP address.
- Default router: Configure the destination IP network or host address of this route.
- DNS Server: Specify the DNS server.

Buttons

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

9.3.2 STATUS

This page displays DHCP server status.

WEB INTERFACE

To display DHCP server status in the web interface:

1. Click DHCP, Server and Status.
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 DHCP server status.

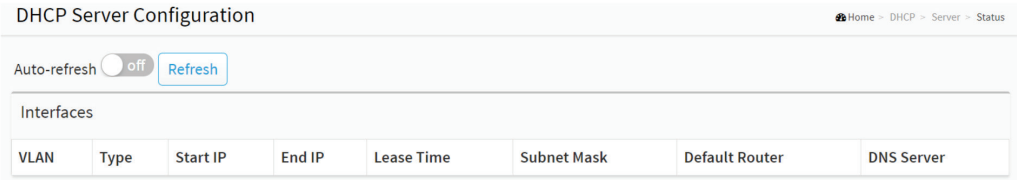

FIGURE 9-7. DHCP SERVER STATUS

PARAMETER DESCRIPTION

- VLAN: The VLAN ID of the entry.
- Type: Indicate the operation type per VLAN. Possible types are Static and DMS.
- Start IP and End IP: Display the Start IP and the End IP.
- Lease Time: Display the lease time of the pool.

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- Subnet Mask: Display the subnet mask of the DHCP address.
- Default router: Display the destination IP network or host address of this route.
- DNS Server: Display the DNS 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.

CHAPTER 10: SECURITY

This section shows you how 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.

10.1 MANAGEMENT

10.1.1 ACCOUNT

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 Security, Management and Account.
2. Click Add new user.
3. Specify the User Name parameter.
4. Click Apply.

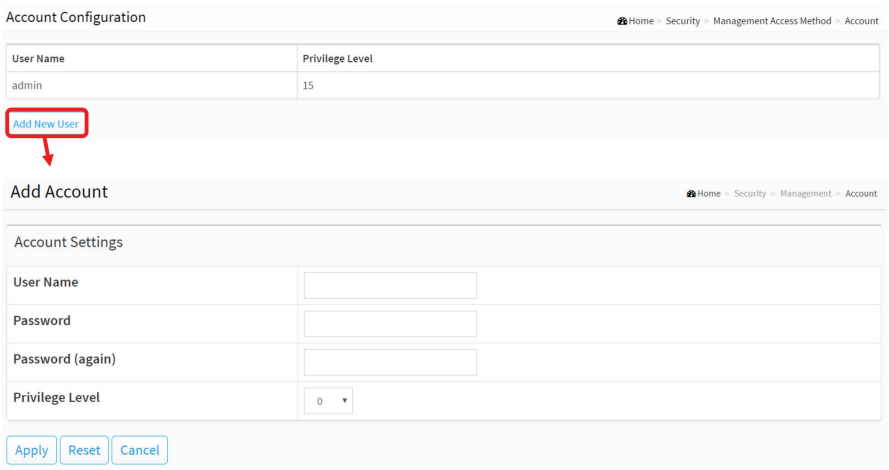

FIGURE 10-1. THE ACCOUNT CONFIGURATION

PARAMETER DESCRIPTION

- User Name: The name identifying the user. The field can be input 31 characters. This is also a link to Add/Edit User.
- Password: Type in the password. The field can be input 31 characters, and the allowed content is the ASCII characters from 32 to 126.
- Password (again): 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 0 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 other values need to refer to each group privilege level. A User's privilege should be same or greater than the group privilege level to have the access to that group. By default setting, most groups' privilege level 5 has read-only access and privilege level 10 has read-write access. The system maintenance options (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).

10.1.2 PRIVILEGE LEVELS

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 Security, Management and Privilege Levels.
2. Specify the Privilege parameter.
3. Click Apply.

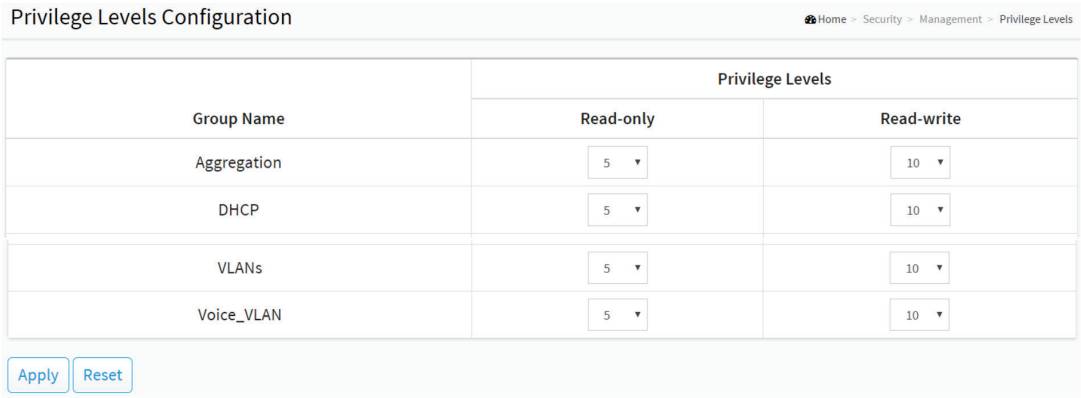

FIGURE 10-2. PRIVILEGE LEVEL CONFIGURATION

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, STP or QoS), but a few of them contain more than one. The following description defines these privilege level groups in detail:

  System: Contact, Name, Location, Timezone, Daylight Saving Time, Log.
- Privilege Levels: Every group has an authorization Privilege level for the following sub groups: configuration read-only, configuration/ execute read-write. 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.

10.1.3 AUTH METHOD

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

WEB INTERFACE

To configure an Auth Method Configuration in the web interface:

1. Click Security, Management and Auth Method.
2. Specify the Client (console, telent, ssh, web) that you want to monitor.
3. Specify the Methods (none, local, radius, tacacs), Service port, Cmd Lvl, Cfg Cmd, Fallback, Exec.
4. Click Apply.

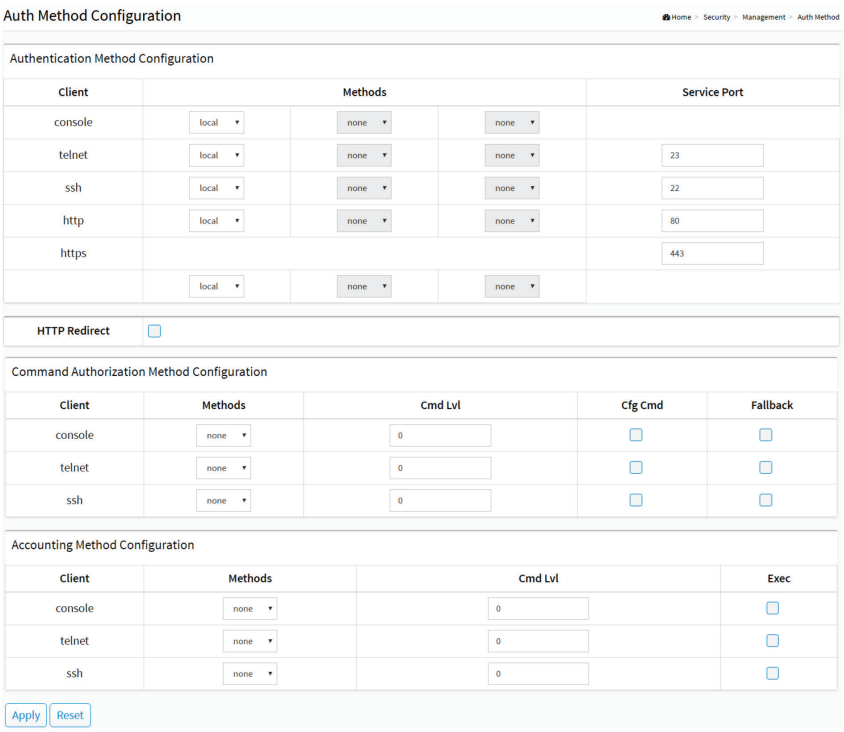

FIGURE 10-3. AUTH METHOD CONFIGURATION

PARAMETER DESCRIPTION

Authentication Method Configuration

- Client: The management client for which the configuration below applies.
- Method: Authentication Method can be set to one of the following values:

  - none : authentication is disabled and login is not possible.

  - local : use the local user database on the switch for authentication.

  - radius : use a remote RADIUS server for authentication.

  - tacacs : use a remote TACACS server for authentication.

  Methods that involve 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.
- HTTP Redirect: Enable http Automatic Redirect.

Command Authorization Method Configuration

- Client: The management client for which the configuration below applies.
- Method: Authorization Method can be set to one of the following values:

  - none: authorization is disabled and login is not possible.

  - tacacs: use a remote TACACS+ server for authorization.
- Cmd Lvl: Runs authorization for all commands at the specified privilege level. Specifies the command level that should be authorized. Valid entries are 0 through 15.
- Cfg Cmd: Enable or disable the configure command.
- Fallback: The local database can act as a fallback method for several functions. This behavior is designed to help you prevent accidental lockout from the security appliance.

Accounting Method Configuration

- Client: The management client for which the configuration below applies.
- Method: The Accounting Method can be set to one of the following values:

  - none: accounting is disabled and login is not possible.

  - tacacs: use a remote TACACS+ server for accounting.
- Cmd Lvl: Runs accounting for all commands at the specified privilege level. Specifies the command level that should be authorized. Valid entries are 0 through 15.
- Exec: Runs accounting to determine if the user is allowed to run an EXEC shell. This facility might return user profile information such as auto command information.

Buttons

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

10.1.4 ACCESS METHOD

This section explains how to configure access management table of the Switch including HTTP/HTTPS, SNMP, and TELNET/SSH. You can manage the Switch over an Ethernet LAN or over the Internet.

WEB INTERFACE

To configure an Access Method Configuration in the web interface:

1. Click Security, Management and Access Method.
2. Select “on” in the Mode of Access Management Configuration.
3. Click “Add new entry”.
4. Specify the VLAN ID, Start IP Address, End IP Address.
5. Check the Access Management method (HTTP/HTTPS, SNMP, and TELNET/SSH).
6. Click Apply.

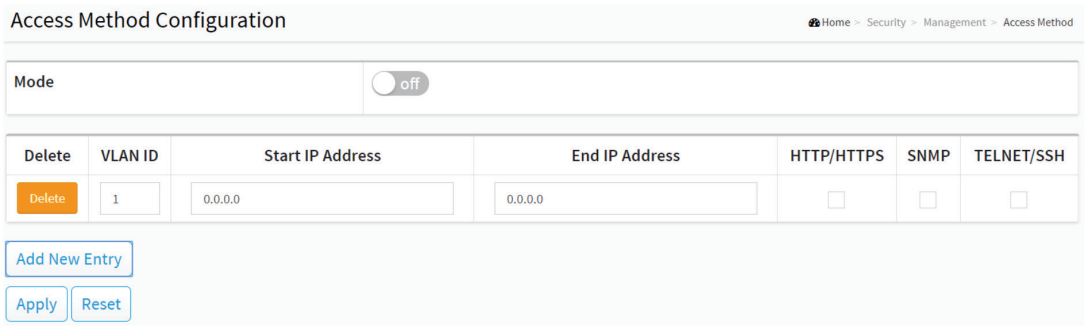

FIGURE 10-4. ACCESS METHOD CONFIGURATION

PARAMETER DESCRIPTION

- Mode: Indicates the access management mode operation. Possible modes are:
  - On: Enable access management mode operation.
  - Off: Disable access management mode operation.
- VLAN ID: Indicates the VLAN ID for the access management entry.
- Delete: Check to delete the entry. It will be deleted during the next save.
- Start IP address: Indicates the start IP unicast address for the access management entry.
- End IP address: Indicates the end IP unicast 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.

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Buttons

- 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.

10.2 802.1X

10.2.1 CONFIGURATION

This section describes how to configure the 802.1X parameters of the switch. 802.1X can be used 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 IEEE 802.1X in the web interface:

1. Click Security, 802.1X and Configuration.
2. Select “on” in the Mode of IEEE 802.1X Configuration.
3. Check 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. Check RADIUS-Assigned QoS Enabled.
9. Check RADIUS-Assigned VLAN Enabled.
10. Check Guest VLAN Enabled.
11. Specify Guest VLAN ID.
12. Specify Max. Reauth. Count.
13. Check Allow Guest VLAN if EAPOL Seen.
14. Select Admin State and displays Port State.
15. Click Apply to save the setting.
16. To cancel the setting, click the Reset button. It will revert to previously saved values.

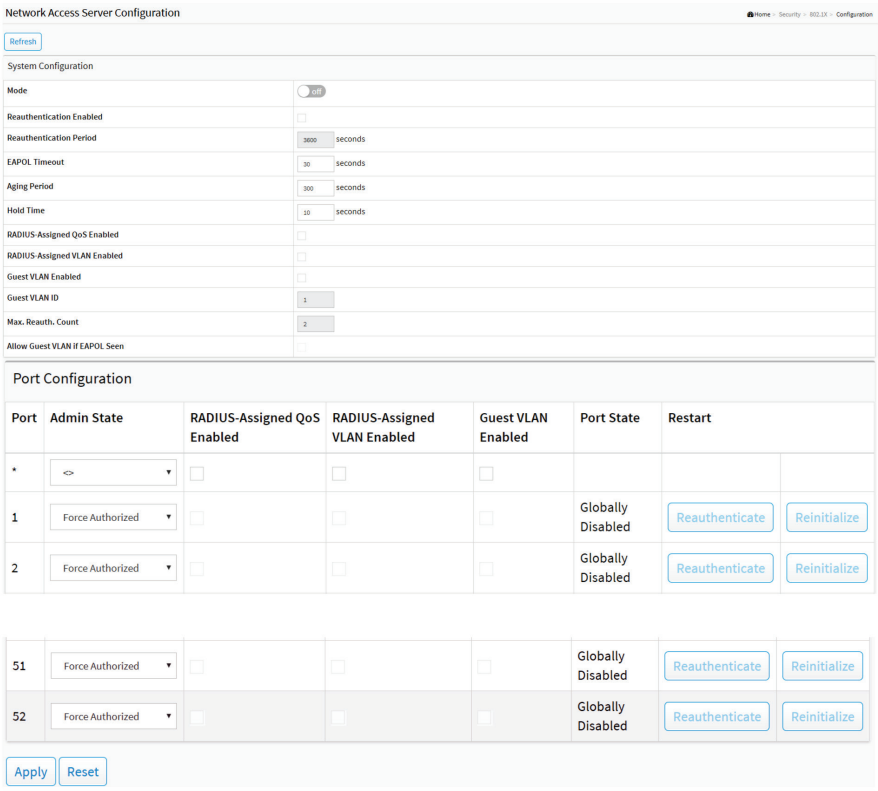


FIGURE 10-5. NETWORK ACCESS SERVER CONFIGURATION

PARAMETER DESCRIPTION

System Configuration

- Mode: on or off. Indicates if IEEE 802.1X is globally enabled or disabled on the switch. If globally disabled, all ports are allowed to forward 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 65535 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 reauthentication, which will fail. But if reauthentication 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 function 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 Unauthorized state. The hold timer does not count during an ongoing 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 port's 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 port's 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; 4094].

- 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 lifetime 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 lifetime 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

- Port: The port number for which the configuration below applies.
- Admin State: If 802.1X is globally enabled, this selection controls the port's authenticationmode. 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).

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

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. 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 piggyback 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 piggyback 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 the 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 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 meantime 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:

  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 0–7, which translates into the desired QoS Class in the range [0; 7].

- 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 troubleshooting 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 troubleshooting 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 meantime, the switch considers entering the Guest VLAN. The interval between transmission 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: IEEE 802.1X is globally disabled.
  - Link Down: IEEE 802.1X 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 affects 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

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

10.2.2 STATUS

This section describes how to show each switch port's 802.1X status information. The status includes Admin State, Port State, Last Source, Last ID and Port VLAN ID.

WEB INTERFACE

To displays 802.1X Status in the web interface:

1. Click Security, IEEE 802.1X and Status.
2. Check "Auto-refresh."
3. Click "Refresh" to refresh the port detailed statistics.
4. You can select the port for which you want display 802.1X Statistics.

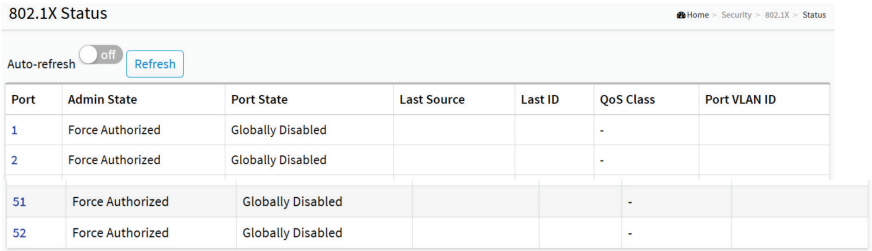


FIGURE 10-6. IEEE 802.1X STATUS

PARAMETER DESCRIPTION

802.1X Status

- Port: The switch port number. Click to navigate to detail 802.1X statistics for this port.
- Admin State: The port's current administrative state. Refer to 802.1X Admin State for a description of possible values.
- Port State: The current state of the port. Refer to 802.1X 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 802.1X has put the port in. The field is blank, if the Port VLAN ID is not overridden by 802.1X.

  If the VLAN ID is assigned by the RADIUS server, "(RADIUS-assigned)" is appended to the VLAN ID.

  If the port is moved to the Guest VLAN, "(Guest)" is appended to the VLAN ID.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

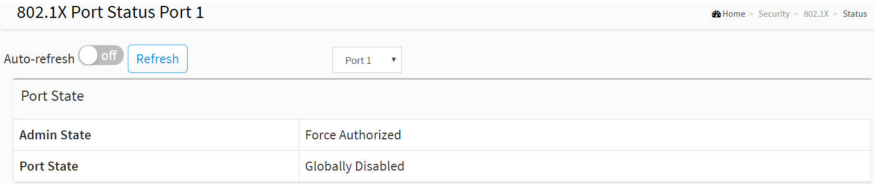


FIGURE 10-7. 802.1X STATISTICS PORT 1

PARAMETER DESCRIPTION

- Port: You can select the port for which you want display 802.1X Statistics.
- Admin State: The port's current administrative state. Refer to 802.1X Admin State for a description of possible values.
- Port State: The current state of the port. Refer to 802.1X Port State for a description of the individual states.

