



**Software  
User's Manual**

**Version 3.0**

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Software Manual  
Version 1.0 (October 2018)

This manual applies to firmware version 3.0 on the following products: LMX-0800(-T), LMX-0802-M(-T), LMX-0802-ST-M(-T), LMX-0802-S3(-T), LMX-0802-ST-S3(-T), LMX-0800G(-T), LMX-0804G-SFP(-T), LMP-0800G(-T), LMP-0800G-24(-T), LMP-0804G-SFP(-T), LMX-1002G-SFP(-T), LMP-1002G-SFP(-T), LMP-1002G-SFP-24(-T), LMX-1202-SFP(-T), LMX-1204G-SFP(-T), LMP-1202G-SFP(-T), LMP-1204G-SFP(-T)

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# CLI Management

---

## Configuration by serial console

ANTAIRA Ethernet switches support CLI management. You can use console or telnet to manage the switches by CLI.

Before configuring RS-232 serial console, connect the RS-232 port of the switches to your PC Com port using a RJ45 to DB9-Female cable.



1. Connect your PC to the switches' Console port.
2. Launch the serial terminal program.
3. Configure the port settings of the serial terminal program to match the console port:
  - ❖ 115200 baud
  - ❖ 8 data bits
  - ❖ No parity
  - ❖ 1 stop bit
  - ❖ No flow control
4. The administrator username / password are admin / admin by default. Enter the username and password to login the serial console.

```
Press ENTER to get started
Username: admin
Password:
# configure terminal
```

## Configuration by Telnet console

1. Connect your PC and the switches on the same logical subnetwork.
2. Launch the Telnet program.
3. Configure the switches' default settings of the Telnet program:
  - **IP Address:** 192.168.1.254
  - **Subnet Mask:** 255.255.255.0
  - **Default Gateway:** none
4. The administrator username / password are admin / admin by default. Enter the username and password to login the Telnet console.

```
Press ENTER to get started
```

```
Username: admin
```

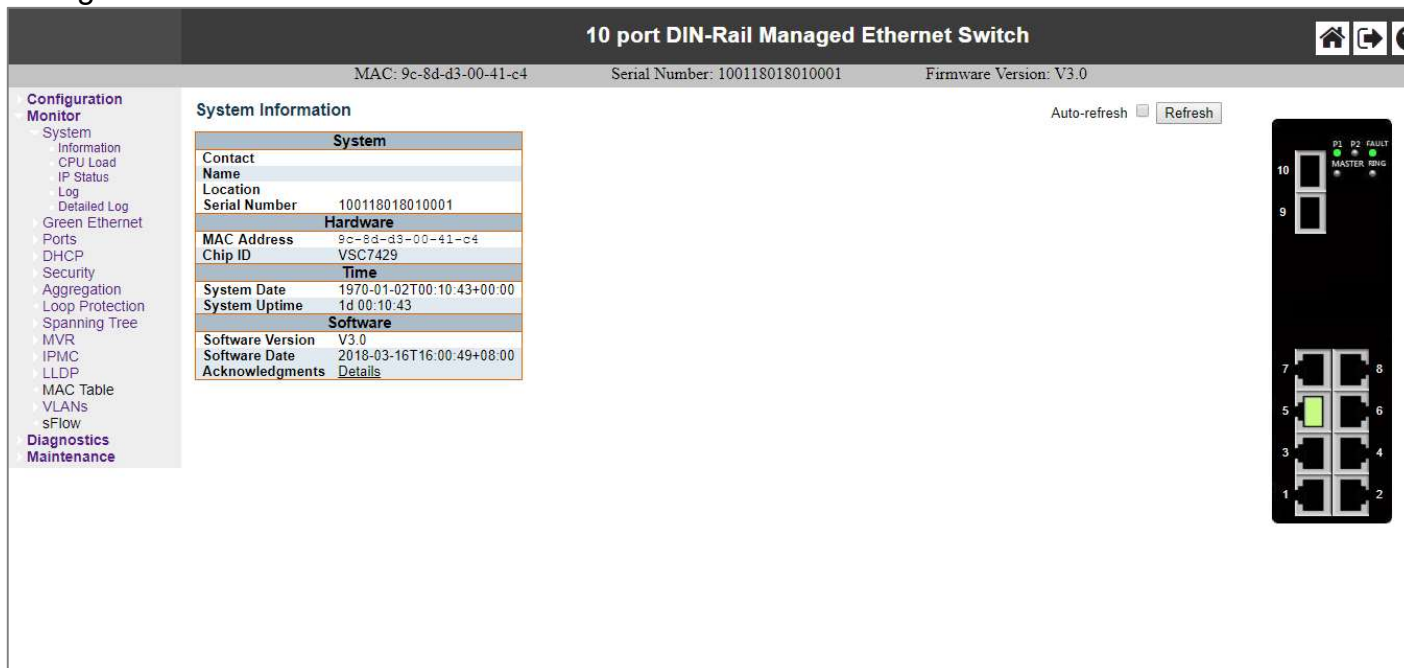
```
Password:
```

```
# configure terminal
```

# Web Management

Besides CLI-based management, ANTAIRA Ethernet switches also support Web-based management.

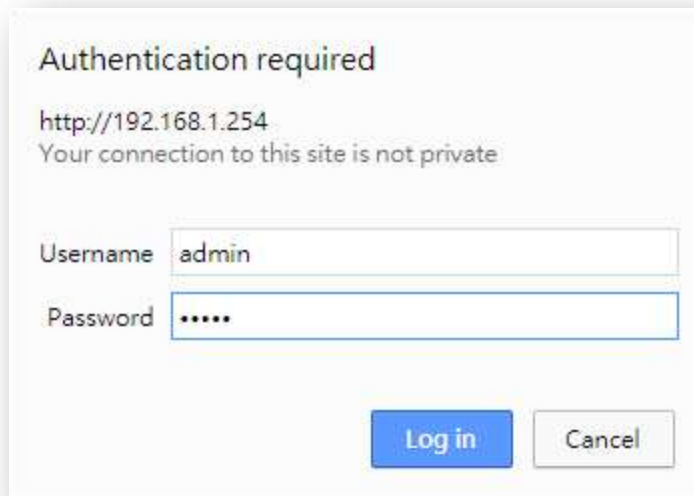
This section describes the Web console interface for a series of Industrial Management Switches. This is a **user-friendly** design with advanced management features that allows you to manage switches through an Internet browser.



## Connecting to the Web Console Interface

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1. Initiate a connection from a browser to the default IP address: <http://192.168.1.254> The Login page appears.
2. The administrator username / password is admin / admin by default. Enter the username and password and then click the Login button.



The screenshot shows a web browser's authentication dialog box. The title is "Authentication required". Below the title, it displays the URL "http://192.168.1.254" and a warning: "Your connection to this site is not private". There are two input fields: "Username" with the text "admin" and "Password" with five dots. At the bottom, there are two buttons: a blue "Log in" button and a grey "Cancel" button.

**NOTE:** Make sure that the PC and switches are on the same logical subnetwork.



# Monitor

## Configuration > System > Information







### Switch State Overview

When logged into the Web GUI Interface, the Switch State Overview page provides an overview of the current switch system and port states.

### System Status

| LED       | Color |          | Description                                      |
|-----------|-------|----------|--|
| POWER 1/2 | Green | On       | Power input 1/2 is active                        |
|           |       | Off      | Power input 1/2 is inactive                      |
| FAULT     | Green | On       | Operating normal                                 |
|           |       | Off      | Power off  |
|           |       | Flashing | Device initialization                            |
| MASTER    | Green | On       | Fault Alarm is set and the condition is inactive |
|           |       | Off      | ERPS Owner Mode (Ring Master) is ready           |
| RING      | Green | On       | ERPS Owner Mode is not active                    |
|           |       | On       | Ring Network is active and works well            |
|           |       | Off      | Ring Network is inactive                         |
|           |       | Flashing | Ring Network is active and works well            |

## Port Status

| Port | State  |  |  |
|------|--|--|--|
| RJ45 |  Disabled |  Down |  Link |
| SFP  |  Disabled |  Down |  Link |

## Check Box

| Check Box    | Description   |
|--------------|---|
| Auto-refresh | Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds. |

## Buttons

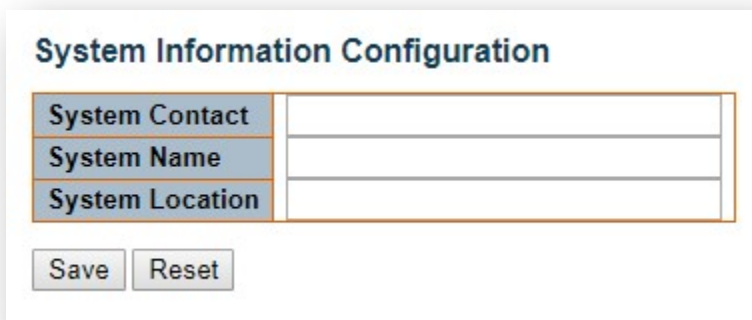
| Button  | Description                |
|---------|----------------------------|
| Refresh | Click to refresh the page. |

# Configuration

## Configuration > System > Information

### System Information Configuration

The switch system information is provided here.



**System Information Configuration**

|                 |                      |
|-----------------|----------------------|
| System Contact  | <input type="text"/> |
| System Name     | <input type="text"/> |
| System Location | <input type="text"/> |

Save Reset

#### System Contact

| Setting                    | Description   | Factory Default |
|----------------------------|---|-----------------|
| <b>Max. 255 Characters</b> | The textual identification of the contact person for this managed node, together with information on how to contact this person. The allowed string length is 0 to 255, and the allowed content is the ASCII characters from 32 to 126. | None            |

#### System Name

| Setting                    | Description  | Factory Default |
|----------------------------|--|-----------------|
| <b>Max. 255 Characters</b> | An administratively assigned name for this managed node. By convention, this is the node's fully-qualified domain name. A domain name is a text string drawn from the alphabet (A-Z, a-z), digits (0-9), minus sign (-). No space characters are permitted as part of a name. The first character must be an alpha character. And the first or last character must not be a minus sign. The allowed string length is 0 to 255. | None            |

#### System Location

| Setting                    | Description   | Factory Default |
|----------------------------|---|-----------------|
| <b>Max. 255 Characters</b> | The physical location of this node (e.g. telephone closet, 3rd floor). The allowed string length is 0 to 255, and the allowed content is the ASCII characters from 32 to 126. | None            |

## Configuration > System > IP

### IP Configuration

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

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

#### IP Configuration

|                     |                          |  |
|---------------------|--------------------------|--|
| <b>Mode</b>         | Host ▼                   |  |
| <b>DNS Server 0</b> | No DNS server ▼          |  |
| <b>DNS Server 1</b> | No DNS server ▼          |  |
| <b>DNS Server 2</b> | No DNS server ▼          |  |
| <b>DNS Server 3</b> | No DNS server ▼          |  |
| <b>DNS Proxy</b>    | <input type="checkbox"/> |  |

#### Mode

Configure whether the IP stack should act as a Host or a Router.

| Setting | Description                                       | Factory Default |
|---------|---|-----------------|
| Host    | IP traffic between interfaces will not be routed. | Host            |
| Router  | IP 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 system selects the active DNS server from configuration if the preferred server does not respond in five attempts.

| Setting                           | Description  | Factory Default |
|-----------------------------------|--|-----------------|
| <b>From any DHCPv4 interfaces</b> | The first DNS server offered from a DHCPv4 lease to a DHCPv4-enabled interface will be used.   | No DNS server   |
| <b>No DNS server</b>              | No DNS server will be used.  |                 |
| <b>Configured IPv4</b>            | 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. |                 |
| <b>From this DHCPv4 interface</b> | Specify from which DHCPv4-enabled interface a provided DNS server should be preferred.   |                 |
| <b>Configured IPv6</b>            | Explicitly provide the valid IPv6 unicast address (except linklocal) of the DNS Server. Make sure the configured DNS server could be reachable (e.g. via PING6) for activating DNS service.        |                 |

|                                   |  |
|-----------------------------------|--|
| <b>From this DHCPv6 interface</b> | Specify from which DHCPv6-enabled interface a provided DNS server should be preferred.       |
| <b>From any DHCPv6 interfaces</b> | The first DNS server offered from a DHCPv6 lease to a DHCPv6-enabled interface will be used. |

### 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 supported.

### IP Interfaces

Click the **Add Interface** button to add a new IP interface. A maximum of 8 interfaces is supported.

**IP Interfaces**

| Delete                   | VLAN | DHCPv4                   |          |               | IPv4          |             | DHCPv6                   |                          |               | IPv6    |             |
|--------------------------|------|--------------------------|----------|---------------|---------------|-------------|--------------------------|--------------------------|---------------|---------|-------------|
|                          |      | Enable                   | Fallback | Current Lease | Address       | Mask Length | Enable                   | Rapid Commit             | Current Lease | Address | Mask Length |
| <input type="checkbox"/> | 1    | <input type="checkbox"/> | 0        |               | 192.168.1.254 | 24          | <input type="checkbox"/> | <input type="checkbox"/> |               |         |             |

| Setting                           | Description   |
|-----------------------------------|---|
| <b>Delete</b>                     | Select this option to delete an existing IP interface.  |
| <b>VLAN</b>                       | The VLAN associated with the IP interface. Only ports in this VLAN will be able to access the IP interface. This field is only available for input when creating a new interface.   |
| <b>IPv4 DHCP Enabled</b>          | Enable the DHCPv4 client by checking this box. If this option is enabled, the system will configure the IPv4 address and mask of the interface using the DHCPv4 protocol. The DHCPv4 client will announce the configured System Name as hostname to provide DNS lookup.   |
| <b>IPv4 DHCP Fallback Timeout</b> | The number of seconds for trying to obtain a DHCP lease. After this period expires, a configured IPv4 address will be used as IPv4 interface address. A value of zero disables the fallback mechanism, such that DHCP will keep retrying until a valid lease is obtained. Legal values are 0 to 4294967295 seconds. |
| <b>IPv4 DHCP Current Lease</b>    | For DHCP interfaces with an active lease, this column shows the current interface address as provided by the DHCP server.   |
| <b>IPv4 Address</b>               | The IPv4 address of the interface in dotted decimal notation. If DHCP is enabled, this field configures the fallback address. The field may be left blank if IPv4 operation on the interface is not desired - or no DHCP fallback address is desired.   |

|                             |   |
|-----------------------------|---|
| <b>IPv4 Mask</b>            | The IPv4 network mask in number of bits (prefix length). Valid values are between 0 and 30 bits for an IPv4 address. If DHCP is enabled, this field configures the fallback address network mask. The field may be left blank if IPv4 operation on the interface is not desired - or no DHCP fallback address is desired.   |
| <b>DHCPv6 Enable</b>        | 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.  |
| <b>DHCPv6 Rapid Commit</b>  | 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.  |
| <b>DHCPv6 Current Lease</b> | For DHCPv6 interface with an active lease, this column shows the interface address provided by the DHCPv6 server.   |
| <b>IPv6 Address</b>         | The IPv6 address of the interface. An IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separating each field (:). For example, fe80::215:c5ff:fe03:4dc7. The symbol :: is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can appear only once. The system accepts the valid IPv6 unicast address only, except IPv4-Compatible address and IPv4-Mapped address. The field may be left blank if IPv6 operation on the interface is not desired.  |
| <b>IPv6 Mask</b>            | The IPv6 network mask in number of bits (prefix length). Valid values are between 1 and 128 bits for an IPv6 address. The field may be left blank if IPv6 operation on the interface is not desired.  |
| <b>Resolving IPv6 DAD</b>   | The link-local address is formed from an interface identifier based on the hardware address which is supposed to be uniquely assigned. Once the DAD (Duplicate Address Detection) detects the address duplication, the operation on the interface should be disabled. At this time, manual intervention is required to resolve the address duplication. For example, check whether the loop occurs in the VLAN or there is in fact another device occupying the same hardware address as the device in the VLAN. After making sure the specific link-local address is unique on the IPv6 link in use, delete and then add the specific IPv6 interface to restart the IPv6 operations on this interface. |

## IP Routes

Click the **Add Route** button to add a new IP route. A maximum of 32 routes is supported.

**IP Routes**

|        |         |             |         |               |
|--------|---------|-------------|---------|---------------|
| Delete | Network | Mask Length | Gateway | Next Hop VLAN |
|--------|---------|-------------|---------|---------------|

| Setting                              | Description  |
|--------------------------------------|--|
| <b>Delete</b>                        | Select this option to delete an existing IP route.   |
| <b>Network</b>                       | 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 <b>0.0.0.0</b> or IPv6 <b>::</b> notation.   |
| <b>Mask Length</b>                   | 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 <b>0</b> (as it will match anything).  |
| <b>Gateway</b>                       | 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.  |
| <b>Next Hop VLAN (Only for IPv6)</b> | The VLAN ID (VID) of the specific IPv6 interface associated with the gateway. The given VID ranges from 1 to 4095 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. |

## Configuration > System > NTP

### NTP Configuration

#### NTP Configuration

|                 |            |
|-----------------|------------|
| <b>Mode</b>     | Disabled ▼ |
| <b>Server 1</b> |            |
| <b>Server 2</b> |            |
| <b>Server 3</b> |            |
| <b>Server 4</b> |            |
| <b>Server 5</b> |            |

#### Mode

| Setting         | Description                        | Factory Default |
|-----------------|------------------------------------|-----------------|
| <b>Enabled</b>  | Enable NTP client mode operation.  | Disabled        |
| <b>Disabled</b> | Disable NTP client mode operation. |                 |

#### Server

| Setting                                      | Description   | Factory Default |
|--|---|-----------------|
| <b>IPv4 or IPv6 address of an NTP server</b> | 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. In addition, it can also accept a domain name address. | None            |



## Configuration > System > Time

### Time Zone Configuration

**Time Zone Configuration**

| Time Zone Configuration |   |
|-------------------------|---|
| Time Zone               | None ▼  |
| Acronym                 | <input type="text" value=""/> ( 0 - 16 characters ) |

| Setting          | Description  | Factory Default |
|------------------|--|-----------------|
| <b>Time Zone</b> | Lists various time zones worldwide. Select appropriate Time Zone from the drop down and click Save to set.                             | None            |
| <b>Acronym</b>   | 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) | None            |

### Daylight Saving Time Configuration

**Daylight Saving Time Configuration**

**Daylight Saving Time Mode**

Daylight Saving Time  ▼

| Start Time settings |        |
|---------------------|--------|
| Month               | Jan ▼  |
| Date                | 1 ▼    |
| Year                | 2014 ▼ |
| Hours               | 0 ▼    |
| Minutes             | 0 ▼    |

| End Time settings |        |
|-------------------|--------|
| Month             | Jan ▼  |
| Date              | 1 ▼    |
| Year              | 2097 ▼ |
| Hours             | 0 ▼    |
| Minutes           | 0 ▼    |

| Offset settings |  |
|-----------------|--|
| Offset          | <input type="text" value="1"/> (1 - 1440)<br>Minutes |

Save    Reset

### Daylight Saving Time Mode

| Setting                     | Description   | Factory Default |
|-----------------------------|---|-----------------|
| <b>Daylight Saving Time</b> | 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. | Disabled        |

### Start time settings

Select the starting Month, Date, Year, Hours, and Minutes.

### End time settings

Select the ending Month, Date, Year, Hours, and Minutes.

### Offset settings

| Setting       | Description  | Factory Default |
|---------------|--|-----------------|
| <b>Offset</b> | Enter the number of minutes to add during Daylight Saving Time. (Range: 1 to 1440) | 1               |

## Configuration > System > Log

### System Log Configuration

#### System Log Configuration

|                |                 |
|----------------|-----------------|
| Server Mode    | Disabled ▼      |
| Server Address |                 |
| Syslog Level   | Informational ▼ |

#### Server Mode

Indicates the server mode operation. When the mode operation is enabled, the syslog message will send out to syslog server. The syslog protocol is based on UDP communication and received on UDP port 514 and the syslog server will not send acknowledgments back 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.

| Setting  | Description                    | Factory Default |
|----------|--------------------------------|-----------------|
| Enabled  | Enable server mode operation.  | Disabled        |
| Disabled | Disable server mode operation. |                 |

#### Server Address

Indicates the IPv4 host address of syslog server. If the switch is provided a DNS, a domain name can be entered.

#### Syslog Level

Indicates what kind of message will send to syslog server.

| Setting       | Description   | Factory Default |
|---------------|---|-----------------|
| Error         | Send the specific messages which severity code is less than or equal to Error(3).         | Informational   |
| Warning       | Send the specific messages which severity code is less than or equal to Warning(4).       |                 |
| Notice        | Send the specific messages which severity code is less than or equal to Notice(5).        |                 |
| Informational | Send the specific messages which severity code is less than or equal to Informational(6). |                 |

## Configuration > System > Event Warning > Relay

### Relay Warning Events Settings

The Relay Warning function uses relay output to alert the user when certain user-configured events take place.

#### Relay Warning Events Settings

**System Events**

|                                  |           |
|----------------------------------|-----------|
| Power Input 1 Failure(On -> Off) | Disable ▼ |
| Power Input 2 Failure(On -> Off) | Disable ▼ |

**Port Events**

| Port | Link     | Enable                   |
|------|----------|--------------------------|
| *    | Linkdown | <input type="checkbox"/> |
| 1    | Linkdown | <input type="checkbox"/> |
| 2    | Linkdown | <input type="checkbox"/> |
| 3    | Linkdown | <input type="checkbox"/> |
| 4    | Linkdown | <input type="checkbox"/> |
| 5    | Linkdown | <input type="checkbox"/> |
| 6    | Linkdown | <input type="checkbox"/> |
| 7    | Linkdown | <input type="checkbox"/> |
| 8    | Linkdown | <input type="checkbox"/> |
| 9    | Linkdown | <input type="checkbox"/> |
| 10   | Linkdown | <input type="checkbox"/> |

Save
Reset

#### System Events

Indicates power down mode operation. Warning Relay output is triggered when a switch is powered down.

| Setting         | Description                          | Factory Default |
|-----------------|--------------------------------------|-----------------|
| <b>Enabled</b>  | Enable system event mode operation.  | Disabled        |
| <b>Disabled</b> | Disable system event mode operation. |                 |

#### Port Events

| Setting       | Description   |
|---------------|---|
| <b>Port</b>   | The switch port number of the port.                                 |
| <b>Link</b>   | Port link down event.   |
| <b>Enable</b> | Controls whether port event warning is enabled on this switch port. |

## Configuration > Green Ethernet > Port Power Savings

### Port Power Saving Configuration

#### Port Power Savings Configuration

Optimize EEE for Latency ▼

#### What is EEE

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

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

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

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

#### Optimize EEE for

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

| Setting | Description           | Factory Default |
|---------|-----------------------|-----------------|
| Power   | Best power saving     | Latency         |
| Latency | Least traffic latency |                 |

## Port Configuration

**Port Configuration**

| Port | ActiPHY                  | PerfectReach             | EEE                      | EEE Urgent Queues        |                          |                          |                          |                          |                          |                          |                          |                          |
|------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|      |                          |                          |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        | 8                        |                          |
| 0    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Setting                  | Description   |
|--------------------------|---|
| <b>Port</b>              | The switch port number of the logical port.   |
| <b>ActiPHY</b>           | Link down power savings enabled. ActiPHY works by lowering the power for a port when there is no link. The port is powered up for a short moment in order to determine if a cable is inserted.  |
| <b>PerfectReach</b>      | Cable length power savings enabled. PerfectReach works by determining the cable length and lowering the power for ports with short cables.  |
| <b>EEE</b>               | Controls whether EEE is enabled for this switch port. For maximizing power savings, the circuit isn't started immediately once transmit data is ready for a port but is instead queued until a burst of data is ready to be transmitted. This will give some traffic latency. If desired, it is possible to minimize the latency for specific frames by mapping the frames to a specific queue (done with QOS), and then mark the queue as an urgent queue. When an urgent queue gets data to be transmitted, the circuits will be powered up at once and the latency will be reduced to the wakeup time. |
| <b>EEE Urgent Queues</b> | Queues set will activate transmission of frames as soon as data is available. Otherwise the queue will postpone transmission until a burst of frames can be transmitted.  |

## Configuration > Ports

### Port Configuration

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

Port Configuration

| Port | Description | Link  | Speed   |            | Adv Duplex |     | Adv speed |      |    | Flow Control |         |         | Maximum Frame Size | Excessive Collision Mode | Frame Length Check |
|------|-------------|-------|---------|------------|------------|-----|-----------|------|----|--------------|---------|---------|--------------------|--------------------------|--------------------|
|      |             |       | Current | Configured | Fdx        | Hdx | 10M       | 100M | 1G | Enable       | Curr Rx | Curr Tx |                    |                          |                    |
| *    |             |       |         | <>         |            |     |           |      |    |              |         |         | 9600               | <>                       |                    |
| 1    |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 2    |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 3    |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 4    |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 5    |             | 1Gfdx | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 6    |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 7    |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 8    |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 9    |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |
| 10   |             | Down  | Auto    |            |            |     |           |      |    |              |         |         | 9600               | Discard                  |                    |

Save Reset

### Port

This is the logical port number for this row.

### Description

| Setting                    | Description   | Factory Default |
|----------------------------|---|-----------------|
| <b>Max. 256 Characters</b> | The description of the port. It is an ASCII string no longer than 256 characters. | None            |

### Link

The current link state is displayed graphically.

| Color        | Description   |
|--------------|---------------|
| <b>Green</b> | Link is up.   |
| <b>Red</b>   | Link is down. |

### Current Link Speed

Provides the current link speed of the port.

### Configured Link Speed

Selects any available link speed for the given switch port. Only speeds supported by the specific port is shown.

| Setting           | Description   | Factory Default |
|-------------------|---|-----------------|
| <b>Disabled</b>   | Disables the switch port operation.   | Auto            |
| <b>Auto</b>       | Port auto negotiating speed with the link partner and selects the highest speed that is compatible with the link partner. |                 |
| <b>10Mbps HDX</b> | Forces the current port to 10Mbps half-duplex mode.   |                 |
| <b>10Mbps FDX</b> | Forces the current port to 10Mbps full-duplex mode.   |                 |

|                    |  |  |
|--------------------|--|--|
| <b>100Mbps HDX</b> | Forces the current port to 100Mbps half-duplex mode. |  |
| <b>100Mbps FDX</b> | Forces the current port to 100Mbps full-duplex mode. |  |
| <b>1Gbps FDX</b>   | Forces the current port to 1Gbps full-duplex.        |  |

### Advertise Duplex

When Duplex is set as Auto (i.e. auto negotiation), the port will only advertise the specified duplex as either **Fdx** or **Hdx** to the link partner. By default, the port will advertise all the supported duplexes if the Duplex is set as Auto.

### Advertise Speed

When Speed is set as Auto (i.e. auto negotiation), the port will only advertise the specified speeds (**10M**, **100M**, **1G**) to the link partner. By default, the port will advertise all the supported speeds if Speed is set as Auto.

### 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, the specific speed selected 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.

**NOTE:** The 100FX standard doesn't support Auto Negotiation, so when in 100FX mode, the flow control capabilities will always be shown as **disabled**.

### PFC

When PFC (802.1Qbb Priority Flow Control) is enabled on a port then flow control on a priority level is enabled. Through the **Priority** field, range (one or more) of priorities can be configured, e.g. '0-3,7' which equals '0,1,2,3,7'. PFC is not supported through auto negotiation. PFC and Flow Control cannot both be enabled on the same port.

### Maximum Frame Size

| Setting          | Description  | Factory Default |
|------------------|--|-----------------|
| <b>1518~9600</b> | Enter the maximum frame size allowed for the switch port, including FCS. The range is 1518-9600 bytes. | 9600            |

### Excessive Collision Mode

Configure port transmit collision behavior.

| Setting        | Description                                    | Factory Default |
|----------------|--|-----------------|
| <b>Discard</b> | Discard frame after 16 collisions.             | Discard         |
| <b>Restart</b> | Restart backoff algorithm after 16 collisions. |                 |

### Frame Length Check

Configures if frames with incorrect frame length in the EtherType/Length field shall be dropped. An Ethernet frame contains a field EtherType which can be used to indicate the frame payload size (in



bytes) for values of 1536 and below. If the EtherType/Length field is above 1536, it indicates that the field is used as an EtherType (indicating which protocol is encapsulated in the payload of the frame).

| Setting   | Description  | Factory Default |
|-----------|--|-----------------|
| Checked   | Frames with payload size less than 1536 bytes are dropped if the EtherType/Length field doesn't match the actual payload length. | Unchecked       |
| Unchecked | Frames are not dropped due to frame length mismatch.   |                 |

**NOTE:** No drop counters count frames dropped due to frame length mismatch.

## Configuration > DHCP > Server > Mode

### DHCP Server Mode Configuration

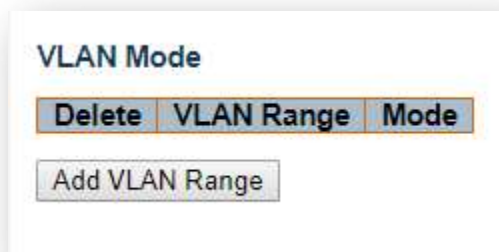
This page configures global mode and VLAN mode to enable/disable DHCP server per system and per VLAN.

#### Global Mode



| Setting         | Description                     | Factory Default |
|-----------------|---------------------------------|-----------------|
| <b>Enabled</b>  | Enable DHCP server per system.  | Disabled        |
| <b>Disabled</b> | Disable DHCP server per system. |                 |

#### VLAN Mode



#### VLAN Range

Indicate the VLAN range in which DHCP server is enabled or disabled. The first VLAN ID must be smaller than or equal to the second VLAN ID. However, if the VLAN range contains only 1 VLAN ID, then you can just input it into either the first or second VLAN ID, or both. Otherwise, if you want to disable an existing VLAN range, then you can follow the steps below.

1. Press **Add VLAN Ranges** button to add a new VLAN range.
2. Input the VLAN range that you want to disable.
3. Choose **Mode** to be **Disabled**.
4. Press **Save** button to apply the change.

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

#### Mode

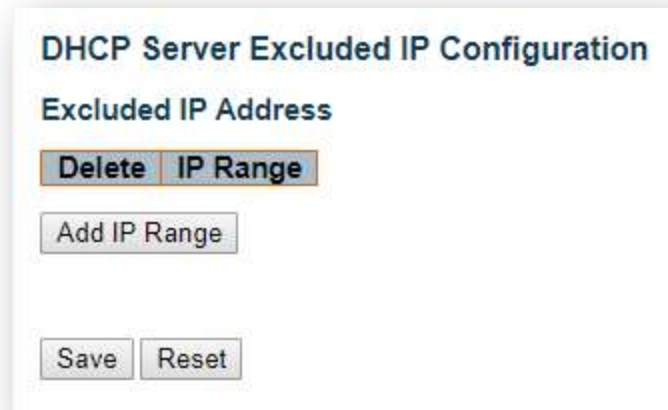
| Setting         | Description                   | Factory Default |
|-----------------|-------------------------------|-----------------|
| <b>Enabled</b>  | Enable DHCP server per VLAN.  | Enabled         |
| <b>Disabled</b> | Disable DHCP server per VLAN. |                 |

## Configuration > DHCP > Server > Excluded IP

### DHCP Server Excluded IP Configuration

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

#### *Excluded IP Address*



The screenshot shows a dialog box titled "DHCP Server Excluded IP Configuration". Below the title is the label "Excluded IP Address". There are three buttons: "Delete IP Range" (highlighted with a blue border), "Add IP Range", and "Save" (next to a "Reset" button).

#### **IP Range**

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

## Configuration > DHCP > Server > Pool

### DHCP Server Pool Configuration

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

#### DHCP Server Pool Configuration

**Pool Setting**

| Delete                   | Name    | Type | IP | Subnet Mask | Lease Time               |
|--------------------------|---------|------|----|-------------|--------------------------|
| <input type="checkbox"/> | testing | -    | -  | -           | 1 days 0 hours 0 minutes |

#### Pool Setting

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

| Setting            | Description  |
|--------------------|--|
| <b>Name</b>        | Configure the pool name that accepts all printable characters, except white space. If you want to configure the detail settings, you can click the pool name to go into the configuration page.  |
| <b>Type</b>        | Display which type of pool it is:<br><b>Network:</b> the pool defines a pool of IP addresses to service more than one DHCP client.<br><b>Host:</b> the pool services for a specific DHCP client identified by client identifier or hardware address.<br>If “-” is displayed, it means not defined. |
| <b>IP</b>          | Display network number of the DHCP address pool. If “-” is displayed, it means not defined.  |
| <b>Subnet Mask</b> | Display subnet mask of the DHCP address pool. If “-” is displayed, it means not defined.   |
| <b>Lease Time</b>  | Display lease time of the pool.  |

## Pool Setting Configuration page

### Pool

#### DHCP Pool Configuration

**Pool**

Name
testing ▼

### Pool

| Setting     | Description                 |
|-------------|-----------------------------|
| <b>Name</b> | Select a pool by pool name. |

### Setting

#### Setting

|                   |         |                |
|-------------------|---------|----------------|
| Pool Name         | pool    |                |
| Type              | None ▼  |                |
| IP                |         |                |
| Subnet Mask       |         |                |
| Lease Time        | 1       | days (0-365)   |
|                   | 0       | hours (0-23)   |
|                   | 0       | minutes (0-59) |
| Domain Name       |         |                |
| Broadcast Address |         |                |
| Default Router    | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |
| DNS Server        | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |
| NTP Server        | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |
|                   | 0.0.0.0 |                |

|                               |         |
|-------------------------------|---------|
| NetBIOS Node Type             | None ▾  |
| NetBIOS Scope                 |         |
| NetBIOS Name Server           | 0.0.0.0 |
|                               | 0.0.0.0 |
|                               | 0.0.0.0 |
|                               | 0.0.0.0 |
| NIS Domain Name               |         |
| NIS Server                    | 0.0.0.0 |
|                               | 0.0.0.0 |
|                               | 0.0.0.0 |
|                               | 0.0.0.0 |
| Client Identifier             | None ▾  |
| Hardware Address              |         |
| Client Name                   |         |
| Vendor 1 Class Identifier     |         |
| Vendor 1 Specific Information |         |
| Vendor 2 Class Identifier     |         |
| Vendor 2 Specific Information |         |
| Vendor 3 Class Identifier     |         |
| Vendor 3 Specific Information |         |
| Vendor 4 Class Identifier     |         |
| Vendor 4 Specific Information |         |

Save Reset

| Setting                  | Description  |
|--------------------------|--|
| <b>Name</b>              | Display the selected pool name.  |
| <b>Type</b>              | Specify which type of the pool it is:<br><b>Network:</b> the pool defines a pool of IP addresses to service more than one DHCP client.<br><b>Host:</b> the pool services for a specific DHCP client identified by client identifier or hardware address. |
| <b>IP</b>                | Specify network number of the DHCP address pool.   |
| <b>Subnet Mask</b>       | Specify subnet mask of the DHCP address pool.  |
| <b>Lease Time</b>        | Specify lease time that allows the client to request a lease time for the IP address. If all are 0's, then it means the lease time is infinite.  |
| <b>Domain Name</b>       | Specify domain name that client should use when resolving hostname via DNS.  |
| <b>Broadcast Address</b> | Specify the broadcast address in use on the client's subnet.   |
| <b>Default Router</b>    | Specify a list of IP addresses for routers on the client's subnet.   |
| <b>DNS Server</b>        | Specify a list of Domain Name System name servers available to the client.   |

|                                      |  |
|--------------------------------------|--|
| <b>NetBIOS Node Type</b>             | Specify NetBIOS node type option to allow Netbios over TCP/IP clients which are configurable to be configured as described in RFC 1001/1002.   |
| <b>NetBIOS Scope</b>                 | Specify the NetBIOS over TCP/IP scope parameter for the client as specified in RFC 1001/1002.  |
| <b>NetBIOS Name Server</b>           | Specify a list of NBNS name servers listed in order of preference.   |
| <b>NIS Domain Name</b>               | Specify the name of the client's NIS domain.   |
| <b>NIS Server</b>                    | Specify a list of IP addresses indicating NIS servers available to the client.   |
| <b>Client Identifier</b>             | Specify client's unique identifier to be used when the pool is set to host.  |
| <b>Hardware Address</b>              | Specify client's hardware (MAC) address to be used when the pool is set to host.   |
| <b>Client Name</b>                   | Specify the name of client to be used when the pool is set to host.  |
| <b>Vendor # Class Identifier</b>     | Specify to be used by DHCP client to optionally identify the vendor type and configuration of a DHCP client. DHCP server will deliver the corresponding option 43 specific information to the client that sends option 60 vendor class identifier. |
| <b>Vendor # Specific Information</b> | Specify vendor specific information according to option 60 vendor class identifier.  |

## Configuration > DHCP > Snooping

### DHCP Snooping Configuration



#### Snooping Mode

| Setting         | Description  | Factory Default |
|-----------------|--|-----------------|
| <b>Enabled</b>  | Enable DHCP snooping mode operation. When DHCP snooping mode operation is enabled, the DHCP request messages will be forwarded to trusted ports and only allow reply packets from trusted ports. | Disabled        |
| <b>Disabled</b> | Disable DHCP snooping mode operation.  |                 |

### Port Mode Configuration



| Setting          | Description   | Factory Default |
|------------------|---|-----------------|
| <b>Trusted</b>   | Configures the port as trusted source of the DHCP messages.   | Trusted         |
| <b>Untrusted</b> | Configures the port as untrusted source of the DHCP messages. |                 |



## Configuration > DHCP > Relay

### DHCP Relay Configuration

A DHCP relay agent is used to forward and 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 (Gateway IP Address) field of the DHCP packet. The DHCP server can use the value of GIADDR field to determine the assigned subnet. For such condition, please make sure the switch configuration of VLAN interface IP address and PVID (Port VLAN ID) correctly.

#### DHCP Relay Configuration

|                          |            |
|--------------------------|------------|
| Relay Mode               | Disabled ▼ |
| Relay Server             | 0.0.0.0    |
| Relay Information Mode   | Disabled ▼ |
| Relay Information Policy | Keep ▼     |

#### Relay Mode

| Setting         | Description  | Factory Default |
|-----------------|--|-----------------|
| <b>Enabled</b>  | Enable DHCP relay mode operation. When DHCP relay mode operation is enabled, the agent forwards and transfers DHCP messages between the clients and the server when they are not in the same subnet domain. And the DHCP broadcast message won't be flooded for security considerations. | Disabled        |
| <b>Disabled</b> | Disable DHCP relay mode operation.   |                 |

#### Relay Server

| Setting           | Description                                 |
|-------------------|---|
| <b>IP address</b> | Indicates the DHCP relay server IP address. |

#### Relay Information Mode

Indicates the DHCP relay information mode option operation. The option 82 circuit ID format as "[vlan\_id][module\_id][port\_no]". The first four characters represent the VLAN ID, the fifth and sixth characters are the module ID (in standalone device it always equals 0; in stackable device it means switch ID), and the last two characters are the port number. For example, "00030108" means the DHCP message receive form VLAN ID 3, switch ID 1, port No 8. And the option 82 remote ID value is equal to the switch MAC address.

| Setting         | Description  | Factory Default |
|-----------------|--|-----------------|
| <b>Enabled</b>  | 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        |
| <b>Disabled</b> | 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.

| Setting        | Description  | Factory Default |
|----------------|--|-----------------|
| <b>Replace</b> | Replace the original relay information when a DHCP message that already contains it is received. | Keep            |
| <b>Keep</b>    | Keep the original relay information when a DHCP message that already contains it is received.    |                 |
| <b>Drop</b>    | Drop the package when a DHCP message that already contains relay information is received.        |                 |

## Configuration > Security > Switch > Users

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

### Users Configuration



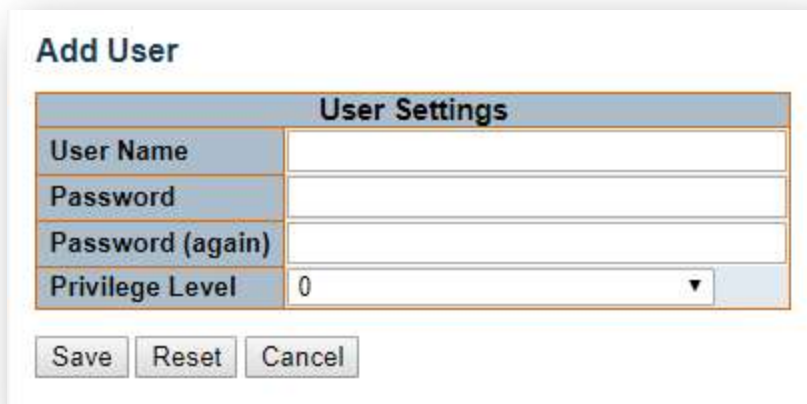
| User Name | Privilege Level |
|-----------|-----------------|
| admin     | 15              |

Add New User

| Setting                     | Description   | Factory Default |
|-----------------------------|---|-----------------|
| <b>User Name</b>            | The name identifying the user.  | None            |
| <b>Privilege Level 0~15</b> | 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 full control of the device. But other values need to refer to each group privilege level. User's privilege should be the same or greater than the group privilege level to have the access to that group. By default setting, most group's privilege level 5 has the read-only access and privilege level 10 has the read-write access. And the system maintenance (software upload, factory defaults, etc.) requires 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. | 0               |

## Add/Edit User

Click the **Add New User** button to add a new user. Also, you can click **User Name** to edit a user.