Buttons:

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page.

10.3 IP SOURCE GUARD

This section describes how to configure the IP Source Guard detail parameters of the switch. You can enable or disable the IP Source Guard.

10.3.1 CONFIGURATION

This section describes how to configure the 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 Security, IP Source Guard and Configuration.
2. Select “on” in the Mode of IP Source Guard Configuration.
3. Select “Enabled” for the specific port in the 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.

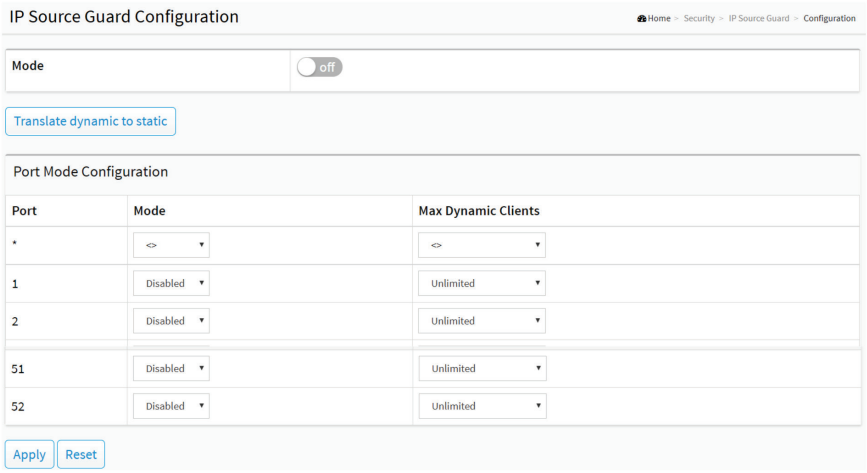


FIGURE 10-8. IP SOURCE GUARD CONFIGURATION

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, the switch only allows the IP packets to be forwarded that match static entries on the specific port.

Buttons

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

10.3.2 STATIC TABLE

This section describes how to configure the Static IP Source Guard Table parameters of the switch. You can 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 Security, 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.

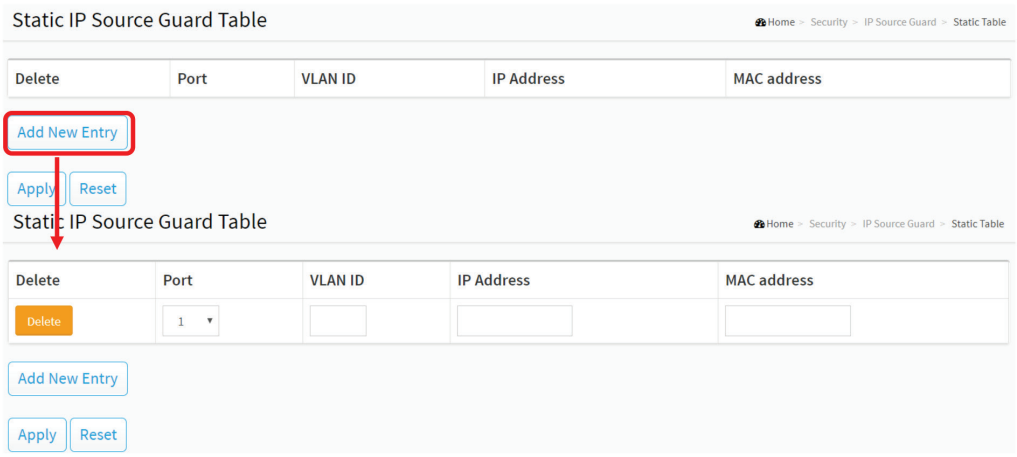


FIGURE 10-9. STATIC IP SOURCE GUARD TABLE

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

- Add New Entry: Click to add a new entry to the Static IP Source Guard table. Specify the Port, IP address, and MAC address for the new entry. Click "Apply".
- 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.

10.3.3 DYNAMIC TABLE

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 IP address, and then by MAC address.

WEB INTERFACE

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

1. Click Security, IP Source Guard and Dynamic Table.
2. Check "Auto-refresh."
3. Click "Refresh" to refresh the port detailed statistics.
4. Click First/Next Page to change page.
5. Specify the Start from port, VLAN, IP Address, and entries per page.

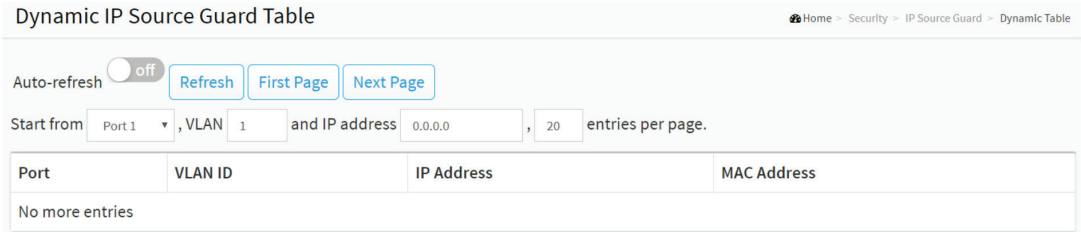


FIGURE 10-10. DYNAMIC IP SOURCE GUARD TABLE

PARAMETER DESCRIPTION

- Navigating the IP Source Guard Table: Each page shows up to 99 entries from the Dynamic IP Source Guard 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 IP Source Guard Table.

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

  The “Next Page” 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 “First Page” button to start over.
- 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.
- Show entries: You can choose how many items you want to show.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the group information entries, turn to the next page.

10.4 ARP INSPECTION

This section describes how to configure the ARP Inspection parameters of the switch. You can use the ARP Inspection configuration to manage the ARP table.

10.4.1 CONFIGURATION

This section describes how to configure ARP Inspection setting including:

- Mode (on and off)
- Port (Enabled and Disabled)

WEB INTERFACE

To configure an ARP Inspection Configuration in the web interface:

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

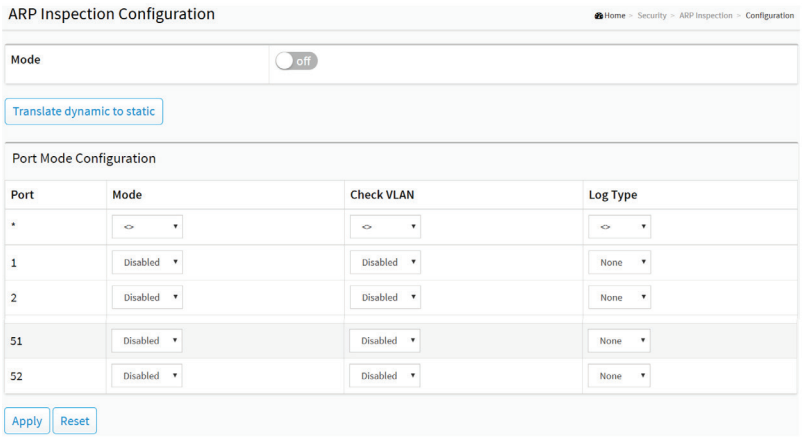


FIGURE 10-11. ARP INSPECTION CONFIGURATION

PARAMETER DESCRIPTION

- Mode of ARP Inspection Configuration: Enable the Global ARP Inspection or disable the Global ARP Inspection.
- Port Mode Configuration: Specify which ports ARP Inspection is enabled on. Only when both Global Mode and Port Mode on a given port are enabled will ARP Inspection be 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. When the setting of “Check VLAN” is enabled, the log type of ARP Inspection will refer to the VLAN setting. Possible settings of “Check VLAN” are:

  - Enabled: Enable check VLAN operation.

  - Disabled: Disable check VLAN operation.

  Only when the Global Mode and Port Mode on a given port are enabled, and the setting of “Check VLAN” is disabled, will the log type of ARP Inspection 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.
- Check VLAN: If you want to inspect the VLAN configuration, you have to enable the setting of “Check VLAN.” The default setting of “Check VLAN” is disabled. When the setting of “Check VLAN” is disabled, the log type of ARP Inspection will refer to the port setting. When the setting of “Check VLAN” is enabled, the log type of ARP Inspection will refer to the VLAN setting. Possible settings of “Check VLAN” are:

  - Enabled: Enable check VLAN operation.

  - Disabled: Disable check VLAN operation.
- Log Type: When 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

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

10.4.2 VLAN CONFIGURATION

Specify which VLANs have ARP Inspection enabled.

WEB INTERFACE

To configure a VLAN Mode Configuration in the web interface:

1. Click Security, ARP Inspection and VLAN Configuration.
2. Click “Add new entry.”
3. Specify the VLAN ID, Log Type.
4. Click Apply.
5. Click First Entry/Next Entry to change Entry.

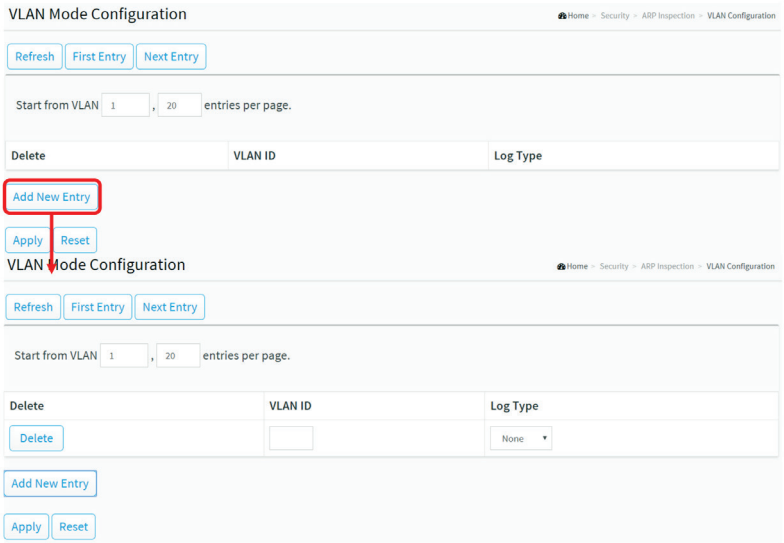


FIGURE 10-12. VLAN MODE CONFIGURATION

PARAMETER DESCRIPTION

- Navigating the VLAN Configuration: Each page shows up to 9999 entries from the VLAN table, default is 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 "Refresh" button will update the displayed table starting from that or the closest next VLAN Table match. The "Next Entry" 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 "First Entry" button to start over.

- 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

- Add New Entry:Click to add a new VLAN to the ARP Inspection VLAN table.
- 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.
- First Entry: Updates the table starting from the first entry in the IPMC Profile Address Configuration.
- Next Entry: Updates the table, starting with the entry after the last entry currently displayed.
- Refresh: Click to refresh the page immediately.

10.4.3 STATIC TABLE

This section describes how to configure the Static ARP Inspection Table parameters of the switch. You can 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 Security, ARP Inspection and Static Table.
2. Click "Add new entry."
3. Specify the Port, VLAN ID, IP Address, MAC address and IP Address in the entry.
4. Click Apply.

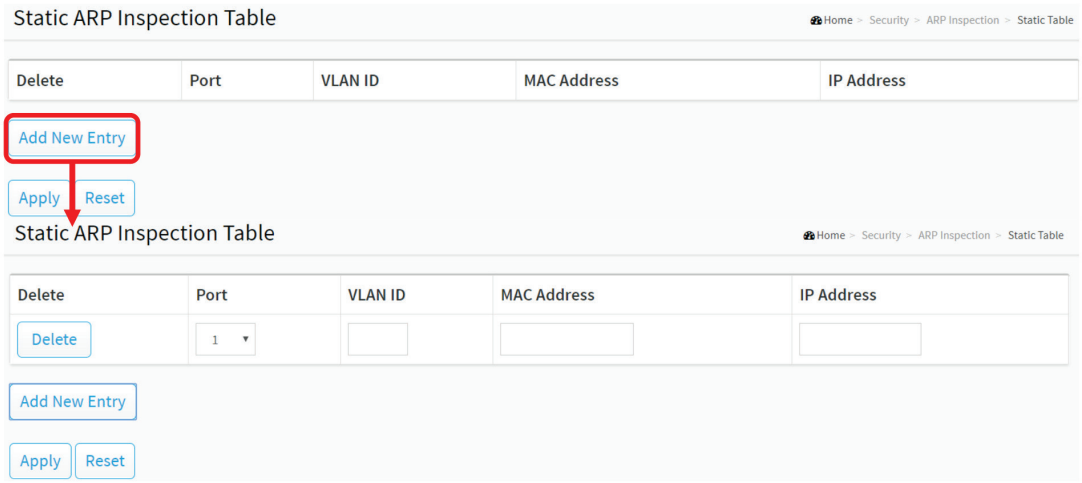


FIGURE 10-13. STATIC ARP INSPECTION TABLE

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

- Add New Entry: Click to add a new entry to the Static ARP Inspection table.
- 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.

10.4.4 DYNAMIC TABLE

Entries in the Dynamic ARP Inspection Table are shown on this page. The Dynamic ARP Inspection Table contains up to 256 entries, and is sorted first by port, then by VLAN ID, then by MAC address, and then by IP address. All dynamic entries are learning from DHCP Snooping.

Navigating the ARP Inspection Table

Each page shows up to 99 entries from the Dynamic ARP Inspection table, default is 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 “Refresh” 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—when you click the “Refresh” button—assume the value of the first displayed entry, allowing for continuous refresh with the same start address.

The “Next Page” 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 “First Page” button to start over.

WEB INTERFACE

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

1. Click Security, ARP Inspection and Dynamic Table.
2. Check “Auto-refresh.”
3. Click “Refresh” to refresh the port detailed statistics.
4. Click First/Next Page to change page.
5. Specify the Start from port, VLAN, MAC Address, IP Address, and entries per page.

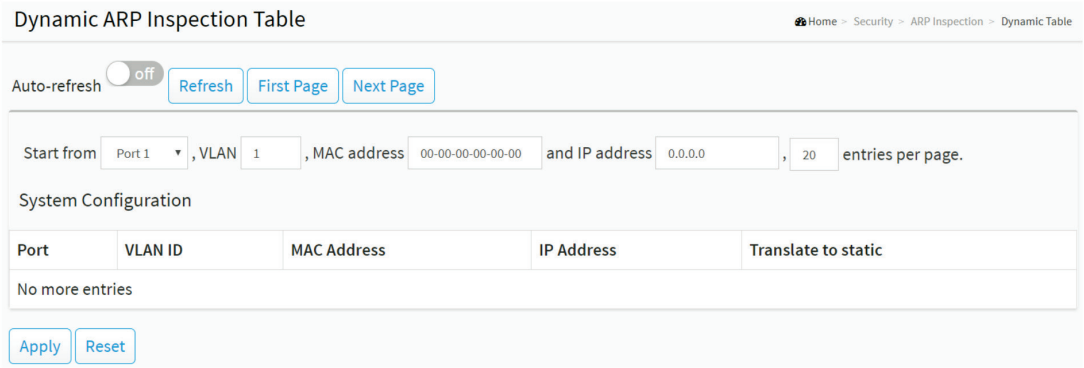


FIGURE 10-14. DYNAMIC ARP INSPECTION TABLE

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.
- Show entries: You can choose how many items you want to show up.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- First Page: Updates the system log entries, turn to the first page.
- Next Page: Updates the group information entries, turn to the next page.

10.5 PORT SECURITY

10.5.1 CONFIGURATION

This section shows you how 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 Port Security Configuration in the web interface:

1. Click Security, Port Security and Configuration.
2. Click to Enable the Aging to specify Aging Period.
3. Set Mode (Enabled, Disabled), Limit, Violation Mode, Violation Limit for each port.
4. Click Apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

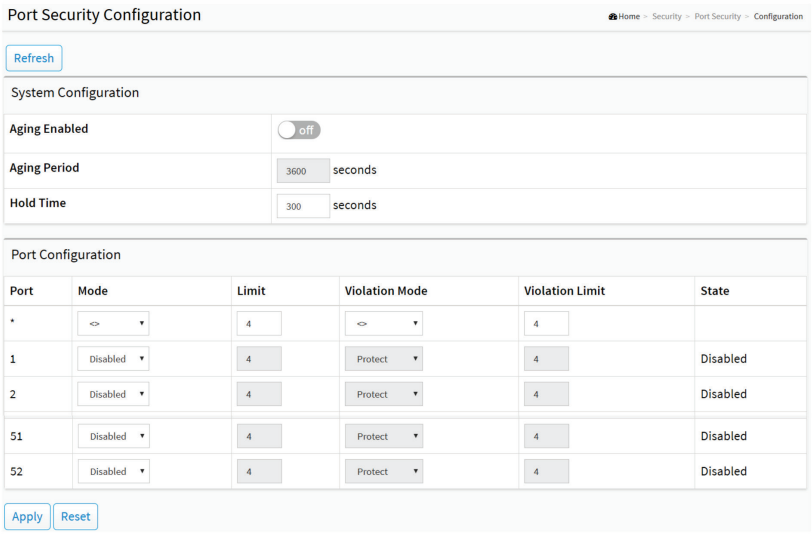


FIGURE 10-15. PORT SECURITY CONFIGURATION

PARAMETER DESCRIPTION

System Configuration

- 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 functionality for securing MAC addresses, they may have other requirements for the aging period. The underlying functionality will use the shorter requested aging period of all modules that have aging enabled.

  The Aging Period can be set to a number between 10 and 10000000 seconds with a default of 3600 seconds.

To understand why aging may be desired, consider the following scenario: Suppose an end-host is connected to a third-party switch or hub, which in turn is connected to a port on this switch on which Port Security is enabled. The end-host will be allowed to forward if the limit is not exceeded. 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.

- Hold Time: The hold time—measured in seconds— is used to determine how long a MAC address is held in the MAC table if it has been found to violate the limit. Valid range is between 10 and 10000000 seconds with a default of 300 seconds.