### User Name

| Setting                   | Description  | Factory Default |
|---------------------------|--|-----------------|
| <b>Max. 31 Characters</b> | A string identifying the user name that this entry should belong to. The allowed string length is 1 to 31. The valid user name allows letters, numbers, and underscores. | None            |

### Password

| Setting                   | Description   | Factory Default |
|---------------------------|---|-----------------|
| <b>Max. 31 Characters</b> | The password of the user. The allowed string length is 0 to 31. Any printable characters including space is accepted. | None            |

### Privilege Level

| Setting     | Description   | Factory Default |
|-------------|---|-----------------|
| <b>0~15</b> | 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 full control of the device. But other values need to refer to each group privilege level. User's privilege should be the same or greater than the group privilege level to have the access of that group. By default setting, most group's privilege level 5 has the read-only access and privilege level 10 has the read-write access. And the system maintenance (software upload, factory defaults, etc.) requires 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. | 0               |

## Configuration > Security > Switch > Privilege Levels

### Privilege Level Configuration

#### Privilege Level Configuration

| Group Name            | Privilege Levels        |                                  |                             |                              |
|-----------------------|-------------------------|----------------------------------|-----------------------------|------------------------------|
|                       | Configuration Read-only | Configuration/Execute Read/write | Status/Statistics Read-only | Status/Statistics Read/write |
| Aggregation           | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Debug                 | 15 ▼                    | 15 ▼                             | 15 ▼                        | 15 ▼                         |
| DHCP                  | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| DHCPv6_Client         | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Diagnostics           | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| DISCOVERY             | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| ERPS                  | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Event_Warning         | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Green_Ethernet        | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| IP                    | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| IPMC_Snooping         | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| JSON_RPC              | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| JSON_RPC_Notification | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| LACP                  | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| LLDP                  | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Loop_Protect          | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| MAC_Table             | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Maintenance           | 15 ▼                    | 15 ▼                             | 15 ▼                        | 15 ▼                         |
| MPTTEST               | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| MVR                   | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| NTP                   | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| POE                   | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Ports                 | 5 ▼                     | 10 ▼                             | 1 ▼                         | 10 ▼                         |
| Private_VLANs         | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| QoS                   | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| RMirror               | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| RSTBTN                | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Security              | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| sFlow                 | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| Spanning_Tree         | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| System                | 5 ▼                     | 10 ▼                             | 1 ▼                         | 10 ▼                         |
| VCL                   | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| VLANs                 | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| VNCUSB                | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |
| XXRP                  | 5 ▼                     | 10 ▼                             | 5 ▼                         | 10 ▼                         |

Save

Reset

## Group Name

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

- **System:** Contact, Name, Location, Time Zone, Daylight Saving Time, Log.
- **Security:** Authentication, System Access Management, Port (contains Dot1x port, MAC based and the MAC Address Limit), ACL, HTTPS, SSH, ARP Inspection, IP source guard.
- **IP:** Everything except ping.
- **Port:** Everything except VeriPHY.
- **Diagnostics:** ping and VeriPHY.
- **Maintenance:** CLI - System Reboot, System Restore Default, System Password, Configuration Save, Configuration Load, and Firmware Load. Web - Users, Privilege Levels, and everything in Maintenance.
- **Debug:** Only present in CLI.

## Privilege Levels

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

Note that some web pages (for example, MPLS-TP and MEP BFD pages) are based on JSON to transmit dynamic data between the web server and application. These pages require the configuration Read/Write privilege of JSON\_RPC group before any operations. This requirement must be met first, then it will evaluate the current privilege level against the required privilege level for the given method. For example, assume the MPLS-TP page only allows Read-Only attribute under privilege level 5, the privilege configuration should be set as JSON\_RPC: [5,5,5,5] and MPLS\_TP: [5,10,5,10].

## Configuration > Security > Switch > Auth Method

### Authentication Method Configuration

The authentication section allows you to configure how a user is authenticated when he logs into the switch via one of the management client interfaces.

| Client  | Methods |      |      |
|---------|---------|------|------|
| console | local ▼ | no ▼ | no ▼ |
| telnet  | local ▼ | no ▼ | no ▼ |
| ssh     | local ▼ | no ▼ | no ▼ |
| http    | local ▼ | no ▼ | no ▼ |

| Setting        | Description  |
|----------------|--|
| <b>Client</b>  | The management client for which the configuration below applies.   |
| <b>Methods</b> | <p>Method can be set to one of the following values:</p> <ul style="list-style-type: none"> <li>• <b>no:</b> Authentication is disabled and login is not possible.</li> <li>• <b>local:</b> Use the local user database on the switch for authentication.</li> <li>• <b>radius:</b> Use remote RADIUS server(s) for authentication.</li> <li>• <b>tacacs:</b> Use remote TACACS+ server(s) for authentication.</li> </ul> <p>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.</p> |

## Command Authorization Method Configuration

The command authorization section allows you to limit the CLI commands available to a user.

### Command Authorization Method Configuration

| Client  | Method | Cmd Lvl | Cfg Cmd                  |
|---------|--------|---------|--------------------------|
| console | no ▼   | 0       | <input type="checkbox"/> |
| telnet  | no ▼   | 0       | <input type="checkbox"/> |
| ssh     | no ▼   | 0       | <input type="checkbox"/> |

| Setting               | Description  |
|-----------------------|--|
| <b>Client</b>         | The management client for which the configuration below applies.   |
| <b>Methods</b>        | Method can be set to one of the following values: <ul style="list-style-type: none"> <li><b>no:</b> Command authorization is disabled. User is granted access to CLI commands according to his privilege level.</li> <li><b>tacacs:</b> Use remote TACACS+ server(s) for command authorization. If all remote servers are offline, the user is granted access to CLI commands according to his privilege level.</li> </ul> |
| <b>Cmd Lvl (0~15)</b> | Authorize all commands with a privilege level higher than or equal to this level. Valid values are in the range 0 to 15.   |
| <b>Cfg Cmd</b>        | Also authorize configuration commands.   |

## Accounting Method Configuration

The accounting section allows you to configure command and exec (login) accounting.

### Accounting Method Configuration

| Client  | Method | Cmd Lvl | Exec                     |
|---------|--------|---------|--------------------------|
| console | no ▼   |         | <input type="checkbox"/> |
| telnet  | no ▼   |         | <input type="checkbox"/> |
| ssh     | no ▼   |         | <input type="checkbox"/> |

| Setting        | Description   |
|----------------|---|
| <b>Client</b>  | The management client for which the configuration below applies.  |
| <b>Methods</b> | Method can be set to one of the following values: <ul style="list-style-type: none"> <li><b>no:</b> Accounting is disabled.</li> <li><b>tacacs:</b> Use remote TACACS+ server(s) for accounting.</li> </ul> |



|                           |   |
|---------------------------|---|
| <b>Cmd Lvl<br/>(0~15)</b> | Enable accounting of all commands with a privilege level higher than or equal to this level.<br>Valid values are in the range 0 to 15. Leave the field empty to disable command accounting. |
| <b>Exec</b>               | Enable exec (login) accounting.   |

## Configuration > Security > Switch > SSH

### SSH Configuration



The image shows a dialog box titled "SSH Configuration". It contains a dropdown menu labeled "Mode" with "Enabled" selected. Below the dropdown are two buttons: "Save" and "Reset".

| Setting         | Description                 | Factory Default |
|-----------------|-----------------------------|-----------------|
| <b>Enabled</b>  | Enable SSH mode operation.  | Enabled         |
| <b>Disabled</b> | Disable SSH mode operation. |                 |

## Configuration > Security > Switch > HTTPS

### HTTPS Configuration

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



#### Mode

| Setting         | Description                   | Factory Default |
|-----------------|-------------------------------|-----------------|
| <b>Enabled</b>  | Enable HTTPS mode operation.  | Disabled        |
| <b>Disabled</b> | Disable HTTPS mode operation. |                 |

#### Automatic Redirect

Indicate the HTTPS redirect mode operation. It is only significant when “HTTPS Mode Enabled” is selected. When the redirect mode is enabled, the HTTP connection will be redirected to HTTPS connection automatically.

Notice that the browser may not allow the redirect operation due to the security consideration unless the switch certificate is trusted to the browser. You need to initialize the HTTPS connection manually for this case.

| Setting         | Description                            | Factory Default |
|-----------------|--|-----------------|
| <b>Enabled</b>  | Enable HTTPS redirect mode operation.  | Disabled        |
| <b>Disabled</b> | Disable HTTPS redirect mode operation. |                 |

#### Certificate Maintain

| Setting         | Description  | Factory Default |
|-----------------|--|-----------------|
| <b>None</b>     | No operation.  | None            |
| <b>Delete</b>   | Delete the current certificate.  |                 |
| <b>Upload</b>   | Upload a certificate PEM file. Possible methods are:<br><b>Web Browser</b> or <b>URL</b> . |                 |
| <b>Generate</b> | Generate a new self-signed RSA certificate.  |                 |

### Certificate Pass Phrase

| Setting     | Description  | Factory Default |
|-------------|--|-----------------|
| Pass phrase | Enter the pass phrase in this field if your uploading certificate is protected by a specific passphrase. | None            |

### Certificate Upload

Upload a certificate PEM file into the switch. The file should contain the certificate and private key together. If you have two separated files for saving certificate and private key, use the Linux cat command to combine them into a single PEM file. For example, `cat my.cert my.key > my.pem`. Notice that the RSA certificate is recommended since most of the new versions of browsers have removed support for DSA in certificate, e.g. Firefox v37 and Chrome v39.

| Setting     | Description   | Factory Default |
|-------------|---|-----------------|
| Web Browser | Upload a certificate via Web browser.   | Web Browser     |
| URL         | <p>Upload a certificate via URL, the supported protocols are HTTP, HTTPS, TFTP and FTP. The URL format is &lt;protocol&gt;://[&lt;username&gt;[:&lt;password&gt;]@]&lt;host&gt;[:&lt;port&gt;][/&lt;path&gt;]/&lt;file_name&gt;. For example:</p> <p>tftp://10.10.10.10/new_image_path/new_image.dat,</p> <p>http://username:password@10.10.10.10:80/new_image_path/new_image.dat.</p> <p>A valid file name is a text string drawn from alphabet (A-Za-z), digits (0-9), dot (.), hyphen (-), under score(_). The maximum length is 63 and hyphen must not be the first character. The file name content that only contains '.' is not allowed.</p> |                 |

### Certificate Status

Display the current status of certificate on the switch.

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

## Configuration > Security > Switch > Access Management

### Access Management Configuration

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

#### Access Management Configuration

Mode Disabled ▾

| Delete   | VLAN ID | Start IP Address | End IP Address | HTTP/HTTPS | SNMP | TELNET/SSH |
|--|---------|------------------|----------------|------------|------|------------|
| <span style="border: 1px solid #ccc; padding: 2px 10px;">Add New Entry</span>  |         |                  |                |            |      |            |
| <span style="border: 1px solid #ccc; padding: 2px 5px;">Save</span> <span style="border: 1px solid #ccc; padding: 2px 5px;">Reset</span> |         |                  |                |            |      |            |

#### Mode

Indicates the access management mode operation.

| Setting  | Description                               | Factory Default |
|----------|---|-----------------|
| Enabled  | Enable access management mode operation.  | Disabled        |
| Disabled | Disable access management mode operation. |                 |

#### Add New Entry

| Setting          | Description  |
|------------------|--|
| Delete           | Check to delete the entry. It will be deleted during the next save.  |
| VLAN ID          | Indicates the VLAN ID for the access management entry.   |
| Start IP address | Indicates the start IP address for the access management entry.  |
| End IP address   | Indicates the end IP address for the access management entry.  |
| HTTP/HTTPS       | Indicates that the host can access the switch from HTTP/HTTPS interface if the host IP address matches the IP address range provided in the entry. |
| SNMP             | Indicates that the host can access the switch from SNMP interface if the host IP address matches the IP address range provided in the entry.       |
| TELNET/SSH       | Indicates that the host can access the switch from TELNET/SSH interface if the host IP address matches the IP address range provided in the entry. |

## Configuration > Security > Switch > SNMP > System

### SNMP System Configuration

#### SNMP System Configuration

|                        |                    |
|------------------------|--------------------|
| <b>Mode</b>            | Enabled ▼          |
| <b>Version</b>         | SNMP v2c ▼         |
| <b>Read Community</b>  | public             |
| <b>Write Community</b> | private            |
| <b>Engine ID</b>       | 800007e5017f000001 |

#### Mode

| Setting         | Description                  | Factory Default |
|-----------------|------------------------------|-----------------|
| <b>Enabled</b>  | Enable SNMP mode operation.  | Enabled         |
| <b>Disabled</b> | Disable SNMP mode operation. |                 |

#### Version

| Setting         | Description                    | Factory Default |
|-----------------|--------------------------------|-----------------|
| <b>SNMP v1</b>  | Set SNMP supported version 1.  | SNMP v2c        |
| <b>SNMP v2c</b> | Set SNMP supported version 2c. |                 |
| <b>SNMP v3</b>  | Set SNMP supported version 3.  |                 |

#### Read Community

| Setting                    | Description  | Factory Default |
|----------------------------|--|-----------------|
| <b>Max. 255 characters</b> | 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 a security name than a SNMPv1 or SNMPv2c community string. In addition to community string, a particular range of source addresses can be used to restrict source subnet. | public          |

## Write Community

| Setting                    | Description  | Factory Default |
|----------------------------|--|-----------------|
| <b>Max. 255 characters</b> | 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 a security name than a SNMPv1 or SNMPv2c community string. In addition to community string, a particular range of source addresses can be used to restrict source subnet. | private         |

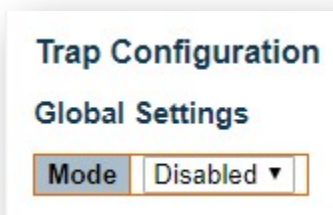
## Engine ID

Indicates the SNMPv3 engine ID. The string must contain an even number (in hexadecimal format) with number of digits between 10 and 64, but all-zeros and all-'F's are not allowed. Change of the Engine ID will clear all original local users.

Configuration > Security > Switch > SNMP > Trap

**Trap Configuration**

*Global Settings*



**Mode**

| Setting  | Description                       | Factory Default |
|----------|-----------------------------------|-----------------|
| Enabled  | Enable SNMP trap mode operation.  | Disabled        |
| Disabled | Disable SNMP trap mode operation. |                 |

**Trap Destination Configurations**



**Name**

Indicates the Trap Configuration's name. Indicates the Trap Destination's name.

**Enable**

Indicates the Trap Destination mode operation.

| Setting  | Description                       | Factory Default |
|----------|-----------------------------------|-----------------|
| Enabled  | Enable SNMP trap mode operation.  | Disabled        |
| Disabled | Disable SNMP trap mode operation. |                 |

**Version**

| Setting  | Description                    | Factory Default |
|----------|--------------------------------|-----------------|
| SNMP v1  | Set SNMP supported version 1.  | SNMP v2c        |
| SNMP v2c | Set SNMP supported version 2c. |                 |
| SNMP v3  | Set SNMP supported version 3.  |                 |



### Destination Address

Indicates the SNMP trap destination address. It allows a valid IP address in dotted decimal notation ('x.y.z.w'). And it also allows a valid hostname. A valid hostname is a string drawn from the alphabet (A-Za-z), digits (0-9), dot (.), and 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

| SNMP Trap Configuration       |                      |
|-------------------------------|----------------------|
| Trap Config Name              | <input type="text"/> |
| Trap Mode                     | Disabled ▼           |
| Trap Version                  | SNMP v2c ▼           |
| Trap Community                | Public               |
| Trap Destination Address      | <input type="text"/> |
| Trap Destination Port         | 162                  |
| Trap Inform Mode              | Disabled ▼           |
| Trap Inform Timeout (seconds) | 3                    |
| Trap Inform Retry Times       | 5                    |
| Trap Probe Security Engine ID | Enabled ▼            |
| Trap Security Engine ID       | <input type="text"/> |
| Trap Security Name            | None ▼               |

### Trap Config Name

| Setting                | Description  | Factory Default |
|------------------------|--|-----------------|
| <b>1~32 characters</b> | Indicates which Trap Configuration's name for configuring. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126. | None            |

### Trap Mode

| Setting         | Description                       | Factory Default |
|-----------------|-----------------------------------|-----------------|
| <b>Enabled</b>  | Enable SNMP trap mode operation.  | Disabled        |
| <b>Disabled</b> | Disable SNMP trap mode operation. |                 |

### Trap Version

| Setting         | Description                    | Factory Default |
|-----------------|--------------------------------|-----------------|
| <b>SNMP v1</b>  | Set SNMP supported version 1.  | SNMP v2c        |
| <b>SNMP v2c</b> | Set SNMP supported version 2c. |                 |
| <b>SNMP v3</b>  | Set SNMP supported version 3.  |                 |

### Trap Community

| Setting                   | Description   | Factory Default |
|---------------------------|---|-----------------|
| <b>0 ~ 255 characters</b> | Indicates the community access string when sending SNMP trap packet. The allowed string length is 0 to 255, and the allowed content is ASCII characters from 33 to 126. | Public          |

### Trap Destination Address

| Setting           | Description   | Factory Default |
|-------------------|---|-----------------|
| <b>IP address</b> | Indicates the SNMP trap destination address. It allows a valid IP address in dotted decimal notation ('x.y.z.w'). And it also allows a valid hostname. A valid hostname is a string drawn from the alphabet (A-Za-z), digits (0- 9), dot (.), and 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, <b>fe80::215:c5ff:fe03:4dc7</b> . 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, <b>::192.1.2.34</b> . | None            |

### Trap Destination port

| Setting        | Description   | Factory Default |
|----------------|---|-----------------|
| <b>1~65535</b> | Indicates the SNMP trap destination port. SNMP Agent will send SNMP message via this port, the port range is 1~65535. | 162             |

### Trap Inform Mode

| Setting         | Description                              | Factory Default |
|-----------------|--|-----------------|
| <b>Enabled</b>  | Enable SNMP trap inform mode operation.  | Disabled        |
| <b>Disabled</b> | Disable SNMP trap inform mode operation. |                 |

### Trap Inform Timeout (seconds)

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0~2147  | Indicates the SNMP trap inform timeout. The allowed range is 0 to 2147. | 3               |

### Trap Inform Retry Times

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| 0~255   | Indicates the SNMP trap inform retry times. The allowed range is 0 to 255. | 5               |

### Trap Probe Security Engine ID

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| Enabled  | Enable SNMP trap probe security engine ID mode of operation.  | Enabled         |
| Disabled | Disable SNMP trap probe security engine ID mode of operation. |                 |

### Trap Security Engine ID

Indicates the SNMP trap security engine ID. SNMPv3 sends traps and informs using USM for authentication and privacy. A unique engine ID for these traps and informs is needed. When Trap Probe Security Engine ID is enabled, the ID will be probed automatically. Otherwise, the ID specified in this field is used. The string must contain an even number (in hexadecimal format) with number of digits between 10 and 64, but all-zeros and all-'F's are not allowed.

### Trap Security Name

Indicates the SNMP trap security name. SNMPv3 traps and informs using USM for authentication and privacy. A unique security name is needed when traps and informs are enabled.