  The reason for holding a violating MAC address in the MAC table is primarily to ensure that the same MAC address doesn't give rise to continuous notifications (if notifications on violation count is 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.
- 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. 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, a configured address might not be granted, if the remaining ports have already used all available MAC addresses.
- Violation Mode: If Limit is reached, the switch can take one of the following actions:
  - Protect: Do not allow more than Limit MAC addresses on the port, but take no further action.
  - Restrict: If Limit is reached, subsequent MAC addresses on the port will be counted and marked as violating. Such MAC addresses are removed from the MAC table when the hold time expires. At most Violation Limit MAC addresses can be marked as violating at any given time.
  - Shutdown: If Limit is reached, one additional MAC address will cause the port to be shut down. This implies that all secured MAC addresses be removed from the port, and no new addresses be learned. There are three ways to re-open the port:

  1) In the "Configuration Ports" page's "Configured" column, first disable the port, then restore the original mode.

  2) Make a Port Security configuration change on the port.

  3) Boot the switch.
- Violation Limit: The maximum number of MAC addresses that can be marked as violating on this port. This number cannot exceed 1023. Default is 4. It is only used when Violation Mode is Restrict.
- 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 Shutdown or Trap and Shutdown.

Buttons

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

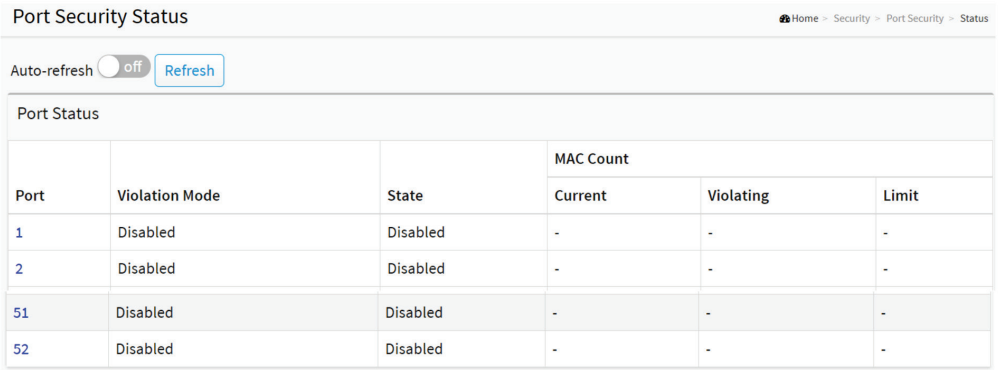
10.5.2 STATUS

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 a Port Security Status in the web interface:

1. Click Security, Port Security and status.
2. Check “Auto-refresh.”
3. Click “Refresh” to refresh the port detailed statistics.
4. Click the port number to see the status for this particular port.



Port	Violation Mode	State	MAC Count		
			Current	Violating	Limit
1	Disabled	Disabled	-	-	-
2	Disabled	Disabled	-	-	-
51	Disabled	Disabled	-	-	-
52	Disabled	Disabled	-	-	-

FIGURE 10-16. PORT SECURITY STATUS

PARAMETER DESCRIPTION

- Port: The port number for which the status applies. Click the port number to see the status for this particular port.
- Violation Mode: Shows the configured Violation Mode of the port. It can take one of four values:
  - Disabled: Port Security is not administratively enabled on this port.
  - Protect: Port Security is administratively enabled in Protect mode.
  - Restrict: Port Security is administratively enabled in Restrict mode.
  - Shutdown: Port Security is administratively enabled in Shutdown mode.
- State: Shows the current state of the port. It can be 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, Violating, Limit): The three columns indicate the number of currently learned MAC addresses (forwarding as well as blocked), the number of violating MAC addresses (only counting in Restrict mode) 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 (-). If Port Security is not administratively enabled on the port, the Violating and Limit columns 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 immediately.
- Click the port number to see the status for this particular port.

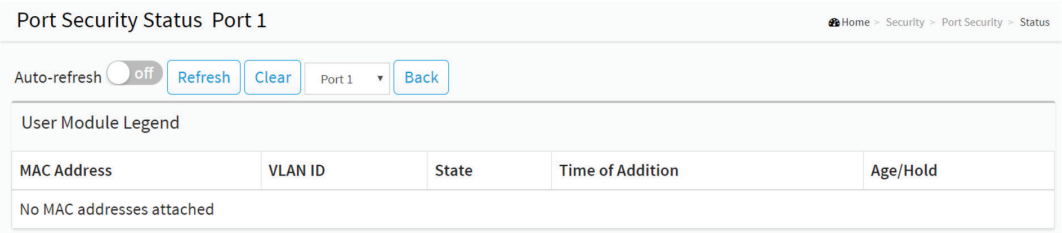


FIGURE 10-17. PORT SECURITY STATUS

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 immediately.
- Clear: Click to remove this particular MAC addresses from MAC table.
- Port 1: Select the port for which you want to display the Port Security Status.
- Back: Click to go back Port Security Status.

10.6 RADIUS

10.6.1 CONFIGURATION

WEB INTERFACE

To configure a RADIUS in the web interface:

1. Click Security, RADIUS and Configuration.
2. Set Timeout, Retransmit, Deadtime, Key, NAS-IP-Address, NAS IPv6-Address, NAS-Identifier.
3. Click “Add New Entry.”
4. Set Hostname, Auth Port, Acct Port, Timeout, Retransmit, Key.
5. Click Apply to save the setting.
6. To cancel the setting, click the Reset button. It will revert to previously saved values.

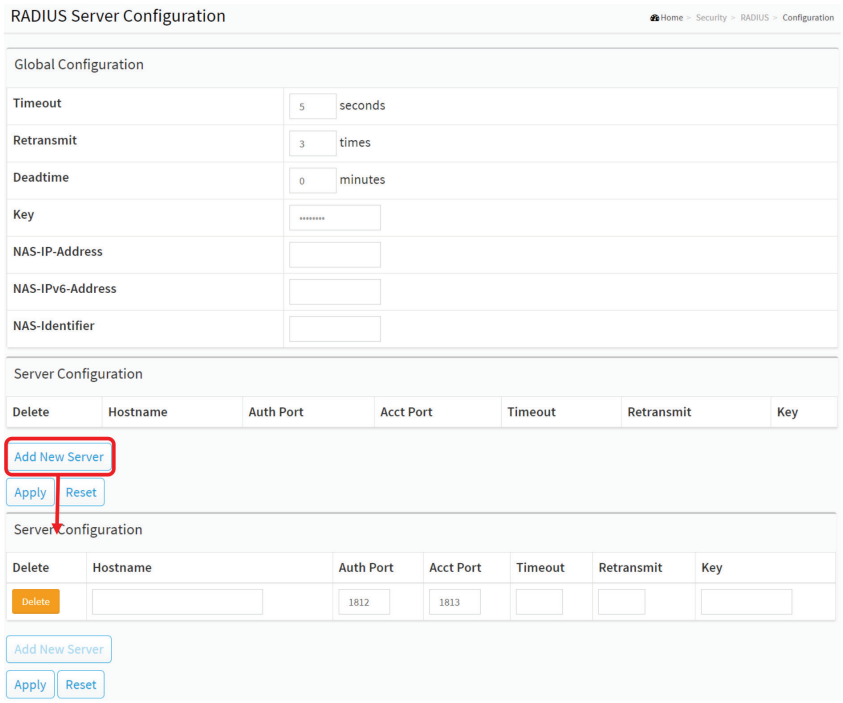


FIGURE 10-18. RADIUS SERVER CONFIGURATION

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: 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: 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: 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: To delete a RADIUS server entry, check this box. The entry will be deleted during the next Save.
- Add New Entry: 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.

10.6.2 STATUS

This section shows you an overview/detail of the RADIUS Authentication and Accounting servers' status to ensure the function is workable.

WEB INTERFACE

To display a RADIUS Status in the web interface:

1. Click Security, RADIUS and Status.
2. Select a server to display the detail statistics for a particular RADIUS.

RADIUS Server Status

Home > Security > RADIUS > Status

Auto-refresh off Refresh

#	IP Address	Authentication Port	Authentication Status	Accounting Port	Accounting Status
1			Disabled		Disabled
2			Disabled		Disabled
3			Disabled		Disabled
4			Disabled		Disabled
5			Disabled		Disabled

FIGURE 10-19. RADIUS SERVER STATUS OVERVIEW

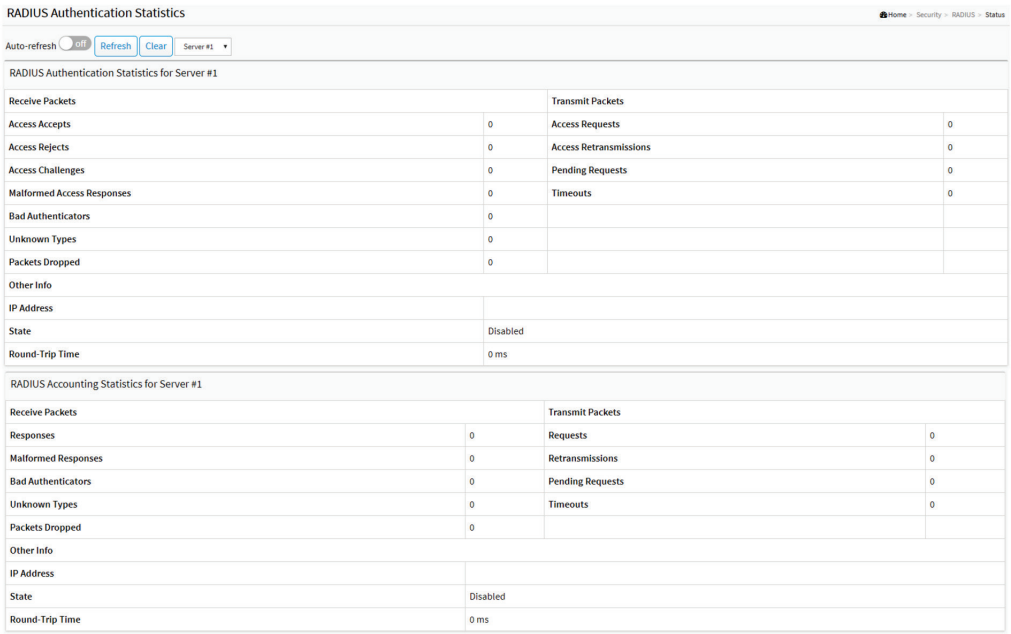
PARAMETER DESCRIPTION

- #: 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.
- Authentication Port: UDP port number for authentication.
- Authentication Status: The current status 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.
- Accounting Port: UDP port number for accounting.
- Accounting Status: The current status 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.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.

If you select Server#1 to display RADIUS Statistics:



RADIUS Authentication Statistics

Home > Security > RADIUS > Status

Auto-refresh off | Refresh | Clear | Server #1

RADIUS Authentication Statistics for Server #1

Receive Packets		Transmit Packets	
Access Accepts	0	Access Requests	0
Access Rejects	0	Access Retransmissions	0
Access Challenges	0	Pending Requests	0
Malformed Access Responses	0	Timeouts	0
Bad Authenticators	0		
Unknown Types	0		
Packets Dropped	0		
Other Info			
IP Address			
State	Disabled		
Round-Trip Time	0 ms		

RADIUS Accounting Statistics for Server #1

Receive Packets		Transmit Packets	
Responses	0	Requests	0
Malformed Responses	0	Retransmissions	0
Bad Authenticators	0	Pending Requests	0
Unknown Types	0	Timeouts	0
Packets Dropped	0		
Other Info			
IP Address			
State	Disabled		
Round-Trip Time	0 ms		

FIGURE 10-20. RADIUS STATISTICS FOR SERVER

PARAMETER DESCRIPTION

- server: You can select the server for which you want to display RADIUS.

RADIUS Authentication Statistics for Server #1

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.

- Access Accepts: The number of RADIUS Access-Accept packets (valid or invalid) received from the server.
- Access Rejects: The number of RADIUS Access-Reject packets (valid or invalid) received from the server.
- Access Challenges: The number of RADIUS Access-Challenge packets (valid or invalid) received from the server.
- Malformed Access Responses: The number of malformed RADIUS Access-Response packets received from the server. Malformed packets include packets with an invalid length. Bad authenticators or Message Authenticator attributes or unknown types are not included as malformed access responses.
- Bad Authenticators: The number of RADIUS Access-Response packets containing invalid authenticators or Message Authenticator attributes received from the server.
- Unknown Types: The number of RADIUS packets that were received with unknown types from the server on the authentication port and dropped.
- Packets Dropped: The number of RADIUS packets that were received from the server on the authentication port and dropped for some other reason.
- Access Requests: The number of RADIUS Access-Request packets sent to the server. This does not include retransmissions.
- Access Retransmissions: The number of RADIUS Access-Request packets retransmitted to the RADIUS authentication server.

- Pending Requests: The number of RADIUS Access-Request packets destined for the server that have not yet timed out or received a response. This variable is incremented when an Access-Request is sent and decremented due to receipt of an Access-Accept, Access-Reject, Access-Challenge, timeout, or retransmission.
- Timeouts: The number of authentication timeouts to the server. After a timeout, the client may retry to the same server, send to a different server, or give up. A retry to the same server is counted as a retransmit as well as a timeout. A send to a different server is counted as a Request as well as a timeout.
- IP Address: IP address and UDP port for the authentication server in question.
- State: Shows the state of the server. It takes one of the following values:
  - Disabled: The selected 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.
- Round-Trip Time: The time interval (measured in milliseconds) between the most recent Access-Reply/Access-Challenge and the Access-Request that matched it from the RADIUS authentication server. The unit of this measurement is 100 ms. A value of 0 ms indicates that there hasn't been round-trip communication with the server yet.

RADIUS Accounting Statistics for Server #1

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.

- Responses: The number of RADIUS packets (valid or invalid) received from the server.
- Malformed Responses: The number of malformed RADIUS packets received from the server. Malformed packets include packets with an invalid length. Bad authenticators or unknown types are not included as malformed access responses.
- Bad Authenticators: The number of RADIUS packets containing invalid authenticators received from the server.
- Unknown Types: The number of RADIUS packets of unknown types that were received from the server on the accounting port.
- Packets Dropped: The number of RADIUS packets that were received from the server on the accounting port and dropped for some other reason.
- Requests: The number of RADIUS packets sent to the server. This does not include retransmissions.
- Retransmissions: The number of RADIUS packets retransmitted to the RADIUS accounting server.
- Pending Requests: The number of RADIUS packets destined for the server that have not yet timed out or received a response. This variable is incremented when a Request is sent and decremented due to receipt of a Response, timeout, or retransmission.
- Timeouts: The number of accounting timeouts to the server. After a timeout, the client may retry to the same server, send to a different server, or give up. A retry to the same server is counted as a retransmit as well as a timeout. A send to a different server is counted as a Request as well as a timeout.
- IP Address: IP address and UDP port for the accounting server in question.
- State: Shows the state of the server. It takes one of the following values:
  - Disabled: The selected 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.

- Round-Trip Time: The time interval (measured in milliseconds) between the most recent Response and the Request that matched it from the RADIUS accounting server. The unit of this measurement is 100 ms. A value of 0 ms indicates that there hasn't been round-trip communication with the server yet.

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 counters for the selected server. The "Pending Requests" counter will not be cleared by this operation.

10.7 TACACS+

This page allows you to configure up to 5 TACACS+servers.

WEB INTERFACE

To configure the TACACS+ servers in the web interface:

1. Click Security and TACACS+.
2. Click "Add New Entry."
3. Specify the Timeout, Deadtime, Key.
4. Specify the Hostname, Port, Timeout and Key in the server.
5. Click Apply.

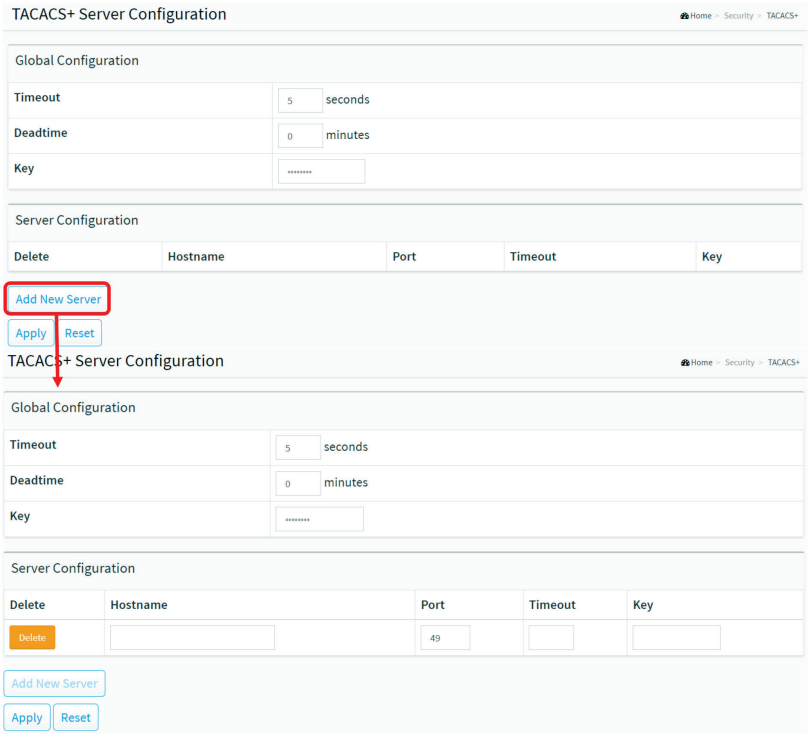


FIGURE 10-21. YACACS+ SERVER CONFIGURATION

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PARAMETER DESCRIPTION

Global Configuration

These setting 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.

11.1 PORTS CONFIGURATION

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 Access Control and Port Configuration.
2. Scroll to the specific parameter value to select the correct value for port ACL setting.
3. Click apply to save the setting.
4. To cancel the setting, click the reset button. It will revert to previously saved values.
5. After you complete configuring, then you can see the port Counter. Click refresh to update the counter or Clear the information.