### SNMP Trap Event

#### SNMP Trap Event

|                       |   |
|-----------------------|---|
| <b>System</b>         | <input type="checkbox"/> * <input type="checkbox"/> Warm Start <span style="float: right;"><input type="checkbox"/> Cold Start</span>   |
| <b>Interface</b>      | Link up <input checked="" type="radio"/> none <input type="radio"/> specific <input type="radio"/> all switches<br><input type="checkbox"/> * Link down <input checked="" type="radio"/> none <input type="radio"/> specific <input type="radio"/> all switches<br>LLDP <input checked="" type="radio"/> none <input type="radio"/> specific <input type="radio"/> all switches |
| <b>Authentication</b> | <input type="checkbox"/> * <input type="checkbox"/> SNMP Authentication Fail  |
| <b>Switch</b>         | <input type="checkbox"/> * <input type="checkbox"/> STP <span style="float: right;"><input type="checkbox"/> RMON</span>  |

## System

Enable/disable that the Interface group's traps.

| Setting           | Description                     | Factory Default |
|-------------------|---------------------------------|-----------------|
| <b>Warm Start</b> | Enable/disable Warm Start trap. | Disabled        |
| <b>Cold Start</b> | Enable/disable Cold Start trap. | Disabled        |

## Interface

Indicates the Interface group's traps. Possible traps are: Indicates that the SNMP entity is permitted to generate authentication failure traps.

| Setting          | Description                    | Factory Default |
|------------------|--------------------------------|-----------------|
| <b>Link Up</b>   | Enable/disable Link Up trap.   | Disabled        |
| <b>Link Down</b> | Enable/disable Link Down trap. | Disabled        |
| <b>LLDP</b>      | Enable/disable LLDP trap.      | Disabled        |

## Authentication

Indicates the authentication group's traps.

| Setting                         | Description   | Factory Default |
|---------------------------------|---|-----------------|
| <b>SNMP Authentication Fail</b> | Enable/disable SNMP trap authentication failure trap. | Disabled        |

## Switch

Indicates the switch group's traps.

| Setting     | Description               | Factory Default |
|-------------|---------------------------|-----------------|
| <b>STP</b>  | Enable/disable STP trap.  | Disabled        |
| <b>RMON</b> | Enable/disable RMON trap. | Disabled        |

## Configuration > Security > Switch > SNMP > Communities

### SNMPv3 Community Configuration

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

#### SNMPv3 Community Configuration

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

#### Add New Entry

| Setting            | Description   |
|--------------------|---|
| <b>Delete</b>      | Check to delete the entry. It will be deleted during the next save.   |
| <b>Community</b>   | Indicates the community access string to permit access to SNMPv3 agent. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126. The community string will be treated as a security name and map a SNMPv1 or SNMPv2c community string. |
| <b>Source IP</b>   | Indicates the SNMP access source address. A particular range of source addresses can be used to restrict source subnet when combined with source mask.  |
| <b>Source Mask</b> | Indicates the SNMP access source address mask.  |

## Configuration > Security > Switch > SNMP > Users

### SNMPv3 User Configuration

Configure SNMPv3 user table on this page. The entry index keys are **Engine ID** and **User Name**.

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

### Add New Entry

| Setting               | Description   |
|-----------------------|---|
| <b>Delete</b>         | Check to delete the entry. It will be deleted during the next save.   |
| <b>Engine ID</b>      | An octet string identifying the engine ID that this entry should belong to. The string must contain an even number (in hexadecimal format) with number of digits between 10 and 64, but all-zeros and all-'F's are not allowed. The SNMPv3 architecture uses the User-based Security Model (USM) for message security and the View-based Access Control Model (VACM) for access control. For the USM entry, the usmUserEngineID and usmUserName are the entry's keys. In a simple agent, usmUserEngineID is always that agent's own snmpEngineID value. The value can also take the value of the snmpEngineID of a remote SNMP engine with which this user can communicate. In other words, if user engine ID equal system engine ID then it is local user; otherwise it's remote user. |
| <b>User Name</b>      | A string identifying the user name that this entry should belong to. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.  |
| <b>Security Level</b> | <p>Indicates the security model that this entry should belong to. Possible security models are:</p> <ul style="list-style-type: none"> <li>• <b>NoAuth, NoPriv:</b> No authentication and no privacy.</li> <li>• <b>Auth, NoPriv:</b> Authentication and no privacy.</li> <li>• <b>Auth, Priv:</b> Authentication and privacy.</li> </ul> <p>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.</p>   |

|                                |   |
|--------------------------------|---|
| <b>Authentication Protocol</b> | <p>Indicates the authentication protocol that this entry should belong to. Possible authentication protocols are:</p> <ul style="list-style-type: none"> <li>• <b>None:</b> No authentication protocol.</li> <li>• <b>MD5:</b> An optional flag to indicate that this user uses MD5 authentication protocol.</li> <li>• <b>SHA:</b> An optional flag to indicate that this user uses SHA authentication protocol.</li> </ul> <p>The value of security level cannot be modified if entry already exists. That means you must first ensure that the value is set correctly.</p> |
| <b>Authentication Password</b> | <p>A string identifying the authentication password phrase. For MD5 authentication protocol, the allowed string length is 8 to 32. For SHA authentication protocol, the allowed string length is 8 to 40. The allowed content is ASCII characters from 33 to 126.</p>   |
| <b>Privacy Protocol</b>        | <p>Indicates the privacy protocol that this entry should belong to. Possible privacy protocols are:</p> <ul style="list-style-type: none"> <li>• <b>None:</b> No privacy protocol.</li> <li>• <b>DES:</b> An optional flag to indicate that this user uses DES authentication protocol.</li> <li>• <b>AES:</b> An optional flag to indicate that this user uses AES authentication protocol.</li> </ul>   |
| <b>Privacy Password</b>        | <p>A string identifying the privacy password phrase. The allowed string length is 8 to 32, and the allowed content is ASCII characters from 33 to 126.</p>  |

## Configuration > Security > Switch > SNMP > Groups

### SNMPv3 Group Configuration

Configure SNMPv3 group table on this page. The entry index keys are **Security Model** and **Security Name**.

#### SNMPv3 Group Configuration

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

#### Add New Entry

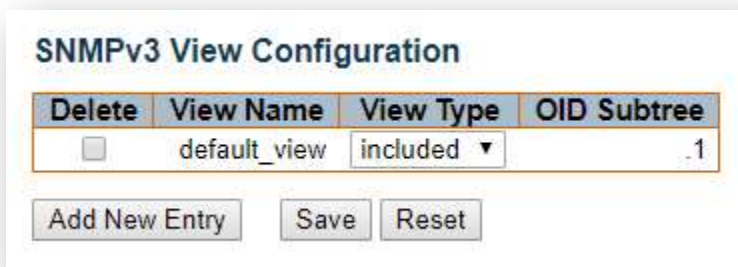
| Setting               | Description   |
|-----------------------|---|
| <b>Delete</b>         | Check to delete the entry. It will be deleted during the next save.   |
| <b>Security Model</b> | Indicates the security model that this entry should belong to. Possible security models are: <ul style="list-style-type: none"> <li><b>v1</b>: Reserved for SNMPv1.</li> <li><b>v2c</b>: Reserved for SNMPv2c.</li> <li><b>usm</b>: User-based Security Model (USM).</li> </ul> |
| <b>Security Name</b>  | A string identifying the security name that this entry should belong to. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.  |
| <b>Group Name</b>     | 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.   |



## Configuration > Security > Switch > SNMP > Views

### SNMPv3 View Configuration

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



| Delete                   | View Name    | View Type  | OID Subtree |
|--------------------------|--------------|------------|-------------|
| <input type="checkbox"/> | default_view | included ▼ | .1          |

#### Add New Entry

| Setting            | Description   |
|--------------------|---|
| <b>Delete</b>      | Check to delete the entry. It will be deleted during the next save.   |
| <b>View Name</b>   | A string identifying the view name that this entry should belong to. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.  |
| <b>View Type</b>   | <p>Indicates the view type that this entry should belong to. Possible view types are:</p> <ul style="list-style-type: none"> <li>• <b>included:</b> An optional flag to indicate that this view subtree should be included.</li> <li>• <b>excluded:</b> An optional flag to indicate that this view subtree should be excluded.</li> </ul> <p>In general, if a view entry's view type is <b>excluded</b>, there should be another view entry existing with view type as 'included' and it's OID subtree should overstep the <b>excluded</b> view entry.</p> |
| <b>OID Subtree</b> | The OID defining the root of the subtree to add to the named view. The allowed OID length is 1 to 128. The allowed string content is digital number or asterisk (*).  |

## Configuration > Security > Switch > SNMP > Access

### SNMPv3 Access Configuration

Configure SNMPv3 access table on this page. The entry index keys are **Group Name**, **Security Model**, and **Security Level**.

#### SNMPv3 Access Configuration

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

#### Add New Entry

| Setting                | Description   |
|------------------------|---|
| <b>Delete</b>          | Check to delete the entry. It will be deleted during the next save.   |
| <b>Group Name</b>      | 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.   |
| <b>Security Model</b>  | Indicates the security model that this entry should belong to. Possible security models are: <ul style="list-style-type: none"> <li><b>any</b>: Any security model accepted(v1 v2c usm).</li> <li><b>v1</b>: Reserved for SNMPv1.</li> <li><b>v2c</b>: Reserved for SNMPv2c.</li> <li><b>usm</b>: User-based Security Model (USM).</li> </ul> |
| <b>Security Level</b>  | Indicates the security model that this entry should belong to. Possible security models are: <ul style="list-style-type: none"> <li><b>NoAuth, NoPriv</b>: No authentication and no privacy.</li> <li><b>Auth, NoPriv</b>: Authentication and no privacy.</li> <li><b>Auth, Priv</b>: Authentication and privacy.</li> </ul>                  |
| <b>Read View Name</b>  | The name of the MIB view defining the MIB objects for which this request may request the current values. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.  |
| <b>Write View Name</b> | The name of the MIB view defining the MIB objects for which this request may potentially set new values. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126.  |

## Configuration > Security > Switch > RMON > Statistics

### RMON statistics Configuration

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



#### Add New Entry

| Setting            | Description  |
|--------------------|--|
| <b>Delete</b>      | Check to delete the entry. It will be deleted during the next save.  |
| <b>ID</b>          | Indicates the index of the entry. The range is from 1 to 65535.  |
| <b>Data Source</b> | Indicates the port ID which wants to be monitored. If in stacking switch, the value must add 1000000*(switch ID-1). For example, if the port is switch 3 port 5, the value is 3000005. |

## Configuration > Security > Switch > RMON > History

### RMON History Configuration

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

#### RMON History Configuration

|        |    |             |          |         |                 |
|--------|----|-------------|----------|---------|-----------------|
| Delete | ID | Data Source | Interval | Buckets | Buckets Granted |
|--------|----|-------------|----------|---------|-----------------|

#### Add New Entry

| Setting                | Description  |
|------------------------|--|
| <b>Delete</b>          | Check to delete the entry. It will be deleted during the next save.  |
| <b>ID</b>              | Indicates the index of the entry. The range is from 1 to 65535.  |
| <b>Data Source</b>     | Indicates the port ID which wants to be monitored. If in stacking switch, the value must add 1000000*(switch ID-1). For example, if the port is switch 3 port 5, the value is 3000005. |
| <b>Interval</b>        | Indicates the interval in seconds for sampling the history statistics data. The range is from 1 to 3600, default value is 1800 seconds.  |
| <b>Buckets</b>         | 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.  |
| <b>Buckets Granted</b> | The number of data shall be saved in the RMON.   |

## Configuration > Security > Switch > RMON > Alarm

### RMON Alarm Configuration

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

#### RMON Alarm Configuration

| Delete  | ID | Interval | Variable | Sample Type | Value | Startup Alarm | Rising Threshold | Rising Index | Falling Threshold | Falling Index |
|---|----|----------|----------|-------------|-------|---------------|------------------|--------------|-------------------|---------------|
| <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <span>Add New Entry</span> <span>Save</span> <span>Reset</span> </div> |    |          |          |             |       |               |                  |              |                   |               |

#### Add New Entry

| Setting            | Description   |
|--------------------|---|
| <b>Delete</b>      | Check to delete the entry. It will be deleted during the next save.   |
| <b>ID</b>          | Indicates the index of the entry. The range is from 1 to 65535.   |
| <b>Data Source</b> | Indicates the port ID which wants to be monitored. If in stacking switch, the value must add 1000000*(switch ID-1). For example, if the port is switch 3 port 5, the value is 3000005.  |
| <b>Interval</b>    | Indicates the interval in seconds for sampling and comparing the rising and falling threshold. The range is from 1 to 2 <sup>31</sup> -1.   |
| <b>Variable</b>    | Indicates the particular variable to be sampled, the possible variables are: <ul style="list-style-type: none"> <li>• <b>InOctets:</b> The total number of octets received on the interface, including framing characters.</li> <li>• <b>InUcastPkts:</b> The number of uni-cast packets delivered to a higher-layer protocol.</li> <li>• <b>InNUcastPkts:</b> The number of broad-cast and multi-cast packets delivered to a higher-layer protocol.</li> <li>• <b>InDiscards:</b> The number of inbound packets that are discarded even the packets that are normal.</li> <li>• <b>InErrors:</b> The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.</li> <li>• <b>InUnknownProtos:</b> the number of the inbound packets that were discarded because of the unknown or un-supported protocol.</li> <li>• <b>OutOctets:</b> The number of octets transmitted out of the interface, including framing characters.</li> <li>• <b>OutUcastPkts:</b> The number of uni-cast packets that request to transmit.</li> <li>• <b>OutNUcastPkts:</b> The number of broad-cast and multi-cast packets that request to transmit.</li> <li>• <b>OutDiscards:</b> The number of outbound packets that are discarded even the packets that are normal.</li> <li>• <b>OutErrors:</b> The number of outbound packets that could not be transmitted because of errors.</li> </ul> |

|                          |  |
|--------------------------|--|
|                          | <ul style="list-style-type: none"> <li>• <b>OutQLen:</b> The length of the output packet queue (in packets).</li> </ul>  |
| <b>Sample Type</b>       | <p>The method of sampling the selected variable and calculating the value to be compared against the thresholds, possible sample types are:</p> <ul style="list-style-type: none"> <li>• <b>Absolute:</b> Get the sample directly.</li> <li>• <b>Delta:</b> Calculate the difference between samples (default).</li> </ul>   |
| <b>Value</b>             | The value of the statistic during the last sampling period.  |
| <b>Startup Alarm</b>     | <p>The method of sampling the selected variable and calculating the value to be compared against the thresholds, possible sample types are:</p> <ul style="list-style-type: none"> <li>• <b>Rising:</b> Trigger alarm when the first value is larger than the rising threshold.</li> <li>• <b>Falling:</b> Trigger alarm when the first value is less than the falling threshold.</li> <li>• <b>RisingOrFalling:</b> Trigger alarm when the first value is larger than the rising threshold or less than the falling threshold (default).</li> </ul> |
| <b>Rising Threshold</b>  | Rising threshold value (-2147483648-2147483647).   |
| <b>Rising Index</b>      | Rising event index (1-65535).  |
| <b>Falling Threshold</b> | Falling threshold value (-2147483648-2147483647).  |
| <b>Falling Index</b>     | Falling event index (1-65535).   |

## Configuration > Security > Switch > RMON > Event

### RMON Event Configuration

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

**RMON Event Configuration**

| Delete | ID | Desc | Type | Community | Event Last Time |
|--------|----|------|------|-----------|-----------------|
|--------|----|------|------|-----------|-----------------|

#### Add New Entry

| Setting                | Description  |
|------------------------|--|
| <b>Delete</b>          | Check to delete the entry. It will be deleted during the next save.  |
| <b>ID</b>              | Indicates the index of the entry. The range is from 1 to 65535.  |
| <b>Desc</b>            | Indicates this event, the string length is from 0 to 127, default is a null string.  |
| <b>Type</b>            | Indicates the notification of the event, the possible types are:<br><b>none:</b> No SNMP log is created; no SNMP trap is sent.<br><b>log:</b> Create SNMP log entry when the event is triggered.<br><b>snmptrap:</b> Send SNMP trap when the event is triggered.<br><b>logandtrap:</b> Create SNMP log entry and send SNMP trap when the event is triggered. |
| <b>Community</b>       | Specify the community when trap is sent, the string length is from 0 to 127, default is public.  |
| <b>Event Last Time</b> | Indicates the value of sysUpTime at the time this event entry last generated an event.   |

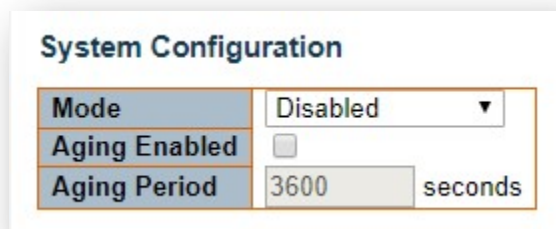
## Configuration > Security > Network > Limit Control

### Port Security Limit Control Configuration

Limit Control allows for limiting the number of users on a given port. A user is identified by a MAC address and VLAN ID. If Limit Control is enabled on a port, the limit specifies the maximum number of users on the port. If this number is exceeded, an action is taken. The action can be one of the four different actions as described below.

The Limit Control module utilizes a lower-layer module, Port Security module, which manages MAC addresses learned on the port. The Limit Control configuration consists of two sections, a system- and a port-wide.

#### System Configuration



| System Configuration |                                     |
|----------------------|-------------------------------------|
| Mode                 | Disabled ▼                          |
| Aging Enabled        | <input checked="" type="checkbox"/> |
| Aging Period         | 3600 seconds                        |

| Setting              | Description  |
|----------------------|--|
| <b>Mode</b>          | Indicates if Limit Control is globally enabled or disabled on the switch. If globally disabled, other modules may still use the underlying functionality, but limit checks and corresponding actions are disabled.   |
| <b>Aging Enabled</b> | If checked, secured MAC addresses are subject to aging as discussed under Aging.   |
| <b>Aging Period</b>  | <p>If Aging Enabled is checked, then the aging period is controlled with this input. If other modules are using the underlying port security for securing MAC addresses, they may have other requirements to the aging period. The underlying port security will use the shorter requested aging period of all modules that use the functionality. The Aging Period can be set to a number between 10 and 10,000,000 seconds.</p> <p>To understand why aging may be desired, consider the following scenario: Suppose an end-host is connected to a 3rd party switch or hub, which in turn is connected to a port on this switch on which Limit Control is enabled. The end-host will be allowed to forward if the limit is not exceeded. Now suppose that the end-host logs off or powers down. If it wasn't for aging, the end-host would still take up resources on this switch and will be allowed to forward. To overcome this situation, enable aging. With aging enabled, a timer is started once the end-host gets secured. When the timer expires, the switch starts looking for frames from the end-host, and if such frames are not seen within the next Aging Period, the end-host is assumed to be disconnected, and the corresponding resources are freed on the switch.</p> |



### Port Configuration

The table has one row for each port on the switch and a number of columns.

**Port Configuration**

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

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

|                       |   |
|-----------------------|---|
|                       | <p>disconnected and reconnected on the port (by disconnecting the cable), the port will remain shut down. There are three ways to re-open the port:</p> <ol style="list-style-type: none"> <li>1. Boot the switch,</li> <li>2. Disable and re-enable Limit Control on the port or the switch,</li> <li>3. Click the Reopen button.</li> </ol> <p><b>Trap &amp; Shutdown:</b> If Limit + 1 MAC addresses are seen on the port, both the Trap and the Shutdown actions described above will be taken.</p>   |
| <b>State</b>          | <p>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:</p> <p><b>Disabled:</b> Limit Control is either globally disabled or disabled on the port.</p> <p><b>Ready:</b> The limit is not yet reached. This can be shown for all actions.</p> <p><b>Limit Reached:</b> Indicates that the limit is reached on this port. This state can only be shown if Action is set to <b>None</b> or <b>Trap</b>.</p> <p><b>Shutdown:</b> Indicates that the port is shut down by the Limit Control module. This state can only be shown if Action is set to <b>Shutdown</b> or <b>Trap &amp; Shutdown</b>.</p> |
| <b>Re-open Button</b> | <p>If a port is shutdown by this module, you may reopen it by clicking this button, which will only be enabled if this is the case. For other methods, refer to <b>Shutdown</b> in the Action section.</p> <p>Note that clicking the reopen button causes the page to be refreshed, so non-committed changes will be lost.</p>  |

## Configuration > Security > Network > NAS

### Network Access Server Configuration

This page allows you to configure the IEEE 802.1X and MAC-based authentication system and port settings.

The IEEE 802.1X standard defines a port-based access control procedure that prevents unauthorized access to a network by requiring users to first submit credentials for authentication. One or more central servers, the backend servers, determine whether the user is allowed access to the network. These backend (RADIUS) servers are configured on the Configuration > Security > AAA page. The IEEE802.1X standard defines port-based operation, but non-standard variants overcome security limitations as shall be explored below.

MAC-based authentication allows for authentication of more than one user on the same port and doesn't require the user to have special 802.1X supplicant software installed on his system. The switch uses the user's MAC address to authenticate against the backend server. Intruders can create counterfeit MAC addresses, which makes MAC-based authentication less secure than 802.1X authentication.

The NAS configuration consists of two sections: a system- and a port-wide.

#### System Configuration

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

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

|                                 |  |
|---------------------------------|--|
| <b>Reauthentication Enabled</b> | <p>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.</p> <p>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).</p>   |
| <b>Reauthentication Period</b>  | <p>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.</p>  |
| <b>EAPOL Timeout</b>            | <p>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.</p>  |
| <b>Aging Period</b>             | <p>This setting applies to the following modes, i.e. modes using the Port Security functionality to secure MAC addresses:</p> <ul style="list-style-type: none"> <li>• <b>Single 802.1X</b></li> <li>• <b>Multi 802.1X</b></li> <li>• <b>MAC-Based Auth.</b></li> </ul> <p>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.</p> <p>It is not critical, if reauthentication is enabled and the port is in an 802.1X-based mode, as 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.</p> <p>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.</p> |
| <b>Hold Time</b>                | <p>This setting applies to the following modes, i.e. modes using the Port Security functionality to secure MAC addresses:</p> <ul style="list-style-type: none"> <li>• <b>Single 802.1X</b></li> <li>• <b>Multi 802.1X</b></li> <li>• <b>MAC-Based Auth.</b></li> </ul> <p>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 <b>Configuration &gt; Security &gt; AAA</b> page) - the client is put on hold in the Unauthorized state. The hold timer does not count during an on-going authentication.</p> <p>In MAC-based Auth. mode, the switch will ignore new frames coming from the client during the hold time.</p>   |

|                                     |  |
|-------------------------------------|--|
|                                     | The Hold Time can be set to a number between 10 and 1000000 seconds  |
| <b>RADIUS-Assigned QoS Enabled</b>  | <p>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).</p> <p>The RADIUS-Assigned QoS Enabled checkbox provides a quick way to globally enable/disable RADIUS-server assigned QoS Class functionality. When checked, the individual ports' ditto setting determines whether RADIUS-assigned QoS Class is enabled on that port. When unchecked, RADIUS-server assigned QoS Class is disabled on all ports.</p>   |
| <b>RADIUS-Assigned VLAN Enabled</b> | <p>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 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 <b>RADIUS-Assigned VLAN Enabled</b> below for a detailed description).</p> <p>The "RADIUS-Assigned VLAN Enabled" checkbox provides a quick way to globally enable/disable RADIUS-server assigned VLAN functionality. When checked, the individual ports' ditto setting determines whether RADIUS-assigned VLAN is enabled on that port. When unchecked, RADIUS-server assigned VLAN is disabled on all ports.</p> |
| <b>Guest VLAN Enabled</b>           | <p>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.</p> <p>The <b>Guest VLAN Enabled</b> 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.</p>   |
| <b>Guest VLAN ID</b>                | <p>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.</p> <p>Valid values are in the range [1:4095].</p>   |

|                                       |   |
|---------------------------------------|---|
| <b>Max. Reauth. Count</b>             | <p>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.</p> <p>Valid values are in the range [1:255].</p>  |
| <b>Allow Guest VLAN if EAPOL Seen</b> | <p>The switch remembers if an EAPOL frame has been received on the port for the life-time of the port. Once the switch considers whether to enter the Guest VLAN, it will first check if this option is enabled or disabled. If disabled (unchecked; default), the switch will only enter the Guest VLAN if an EAPOL frame has not been received on the port for the life-time of the port. If enabled (checked), the switch will consider entering the Guest VLAN even if an EAPOL frame has been received on the port for the life-time of the port.</p> <p>The value can only be changed if the Guest VLAN option is globally enabled.</p> |

### Port Configuration

The table has one row for each port on the switch and a number of columns

| Port | Admin State      | RADIUS-Assigned QoS Enabled | RADIUS-Assigned VLAN Enabled | Guest VLAN Enabled       | Port State        | Restart        |              |
|------|------------------|-----------------------------|------------------------------|--------------------------|-------------------|----------------|--------------|
| *    | <>               | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> |                   |                |              |
| 1    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 2    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 3    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 4    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 5    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 6    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 7    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 8    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 9    | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |
| 10   | Force Authorized | <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/> | Globally Disabled | Reauthenticate | Reinitialize |

Save    Reset

### Port

The port number for which the configuration below applies.

## Admin State

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

| Setting                   | Description   |
|---------------------------|---|
| <b>Force Authorized</b>   | 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.   |
| <b>Force Unauthorized</b> | 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.   |
| <b>Port-based 802.1X</b>  | <p>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 (<a href="#">RFC3748</a>). Frames sent between the switch and the RADIUS server are <a href="#">RADIUS</a> 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 <a href="#">MD5-Challenge</a>, <a href="#">PEAP</a>, and <a href="#">TLS</a>. 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.</p> <p>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.</p> <p><b>NOTE:</b> Suppose two backend servers are enabled and that the server timeout is configured to X seconds (using the AAA configuration page) and suppose that the first server in the list is currently down (but not considered dead). Now, if the supplicant retransmits EAPOL Start frames at a rate faster than X seconds, then it will never get authenticated, because the switch will cancel on-going backend authentication server requests whenever it receives a new EAPOL Start frame from the supplicant. And since the server hasn't yet failed (because the X seconds haven't expired), the same server will be contacted upon the next backend authentication server request from the switch. This scenario will loop forever.</p> <p>Therefore, the server timeout should be smaller than the supplicant's EAPOL Start frame retransmission rate.</p> |
| <b>Single 802.1X</b>      | <p>In port-based 802.1X authentication, once a supplicant is successfully authenticated on a port, the whole port is opened for network traffic. This allows other clients connected to the port (for instance through a hub) to piggy-back on the successfully authenticated client and get network access even though they really aren't authenticated. To overcome this security breach, use the Single 802.1X variant.</p> <p>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</p>  |

|                        |   |
|------------------------|---|
|                        | <p>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.</p>   |
| <b>Multi 802.1X</b>    | <p>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.</p> <p>In Multi 802.1X, it is not possible to use the multicast BPDU MAC address as destination MAC address for EAPOL frames sent from the switch towards the supplicant, since that would cause all supplicants attached to the port to reply to requests sent from the switch. Instead, the switch uses the supplicant's MAC address, which is obtained from the first EAPOL Start or EAPOL Response.</p> <p>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.</p> <p>The maximum number of supplicants that can be attached to a port can be limited using the Port Security Limit Control functionality.</p>   |
| <b>MAC-based Auth.</b> | <p>Unlike port-based 802.1X, MAC-based authentication is not a standard, but merely a best-practice 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.</p> <p>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.</p> <p>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</p> |



|  |
|--|
| 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:

- **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 meantime without affecting the RADIUS-assigned).

This option is only available for single-client modes:

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

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

#### RADIUS attributes used in identifying a VLAN ID:

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

- The **Tunnel-Medium-Type**, **Tunnel-Type**, and **Tunnel-Private-Group-ID** attributes must all be present at least once in the Access-Accept packet.

- The switch looks for the first set of these attributes that have the same **Tag** value and fulfill 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.
  - Value of **Tunnel-Type** must be set to **VLAN**.
  - 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:

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

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

#### Guest VLAN Operation:

When a Guest VLAN enabled port's link comes up, the switch starts transmitting EAPOL Request Identity frames. If the number of transmissions of such frames exceeds Max. Reauth. Count and no EAPOL frames have been received in the 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 can undertake one of the following values:

- **Globally Disabled:** NAS is globally disabled.
- **Link Down:** NAS is globally enabled, but there is no link on the port.
- **Authorized:** The port is in Force Authorized or a single-supplicant mode and the supplicant is authorized.

- **Unauthorized:** The port is in Force Unauthorized or a single-supPLICANT mode and the supplicant is not successfully authorized by the RADIUS server.
- **X Auth/Y Unauth:** The port is in a multi-supPLICANT mode. Currently X clients are authorized and Y are unauthorized.

### Restart

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

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

- **Reauthenticate:** Schedules a reauthentication whenever the quiet-period of the port runs out (EAPOL-based authentication). For MAC-based authentication, reauthentication will be attempted immediately. The button only has effect for successfully authenticated clients on the port and will not cause the clients to get temporarily unauthorized.
- **Reinitialize:** Forces a reinitialization of the clients on the port and thereby a reauthentication immediately. The clients will transfer to the unauthorized state while the reauthentication is in progress.

## Configuration > Security > Network > ACL > Ports

### ACL Ports Configuration

Configure the Access Control List (ACL) parameters Access Control Entity (ACE) of each switch port. These parameters will affect frames received on a port unless the frames match a specific ACE.

ACL Ports Configuration

| Port | Policy ID | Action | Rate Limiter ID | Port Redirect                | Mirror   | Logging  | Shutdown | State   | Counter |
|------|-----------|--------|-----------------|------------------------------|----------|----------|----------|---------|---------|
| *    | 0         | <>     | <>              | Disabled<br>Port 1<br>Port 2 | <>       | <>       | <>       | <>      | *       |
| 1    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |
| 2    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |
| 3    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |
| 4    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |
| 5    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |
| 6    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |
| 7    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 27050   |
| 8    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |
| 9    | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |
| 10   | 0         | Permit | Disabled        | Disabled<br>Port 1<br>Port 2 | Disabled | Disabled | Disabled | Enabled | 0       |

Save Reset

#### Port

The logical port for the settings contained in the same row.

#### Policy ID

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| 0~255   | Select the policy to apply to this port. The allowed values are 0 through 255. | 0               |

### Action

| Setting | Description              | Factory Default |
|---------|--------------------------|-----------------|
| Permit  | Forwarding is permitted. | Permit          |
| Deny    | Forwarding is denied.    |                 |

### Rate Limiter ID

| Setting  | Description                                      | Factory Default |
|----------|--|-----------------|
| Disabled | Rate Limiter is disabled.                        | Disabled        |
| 1~16     | Select which Rate Limiter to apply on this port. |                 |

### Port Redirect

| Setting  | Description                                 | Factory Default |
|----------|---|-----------------|
| Disabled | Port Redirect is disabled.                  | Disabled        |
| Port X   | Select which port frames are redirected on. |                 |

### Mirror

| Setting  | Description                                   | Factory Default |
|----------|---|-----------------|
| Disabled | Frames received on the port are not mirrored. | Disabled        |
| Enabled  | Frames received on the port are mirrored.     |                 |

### Logging

Specify the logging operation of this port. Notice that the logging message doesn't include the 4 bytes CRC.

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| Disabled | Frames received on the port are not logged.               | Disabled        |
| Enabled  | Frames received on the port are stored in the System Log. |                 |

**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

| Setting  | Description  | Factory Default |
|----------|--|-----------------|
| Disabled | Port shut down is disabled.                                    | Disabled        |
| Enabled  | If a frame is received on the port, the port will be disabled. |                 |

**NOTE:** The shutdown feature only works when the packet length is less than 1518(without VLAN tags).

**State**

| Setting         | Description               | Factory Default |
|-----------------|---------------------------|-----------------|
| <b>Disabled</b> | Disable this port policy. | Enabled         |
| <b>Enabled</b>  | Enable this port policy.  |                 |

**Counter**

Counts the number of frames that match this ACE.

## Configuration > Security > Network > ACL > Rate Limiters

### ACL Rate Limiter Configuration

#### ACL Rate Limiter Configuration

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

#### Rate Limiter ID

The rate limiter ID for the settings contained in the same row. Its range is 1 to 16.

#### Rate

| Setting          | Description  | Factory Default |
|------------------|--|-----------------|
| <b>0-3276700</b> | The valid rate is 0-3276700 in pps.<br>OR 0, 100, 200, 300, ..., 1000000 in kbps | 1               |

#### Unit

| Setting     | Description        | Factory Default |
|-------------|--------------------|-----------------|
| <b>pps</b>  | packets per second | pps             |
| <b>kbps</b> | Kbits per second   |                 |

## Configuration > Security > Network > ACL > Access Control List

### Access Control List Configuration

This page shows the Access Control List (ACL), which is made up of the Access Control Entry (ACE) defined on this switch. Each row describes the ACE that is defined. The maximum number of ACEs is 256 on each switch.

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

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

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.
- ↑: Moves the ACE up the list.
- ↓: Moves the ACE down the list.
- ✕: Deletes the ACE.
- ⊕: The lowest plus sign adds a new entry at the bottom of the ACE listings.

### ACE Configuration

#### ACE Configuration

|              |   |               |            |
|--------------|---|---------------|------------|
| Ingress Port | All<br>Port 1<br>Port 2<br>Port 3<br>Port 4 | Policy Filter | Any ▼      |
| Frame Type   | Any ▼                                       | Action        | Permit ▼   |
|              |   | Rate Limiter  | Disabled ▼ |
|              |   | Mirror        | Disabled ▼ |
|              |   | Logging       | Disabled ▼ |
|              |   | Shutdown      | Disabled ▼ |
|              |   | Counter       | 213        |

#### VLAN Parameters

|                |       |
|----------------|-------|
| 802.1Q Tagged  | Any ▼ |
| VLAN ID Filter | Any ▼ |
| Tag Priority   | Any ▼ |



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

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| All     | The ACE applies to all ports.  | All             |
| Port n  | The ACE applies to this port number, where n is the number of the switch port. |                 |

### Policy Filter

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| Any      | No policy filter is specified.  | Any             |
| Specific | If you want to filter a specific policy with this ACE, choose this value. Two fields for entering a policy value and bitmask appears. |                 |

### Policy Value

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| 0~255   | When Specific is selected for the policy filter, you can enter a specific policy value. The allowed range is 0 to 255. | 0               |

### Policy Bitmask

| Setting    | Description   | Factory Default |
|------------|---|-----------------|
| 0x0 ~ 0xff | 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. | 0xff            |

### Frame Type

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

| Setting | Description                   | Factory Default |
|---------|-------------------------------|-----------------|
| Any     | Any frame can match this ACE. | Any             |

|                      |   |  |
|----------------------|---|--|
| <b>Ethernet Type</b> | 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) and the value should not be equal to 0x800(IPv4), 0x806(ARP), or 0x86DD(IPv6). |  |
| <b>ARP</b>           | Only ARP frames can match this ACE. Notice the ARP frames won't match the ACE with Ethernet type.   |  |
| <b>IPv4</b>          | Only IPv4 frames can match this ACE. Notice the IPv4 frames won't match the ACE with Ethernet type.   |  |
| <b>IPv6</b>          | 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.

| Setting       | Description   | Factory Default |
|---------------|---|-----------------|
| <b>Permit</b> | The frame that hits this ACE is granted permission for the ACE operation. | Permit          |
| <b>Deny</b>   | The frame that hits this ACE is dropped.                                  |                 |
| <b>Filter</b> | Frames matching the ACE are filtered.                                     |                 |

### Rate Limiter

Specify the rate limiter in number of base units.

| Setting         | Description   | Factory Default |
|-----------------|---|-----------------|
| <b>Disabled</b> | Rate limiter operation is disabled.   | Disabled        |
| <b>1~16</b>     | Specify the rate limiter in number of base units. The allowed range is 1 to 16. |                 |

### 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.

| Setting         | Description                          | Factory Default |
|-----------------|--------------------------------------|-----------------|
| <b>Disabled</b> | Port redirect operation is disabled. | Disabled        |
| <b>Enabled</b>  | Port redirect operation is enabled.  |                 |

### 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.

| Setting         | Description                                   | Factory Default |
|-----------------|---|-----------------|
| <b>Enabled</b>  | Frames received on the port are mirrored.     | Disabled        |
| <b>Disabled</b> | Frames received on the port are not mirrored. |                 |

## Logging

Specify the logging operation of the ACE. Notice that the logging message doesn't include the 4 bytes CRC information.

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| Enabled  | Frames matching the ACE are stored in the System Log. | Disabled        |
| 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

| Setting  | Description  | Factory Default |
|----------|--|-----------------|
| Enabled  | If a frame matches the ACE, the ingress port will be disabled. | 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 Parameters

(Only displayed when the frame type is Ethernet Type or ARP.)

### SMAC Filter

| Setting  | Description  | Factory Default |
|----------|--|-----------------|
| Any      | No SMAC filter is specified.   | Any             |
| Specific | If you want to filter a specific source MAC address with this ACE, choose this value. A field for entering a SMAC value appears. |                 |

### SMAC Value

| Setting | Description | Factory Default |
|---------|-------------|-----------------|
|---------|-------------|-----------------|

|                    |   |                   |
|--------------------|---|-------------------|
| <b>MAC address</b> | When Specific is selected for the SMAC filter, you can enter a specific source MAC address. The legal format is <b>xx-xx-xx-xx-xx-xx</b> or <b>xx.xx.xx.xx.xx.xx</b> or <b>xxxxxxxxxxxx</b> (x is a hexadecimal digit). A frame that hits this ACE matches this SMAC value. | 00-00-00-00-00-01 |
|--------------------|---|-------------------|

### DMAC Filter

| Setting         | Description   | Factory Default |
|-----------------|---|-----------------|
| <b>Any</b>      | No DMAC filter is specified.  | Any             |
| <b>MC</b>       | Frame must be multicast.  |                 |
| <b>BC</b>       | Frame must be broadcast.  |                 |
| <b>UC</b>       | Frame must be unicast.  |                 |
| <b>Specific</b> | 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

| Setting            | Description   | Factory Default   |
|--------------------|---|-------------------|
| <b>MAC address</b> | When Specific is selected for the DMAC filter, you can enter a specific source MAC address. The legal format is <b>xx-xx-xx-xx-xx-xx</b> or <b>xx.xx.xx.xx.xx.xx</b> or <b>xxxxxxxxxxxx</b> (x is a hexadecimal digit). A frame that hits this ACE matches this DMAC value. | 00-00-00-00-00-01 |

## VLAN Parameters

### 802.1Q Tagged

| Setting         | Description           | Factory Default |
|-----------------|-----------------------|-----------------|
| <b>Any</b>      | Any value is allowed. | Any             |
| <b>Enabled</b>  | Tagged frame only.    |                 |
| <b>Disabled</b> | Untagged frame only.  |                 |

### VLAN ID Filter

| Setting         | Description   | Factory Default |
|-----------------|---|-----------------|
| <b>Any</b>      | No VLAN ID filter is specified.   | Any             |
| <b>Specific</b> | 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

| Setting | Description | Factory Default |
|---------|-------------|-----------------|
|---------|-------------|-----------------|

|               |   |   |
|---------------|---|---|
| <b>1~4095</b> | 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. | 1 |
|---------------|---|---|

### Tag Priority

| Setting                                  | Description  | Factory Default |
|--|--|-----------------|
| <b>Any</b>                               | No tag priority is specified   | Any             |
| <b>0~7, 0-1, 2-3, 4-5, 6-7, 0-3, 4-7</b> | Specify the tag priority for this ACE. A frame that hits this ACE matches this tag priority. |                 |

### ARP Parameters

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

#### ARP/RARP

| Setting      | Description                              | Factory Default |
|--------------|--|-----------------|
| <b>Any</b>   | No ARP/RARP OP flag is specified.        | Any             |
| <b>ARP</b>   | Frame must have ARP opcode set to ARP.   |                 |
| <b>RARP</b>  | Frame must have RARP opcode set to RARP. |                 |
| <b>Other</b> | Frame has unknown ARP/RARP Opcode flag.  |                 |

#### Request/Reply

| Setting        | Description  | Factory Default |
|----------------|--|-----------------|
| <b>Any</b>     | No Request/Reply OP flag is specified.                   | Any             |
| <b>Request</b> | Frame must have ARP Request or RARP Request OP flag set. |                 |
| <b>Reply</b>   | Frame must have ARP Reply or RARP Reply OP flag.         |                 |

#### Sender IP Filter

| Setting        | Description  | Factory Default |
|----------------|--|-----------------|
| <b>Any</b>     | No sender IP filter is specified.  | Any             |
| <b>Host</b>    | Sender IP filter is set to Host. Specify the sender IP address in the SIP Address field that appears.                                    |                 |
| <b>Network</b> | 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

| Setting | Description | Factory Default |
|---------|-------------|-----------------|
|---------|-------------|-----------------|

|                   |   |         |
|-------------------|---|---------|
| <b>IP address</b> | When <b>Host</b> or <b>Network</b> is selected for the sender IP filter, you can enter a specific sender IP address in dotted decimal notation. Notice the invalid IP address configuration is acceptable too, i.e. 0.0.0.0. Normally, an ACE with an invalid IP address will explicitly add deny action. | 0.0.0.0 |
|-------------------|---|---------|

### Sender IP Mask

| Setting           | Description   | Factory Default |
|-------------------|---|-----------------|
| <b>IP address</b> | When <b>Network</b> is selected for the sender IP filter, you can enter a specific sender IP mask in dotted decimal notation. | 255.255.255.0   |

### Target IP Filter

| Setting        | Description  | Factory Default |
|----------------|--|-----------------|
| <b>Any</b>     | No target IP filter is specified.  | Any             |
| <b>Host</b>    | Target IP filter is set to Host. Specify the target IP address in the Target IP Address field that appears.  |                 |
| <b>Network</b> | 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

| Setting    | Description   | Factory Default |
|------------|---|-----------------|
| IP address | When <b>Host</b> or <b>Network</b> is selected for the target IP filter, you can enter a specific target IP address in dotted decimal notation. Notice the invalid IP address configuration is acceptable too, i.e. 0.0.0.0. Normally, an ACE with an invalid IP address will explicitly add deny action. | 0.0.0.0         |

### Target IP Mask

| Setting    | Description   | Factory Default |
|------------|---|-----------------|
| IP address | When <b>Network</b> is selected for the target IP filter, you can enter a specific target IP mask in dotted decimal notation. | 255.255.255.0   |

### ARP Sender MAC Match

Specify whether frames can hit the action according to their sender hardware address field (SHA) settings.