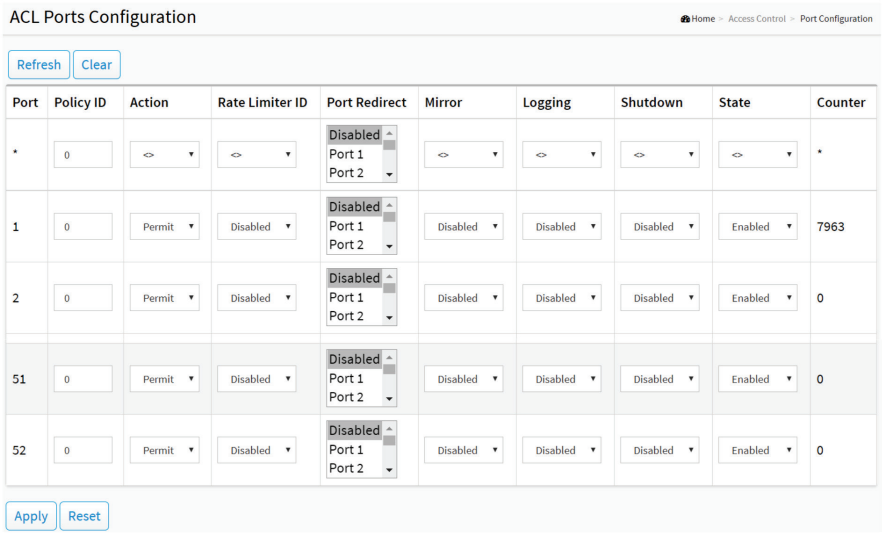

FIGURE 11-1. ACL PORTS CONFIGURATION

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.”
- 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.”

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- 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.”

NOTE: The System Log memory size and logging rate is limited.

- Shutdown: Specify the 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 state of this port. The allowed values are:
  - Enabled: Reopen ports by changing the volatile port configuration of the ACL user module.
  - Disabled: 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: Click to refresh the ACL Port Configuration or clear them manually.
- Apply: Click to save changes.
- Reset: Click to undo any changes made locally and revert to previously saved values.

11.2 RATE LIMITERS

This section describes how to configure the switch’s ACL Rate Limiter parameters. The Rate Limiter Level from 1 to 16 allow userss to set the rate limiter value in units of pps.

WEB INTERFACE

To configure ACL Rate Limiter in the web interface:

1. Click Access Control and Rate Limiters.
2. Specify the Rate field, Unit.
3. Click Apply to save the setting
4. To cancel the setting, click the reset button. It will revert to previously saved values.

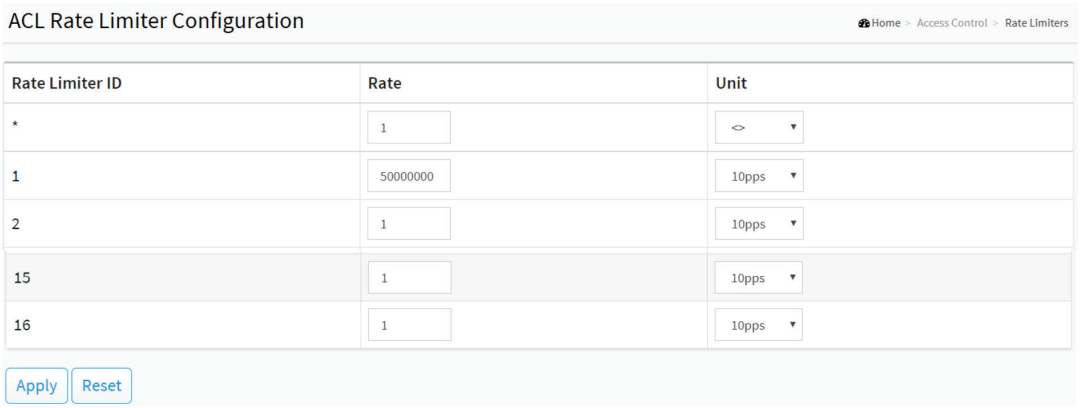

FIGURE 11-2. ACL RATE LIMITER CONFIGURATION

PARAMETER DESCRIPTION

- Rate Limiter ID: The rate limiter ID for the settings contained in the same row and its range is 1 to 16.
- Rate: The valid rate is 0, 10, 20, 30, ..., 5000000 in pps or 0, 25, 50, 75, ..., 10000000 in kbps.
- Unit: Specify the rate unit. The allowed values are:

  10 pps: packets per second.

  25 kbps: Kbits per second.

Buttons

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

11.3 ACCESS CONTROL LIST

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 512 on each switch.

Click on the lowest plus sign to add a new ACE to the list. The reserved ACEs are used for internal protocol and cannot be edited or deleted, the order sequence cannot be changed and the priority is highest.

WEB INTERFACE

To configure Access Control List in the web interface:

1. Click Access Control and Access Control List.
2. 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).
3. Specify the ACE parameter.
4. Click save to save the setting.
5. To cancel the setting, click the reset button. It will revert to previously saved values.

6. 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).

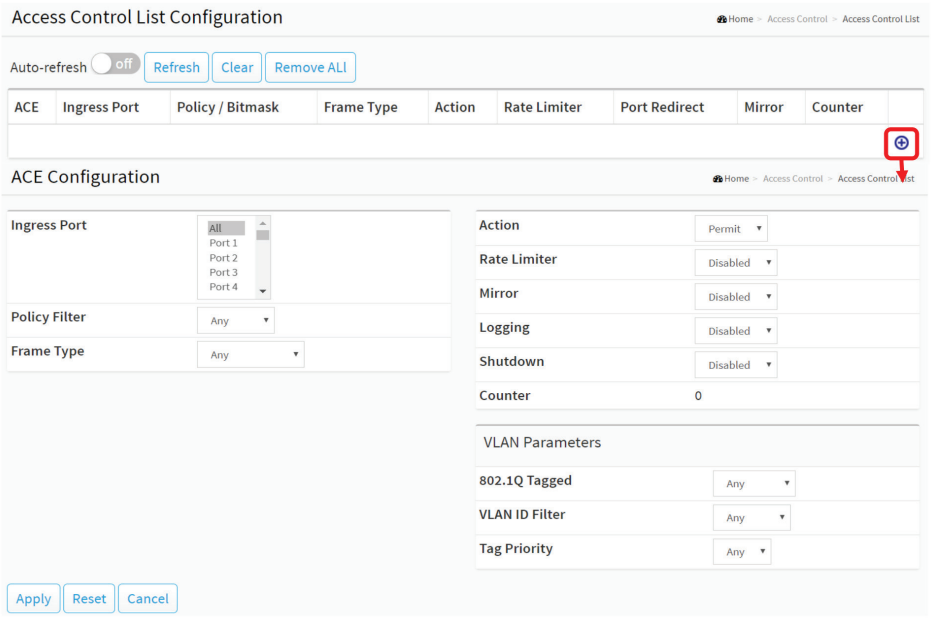

FIGURE 11-3. ACCESS CONTROL LIST CONFIGURATION

PARAMETER DESCRIPTION

- ACE: Indicates the ACE ID.
- 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.

  e : Edits the ACE row.

  up-arrow: Moves the ACE up the list.

  down-arrow : Moves the ACE down the list.

  X : 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 ports.

  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 fields are used for entering a policy value and bitmask.
- 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. NOTE: The ARP frames won't match the ACE with ethernet type.

  IPv4: Only IPv4 frames can match this ACE. NOTE: 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. NOTE: The logging message doesn't include the 4 bytes of 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: This is 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 an 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 "xxxxxxxxxxxx" (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 “xxxxxxxxxxxx” (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 (0 x 800).

  1: ARP/RARP frames where the PRO is equal to IP (0 x 800).

  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.

  UDP: Select UDP to filter IPv4 UDP protocol frames. Extra fields for defining UDP parameters will appear.

  TCP: Select TCP to filter IPv4 TCP protocol frames. Extra fields for defining TCP parameters will appear.
- 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.

  UDP: Select UDP to filter IPv6 UDP protocol frames. Extra fields for defining UDP parameters will appear.

  TCP: Select TCP to filter IPv6 TCP protocol frames. Extra fields for defining TCP parameters will appear.

- 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 supports the 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 supports 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 0xFFFFFFFE(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 a 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.

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- Auto-refresh: Select auto-refresh to refresh the information automatically.
- Refresh, clear, Remove All: Click to refresh the ACL configuration or clear manually. Click Remove All to clean up all ACL configurations on the table.
- Cancel: Return to the previous page.

11.4 ACL STATUS

This section describes how to show the ACL status for 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 Access Control and ACL status
2. To auto-refresh the information, select“Auto-refresh.”
3. Click “Refresh“ to refresh the ACL Status.

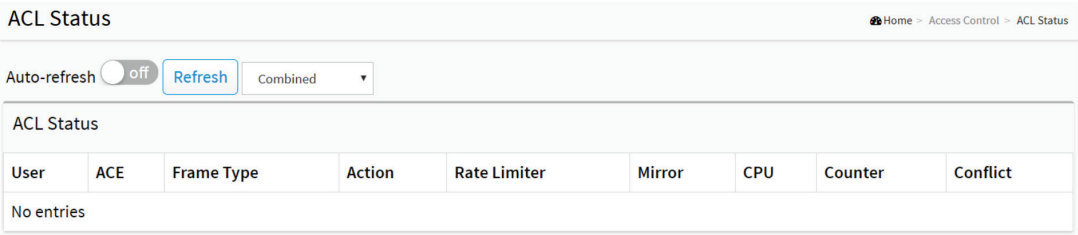

FIGURE 11-4. ACL STATUS SCREEN

PARAMETER DESCRIPTION

- User: Indicates the ACL user.
- 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: 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.

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- 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.
- CPU: Forward packets that match 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 immediately.

CHAPTER 12: 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. An SNMP agent is running on the switch to respond to requests issued by the SNMP manager.

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

12.1 CONFIGURATION

This section describes how to configure an 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 the <Apply> button and the setting takes effect.

WEB INTERFACE

To configure the configure SNMP System in the web interface:

1. Click SNMP and configuration.
2. Enable or disable the SNMP function.
3. Specify the Read Community, Write Community.
4. Click Apply.

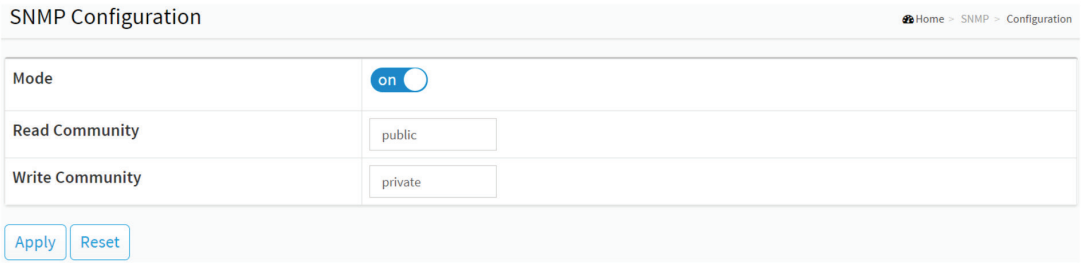

FIGURE 12-1. SNMP CONFIGURATION

PARAMETER DESCRIPTION

- Mode: Indicates the SNMP mode operation. Possible modes are:

  on: Enable SNMP mode operation.

  off: Disable SNMP mode operation.
- Read Community: Indicates the community read access string to permit access to SNMP agent. The allowed string length is 1 to 31, 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 the source subnet.

- Write Community: Indicates the community write access string to permit access to an SNMP agent. The allowed string length is 1 to 31, 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 an SNMPv1 or SNMPv2c community string. In addition to community string, a particular range of source addresses can be used to restrict the source subnet.

Buttons

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

12.2 SNMPV3

12.2.1 COMMUNITIES

Configure SNMPv3 community table on this page. The entry index key is Community.

WEB INTERFACE

To configure the configure SNMP Communities in the web interface:

1. Click SNMP, SNMPv3 and Communities.
2. Click Add New Entry.
3. Specify the SNMP community parameters.
4. Click Apply.
5. To modify or clear the setting, click Reset.

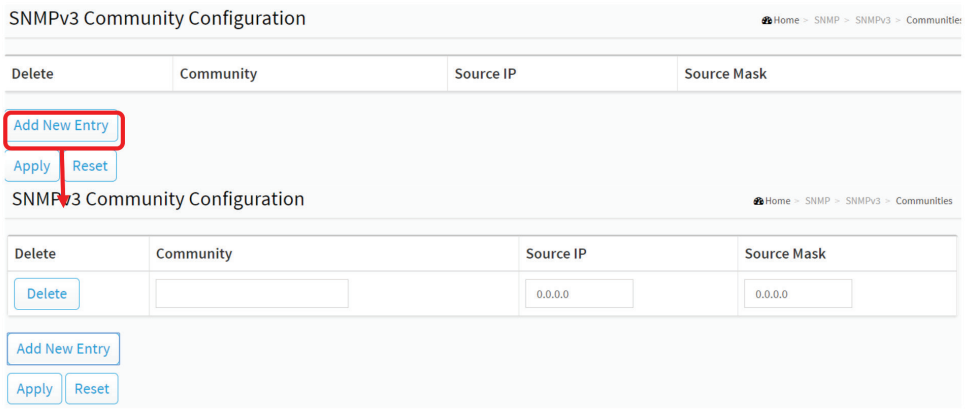

FIGURE 12-2. SNMP3 COMMUNITIES CONFIGURATION

PARAMETER DESCRIPTION

- Community: Indicates the security name to map the community to the SNMP Groups configuration. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.
- Source IP: Indicates the SNMP access source address. A particular range of source addresses can be used to restrict a source subnet when combined with a source mask.
- Source IP Prefix: Indicates the SNMP access source address prefix.

Buttons

- Add New Entry: Click to add a new entry. Specify the name and configure the new entry. Click “Apply.”
- 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.

12.2.2 USERS

This function is used to configure an SNMPv3 user. The Entry index key is UserName. To create a new UserName account, check the <Add new user> button, and enter the user information, then check <Apply>. Max Group Number: 6.

WEB INTERFACE

To configure SNMP Users in the web interface:

1. Click SNMP, SNMPv3 and Users.
2. Click Add new entry.
3. Specify the SNMPv3 Users parameter.
4. Click Apply.

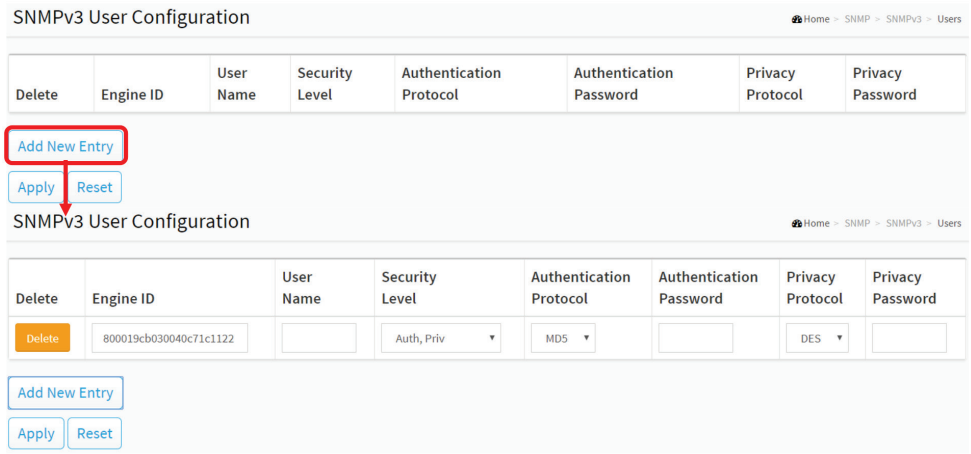

FIGURE 12-3. SNMP USERS CONFIGURATION

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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 a local user; otherwise it's a remote user.
- User Name: A string identifying the user name that this entry should belong to. The allowed string length is 1 to 31, 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:

  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 you 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 39. For SHA authentication protocol, the allowed string length is 8 to 39. 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:

  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 31, and the allowed content is ASCII characters from 33 to 126.

Buttons

- Add New Entry: Click to add a new entry. Specify the name and configure the new entry. Click "Apply."
- 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.

12.2.3 GROUPS

This function is used to configure an SNMPv3 group. The Entry index keys are Security Model and Security Name. To create a new group account, check <Add new group> button and enter the group information, then check <Apply>. Max Group Number:12.

WEB INTERFACE

To configure SNMP Groups in the web interface:

1. Click SNMP, SNMPv3 and Groups.
2. Click Add new entry.
3. Specify the SNMP group parameter.
4. Click Apply.

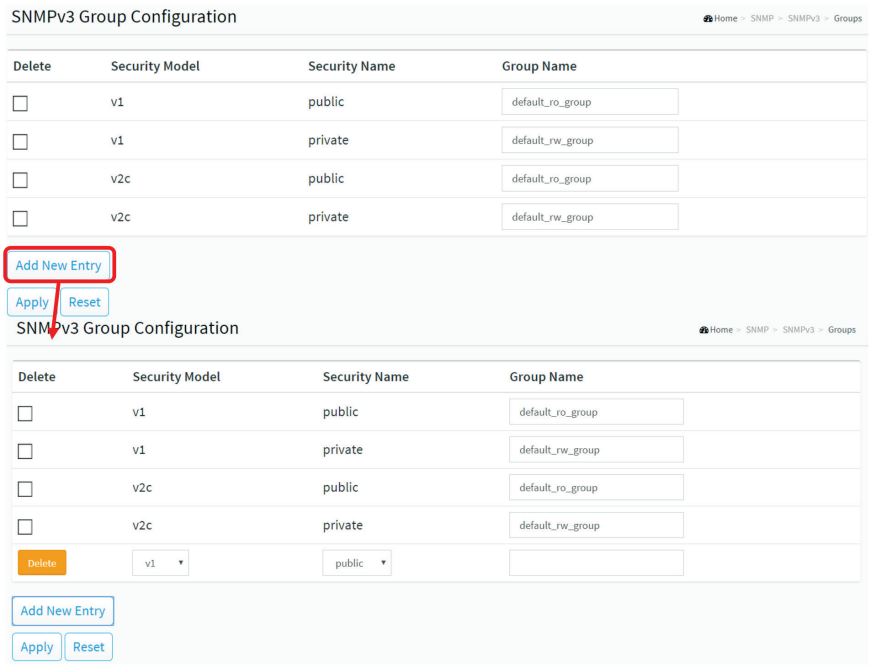

FIGURE 12-4. SNMP GROUPS CONFIGURATION

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 31, 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

- Add New Entry: Click to add a new entry. Specify the name and configure the new entry. Click “Apply.”
- 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.