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| 0       | ARP frames where SHA is not equal to the SMAC address. | Any             |
| 1       | ARP frames where SHA is equal to the SMAC address.     |                 |
| Any     | Any value is allowed.                                  |                 |

### RARP Target MAC Match

Specify whether frames can hit the action according to their target hardware address field (THA) settings.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0       | RARP frames where THA is not equal to the target MAC address. | Any             |
| 1       | RARP frames where THA is equal to the target MAC address.     |                 |
| Any     | Any value is allowed.   |                 |

### 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.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0       | ARP/RARP frames where the HLN is not equal to Ethernet (0x06) or the (PLN) is not equal to IPv4 (0x04). | Any             |
| 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.   |                 |

## Ethernet

Specify whether frames can hit the action according to their ARP/RARP protocol address space (PRO) settings.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0       | ARP/RARP frames where the PRO is not equal to IP (0x800). | Any             |
| 1       | ARP/RARP frames where the PRO is equal to IP (0x800).     |                 |
| Any     | Any value is allowed.                                     |                 |

## IP Parameters

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

### IP Protocol Filter

| Setting  | Description  | Factory Default |
|----------|--|-----------------|
| Any      | No IP protocol filter is specified.  | Any             |
| Specific | If you want to filter a specific IP protocol filter with this ACE, choose this value. A field for entering an IP protocol filter appears.                |                 |
| ICMP     | Select ICMP to filter IPv4 ICMP protocol frames. Extra fields for defining ICMP parameters will appear. These fields are explained later in this manual. |                 |
| UDP      | Select UDP to filter IPv4 UDP protocol frames. Extra fields for defining UDP parameters will appear. These fields are explained later in this manual.    |                 |
| TCP      | Select TCP to filter IPv4 TCP protocol frames. Extra fields for defining TCP parameters will appear. These fields are explained later in this manual.    |                 |

### IP Protocol Value

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0~255   | When <b>Specific</b> 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. | 0               |

### IP TTL

Specify the Time-to-Live settings for this ACE.

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| zero     | IPv4 frames with a Time-to-Live field greater than zero must not be able to match this entry. | Any             |
| 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.   |                 |



### 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.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 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. | Any             |
| 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.   |                 |

### IP Option

Specify the options flag setting for this ACE.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| No      | IPv4 frames where the options flag is set must not be able to match this entry. | Any             |
| Yes     | IPv4 frames where the options flag is set must be able to match this entry.     |                 |
| Any     | Any value is allowed.   |                 |

### SIP Filter

Specify the source IP filter for this ACE.

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| Any     | No source IP filter is specified.  | Any             |
| 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

| Setting    | Description   | Factory Default |
|------------|---|-----------------|
| IP address | When <b>Host</b> or <b>Network</b> is selected for the source IP filter, you can enter a specific SIP address in dotted decimal notation. Notice the invalid IP address configuration is acceptable too, i.e. 0.0.0.0. Normally, an ACE with an invalid IP address will explicitly add deny action. | 0.0.0.0         |

### SIP Mask

| Setting    | Description   | Factory Default |
|------------|---|-----------------|
| IP address | When <b>Network</b> is selected for the source IP filter, you can enter a specific SIP mask in dotted decimal notation. | 255.255.255.0   |

### DIP Filter

Specify the destination IP filter for this ACE.

| Setting        | Description  | Factory Default |
|----------------|--|-----------------|
| <b>Any</b>     | No source IP filter is specified.  | Any             |
| <b>Host</b>    | Source IP filter is set to Host. Specify the source IP address in the SIP Address field that appears.                                    |                 |
| <b>Network</b> | 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. |                 |

### DIP Address

| Setting           | Description  | Factory Default |
|-------------------|--|-----------------|
| <b>IP address</b> | When <b>Host</b> or <b>Network</b> is selected for the destination IP filter, you can enter a specific DIP address in dotted decimal notation. Notice the invalid IP address configuration is acceptable too, i.e. 0.0.0.0. Normally, an ACE with an invalid IP address will explicitly add deny action. | 0.0.0.0         |

### DIP Mask

| Setting           | Description  | Factory Default |
|-------------------|--|-----------------|
| <b>IP address</b> | When <b>Network</b> is selected for the destination IP filter, you can enter a specific DIP mask in dotted decimal notation. | 255.255.255.0   |

## IPv6 Parameters

The IP parameters can be configured when Frame Type **IPv6** is selected.

### Next Header Filter

| Setting      | Description  | Factory Default |
|--------------|--|-----------------|
| <b>Any</b>   | No IPv6 next header filter is specified.   | Any             |
| <b>Other</b> | 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.      |                 |
| <b>ICMP</b>  | Select ICMP to filter IPv6 ICMP protocol frames. Extra fields for defining ICMP parameters will appear. These fields are explained later in this manual. |                 |
| <b>UDP</b>   | Select UDP to filter IPv6 UDP protocol frames. Extra fields for defining UDP parameters will appear. These fields are explained later in this manual.    |                 |
| <b>TCP</b>   | Select TCP to filter IPv6 TCP protocol frames. Extra fields for defining TCP parameters will appear. These fields are explained later in this manual.    |                 |

### Next Header Value

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0~255   | When <b>Next Header Filter &gt; Other</b> 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. | 0               |

### SIP Filter

Specify the source IPv6 filter for this ACE.

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| Any      | No source IPv6 filter is specified.   | Any             |
| 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

| Setting      | Description  | Factory Default |
|--------------|--|-----------------|
| IPv6 address | When <b>SIP Filter &gt; Specific</b> is selected for the source IPv6 filter, you can enter a specific SIPv6 address. The field only supported last 32 bits for IPv6 address. | ::              |

### SIP BitMask

| Setting      | Description  | Factory Default |
|--------------|--|-----------------|
| IPv6 address | When <b>SIP Filter &gt; Specific</b> is selected for the source IPv6 filter, you can enter a specific SIPv6 mask. The field only supports the last 32 bits for IPv6 address. | 0xFFFFFFFF      |

### Hop Limit

| Setting  | Description  | Factory Default |
|----------|--|-----------------|
| zero     | IPv6 frames with a hop limit field greater than zero must not be able to match this entry. | Any             |
| non-zero | IPv6 frames with a hop limit field greater than zero must be able to match this entry.     |                 |
| Any      | Any value is allowed.  |                 |

## ICMP Parameters

### ICMP Type Filter

| Setting  | Description  | Factory Default |
|----------|--|-----------------|
| Any      | No ICMP filter is specified.   | Any             |
| 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

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| 0~255   | 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. | 0               |

### ICMP Code Filter

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| Any      | No ICMP code filter is specified.   | Any             |
| 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

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0~255   | 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. | 0               |

## TCP/UDP Parameters

### TCP/UDP Source Filter

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| Any      | No TCP/UDP source filter is specified.  | Any             |
| 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.

| Setting   | Description  | Factory Default |
|-----------|--|-----------------|
| 0 ~ 65535 | 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. | 0               |

### TCP/UDP Source Range

| Setting          | Description   | Factory Default |
|------------------|---|-----------------|
| <b>0 ~ 65535</b> | 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. | 0               |

### TCP/UDP Destination Filter

| Setting         | Description  | Factory Default |
|-----------------|--|-----------------|
| <b>Any</b>      | No TCP/UDP destination filter is specified   | Any             |
| <b>Specific</b> | 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.             |                 |
| <b>Range</b>    | 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

| Setting          | Description   | Factory Default |
|------------------|---|-----------------|
| <b>0 ~ 65535</b> | 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. | 0               |

### TCP/UDP Destination Range

| Setting          | Description  | Factory Default |
|------------------|--|-----------------|
| <b>0 ~ 65535</b> | 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. | 0               |

### TCP FIN

Specify the TCP "No more data from sender" (FIN) value for this ACE.

| Setting    | Description   | Factory Default |
|------------|---|-----------------|
| <b>0</b>   | TCP frames where the FIN field is set must not be able to match this entry. | Any             |
| <b>1</b>   | TCP frames where the FIN field is set must be able to match this entry.     |                 |
| <b>Any</b> | Any value is allowed.   |                 |

**TCP SYN**

Specify the TCP "Synchronize sequence numbers" (SYN) value for this ACE.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0       | TCP frames where the SYN field is set must not be able to match this entry. | Any             |
| 1       | TCP frames where the SYN field is set must be able to match this entry.     |                 |
| Any     | Any value is allowed.   |                 |

**TCP RST**

Specify the TCP "Reset the connection" (RST) value for this ACE.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0       | TCP frames where the RST field is set must not be able to match this entry. | Any             |
| 1       | TCP frames where the RST field is set must be able to match this entry.     |                 |
| Any     | Any value is allowed.   |                 |

**TCP PSH**

Specify the TCP "Push Function" (PSH) value for this ACE.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0       | TCP frames where the PSH field is set must not be able to match this entry. | Any             |
| 1       | TCP frames where the PSH field is set must be able to match this entry.     |                 |
| Any     | Any value is allowed.   |                 |

**TCP ACK**

Specify the TCP "Acknowledgment field significant" (ACK) value for this ACE.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0       | TCP frames where the ACK field is set must not be able to match this entry. | Any             |
| 1       | TCP frames where the ACK field is set must be able to match this entry.     |                 |
| Any     | Any value is allowed.   |                 |

**TCP URG**

Specify the TCP "Urgent Pointer field significant" (URG) value for this ACE.

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 0       | TCP frames where the URG field is set must not be able to match this entry. | Any             |

|     |   |  |
|-----|---|--|
| 1   | TCP frames where the URG field is set must be able to match this entry. |  |
| Any | Any value is allowed.   |  |

## Ethernet Type Parameters

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

### EtherType Filter

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| Any      | No EtherType filter is specified.   | Any             |
| Specific | If you want to filter a specific EtherType filter with this ACE, you can enter a specific EtherType value. A field for entering an EtherType value appears. |                 |

### Ethernet Type Value

| Setting                                       | Description   | Factory Default |
|---|---|-----------------|
| 0x600 ~ 0xFFFF excluding 0x800, 0x806, 0x86DD | When <b>Specific</b> 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. | 0xFFFF          |

**Configuration > Security > Network > IP Source Guard > Configuration**

**IP Source Guard Configuration**

\*\*\*\*\*  
 DHCP Snooping must be Enabled for IP Source Guard to function.  
 \*\*\*\*\*



**Mode**

| Setting         | Description  | Factory Default |
|-----------------|--|-----------------|
| <b>Enabled</b>  | Enable the Global IP Source Guard.<br>All configured ACEs will be disabled when the mode is enabled. | Enabled         |
| <b>Disabled</b> | Disable the Global IP Source Guard.  |                 |

**Translate dynamic to static button**

Click to translate all dynamic entries to static entries.



## Port Mode Configuration

### Port Mode Configuration

| Port | Mode       | Max Dynamic Clients |
|------|------------|---------------------|
| *    | <> ▼       | <> ▼                |
| 1    | Disabled ▼ | Unlimited ▼         |
| 2    | Disabled ▼ | Unlimited ▼         |
| 3    | Disabled ▼ | Unlimited ▼         |
| 4    | Disabled ▼ | Unlimited ▼         |
| 5    | Disabled ▼ | Unlimited ▼         |
| 6    | Disabled ▼ | Unlimited ▼         |
| 7    | Disabled ▼ | Unlimited ▼         |
| 8    | Disabled ▼ | Unlimited ▼         |
| 9    | Disabled ▼ | Unlimited ▼         |
| 10   | Disabled ▼ | Unlimited ▼         |

### Mode

| Setting         | Description            | Factory Default |
|-----------------|------------------------|-----------------|
| <b>Enabled</b>  | Port Mode is enabled.  | Disabled        |
| <b>Disabled</b> | Port Mode is disabled. |                 |

### Max Dynamic Clients

| Setting                | Description   | Factory Default |
|------------------------|---|-----------------|
| <b>0,1,2,Unlimited</b> | Specify the maximum number of dynamic clients that can be learned on a given port. This value can be 0, 1, 2, or unlimited. If the port mode is enabled and the value of max dynamic client is equal to 0, it means only allow the IP packets forwarding that are matched in static entries on the specific port. | Unlimited       |

## Configuration > Security > Network > IP Source Guard > Static Table

### Static IP Source Guard Table

**Static IP Source Guard Table**

| Delete                                       | Port | VLAN ID                              | IP Address | MAC address |
|--|------|--------------------------------------|------------|-------------|
| <input type="button" value="Add New Entry"/> |      |                                      |            |             |
| <input type="button" value="Save"/>          |      | <input type="button" value="Reset"/> |            |             |

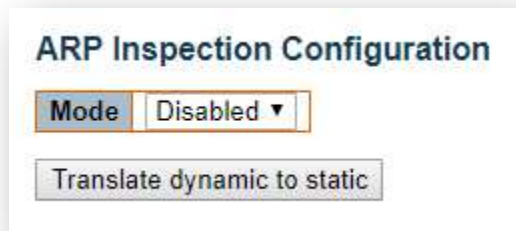
#### Add New Entry

| Setting            | Description   |
|--------------------|---|
| <b>Delete</b>      | Check to delete the entry. It will be deleted during the next save. |
| <b>Port</b>        | The logical port for the settings.                                  |
| <b>VLAN ID</b>     | The VLAN ID for the settings.                                       |
| <b>IP Address</b>  | Allowed Source IP address.  |
| <b>MAC address</b> | Allowed Source MAC address.   |

# Configuration > Security > Network > ARP Inspection > Port Configuration

## ARP Inspection Configuration

\*\*\*\*\*  
 DHCP Snooping must be Enabled for ARP Inspection to function.  
 \*\*\*\*\*



### Mode

| Setting  | Description                        | Factory Default |
|----------|------------------------------------|-----------------|
| Enabled  | Enable the Global ARP Inspection.  | Disabled        |
| Disabled | Disable the Global ARP Inspection. |                 |

### Translate dynamic to static button

Click to translate all dynamic entries to static entries.

## Port Mode Configuration

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

**Port Mode Configuration**

| Port | Mode       | Check VLAN | Log Type |
|------|------------|------------|----------|
| *    | <> ▼       | <> ▼       | <> ▼     |
| 1    | Disabled ▼ | Disabled ▼ | None ▼   |
| 2    | Disabled ▼ | Disabled ▼ | None ▼   |
| 3    | Disabled ▼ | Disabled ▼ | None ▼   |
| 4    | Disabled ▼ | Disabled ▼ | None ▼   |
| 5    | Disabled ▼ | Disabled ▼ | None ▼   |
| 6    | Disabled ▼ | Disabled ▼ | None ▼   |
| 7    | Disabled ▼ | Disabled ▼ | None ▼   |
| 8    | Disabled ▼ | Disabled ▼ | None ▼   |
| 9    | Disabled ▼ | Disabled ▼ | None ▼   |
| 10   | Disabled ▼ | Disabled ▼ | None ▼   |

### Mode

| Setting         | Description                       | Factory Default |
|-----------------|-----------------------------------|-----------------|
| <b>Enabled</b>  | Enable ARP Inspection operation.  | Disabled        |
| <b>Disabled</b> | Disable ARP Inspection operation. |                 |

### 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.

| Setting         | Description                   | Factory Default |
|-----------------|-------------------------------|-----------------|
| <b>Enabled</b>  | Enable check VLAN operation.  | Disabled        |
| <b>Disabled</b> | Disable check VLAN operation. |                 |

### Log Type

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

| Setting       | Description            | Factory Default |
|---------------|------------------------|-----------------|
| <b>None</b>   | Log nothing.           | None            |
| <b>Deny</b>   | Log denied entries.    |                 |
| <b>Permit</b> | Log permitted entries. |                 |
| <b>ALL</b>    | Log all entries.       |                 |

## Configuration > Security > Network > ARP Inspection > VLAN Configuration

### VLAN Mode Configuration



VLAN Mode Configuration

Start from VLAN  with  entries per page.

| Delete | VLAN ID | Log Type |
|--------|---------|----------|
|--------|---------|----------|

#### Navigating the VLAN Configuration

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

#### 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.

#### Add New Entry Button

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

## Configuration > Security > Network > ARP Inspection > Static Table

### Static ARP Inspection Table

This page shows the static ARP Inspection rules. The maximum number of rules is **256** on the switch.

#### Static ARP Inspection Table

| Delete                                       | Port | VLAN ID                              | MAC Address | IP Address |
|--|------|--------------------------------------|-------------|------------|
| <input type="button" value="Add New Entry"/> |      |                                      |             |            |
| <input type="button" value="Save"/>          |      | <input type="button" value="Reset"/> |             |            |

#### Add New Entry

| Setting            | Description   |
|--------------------|---|
| <b>Delete</b>      | Check to delete the entry. It will be deleted during the next save. |
| <b>Port</b>        | The logical port for the settings.                                  |
| <b>VLAN ID</b>     | The VLAN ID for the settings.                                       |
| <b>MAC address</b> | Allowed Source MAC address in ARP request packets.                  |
| <b>IP Address</b>  | Allowed Source IP address in ARP request packets.                   |

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

### Dynamic ARP Inspection 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.

**Dynamic ARP Inspection Table**

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

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

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

The “Start from port address”, “VLAN”, “MAC address”, and “IP address” input fields allow the user to select the starting point in the Dynamic ARP Inspection Table.

### ARP Inspection Table Columns

| Item                       | Description   |
|----------------------------|---|
| <b>Port</b>                | Switch Port Number for which the entries are displayed.     |
| <b>VLAN ID</b>             | VLAN-ID in which the ARP traffic is permitted.              |
| <b>MAC Address</b>         | User MAC address of the entry.                              |
| <b>IP Address</b>          | User IP address of the entry.                               |
| <b>Translate to static</b> | Select the checkbox to translate the entry to static entry. |



## Configuration > Security > AAA > RADIUS

### RADIUS Server Configuration

#### Global Configuration

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

| Setting                 | Description  |
|-------------------------|--|
| <b>Timeout</b>          | 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.  |
| <b>Retransmit</b>       | 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.   |
| <b>Deadtime</b>         | 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. |
| <b>Key</b>              | The secret key - up to 63 characters long - shared between the RADIUS server and the switch.   |
| <b>NAS-IP-Address</b>   | 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.  |
| <b>NAS-IPv6-Address</b> | 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.   |
| <b>NAS-Identifier</b>   | The identifier - up to 253 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.



The screenshot shows a web interface titled "Server Configuration". At the top, there is a table with seven columns: "Delete", "Hostname", "Auth Port", "Acct Port", "Timeout", "Retransmit", and "Key". Below the table is a button labeled "Add New Server". At the bottom of the interface are two buttons: "Save" and "Reset".

| Setting           | Description   |
|-------------------|---|
| <b>Delete</b>     | To delete a RADIUS server entry, check this box. The entry will be deleted during the next save.                    |
| <b>Hostname</b>   | The IP address or hostname of the RADIUS server.  |
| <b>Auth Port</b>  | The UDP port to use on the RADIUS server for authentication. Set to 0 to disable authentication.                    |
| <b>Acct Port</b>  | The UDP port to use on the RADIUS server for accounting. Set to 0 to disable accounting.                            |
| <b>Timeout</b>    | This optional setting overrides the global timeout value. Leaving it blank will use the global timeout value.       |
| <b>Retransmit</b> | This optional setting overrides the global retransmit value. Leaving it blank will use the global retransmit value. |
| <b>Key</b>        | This optional setting overrides the global key. Leaving it blank will use the global key.                           |

### “Add New Server” Button

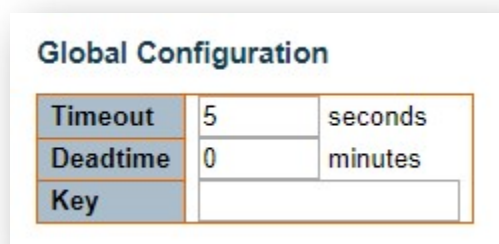
Click “Add New Server” button to add a new RADIUS server. An empty row is added to the table, and the RADIUS server can be configured as needed. Up to 5 servers are supported.

The “Delete” button can be used to undo the addition of the new server.

## Configuration > Security > AAA > TACACS+

### TACACS+ Server Configuration

#### Global Configuration



The screenshot shows a form titled "Global Configuration" with three rows:

| Setting  | Value | Unit    |
|----------|-------|---------|
| Timeout  | 5     | seconds |
| Deadtime | 0     | minutes |
| Key      |       |         |

| Setting  | Description  |
|----------|--|
| 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.



The screenshot shows a table with the following columns: Delete, Hostname, Port, Timeout, and Key. Below the table are three buttons: "Add New Server", "Save", and "Reset".

| Setting  | Description   |
|----------|---|
| 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.                     |

**“Add New Server” Button**

Click “Add New Server” button 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. The “Delete” button can be used to undo the addition of the new server.