12.2.4 VIEWS

This function is used to configure SNMPv3 view. The Entry index keys are OID Subtree and View Name. To create a new view account, check the <Add new view> button and enter the view information, then click <Apply>. Max Group Number: 12.

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

WEB INTERFACE

To configure SNMP views in the web interface:

1. Click SNMP, SNMPv3 and Views.
2. Click Add new entry.
3. Specify the SNMP View parameters.
4. Click Apply.
5. To modify or clear the setting, click Reset.

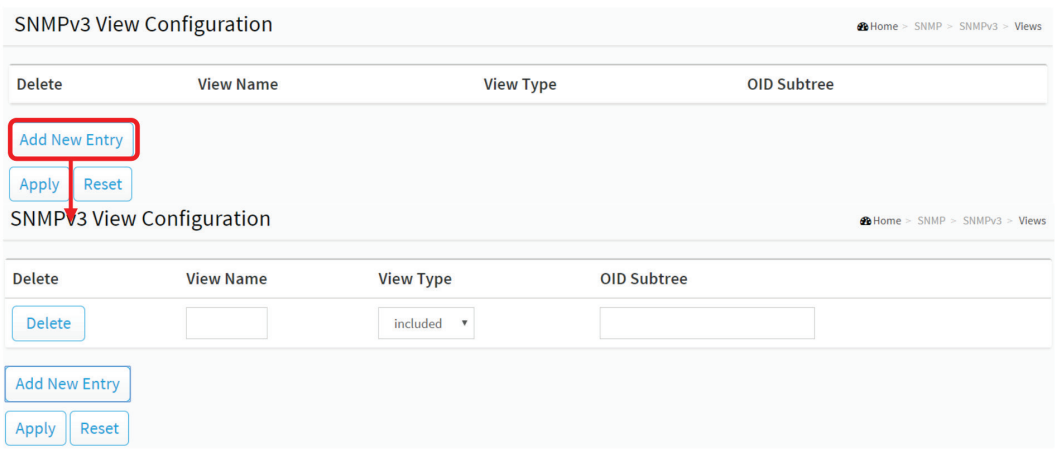

FIGURE 12-5. SNMP VIEWS CONFIGURATION

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PARAMETER DESCRIPTION

- View Name: A string identifying the view name that this entry should belong to. The allowed string length is 1 to 31, 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 a digital number or asterisk(*).

Buttons

- Add New Entry: Click to add a new entry. Specify the name and configure the new entry. Click "Apply."
- 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.

12.2.5 ACCESS

This function is used to configure SNMPv3 access. The Entry index keys are Group Name, Security Model and Security level. To create a new access account, check the <Add new access> button and enter the access information, then check <Apply>. Max Group Number : 12.

WEB INTERFACE

To display the configure SNMP Access in the web interface:

1. Click SNMP, SNMPv3 and Accesses.
2. Click Add new entry.
3. Specify the SNMP Access parameters.
4. Click Apply.
5. To modify or clear the setting, click Reset.

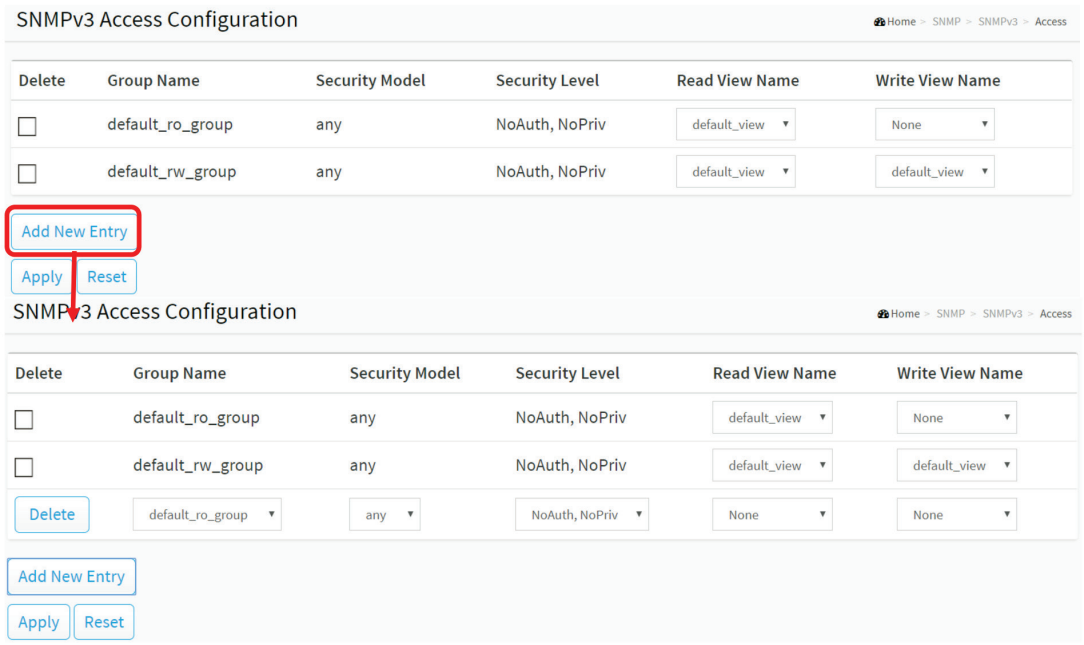

FIGURE 12-6. SNMP ACCESS CONFIGURATION

PARAMETER DESCRIPTION

- Group Name: A string identifying the group name that this entry should belong to. The allowed string length is 1 to 31, 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 31, 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 31, and the allowed content is ASCII characters from 33 to 126.

Buttons

- Add New Entry: Click to add a new entry. Specify the name and configure the new entry. Click “Apply.”
- 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.

12.3 STATISTICS

12.3.1 CONFIGURATION

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

WEB INTERFACE

To configure the RMON Statistics Configuration in the web interface:

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

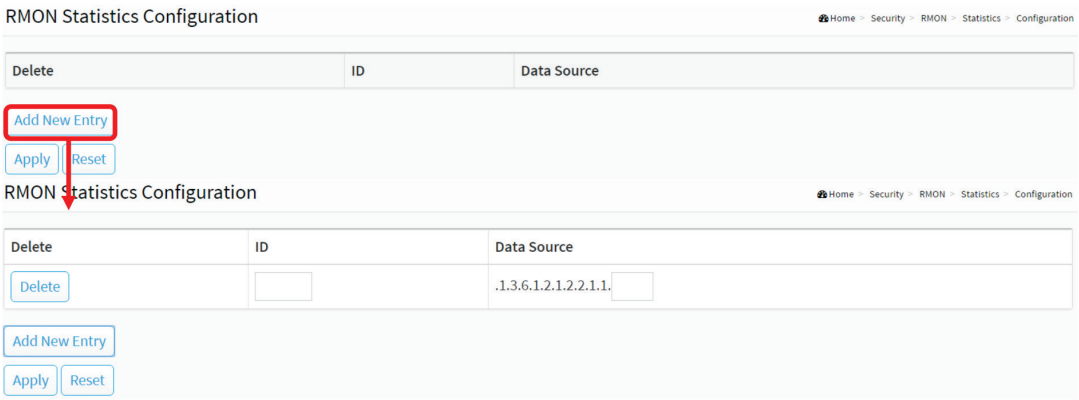

FIGURE 12-7. RMON STATISTICS CONFIGURATION

PARAMETER DESCRIPTION

- ID: Indicates the index of the entry. The range is from 1 to 65535.
- Data Source: Indicates the port ID to be monitored. If in a 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.

12.3.2 STATUS

This page provides an overview of RMON Statistics entries. Each page shows up to 99 entries from the Statistics table, default is 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.

The “Start from Control Index” allows the user to select the starting point in the Statistics table. Clicking the Refresh button will update the displayed table starting from that or the next closest Statistics table match.

The Next Entry 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 First Entry button to start over.

WEB INTERFACE

To display a RMON Statistics Status in the web interface:

1. Click Security, RMON, Statistics and Status.
2. Specify the Port you want to check.
3. Check “Auto-refresh.”
4. Click “Refresh” to refresh the port detailed statistics.

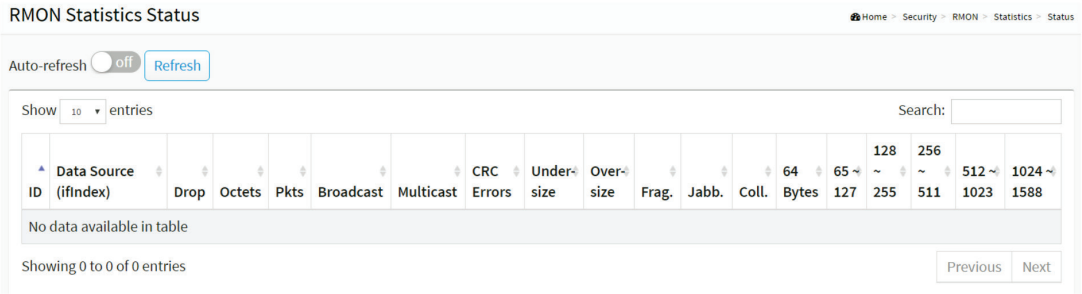

FIGURE 12-8. RMON STATISTICS STATUS

PARAMETER DESCRIPTION

- ID: Indicates the index of Statistics entry.
- Data Source(if Index): The port ID 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.
- 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.
- 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 with size less than 64 octets received with invalid CRC.

- Jabb.: The number of frames with size larger than 64 octets received with invalid CRC.
- Coll.: The best estimate of the total number of collisions on this Ethernet segment.
- 64 Bytes: 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.
- Search: You can search for the information that you want to see.
- Show entries: You can choose how many items you want to show off.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- Next: Updates the system log entries, turn to the next page.
- Previous: Updates the system log entries, turn to the previous page.

12.4 HISTORY

12.4.1 CONFIGURATION

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

WEB INTERFACE

To configure the RMON History Configuration in the web interface:

1. Click SNMP, History and Configuration.
2. Click Add New Entry.
3. Specify the ID parameters.
4. Click Apply.

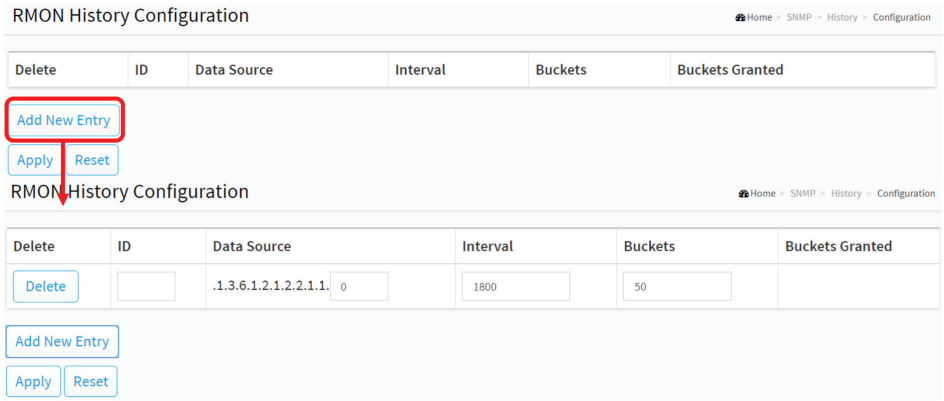

FIGURE 12-9. RMON HISTORY CONFIGURATION

PARAMETER DESCRIPTION

- ID: Indicates the index of the entry. The range is from 1 to 65535.
- Data Source: Indicates the port ID 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 with this History control entry stored in RMON. The range is from 1 to 3600, default value is 50.
- Buckets Granted: The number of data that will 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.

12.4.2 STATUS

This page provides an overview of RMON History entries. Each page shows up to 99 entries from the History table, default is 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.

The “Start from History Index and Sample Index” allows the user to select the starting point in the History table. Clicking the Refresh button will update the displayed table starting from that or the next closest History table match.

The Next Entry 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 First Entry button to start over.

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WEB INTERFACE

To display a RMON History Status in the web interface:

1. Click SNMP, History and Status.
2. Check "Auto-refresh."
3. Click "Refresh" to refresh the port detailed statistics.
4. Click First Entry/Next Entry to change Entry.

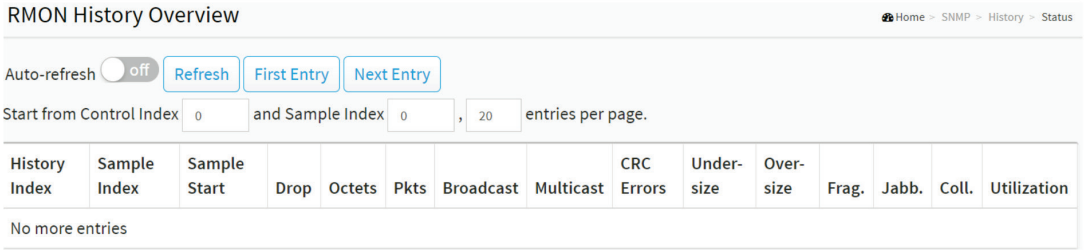

FIGURE 12-10. RMON HISTORY STATUS

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.
- 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 with size less than 64 octets received with invalid CRC.
- Jabb.: The number of frames with size 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.
- Show entries: You can choose how many items you want to show.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- First Entry: Updates the table starting from the first entry in the IPMC Profile Address Configuration.
- Next Entry: Updates the table, starting with the entry after the last entry currently displayed.

12.5 ALARM

12.5.1 CONFIGURATION

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

WEB INTERFACE

To configure the RMON Alarm Configuration in the web interface:

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

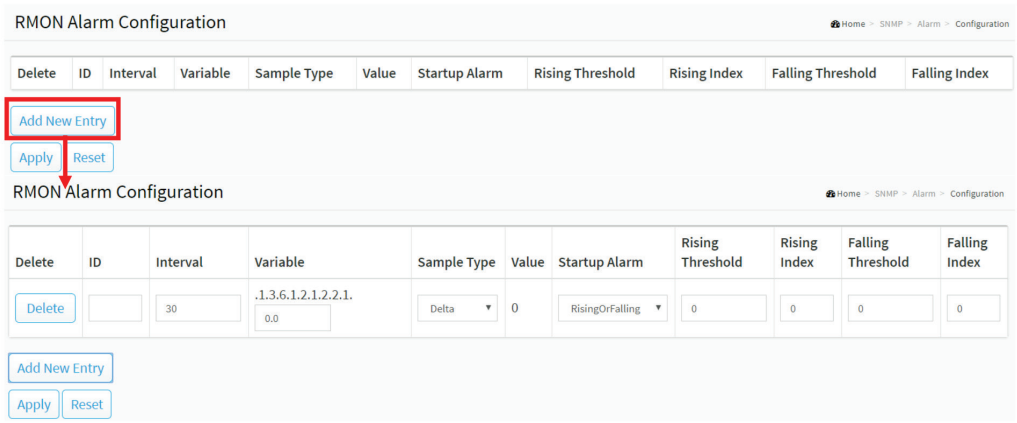

FIGURE 12-11. RMON ALARM CONFIGURATION

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 unicast packets delivered to a higher-layer protocol.

  InNUcastPkts: The number of broadcast and multicast 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 inbound packets that were discarded because of an unknown or unsupported protocol.

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

  OutUcastPkts: The number of unicast packets that requested to transmit.

  OutNUcastPkts: The number of broadcast and multicast packets that requested to transmit.

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

OutErrors: The 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.

12.5.2 STATUS

This page provides an overview of RMON Alarm entries. Each page shows up to 99 entries from the Alarm table, default is 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.

The “Start from Control Index” allows the user to select the starting point in the Alarm table. Clicking the Refresh button will update the displayed table starting from that or the next closest Alarm table match.

The Next Entry 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 First Entry button to start over.

WEB INTERFACE

To display a RMON Alarm Status in the web interface:

1. Click SNMP, Alarm and Status.
2. Check “Auto-refresh.”
3. Click “Refresh” to refresh the port detailed statistics.
4. Click First Entry/Next Entry to change the Entry.

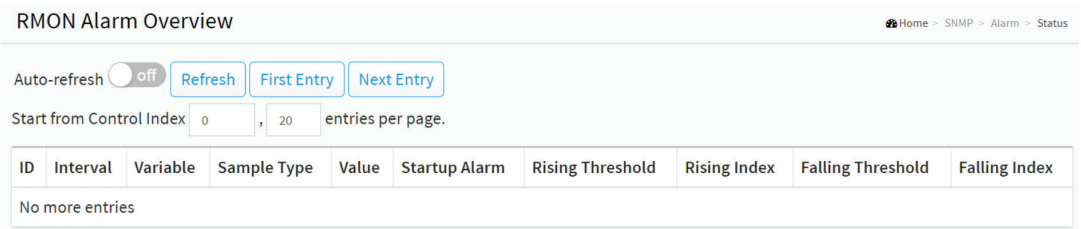

FIGURE 12-12. RMON ALARM STATUS

PARAMETER DESCRIPTION

- ID: Indicates the Alarm control entry index.
- 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.
- Show entries: You can choose how many items you want to show off.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- First Entry: Updates the table starting from the first entry in the IPMC Profile Address Configuration.
- Next Entry: Updates the table, starting with the entry after the last entry currently displayed.

12.6 EVENT

12.6.1 CONFIGURATION

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

WEB INTERFACE

To configure the RMON Event Configuration in the web interface:

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

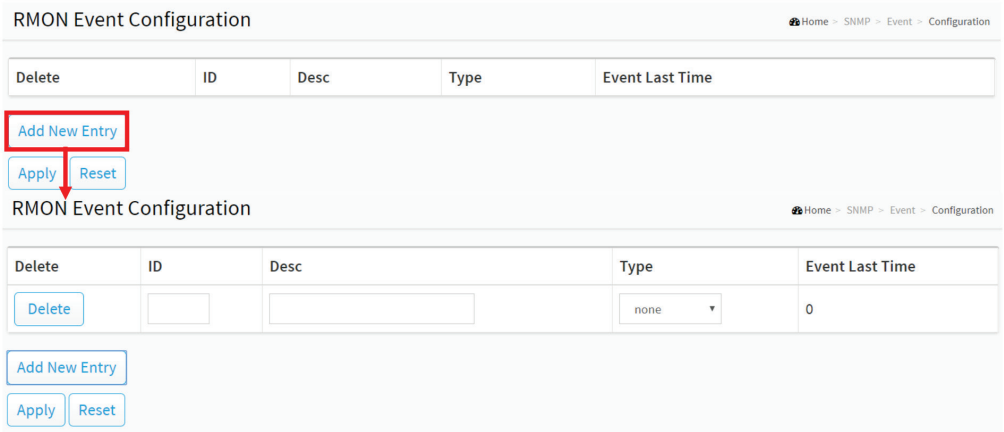

FIGURE 12-13. RMON EVENT CONFIGURATION

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.

  Snmp trap: Send SNMP trap when the event is triggered.

  Log and trap: Create SNMP log entry and sent SNMP trap when the event is triggered.
- 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.

12.6.2 STATUS

This page provides an overview of RMON Event table entries. Each page shows up to 99 entries from the Event table, default is 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.

The “Start from Event Index and Log Index” allows the user to select the starting point in the Event table. Clicking the Refresh button will update the displayed table starting from that or the next closest Event table match.

The Next Entry 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 First Entry button to start over.

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WEB INTERFACE

To display an RMON Event Status in the web interface:

1. Click SNMP, Event and Status.
2. Check “Auto-refresh.”
3. Click “ Refresh“ to refresh the port’s detailed statistics.
4. Click First Entry/Next Entry to change the Entry.

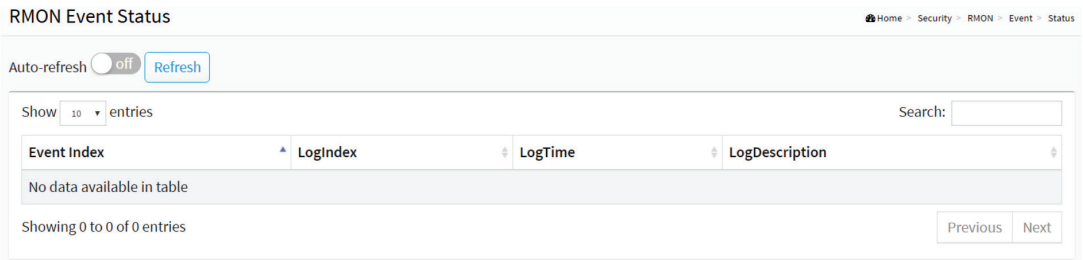

FIGURE 12-14. RMON EVENT STATUS

PARAMETER DESCRIPTION

- Event Index: Indicates the index of the event entry.
- Log Index: Indicates the index of the log entry.
- LogTIme: Indicates the Event log time
- LogDescription: Indicates the Event description.
- Show entries: You can choose how many items you want to show.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Click to refresh the page immediately.
- First Entry: Updates the table starting from the first entry in the IPMC Profile Address Configuration.
- Next Entry: Updates the table, starting with the entry after the last entry currently displayed.

13.1 SNMP TRAP

Configure Trap on this page.

WEB INTERFACE

To configure SNMP Trap Configuration in the web interface:

1. Click Event Notification and SNMP Trap.
2. Click Add New Entry, then you can create new SNMP Trap on the switch.
3. Specify the SNMP Trap parameter.
4. Click Apply.

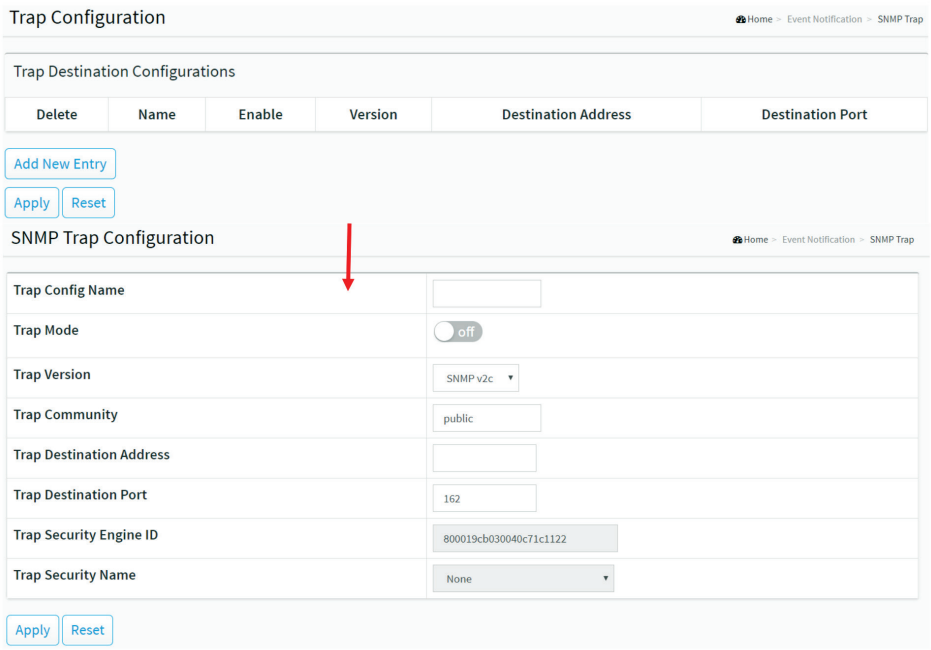

FIGURE 13-1. SNMP TRAP CONFIGURATION

PARAMETER DESCRIPTION

Trap Destination Configurations

- 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').

  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 Configuration

- Trap Config Name : Indicates the trap Configuration's name. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.
- Trap Mode: Indicates the SNMP mode operation. Possible modes are:

  on: Enable SNMP mode operation.

  off: 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 an SNMP trap packet. The allowed string length is 0 to 63, 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').

  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. The SNMP Agent will send an SNMP message via this port, the port range is 1–65535.
- Trap Security Engine ID: Indicates the SNMP trap security engine ID. SNMPv3 sends traps and information using USM for authentication and privacy. A unique engine ID for these traps and information 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 information using USM for authentication and privacy. A unique security name is needed when traps and information are enabled.

Buttons

- 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.

13.2 EMAIL

Configure SMTP (Simple Mail Transfer Protocol) on this page. Simple Mail Transfer Protocol is the message-exchange standard for the Internet.

The Switch is to be configured as a client of SMTP while the server is a remote device that will receive messages from the switch that alarm events occurred.

WEB INTERFACE

To configure SMTP Configuration in the web interface:

1. Click Event Notification and eMail.
2. Specify the SMTP Configuration parameter.
3. Click Apply.

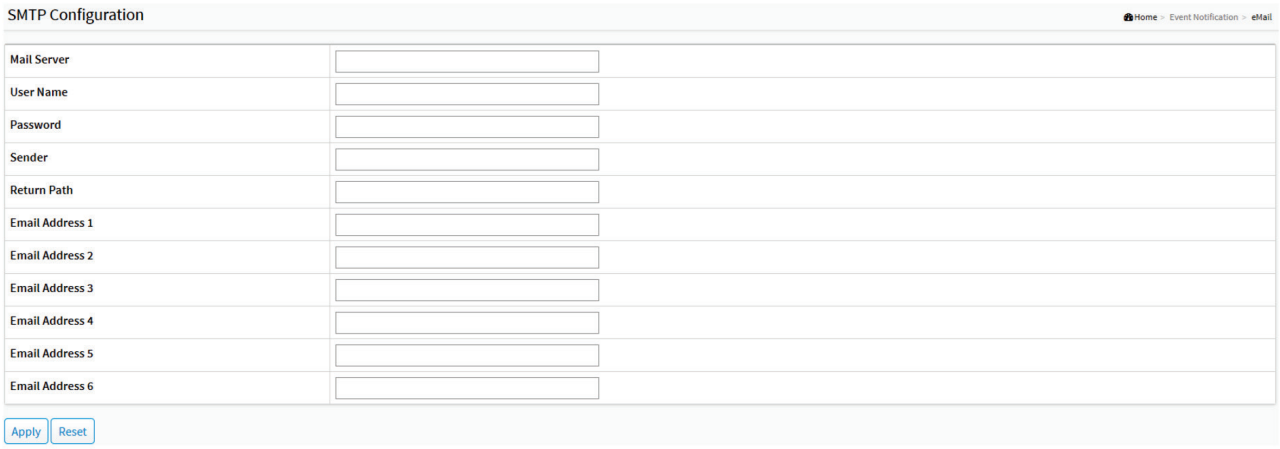

FIGURE 13-2. SMTP CONFIGURATION

PARAMETER DESCRIPTION

- Mail Server: The IP address or hostname of the mail server. IP address is expressed in dotted decimal notation. This will be the device that sends out the mail for you.
- User Name: Specify the username on the mail server.
- Password: Specify the password of the user on the mail server.
- Sender: Specify the sender name of the alarm mail.
- Return Path: Specify the sender email address of the alarm mail. This address will be the “from” address on the email message.
- Email Address #: Specify the email address of the receiver.

Buttons

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

13.3 LOG

13.3.1 SYSLOG

The Syslog Configuration 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 for general information, analysis and debugging messages. It is supported by a wide variety of devices and receivers across multiple platforms.

WEB INTERFACE

To configure Syslog Configuration in the web interface:

1. Click Event Notification, Log and Syslog.
2. Select the Server Mode to enable it.
3. Specify the syslog parameters, including Server Address and Server Port.
4. Click Apply.

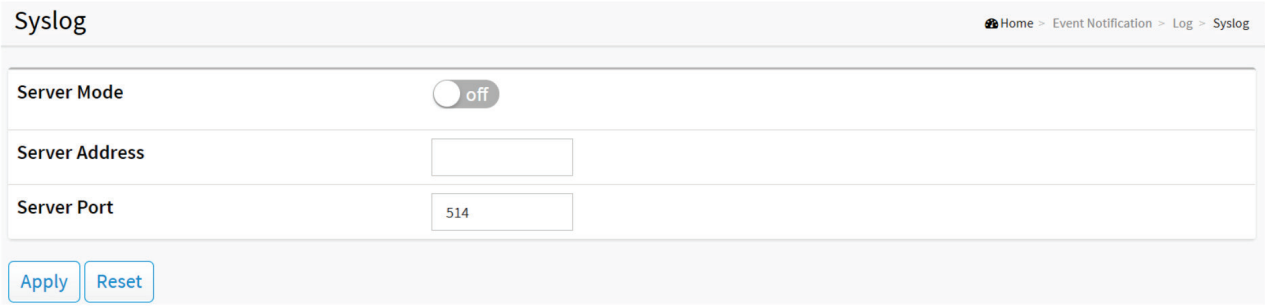

FIGURE 13-3. SYSTEM LOG CONFIGURATION

PARAMETER DESCRIPTION

- Server Mode: Indicates the server mode operation. When the mode operation is enabled, the syslog message will send out to the 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 to the 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 host address of syslog server. If the switch provides a DNS feature, it also can be a domain name.
- Server Port: Indicates the service port of syslog server.

Buttons

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

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13.3.2 VIEW LOG

This section describes how to display the system log information of the switch.

WEB INTERFACE

To display the log Information in the web interface:

1. Click Event Notification, Log and View Log.
2. Display the log information.

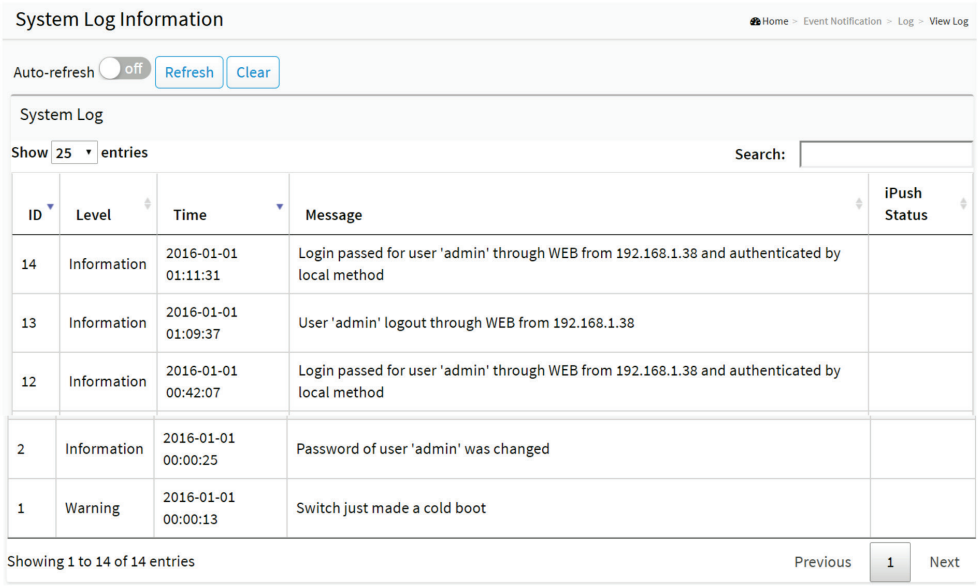

FIGURE 13-4. SYSTEM LOG INFORMATION

PARAMETER DESCRIPTION

- ID: ID (>= 1) of the system log entry.
- Level: level of the system log entry. The following level types are supported:

  Debug: debug level message.

  Info: informational message.

  Notice: normal, but significant, condition.

  Warning: warning condition.

  Error: error condition.

  Crit: critical condition.

  Alert: action must be taken immediately.

  Emerg: system is unusable.
- Time: This will display the log record by device time. The time of the system log entry.
- Message: This will display the log detail message. The message of the system log entry.
- Search: You can search for the information that you want to see.

- Show entries: You can choose how many items you want to show.

Buttons

- Auto-refresh: Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
- Refresh: Updates the system log entries, starting from the current entry ID.
- Clear: Clear all the system log entries.
- Next: Updates the system log entries, turn to the next page.
- Previous: Updates the system log entries, turn to the previous page.

13.4 EVENT CONFIGURATION

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

WEB INTERFACE

To display the configure Trap Event Severity in the web interface:

1. Click Event Notification and Event Configuration.
2. Scroll to select the Group name and Severity Level.
3. Click Enable to select a different trap event.
4. Click the Apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

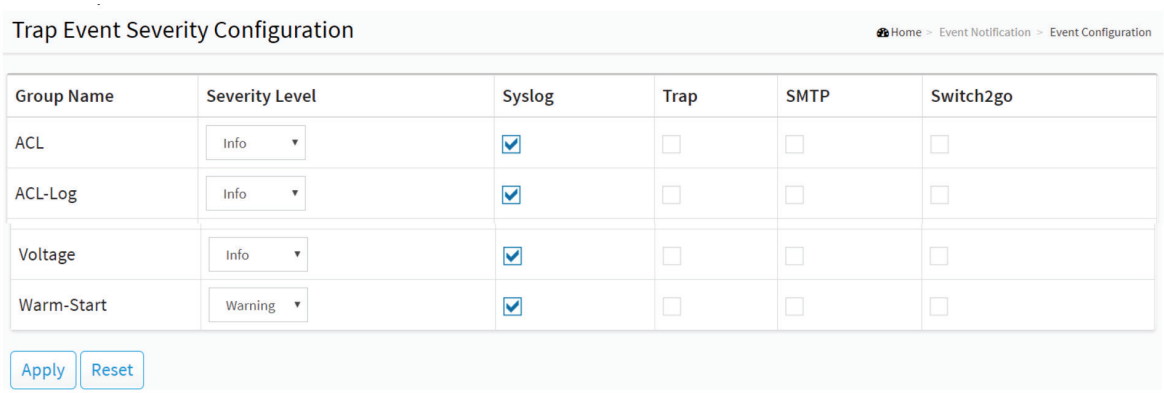

FIGURE 13-5. TRAP EVENT SEVERITY CONFIGURATION

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.

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<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.
- Switch2go: Enable - Select this Group Name in Push Notification.

Buttons

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

13.5 SWITCH2GO

13.5.1 SWITCH2GO SETTING

Configure Switch2go setting.

WEB INTERFACE

To set the Switch2go in the web interface:

1. Click Event Notification, Switch2go and Switch2go Setting.
2. Click to enable the Switch2go mode.
3. Specify the Server Address.
4. Click Apply to save the setting.
5. To cancel the setting, click the Reset button. It will revert to previously saved values.