## Configuration > Aggregation > Static

### Aggregation Mode Configuration

**Aggregation Mode Configuration**

**Hash Code Contributors**

Source MAC Address

Destination MAC Address

IP Address

TCP/UDP Port Number

#### Hash Code Contributors

| Setting                        | Description   |
|--------------------------------|---|
| <b>Source MAC Address</b>      | The Source MAC address can be used to calculate the destination port for the frame. Check to enable the use of the Source MAC address or uncheck to disable. By default, Source MAC Address is enabled.                 |
| <b>Destination MAC Address</b> | 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. |
| <b>IP Address</b>              | The IP address can be used to calculate the destination port for the frame. Check to enable the use of the IP Address, or uncheck to disable. By default, IP Address is enabled.  |
| <b>TCP/UDP Port Number</b>     | The TCP/UDP port number can be used to calculate the destination port for the frame. Check to enable the use of the TCP/UDP Port Number or uncheck to disable. By default, TCP/UDP Port Number is enabled.              |

## Aggregation Group Configuration

### Aggregation Group Configuration

| Group ID | Port Members                     |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
|----------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|          | 1                                | 2                                | 3                                | 4                                | 5                                | 6                                | 7                                | 8                                | 9                                | 10                               |
| Normal   | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |
| 1        | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            |
| 2        | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            |
| 3        | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            |
| 4        | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            |
| 5        | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            | <input type="radio"/>            |

| Setting             | Description  |
|---------------------|--|
| <b>Group ID</b>     | 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.   |
| <b>Port Members</b> | 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. |

## Configuration > Aggregation > LACP

### LACP Port Configuration

#### LACP Port Configuration

| Port | LACP Enabled             | Key    | Role     | Timeout | Prio  |
|------|--------------------------|--------|----------|---------|-------|
| *    | <input type="checkbox"/> | <> ▼   | <> ▼     | <> ▼    | 32768 |
| 1    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 2    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 3    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 4    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 5    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 6    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 7    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 8    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 9    | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |
| 10   | <input type="checkbox"/> | Auto ▼ | Active ▼ | Fast ▼  | 32768 |

| Setting             | Description   |
|---------------------|---|
| <b>Port</b>         | The switch port number.   |
| <b>LACP Enabled</b> | 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.   |
| <b>Key</b>          | The <b>Key</b> value incurred by the port, range 1-65535. The <b>Auto</b> setting will set the key as appropriate by the physical link speed, 10Mb = 1, 100Mb = 2, 1Gb = 3.<br>Using the <b>Specific</b> 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. |
| <b>Role</b>         | The <b>Role</b> shows the LACP activity status. The <b>Active</b> will transmit LACP packets each second, while <b>Passive</b> will wait for a LACP packet from a partner (speak if spoken to).   |
| <b>Timeout</b>      | The <b>Timeout</b> controls the period between BPDUs transmissions. <b>Fast</b> will transmit LACP packets each second, while <b>Slow</b> will wait for 30 seconds before sending a LACP packet.  |
| <b>Prio</b>         | The <b>Prio</b> controls the priority of the port, range 1-65535. 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.  |

## Configuration > Loop Protection

### Loop Protection Configuration

#### Loop Protection Configuration

General Settings

Global Configuration

|                               |           |         |
|-------------------------------|-----------|---------|
| <b>Enable Loop Protection</b> | Disable ▾ |         |
| <b>Transmission Time</b>      | 5         | seconds |
| <b>Shutdown Time</b>          | 180       | seconds |

Port Configuration

| Port | Enable                              | Action          | Tx Mode  |
|------|-------------------------------------|-----------------|----------|
| *    | <input type="checkbox"/>            | <> ▾            | <> ▾     |
| 1    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 2    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 3    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 4    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 5    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 6    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 7    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 8    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 9    | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |
| 10   | <input checked="" type="checkbox"/> | Shutdown Port ▾ | Enable ▾ |

#### General Settings

| Setting                       | Description   |
|-------------------------------|---|
| <b>Enable Loop Protection</b> | Controls whether loop protections are enabled (as a whole).   |
| <b>Transmission Time</b>      | The interval between each loop protection PDU sent on each port. Valid values are 1 to 10 seconds. Default value is 5 seconds.  |
| <b>Shutdown Time</b>          | The period (in seconds) for which a port will be kept disabled in the event of a loop being detected (and the port action shuts down the port). Valid values are 0 to 604800 seconds (7 days). A value of zero will keep a port disabled (until next device restart). Default value is 180 seconds. |

#### Port Configuration

| Setting     | Description                         |
|-------------|-------------------------------------|
| <b>Port</b> | The switch port number of the port. |



|                |  |
|----------------|--|
| <b>Enable</b>  | Controls whether loop protection is enabled on this switch port.   |
| <b>Action</b>  | Configures the action performed when a loop is detected on a port. Valid values are <b>Shutdown Port</b> , <b>Shutdown Port and Log</b> , or <b>Log Only</b> . |
| <b>Tx Mode</b> | Controls whether the port is actively generating loop protection PDU's, or whether it is just passively looking for looped PDU's.                              |

## Configuration > Spanning Tree > Bridge Settings

### STP Bridge Configuration

This page allows you to configure STP system settings. The settings are used by all STP Bridge instances in the switch.

#### STP Bridge Configuration

**Basic Settings**

|                     |         |
|---------------------|---------|
| Protocol Version    | MSTP ▼  |
| Bridge Priority     | 32768 ▼ |
| Hello Time          | 2       |
| Forward Delay       | 15      |
| Max Age             | 20      |
| Maximum Hop Count   | 20      |
| Transmit Hold Count | 6       |

**Advanced Settings**

|                             |   |
|-----------------------------|---|
| Edge Port BPDU Filtering    | <input type="checkbox"/>                  |
| Edge Port BPDU Guard        | <input type="checkbox"/>                  |
| Port Error Recovery         | <input type="checkbox"/>                  |
| Port Error Recovery Timeout | <input style="width: 100%;" type="text"/> |

#### Basic Settings

| Setting                 | Description  |
|-------------------------|--|
| <b>Protocol Version</b> | The MSTP / RSTP / STP protocol version setting. Valid values are <b>STP</b> , <b>RSTP</b> , and <b>MSTP</b> .  |
| <b>Bridge Priority</b>  | 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 <b>MSTP</b> operation, this is the priority of the CIST. Otherwise, this is the priority of the STP/RSTP bridge. |
| <b>Hello Time</b>       | The interval between sending STP BPDU's. Valid values are in the range 1 to 10 seconds. Default is 2 seconds.<br><b>NOTE:</b> Changing this parameter from the default value is not recommended and may have adverse effects on your network.  |
| <b>Forward Delay</b>    | The delay used by STP Bridges to transit Root and Designated Ports to Forwarding (used in STP compatible mode). Valid values are in the range 4 to 30 seconds.   |

|                            |  |
|----------------------------|--|
| <b>Max Age</b>             | The maximum age of the information transmitted by the Bridge when it is the Root Bridge. Valid values are in the range 6 to 40 seconds, and MaxAge must be $\leq (\text{FwdDelay}-1)*2$ .  |
| <b>Maximum Hop Count</b>   | 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. |
| <b>Transmit Hold Count</b> | The number of BPDUs 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 BPDUs per second.   |

### Advanced Settings

| Setting                            | Description   |
|------------------------------------|---|
| <b>Edge Port BPDU Filtering</b>    | Control whether a port explicitly configured as <b>Edge</b> will transmit and receive BPDUs.  |
| <b>Edge Port BPDU Guard</b>        | Control whether a port explicitly configured as <b>Edge</b> will disable itself upon reception of a BPDU. The port will enter the error-disabled state and will be removed from the active topology.  |
| <b>Port Error Recovery</b>         | 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. |
| <b>Port Error Recovery Timeout</b> | 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).  |

## Configuration > Spanning Tree > MSTI Mapping

### MSTI Configuration

This page allows the user to inspect the current STP MSTI bridge instance priority configurations.

#### MSTI Configuration

Add VLANs separated by spaces or comma.

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

**Configuration Identification**

|                               |                   |
|-------------------------------|-------------------|
| <b>Configuration Name</b>     | 9c-8d-d3-00-41-c4 |
| <b>Configuration Revision</b> | 0                 |

**MSTI Mapping**

| MSTI  | VLANs Mapped |
|-------|--------------|
| MSTI1 |              |
| MSTI2 |              |
| MSTI3 |              |
| MSTI4 |              |
| MSTI5 |              |
| MSTI6 |              |
| MSTI7 |              |

#### Configuration Identification

| Setting                       | Description   |
|-------------------------------|---|
| <b>Configuration Name</b>     | The name identifying the VLAN to MSTI mapping. Bridges must share the name and revision (see below), as well as the VLAN-to-MSTI mapping configuration in order to share spanning trees for MSTI's (Intra-region). The name is at most 32 characters. |
| <b>Configuration Revision</b> | The revision of the MSTI configuration named above. This must be an integer between 0 and 65535.  |

#### MSTI Mapping

| Setting     | Description  |
|-------------|--|
| <b>MSTI</b> | The bridge instance. The CIST is not available for explicit mapping, as it will receive the VLANs not explicitly mapped. |

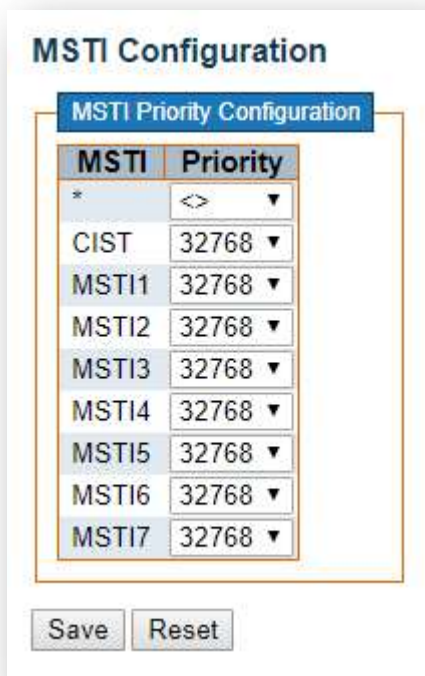
**VLANs Mapped**

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

## Configuration > Spanning Tree > MSTI Priorities

### MSTI Configuration

This page allows the user to inspect the current STP MSTI bridge instance priority configurations.



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

Save Reset

### MSTI Priority Configuration

| Setting         | Description   |
|-----------------|---|
| <b>MSTI</b>     | The bridge instance. The CIST is the default instance, which is always active.  |
| <b>Priority</b> | 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. |

## Configuration > Spanning Tree > CIST Ports

### STP CIST Port Configuration

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

This page contains settings for physical and aggregated ports.

STP CIST Port Configuration

CIST Aggregated Port Configuration

| Port | STP Enabled                         | Path Cost | Priority | Admin Edge | Auto Edge                           | Restricted Role          | TCN                      | BPDU Guard               | Point-to-point |
|------|-------------------------------------|-----------|----------|------------|-------------------------------------|--------------------------|--------------------------|--------------------------|----------------|
| -    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Forced True    |

CIST Normal Port Configuration

| Port | STP Enabled                         | Path Cost | Priority | Admin Edge | Auto Edge                           | Restricted Role          | TCN                      | BPDU Guard               | Point-to-point |
|------|-------------------------------------|-----------|----------|------------|-------------------------------------|--------------------------|--------------------------|--------------------------|----------------|
| *    | <input type="checkbox"/>            | <>        | <>       | <>         | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <>             |
| 1    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 2    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 3    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 4    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 5    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 6    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 7    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 8    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 9    | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 10   | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 11   | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |
| 12   | <input checked="" type="checkbox"/> | Auto      | 128      | Non-Edge   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Auto           |

Save Reset

### CIST Aggregated/ Normal Port Configuration

| Setting            | Description   |
|--------------------|---|
| <b>Port</b>        | The switch port number of the logical STP port.   |
| <b>STP Enabled</b> | Controls whether STP is enabled on this switch port.  |
| <b>Path Cost</b>   | Controls the path cost incurred by the port. The <b>Auto</b> setting will set the path cost as appropriate by the physical link speed using the 802.1D recommended values. Using the <b>Specific</b> 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. |
| <b>Priority</b>    | Controls the port priority. This can be used to control priority of ports having identical port cost.   |

|                              |  |
|------------------------------|--|
| <b>operEdge (state flag)</b> | Operational flag describing whether the port is connecting directly to edge devices (no Bridges attached). Transition to the forwarding state is faster for edge ports (having operEdge true) than for other ports. The value of this flag is based on AdminEdge and AutoEdge fields. This flag is displayed as Edge in <b>Monitor &gt; Spanning Tree &gt; STP Detailed Bridge Status</b> .  |
| <b>AdminEdge</b>             | Controls whether the operEdge flag should start as set or cleared (the initial operEdge state when a port is initialized).   |
| <b>AutoEdge</b>              | Controls whether the bridge should enable automatic edge detection on the bridge port. This allows operEdge to be derived whether BPDUs are received on the port or not.   |
| <b>Restricted Role</b>       | If enabled, causes the port not to be selected as Root Port for the CIST or any MSTI, even if it has the best spanning tree priority vector. Such a port will be selected as an Alternate Port after the Root Port has been selected. If set, it can cause lack of spanning tree connectivity. It can be set by a network administrator to prevent bridges external to a core region of the network influence the spanning tree active topology, possibly because those bridges are not under the full control of the administrator. This feature is also known as Root Guard.                                 |
| <b>Restricted TCN</b>        | 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. |
| <b>BPDU Guard</b>            | If enabled, causes the port to disable itself upon receiving valid BPDUs. Contrary to the similar bridge setting, the port <b>Edge</b> 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.   |
| <b>Point-to-Point</b>        | 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.  |



## Configuration > Spanning Tree > MSTI Ports

### MSTI Port Configuration

#### MSTI Port Configuration

Select MSTI

MST1 ▾
Get

#### Select MSTI

Select **MSTI port number** and click “**Get**” Button to configuration.

### (MST#) MSTI Port Configuration

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

This page contains MSTI port settings for physical and aggregated ports.

#### MST1 MSTI Port Configuration

MST1 Aggregated Ports Configuration

| Port | Path Cost | Priority |
|------|-----------|----------|
| -    | Auto ▾    | 128 ▾    |

MST1 Normal Ports Configuration

| Port | Path Cost | Priority |
|------|-----------|----------|
| *    | <> ▾      | <> ▾     |
| 1    | Auto ▾    | 128 ▾    |
| 2    | Auto ▾    | 128 ▾    |
| 3    | Auto ▾    | 128 ▾    |
| 4    | Auto ▾    | 128 ▾    |
| 5    | Auto ▾    | 128 ▾    |
| 6    | Auto ▾    | 128 ▾    |
| 7    | Auto ▾    | 128 ▾    |
| 8    | Auto ▾    | 128 ▾    |
| 9    | Auto ▾    | 128 ▾    |
| 10   | Auto ▾    | 128 ▾    |

Save
Reset

**MSTI Aggregated/ Normal Ports Configuration**

| Setting          | Description  |
|------------------|--|
| <b>Port</b>      | The switch port number of the corresponding STP CIST (and MSTI) port.  |
| <b>Path Cost</b> | Controls the path cost incurred by the port. The <b>Auto</b> setting will set the path cost as appropriate by the physical link speed, using the 802.1D recommended values. Using the <b>Specific</b> 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. |
| <b>Priority</b>  | Controls the port priority. This can be used to control priority of ports having identical port cost.  |

## Configuration > IPMC Profile > Profile Table

### IPMC Profile Configurations

This page provides IPMC Profile related configurations.

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



#### Global Profile Mode

Enable/Disable the Global IPMC Profile.

### IPMC Profile Table Setting



#### “Add New IPMC Profile” button

Click to add new IPMC profile. Specify the name and configure the new entry.

| Setting                    | Description  |
|----------------------------|--|
| <b>Delete</b>              | Check to delete the entry. It will be deleted during the next save.  |
| <b>Profile Name</b>        | The name used for indexing the profile table. Each entry has the unique name which is composed of at maximum 16 alphabetic and numeric characters. At least one alphabetic character must be present.  |
| <b>Profile Description</b> | Additional description, which is composed of at maximum 64 alphabetic and numeric characters, about the profile. No blank or space characters are permitted as part of description. Use "_" or "-" to separate the description sentence.   |
| <b>Rule</b>                | 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:<br>: List the rules associated with the designated profile.<br>: Adjust the rules associated with the designated profile. |

## Configuration > IPMC Profile > Address Entry

### IPMC Profile Address Configuration

This page provides address range settings used in IPMC profile.

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

**IPMC Profile Address Configuration**

Navigate Address Entry Setting in IPMC Profile by  entries per page.

| Delete | Entry Name | Start Address | End Address |
|--------|------------|---------------|-------------|
| Delete |            |               |             |

#### “Add New Address (Range) Entry” button

| Setting              | Description   |
|----------------------|---|
| <b>Delete</b>        | Check to delete the entry. It will be deleted during the next save.   |
| <b>Entry Name</b>    | The name used for indexing the address entry table. Each entry has a unique name which is composed of at maximum 16 alphabetic and numeric characters. At least one alphabetic character must be present. |
| <b>Start Address</b> | The starting IPv4/IPv6 Multicast Group Address that will be used as an address range.   |
| <b>End Address</b>   | The ending IPv4/IPv6 Multicast Group Address that will be used as an address range.   |

## Configuration > MVR

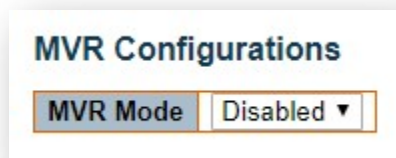
### MVR Configurations

The MVR (Multicast VLAN Registration) feature enables multicast traffic forwarding on the Multicast VLANs.

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

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

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

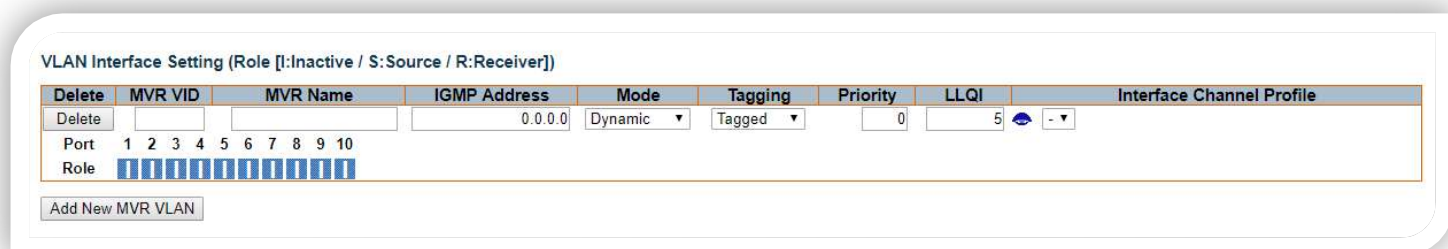


### MVR Mode

Enable/Disable the Global MVR.