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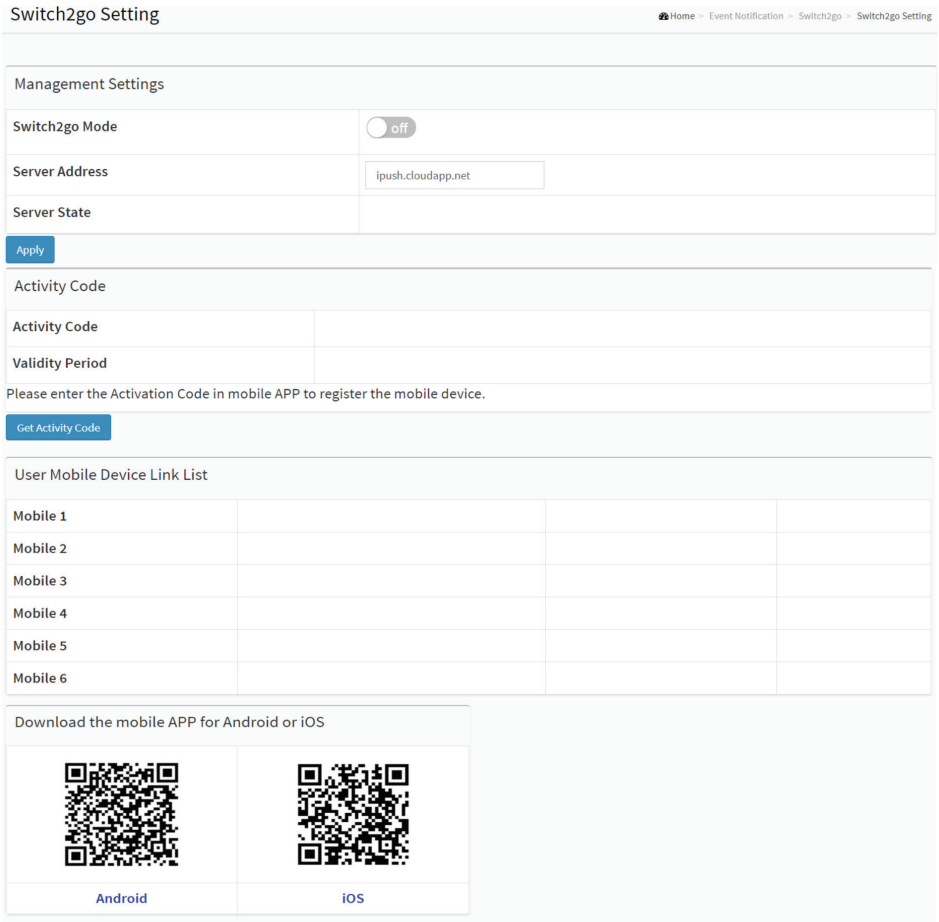

FIGURE 13-6. SWITCH2GO SETTING

PARAMETER DESCRIPTION

Management Setting

Configure Switch2go management setting.

- Switch2go Mode: Indicates the Switch2go mode operation. When the mode operation is enabled, the message will send out to (or get from) the server. The switch also establishes a vtunnel with the Switch2go server for the connection back to this switch from a mobile device. Possible modes are:

  Enabled: Enable Switch2go mode.

  Disabled: Disable Switch2go mode.
- Server Address: Indicates the IPv4 host address of server. If the switch provides a DNS feature, it also can be a host name.
- Server State: Report network information between the Switch and Server.

Activity Code

Get Activity Code from the Switch2go server to register a mobile device.

- Activity Code: The Activity Code registers the mobile device to the Switch2goServer. User has to key-in the Activity Code in the Switch2go APP.
- Validity Period: The expire time of the Activity Code.

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User Mobile Device Link List

Display and manage the registered mobile devices.

- Mobile 1¬ 6 : Information about the mobile devices registered with this switch.

Download the mobile APP for Android or iOS

QR codes and URLs to the APP stores for users to download/install the APP.

Buttons

- Apply: Click to save changes.

13.5.2 IPUSH OPTIONS

iPush options are configured on this page. A User can set up the events to trigger the iPush and the severity in iPush Event Severity Configuration. The name and role of each port also can be defined here.

WEB INTERFACE

To configure the iPush Option in the web interface:

1. Click Event Notification, Switch2go and iPush Option.
2. Specify the Port Name and select the Role.
3. Click Apply to save the setting.
4. To cancel the setting, click the Reset button. It will revert to previously saved values.

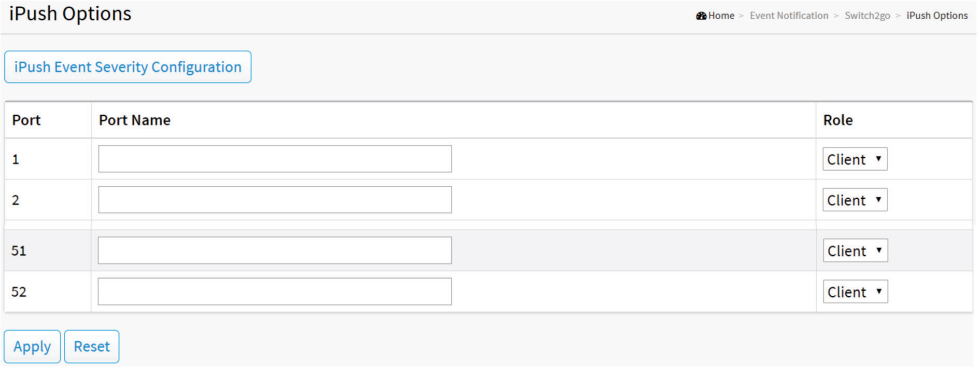

FIGURE 13-7. IPUSH OPTIONS

PARAMETER DESCRIPTION

- Port: This is the logical port number for this row.
- Port Name: Enter up to 47 characters to be the descriptive name that identifies this port.
- Role: Selects any available role for the given switch port. Possible roles are:

  Server - Assign this as Server Port.

  Client - Assign this as Client Port.

Buttons

- iPush Event Severity Configuration: Go to event severity configuration page.

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

CHAPTER 14: DIAGNOSTICS

This chapter provides a set of basic system diagnoses. These include Ping, Traceroute, Cable Diagnostics and port mirror.

14.1 PING

This section explains how to issue ICMP Echo packets to troubleshoot Ipv4/6 connectivity issues.

WEB INTERFACE

To configure a PING in the web interface:

1. Click Diagnostics and Ping.
2. Specify IP Address, Ping Length, Ping Count, Ping Interval and Egress Interface.
3. Click Start.

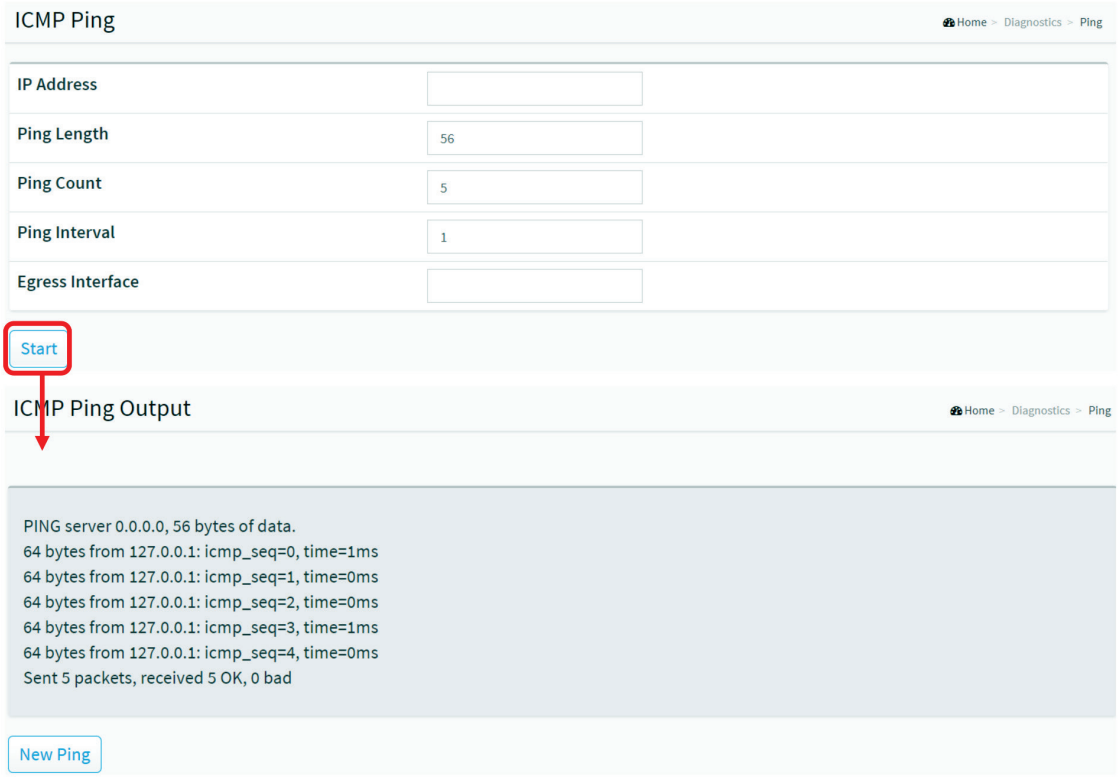


FIGURE 14-1. ICMP PING

PARAMETER DESCRIIPTION

- IP Address: Specify the target IP Address of the Ping.
- 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 to 30 seconds.

- Egress Interface (Only for IPv6): The VLAN ID (VID) of the specific egress IPv6 interface where the 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 matched 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 to start to ping the target IP Address.
- New Ping: Go back to the ICMP Ping page.

14.2 TRACEROUTE

This page allows you to issue ICMP, TCP, or UDP packets to diagnose network connectivity issues.

WEB INTERFACE

To start a Traceroute in the web interface:

1. Click Diagnostics and Traceroute.
2. Specify IP Address, Wait Time, Max TTL and Probe Count.
3. Click Start.

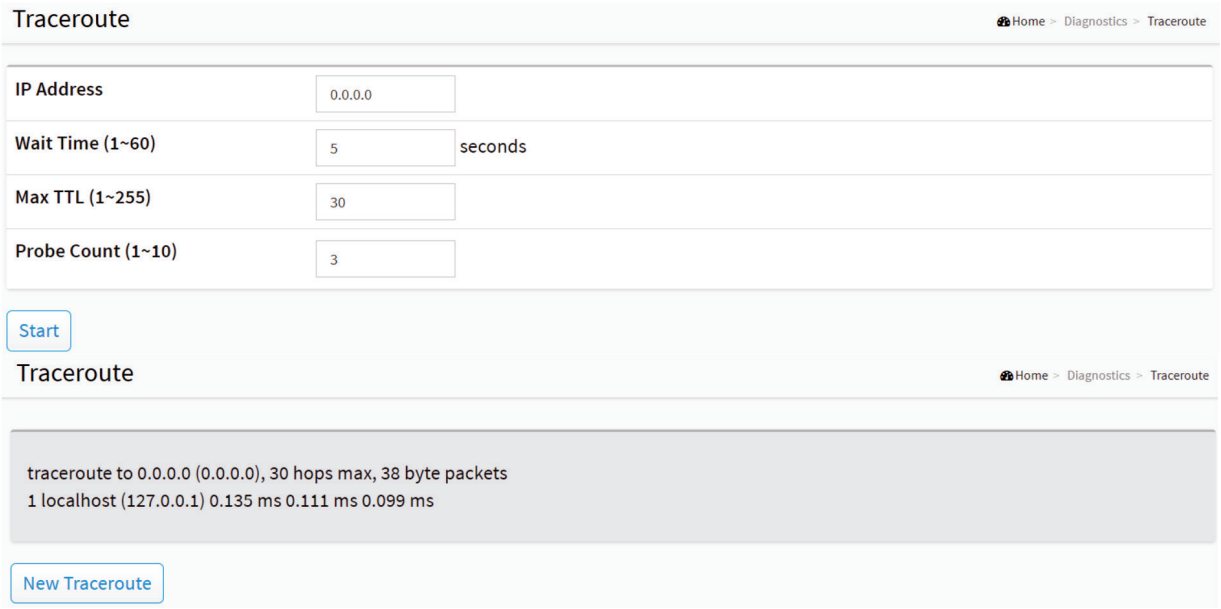


FIGURE 14-2. TRACEROUTE

PARAMETER DESCRIPTION

- 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 to start to traceroute the target IP Address.
- New Ping: Back to Traceroute page.

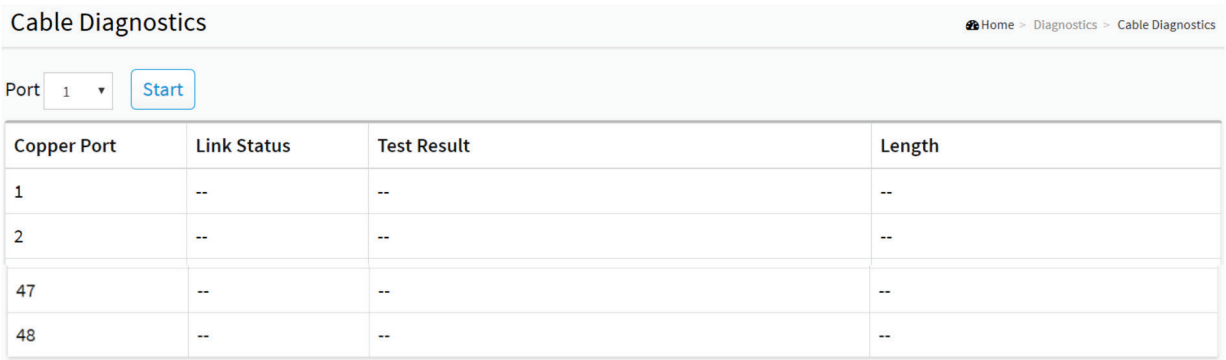
14.3 CABLE DIAGNOSTICS

This section shows how to run Cable Diagnostics for copper ports.

WEB INTERFACE

To configure a Cable Diagnostics Configuration in the web interface:

1. Click Diagnostics and Cable Diagnostics.
2. Specify the Port to check.
3. Click Start.



Copper Port	Link Status	Test Result	Length
1	--	--	--
2	--	--	--
47	--	--	--
48	--	--	--

FIGURE 14-3. CABLE DIAGNOSTICS

PARAMETER DESCRIPTION

- Port: The port where you are requesting Cable Diagnostics.
- Copper Port: Copper port number.
- Link Status: The status of the cable.

  10M: Cable is link up and correct. Speed is 10 Mbps.

  100M: Cable is link up and correct. Speed is 100 Mbps.

  1G: Cable is link up and correct. Speed is 1 Gbps.

Link Down: Link down or cable is not correct.

- Test Result: Test Result of the cable.

  OK: Correctly terminated pair.

  Abnormal: Incorrectly terminated pair or link down.

- Length: The length (in meters) of the cable pair. The default length is 3 meters. When Link Status is shown as follows, the length has different definition.

  1G: The length is the minimum value of 4-pair.

  10M/100M: The length is the minimum value of 2-pair.

  Link Down: The length is the minimum value of non-zero of 4-pair.

Button

- Start: Start the cable diagnostics the port that you selected.

14.4 MIRRORING

You can mirror traffic from any source port to a target port for real-time analysis. You can then attach a logic analyzer or RMON probe to the target port and study the traffic crossing the source port in a completely unobtrusive manner.

Mirror Configuration is to monitor the traffic of the network. For example, we assume that Port A and Port B are Monitoring Port and Monitored Port respectively, thus, the traffic received by Port B will be copied to Port A for monitoring.

WEB INTERFACE

To configure the Port Mirror function in the web interface:

1. Click Diagnostics and Mirroring.
2. Select the Monitor Destination Port (Mirror Port).
3. Select mode (disabled, enable, TX Only and RX only) for each monitored port.
4. Click the Apply button to save the setting.
5. To cancel the setting, click the Reset button to revert to previously saved values.

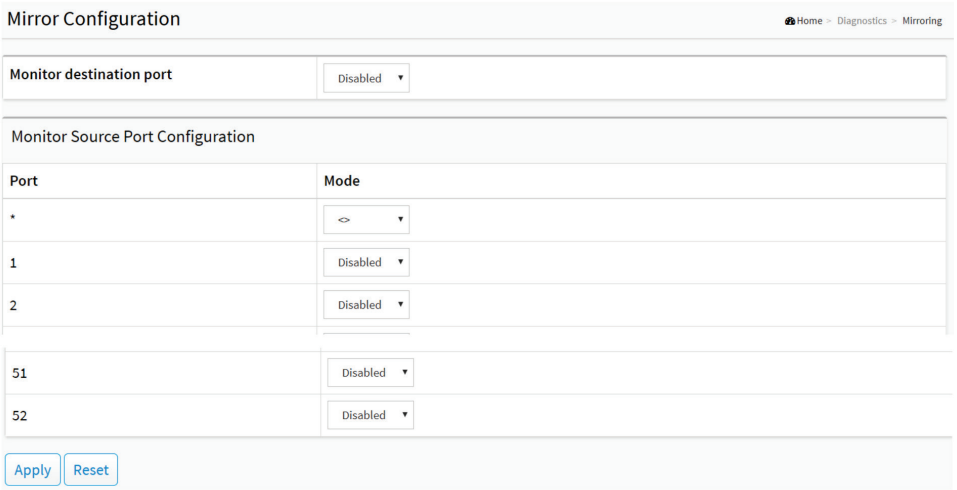


FIGURE 14-4. MIRROR CONFIGURATION

PARAMETER DESCRIPTION

- Monitor Destination Port: Port to output the mirrored traffic. Also known as the mirror port. Frames from ports that have either source (rx) or destination (tx) mirroring enabled are mirrored on this port.

Mirror Source Port Configuration

- 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.

Buttons

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

14.5 SFLOW

14.5.1 CONFIGURATION

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 saved to non-volatile memory, so a reboot or master change will disable sFlow sampling.

WEB INTERFACE

To configure the sFlow in the web interface:

1. Click Diagnostics, sFlow and Configuration.
2. Set the sFlow parameters.
3. Click apply to save the setting.
4. To cancel the setting, click the Reset button. It will revert to previously saved values.

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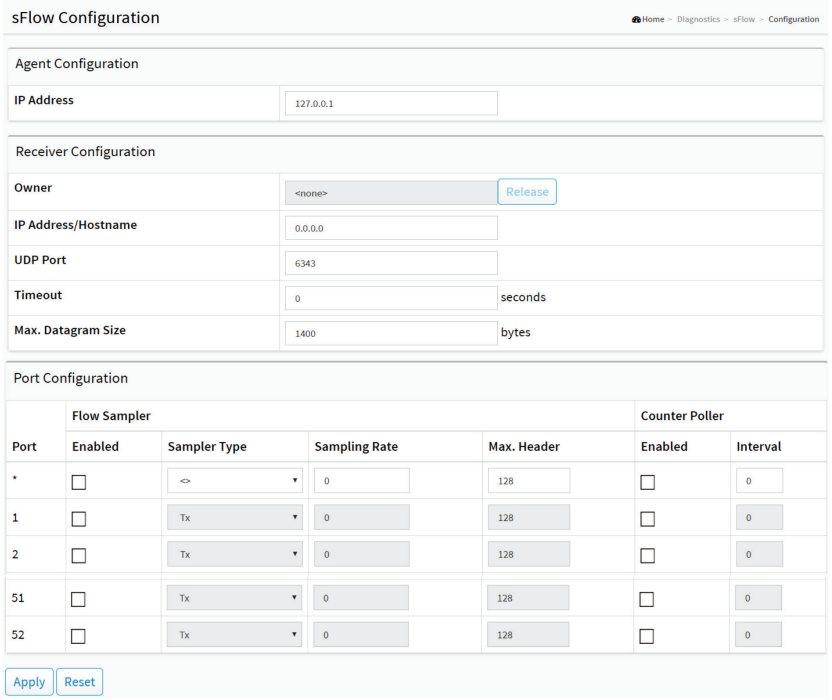

FIGURE 14-5. SFLOW CONFIGURATION

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 disables 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 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 a default of 1400 bytes.

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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 a default of 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.

14.5.2 STATISTICS

This session shows receiver and per-port sFlow statistics.

WEB INTERFACE

To Display port sFlow statistics in the web interface:

1. Click Diagnostics, sFlow and statistics.
2. Display sFlow information.

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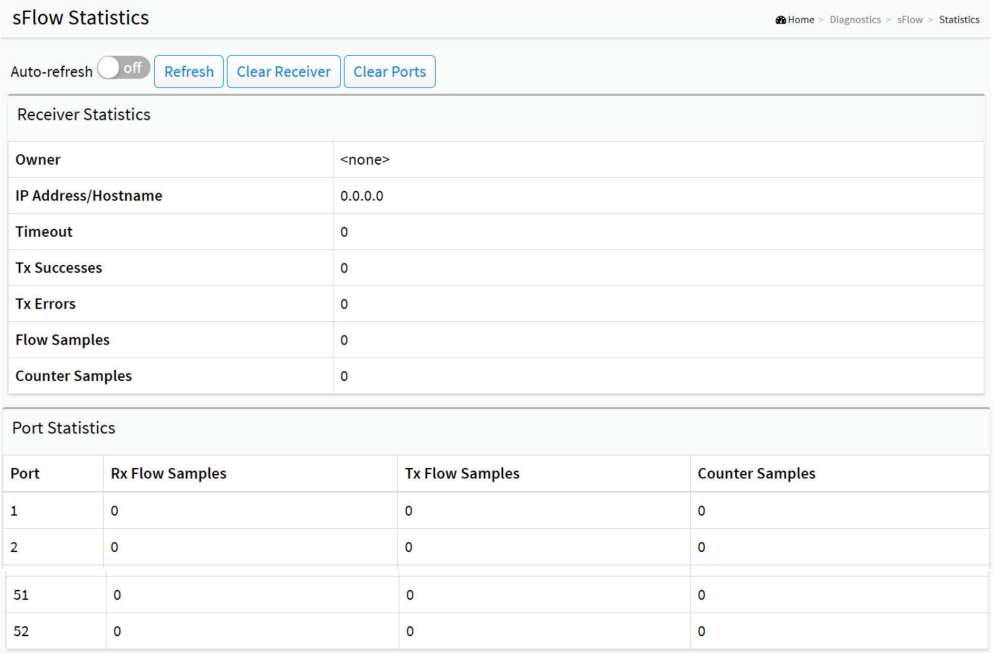

FIGURE 14-6. SFLOW STATISTICS

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 have 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.

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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.

CHAPTER 15: MAINTENANCE

This chapter describes the Maintenance configuration tasks including Save/Backup/Restore/Activate/Delete Restart Device, Factory Defaults and Firmware upgrade.

15.1 CONFIGURATION

The switch stores its configuration in a number of files in text format. The files are either virtual (RAM-based) or stored in flash on the switch.

There are three system files:

- running-config: A virtual file that represents the currently active configuration on the switch. This file is volatile.
- 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.

15.1.1 SAVE STARTUP CONFIG

This copies the running-config to startup-config, ensuring that the current active configuration will be used at the next reboot.

WEB INTERFACE

To save the running configuration in the web interface:

1. Click Maintenance, Configuration and Save startup-config.
2. Click Save Configuration.

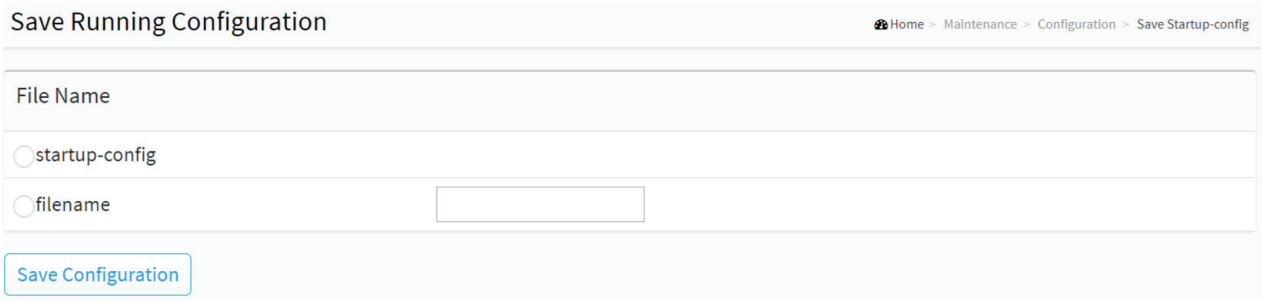

FIGURE 15-1. SAVE STARTUP CONFIGURATION

PARAMETER DESCRIPTION

Button

- Save Configuration: Click to save the configuration; the running configuration will be written to flash memory for system boot up to load this startup configuration file.

15.1.2 BACKUP

This section describes how to export the Switch Configuration for maintenance. Any current configuration files will be exported as text format.

The configuration files on the switch can be backed up and saved on the station running the web browser.

You can transfer any of the files on the switch to the web browser. Select the running-config. This may take a little while to complete, because the file must be prepared before backup.

WEB INTERFACE

To backup configuration in the web interface:

1. Click Maintenance, Configuration and Backup.
2. Click Backup.

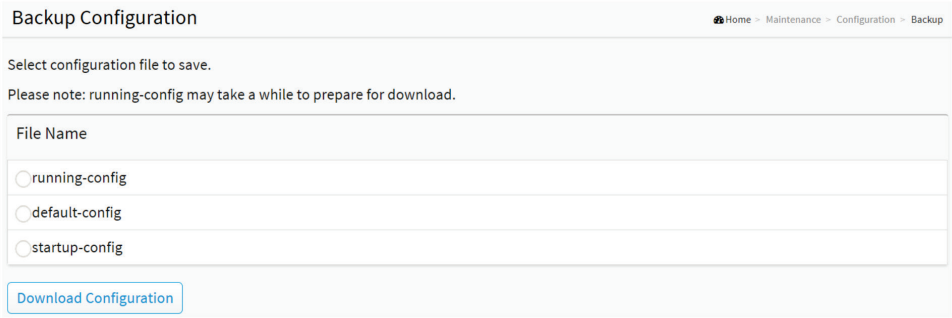

FIGURE 15-2. BACKUP

PARAMETER DESCRIPTION

- running-config: A virtual file that represents the currently active configuration on the switch. This file is volatile.
- 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.

Button

- Download Configuration: Click the button, then the switch will start to transfer the configuration file to your workstation.

15.1.3 RESTORE

You can import a file from the web browser to all the files on the switch, except default-config, which is read-only.

Select the source file to restore, and select the destination file on the target.

If the destination is running-config, the file will be applied to the switch configuration. This can be done in two ways:

- Replace mode: The current configuration is fully replaced with the configuration specified in the source file.
- Merge mode: The source file configuration is merged into running-config.

WEB INTERFACE

To restore configuration in the web interface:

1. Click Maintenance, Configuration and Restore.
2. Click Restore.

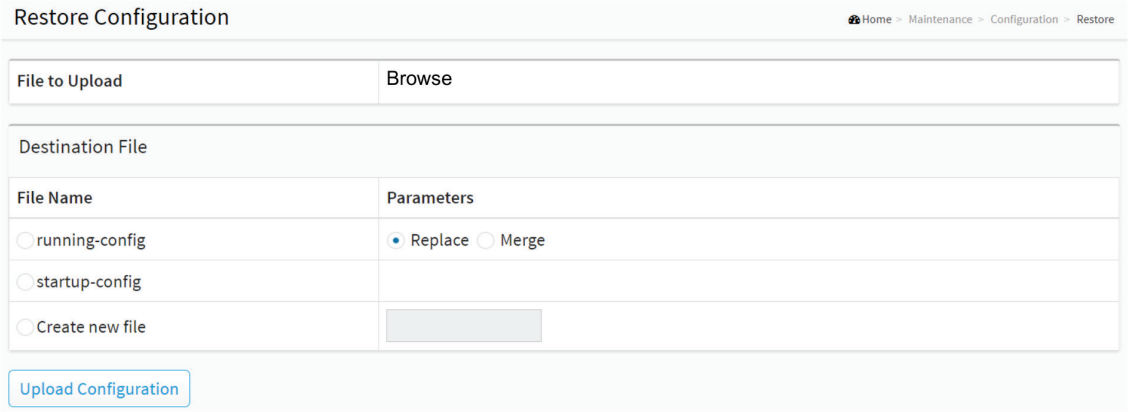

FIGURE 15-3. RESTORE CONFIG

PARAMETER DESCRIPTION

- running-config: A virtual file that represents the currently active configuration on the switch. This file is volatile.
- Replace mode: The current configuration is fully replaced with the configuration in the uploaded file.
- Merge mode: The uploaded file is merged into running-config.
- startup-config: The startup configuration for the switch, read at boot time.
- Create new file: To create new files.

Buttons

- Browse: Click the button to search the configuration text file and filename.
- Upload Configuration: Click the button to start transferring the source file to the destination file.

15.1.4 ACTIVATE

You can 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 Maintenance, Configuration and Activate.
2. Click Activate Select.

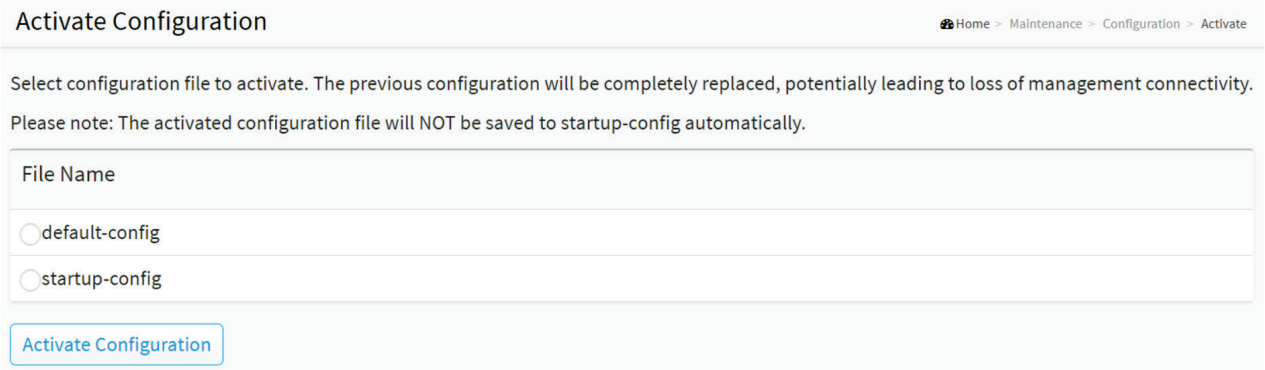

FIGURE 15-4. CONFIGURATION ACTIVATION

PARAMETER DESCRIPTION

Buttons

- Activate Configuration: Click the "Activate Configuration" button, then the selected file will be activated to be the switch's running configuration.

15.1.5 DELETE

You can 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 the default configuration.

WEB INTERFACE

To delete the configuration in the web interface:

1. Click Maintenance, Configuration and Delete.
2. Click Delete Select.

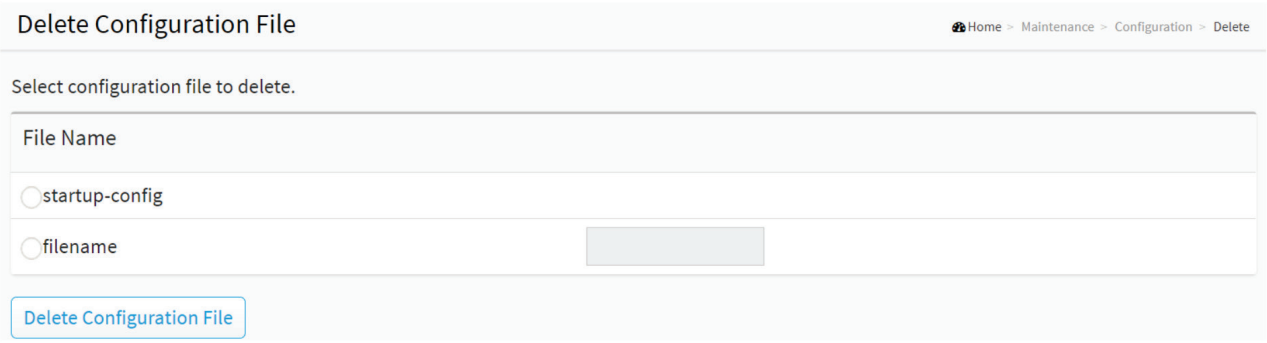

FIGURE 15-5. DELETE CONFIGURATION

PARAMETER DESCRIPTION

Buttons

- Delete Configuration File: Click the “Delete Configuration File” button then the selected file will be deleted.

15.2 RESTART DEVICE

This section describes how to restart the device for maintenance. Any configuration files or scripts that you saved in the switch should still be available afterwards.

WEB INTERFACE

To Restart Device in the web interface:

1. Click Maintenance and Restart Device.
2. Click Yes.

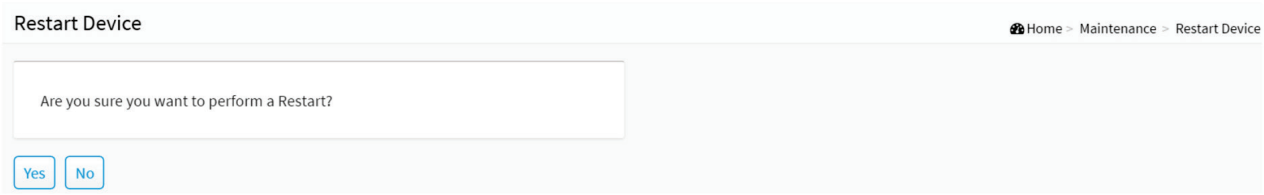

FIGURE 15-6. RESTART DEVICE

PARAMETER DESCRIPTION

Restart Device: You can restart the switch on this page. After restart, the switch will boot normally.

Buttons

- Yes: Click “Yes” and the device will restart.
- No: Click to cancel the operation.

15.3 FACTORY DEFAULTS

This section describes how to restore the Switch configuration to Factory Defaults.

WEB INTERFACE

To restore a Factory Defaults in the web interface:

1. Click Maintenance and Factory Defaults.
2. You can choose if you want to keep the ip configuration or not.
3. Click Yes.

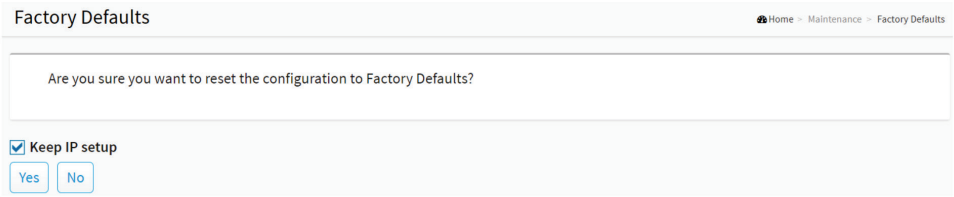

FIGURE 15-7. FACTORY DEFAULTS

15.4 FIRMWARE

This section describes how to upgrade (or update) Firmware.

15.4.1 FIRMWARE UPGRADE

This page facilitates an update of the firmware controlling the switch.

WEB INTERFACE

To update firmware of the device in the web interface:

1. Click Maintenance, Firmware and Firmware Upgrade.
2. Click Upload.

FIGURE 15-8. FIRMWARE UPGRADE

PARAMETER DESCRIPTION

- Browse: Click the “Browse” button to search the Firmware URL and filename.

15.4.2 FIRMWARE SELECTION

This page provides information about the active and alternate (backup) firmware images in the device, and allows you to activate the alternate image.

The web page displays two tables with information about the active and alternate firmware images.

WEB INTERFACE

To show the Firmware information or swap booting firmware in the web interface:

1. Click Maintenance, Firmware and Firmware Selection.
2. Click Activate Alternate Image

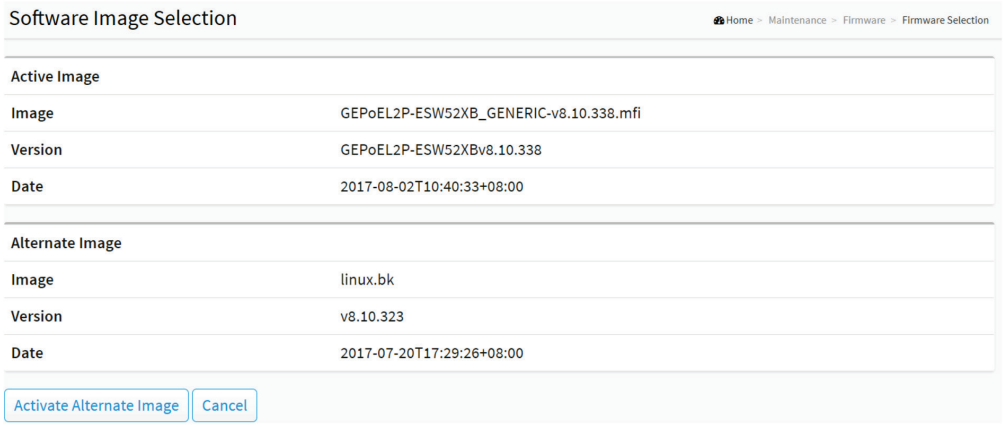

FIGURE 15-9. FIRMWARE SELECTION

Image Information

- Image: The file name of the firmware image, from when the image was last updated.
- 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 the system state.
- Cancel: Cancel activating the alternate image. Navigates away from this page.

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A.1 DISCLAIMER

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