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

### VLAN Interface Setting



### “Add New MVR VLAN” button

| Setting         | Description  |
|-----------------|--|
| <b>Delete</b>   | Check to delete the entry. It will be deleted during the next save.  |
| <b>MVR VID</b>  | Specify the Multicast VLAN ID.<br>Note: MVR source ports are not recommended to be overlapped with management VLAN ports.  |
| <b>MVR Name</b> | MVR Name is an optional attribute to indicate the name of the specific MVR VLAN.<br>Maximum length of the MVR VLAN Name string is 16. MVR VLAN Name can only contain alphabets or numbers. When the optional MVR VLAN name is given, it should contain at least one alphabet. MVR VLAN name can be |

|  |   |
|--|---|
|  | edited for the existing MVR VLAN entries or it can be added to the new entries.   |
| <b>IGMP Address</b>  | Define the IPv4 address as source address used in IP header for IGMP control frames. The default IGMP address is not set (0.0.0.0).<br>When the IGMP address is not set, the system uses IPv4 management address of the IP interface associated with this VLAN.<br>When the IPv4 management address is not set, the 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.  |
| <b>Mode</b>  | 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.   |
| <b>Tagging</b>   | Specify whether the traversed IGMP/MLD control frames will be sent as Untagged or Tagged with MVR VID. The default is Tagged.   |
| <b>Priority</b>  | Specify how the traversed IGMP/MLD control frames will be sent in prioritized manner. The default Priority is 0.  |
| <b>LLQI</b>  | Define the maximum time to wait for IGMP/MLD report memberships on a receiver port before removing the port from multicast group membership. The value is in units of tenths of a second. The range is from 0 to 31744. The default LLQI is 5 tenths or one-half second.  |
| <b>Interface Channel Profile</b>   | When the MVR VLAN is created, select the IPMC Profile as the channel filtering condition for the specific MVR VLAN. Summary about the Interface Channel Profiling (of the MVR VLAN) will be shown by clicking the view button. Profile selected for designated interface channel is not allowed to have overlapped permit group address.  |
|  <b>Profile Management Button</b> | List the rules associated with the designated profile.  |
| <b>Port</b>  | The logical port for the settings.  |
| <b>Port Role</b>   | Configure an MVR port of the designated MVR VLAN as one of the following roles:<br><b>Inactive:</b> The designated port does not participate in MVR operations.<br><b>Source:</b> Configure uplink ports that receive and send multicast data as source ports. Subscribers cannot be directly connected to source ports.<br><b>Receiver:</b> 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.<br>Note: MVR source ports are not recommended to be overlapped with management VLAN ports.<br>Select the port role by clicking the Role symbol to switch the setting. “I” indicates Inactive; “S” indicates Source; “R” indicates Receiver.<br>The default role is Inactive. |

## Immediate Leave Setting

Immediate Leave Setting

| Port | Immediate Leave |
|------|-----------------|
| *    | <> ▼            |
| 1    | Disabled ▼      |
| 2    | Disabled ▼      |
| 3    | Disabled ▼      |
| 4    | Disabled ▼      |
| 5    | Disabled ▼      |
| 6    | Disabled ▼      |
| 7    | Disabled ▼      |
| 8    | Disabled ▼      |
| 9    | Disabled ▼      |
| 10   | Disabled ▼      |

Save Reset

| Setting         | Description                         |
|-----------------|-------------------------------------|
| <b>Enabled</b>  | Enable the fast leave on the port.  |
| <b>Disabled</b> | Disable the fast leave on the port. |

## Configuration > IPMC > IGMP Snooping > Basic Configuration

### IGMP Snooping Configuration

#### IGMP Snooping Configuration

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

#### Global Configuration

| Setting                                     | Description  |
|---|--|
| <b>Snooping Enabled</b>                     | Enable the Global IGMP Snooping.   |
| <b>Unregistered IPMCv4 Flooding Enabled</b> | Enable unregistered IPMCv4 traffic flooding. The flooding control takes effect only when IGMP Snooping is enabled. When IGMP Snooping is disabled, unregistered IPMCv4 traffic flooding is always active in spite of this setting.           |
| <b>IGMP SSM Range</b>                       | SSM (Source-Specific Multicast) Range allows the SSM-aware hosts and routers run the SSM service model for the groups in the address range. Assign valid IPv4 multicast address as prefix with a prefix length (from 4 to 32) for the range. |
| <b>Leave Proxy Enabled</b>                  | Enable IGMP Leave Proxy. This feature can be used to avoid forwarding unnecessary leave messages to the router side.   |
| <b>Proxy Enabled</b>                        | Enable IGMP Proxy. This feature can be used to avoid forwarding unnecessary join and leave messages to the router side.  |



## Port Related Configuration

### Port Related Configuration

| Port | Router Port              | Fast Leave               | Throttling  |
|------|--------------------------|--------------------------|-------------|
| *    | <input type="checkbox"/> | <input type="checkbox"/> | <> ▼        |
| 1    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 2    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 3    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 4    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 5    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 6    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 7    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 8    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 9    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 10   | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |

| Setting            | Description   |
|--------------------|---|
| <b>Router Port</b> | 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. |
| <b>Fast Leave</b>  | Enable the fast leave on the port.  |
| <b>Throttling</b>  | Enable to limit the number of multicast groups to which a switch port can belong.   |

## Configuration > IPMC > IGMP Snooping > VLAN Configuration

### IGMP Snooping VLAN Configuration

**IGMP Snooping VLAN Configuration** Refresh |<< >>

Start from VLAN  with  entries per page.

| Delete | VLAN ID              | Snooping Enabled         | Querier Election                    | Querier Address | Compatibility | PRI | RV | QI (sec) | QRI (0.1 sec) | LLQI (0.1 sec) | URI (sec) |
|--------|----------------------|--------------------------|-------------------------------------|-----------------|---------------|-----|----|----------|---------------|----------------|-----------|
| Delete | <input type="text"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 0.0.0.0         | IGMP-Auto     | 0   | 2  | 125      | 100           | 10             | 1         |

#### Navigating the IGMP Snooping VLAN Table

Each page shows up to 99 entries from the VLAN table, default being 20, selected through the “entries per page” input field. When first visited, the web page will show the first 20 entries from the beginning of the VLAN Table. The first displayed will be the one with the lowest VLAN ID found in the VLAN Table.

#### “Add New IGMP VLAN” button











| Setting                      | Description  |
|------------------------------|--|
| <b>Delete</b>                | Check to delete the entry. It will be deleted during the next save.  |
| <b>VLAN ID</b>               | The VLAN ID of the entry.  |
| <b>IGMP Snooping Enabled</b> | Enable the per-VLAN IGMP Snooping. Up to 32 VLANs can be selected for IGMP Snooping.   |
| <b>Querier Election</b>      | Enable to join IGMP Querier election in the VLAN. Disable to act as an IGMP Non- Querier.  |
| <b>Querier Address</b>       | Define the IPv4 address as source address used in IP header for IGMP Querier election.<br>When the Querier address is not set, system uses IPv4 management address of the IP interface associated with this VLAN.<br>When the IPv4 management address is not set, system uses the first available IPv4 management address. Otherwise, system uses a pre-defined value. By default, this value will be 192.0.2.1. |
| <b>Compatibility</b>         | 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 <b>IGMP-Auto</b> , <b>Forced IGMPv1</b> , <b>Forced IGMPv2</b> , and <b>Forced IGMPv3</b> . Default compatibility value is IGMP-Auto.  |
| <b>PRI</b>                   | Priority of Interface.<br>It indicates the IGMP control frame priority level generated by the system. These values can be used to prioritize different classes of traffic.<br>The allowed range is <b>0</b> (best effort) to <b>7</b> (highest). Default interface priority value is 0.  |
| <b>RV</b>                    | Robustness Variable.   |


|                             |   |
|-----------------------------|---|
|                             | <p>The Robustness Variable allows tuning for the expected packet loss on a network. The allowed range is <b>1</b> to <b>255</b>. The default robustness variable value is 2.</p>  |
| <b>QI</b>                   | <p>Query Interval.<br/>The Query Interval is the interval between General Queries sent by the Querier. The allowed range is <b>1</b> to <b>31744</b> seconds. The default query interval is 125 seconds.</p>  |
| <b>QRI</b>                  | <p>Query Response Interval.<br/>The Maximum Response Delay used to calculate the Maximum Response Code inserted into the periodic General Queries.<br/>The allowed range is <b>0</b> to <b>31744</b> in tenths of seconds. The default query response interval is 100 in tenths of seconds (10 seconds).</p>                        |
| <b>LLQI (LMQI for IGMP)</b> | <p>Last Member Query Interval.<br/>The Last Member Query Time is the time value represented by the Last Member Query Interval, multiplied by the Last Member Query Count.<br/>The allowed range is <b>0</b> to <b>31744</b> in tenths of seconds. The default last member query interval is 10 in tenths of seconds (1 second).</p> |
| <b>URI</b>                  | <p>Unsolicited Report Interval.<br/>The Unsolicited Report Interval is the time between repetitions of a host's initial report of membership in a group.<br/>The allowed range is <b>0</b> to <b>31744</b> seconds. The default unsolicited report interval is 1 second.</p>  |

## Configuration > IPMC > IGMP Snooping > Port Filtering Profile

### IGMP Snooping Port Filtering Profile Configuration

**IGMP Snooping Port Filtering Profile Configuration**

| Port | Filtering Profile   |     |
|------|---|-----|
| 1    |  | - ▼ |
| 2    |  | - ▼ |
| 3    |  | - ▼ |
| 4    |  | - ▼ |
| 5    |  | - ▼ |
| 6    |  | - ▼ |
| 7    |  | - ▼ |
| 8    |  | - ▼ |
| 9    |  | - ▼ |
| 10   |  | - ▼ |

| Setting   | Description   |
|---|---|
| <b>Port</b>   | The logical port for the settings.  |
| <b>Filtering Profile</b>  | Select the IPMC Profile as the filtering condition for the specific port. Summary about the designated profile will be shown by clicking the view button. |
| <br><b>Profile Management Button</b> | List the rules associated with the designated profile.  |

## Configuration > IPMC > MLD Snooping > Basic Configuration

### MLD Snooping Configuration

#### MLD Snooping Configuration

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

#### Global Configuration

| Setting                                     | Description   |
|---|---|
| <b>Snooping Enabled</b>                     | Enable the Global MLD Snooping.   |
| <b>Unregistered IPMCv6 Flooding Enabled</b> | 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.              |
| <b>MLD SSM Range</b>                        | SSM (Source-Specific Multicast) Range allows the SSM-aware hosts and routers run the SSM service model for the groups in the address range. Assign valid IPv6 multicast address as prefix with a prefix length (from 8 to 128) for the range. |
| <b>Leave Proxy Enabled</b>                  | Enable MLD Leave Proxy. This feature can be used to avoid forwarding unnecessary leave messages to the router side.   |
| <b>Proxy Enabled</b>                        | Enable MLD Proxy. This feature can be used to avoid forwarding unnecessary join and leave messages to the router side.  |

## Port Related Configuration

### Port Related Configuration

| Port | Router Port              | Fast Leave               | Throttling  |
|------|--------------------------|--------------------------|-------------|
| *    | <input type="checkbox"/> | <input type="checkbox"/> | <> ▼        |
| 1    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 2    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 3    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 4    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 5    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 6    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 7    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 8    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 9    | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |
| 10   | <input type="checkbox"/> | <input type="checkbox"/> | unlimited ▼ |

| Setting            | Description  |
|--------------------|--|
| <b>Router Port</b> | Specify which ports act as router ports.<br>A router port is a port on the Ethernet switch that leads towards the Layer 3 multicast device or MLD querier.<br>If an aggregation member port is selected as a router port, the whole aggregation will act as a router port. |
| <b>Fast Leave</b>  | Enable the fast leave on the port.   |
| <b>Throttling</b>  | Enable to limit the number of multicast groups to which a switch port can belong.  |

## Configuration > IPMC > MLD Snooping > VLAN Configuration

### MLD Snooping VLAN Configuration

**MLD Snooping VLAN Configuration** Refresh << >>

Start from VLAN  with  entries per page.

| Delete | VLAN ID              | Snooping Enabled         | Querier Election                    | Compatibility | PRI | RV | QI (sec) | QRI (0.1 sec) | LLQI (0.1 sec) | URI (sec) |
|--------|----------------------|--------------------------|-------------------------------------|---------------|-----|----|----------|---------------|----------------|-----------|
| Delete | <input type="text"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | MLD-Auto      | 0   | 2  | 125      | 100           | 10             | 1         |

#### Navigating the MLD Snooping VLAN Table

Each page shows up to 99 entries from the VLAN table, default being 20, selected through the “entries per page” input field. When first visited, the web page will show the first 20 entries from the beginning of the VLAN Table. The first displayed will be the one with the lowest VLAN ID found in the VLAN Table.

#### “Add New MLD VLAN” button

| Setting                 | Description   |
|-------------------------|---|
| <b>Delete</b>           | Check to delete the entry. It will be deleted during the next save.   |
| <b>VLAN ID</b>          | The VLAN ID of the entry.   |
| <b>Snooping Enabled</b> | Enable the per-VLAN MLD Snooping. Up to 32 VLANs can be selected for MLD Snooping.  |
| <b>Querier Election</b> | Enable to join MLD Querier election in the VLAN. Disable to act as an MLD Non- Querier.   |
| <b>Compatibility</b>    | Compatibility is maintained by hosts and routers taking appropriate actions depending on the versions of MLD operating on hosts and routers within a network. The allowed selection is <b>MLD-Auto</b> , <b>Forced MLDv1</b> , <b>Forced MLDv2</b> . The default compatibility value is MLD-Auto. |
| <b>PRI</b>              | Priority of Interface.<br>It indicates the MLD control frame priority level generated by the system. These values can be used to prioritize different classes of traffic. The allowed range is <b>0</b> (best effort) to <b>7</b> (highest). The default interface priority value is 0.           |
| <b>RV</b>               | Robustness Variable.<br>The Robustness Variable allows tuning for the expected packet loss on a link. The allowed range is <b>1</b> to <b>255</b> . The default robustness variable value is 2.   |
| <b>QI</b>               | Query Interval.<br>The Query Interval is the interval between General Queries sent by the Querier. The allowed range is <b>1</b> to <b>31744</b> seconds. The default query interval is 125 seconds.  |











|             |   |
|-------------|---|
| <b>QRI</b>  | Query Response Interval.<br>The Maximum Response Delay used to calculate the Maximum Response Code inserted into the periodic General Queries.<br>The allowed range is <b>0</b> to <b>31744</b> in tenths of seconds. The default query response interval is 100 in tenths of seconds (10 seconds).   |
| <b>LLQI</b> | Last Listener Query Interval.<br>The Last Listener Query Interval is the Maximum Response Delay used to calculate the Maximum Response Code inserted into Multicast Address Specific Queries sent in response to Version 1 Multicast Listener Done messages. It is also the Maximum Response Delay used to calculate the Maximum Response Code inserted into Multicast Address and Source Specific Query messages.<br>The allowed range is <b>0</b> to <b>31744</b> in tenths of seconds. The default last listener query interval is 10 in tenths of seconds (1 second). |
| <b>URI</b>  | Unsolicited Report Interval.<br>The Unsolicited Report Interval is the time between repetitions of a node's initial report of interest in a multicast address.<br>The allowed range is <b>0</b> to <b>31744</b> seconds. The default unsolicited report interval is 1 second.   |




## Configuration > IPMC > MLD Snooping > Port Filtering Profile

### MLD Snooping Port Filtering Profile Configuration

MLD Snooping Port Filtering Profile Configuration

| Port | Filtering Profile   |
|------|---|
| 1    |  - ▼ |
| 2    |  - ▼ |
| 3    |  - ▼ |
| 4    |  - ▼ |
| 5    |  - ▼ |
| 6    |  - ▼ |
| 7    |  - ▼ |
| 8    |  - ▼ |
| 9    |  - ▼ |
| 10   |  - ▼ |

Save Reset

| Setting  | Description   |
|--|---|
| <b>Port</b>  | The logical port for the settings.  |
| <b>Filtering Profile</b>   | Select the IPMC Profile as the filtering condition for the specific port. Summary about the designated profile will be shown by clicking the view button. |
|  <b>Profile Management Button</b> | List the rules associated with the designated profile.  |

## Configuration > LLDP > LLDP

### LLDP Configuration

#### LLDP Parameters

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

#### Tx Interval

| Setting   | Description   | Factory Default |
|-----------|---|-----------------|
| 5 ~ 32768 | The switch periodically transmits LLDP frames to its neighbors for having the network discovery information up-to-date. The interval between each LLDP frame is determined by the <b>Tx Interval</b> value. Valid values are restricted to 5 - 32768 seconds. | 30              |

#### Tx Hold

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| 2 ~ 10  | Each LLDP frame contains information about how long the information in the LLDP frame shall be considered valid. The LLDP information valid period is set to <b>Tx Hold</b> multiplied by <b>Tx Interval</b> seconds. Valid values are restricted to 2 - 10 times. | 4               |

#### Tx Delay

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| 1 ~ 8192 | 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 <b>Tx Delay</b> seconds. <b>Tx Delay</b> cannot be larger than 1/4 of the <b>Tx Interval</b> value. Valid values are restricted to 1 - 8192 seconds. | 2               |

### Tx Reinit

| Setting | Description   | Factory Default |
|---------|---|-----------------|
| 1 ~ 10  | When an interface 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. <b>Tx Reinit</b> controls the number of seconds between the shutdown frame and a new LLDP initialization. Valid values are restricted to 1 - 10 seconds. | 2               |

### LLDP Interface Configuration

LLDP Interface Configuration

| Interface            | Mode    | CDP aware                | Optional TLVs                       |                                     |                                     |                                     |                                     |
|----------------------|---------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                      |         |                          | Port Descr                          | Sys Name                            | Sys Descr                           | Sys Capa                            | Mgmt Addr                           |
| *                    | <>      | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| GigabitEthernet 1/1  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/2  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/3  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/4  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/5  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/6  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/7  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/8  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/9  | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/10 | Enabled | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Save Reset

| Setting   | Description  |
|-----------|--|
| Interface | The switch interface name of the logical LLDP interface.   |
| Mode      | <p>Select LLDP mode.</p> <p><b>Rx only:</b> The switch will not send out LLDP information, but LLDP information from neighbor units is analyzed.</p> <p><b>Tx only:</b> The switch will drop LLDP information received from neighbors, but will send out LLDP information.</p> <p><b>Disabled:</b> The switch will not send out LLDP information and will drop LLDP information received from neighbors.</p> <p><b>Enabled:</b> The switch will send out LLDP information and will analyze LLDP information received from neighbors.</p> |

|                   |  |
|-------------------|--|
| <b>CDP Aware</b>  | <p>Select CDP awareness. The CDP operation is restricted to decoding incoming CDP frames (the switch doesn't transmit CDP frames). CDP frames are only decoded if LLDP on the interface is enabled.</p> <p>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.</p> <p>CDP TLV Device ID is mapped to the LLDP Chassis ID field.</p> <p>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.</p> <p>CDP TLV Port ID is mapped to the LLDP Port ID field.</p> <p>CDP TLV Version and Platform is mapped to the LLDP System Description field.</p> <p>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.</p> <p>If all interfaces have CDP awareness disabled, the switch forwards CDP frames received from neighbor devices. If at least one interface has CDP awareness enabled, all CDP frames are terminated by the switch.</p> <p><b>NOTE:</b> When CDP awareness on an interface is disabled, the CDP information isn't removed immediately but gets removed when the hold time is exceeded.</p> |
| <b>Port Descr</b> | Optional TLV: When checked, the port description is included in LLDP information transmitted.  |
| <b>Sys Name</b>   | Optional TLV: When checked, the system name is included in LLDP information transmitted.   |
| <b>Sys Descr</b>  | Optional TLV: When checked, the system description is included in LLDP information transmitted.  |
| <b>Sys Capa</b>   | Optional TLV: When checked, the system capability is included in LLDP information transmitted.   |
| <b>Mgmt Addr</b>  | Optional TLV: When checked, the management address is included in LLDP information transmitted.  |

## Configuration > LLDP > LLDP-MED

### LLDP-MED Configuration

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

#### *Fast start repeat count*



The screenshot shows a configuration window titled "Fast Start Repeat Count". Inside the window, there is a label "Fast start repeat count" followed by a text input field containing the number "4".

Rapid startup and Emergency Call Service Location Identification Discovery of endpoints are critically important aspects of VoIP systems. In addition, it is best to advertise only those pieces of information which are specifically relevant to particular endpoint types (for example only advertise the voice network policy to permitted voice-capable devices). This is in order to conserve the limited LLDPDU space and to reduce security and system integrity issues that can come with inappropriate knowledge of the network policy.

With this in mind, LLDP-MED defines an LLDP-MED Fast Start interaction between the protocol and the application layers on top of the protocol in order to achieve these related properties. Initially, a Network Connectivity Device will only transmit LLDP TLVs in an LLDPDU. Only after an LLDP-MED Endpoint Device is detected, will an LLDP-MED capable Network Connectivity Device start to advertise LLDP-MED TLVs in outgoing LLDPDUs on the associated interface. The LLDP-MED application will temporarily speed up the transmission of the LLDPDU to start within a second when a new LLDP-MED neighbor has been detected in order 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, it is recommended to repeat the fast start transmission multiple times to increase the possibility of the neighbors receiving the LLDP frame. With **Fast start repeat count**, it is possible to specify the number of times the fast start transmission would be repeated. The recommended value is 4 times, given that 4 LLDP frames with a 1 second interval will be transmitted, when an LLDP frame with new information is received.

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

### Transmit TLVs

It is possible to select which LLDP-MED information that shall be transmitted to the neighbors. When the checkbox is checked, the information is included in the frame transmitted to the neighbor.

| Interface            | Capabilities                        | Policies                            | Location                            | PoE                                 |
|----------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| *                    | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| GigabitEthernet 1/1  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/2  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/3  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/4  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/5  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/6  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/7  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/8  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/9  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| GigabitEthernet 1/10 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

| Setting             | Description   |
|---------------------|---|
| <b>Interface</b>    | The interface name to which the configuration applies.  |
| <b>Capabilities</b> | When checked, the switch's capabilities are included in LLDP-MED information transmitted.   |
| <b>Policies</b>     | When checked, the configured policies for the interface are included in LLDP-MED information transmitted.                             |
| <b>Location</b>     | When checked, the configured location information for the switch is included in LLDP-MED information transmitted.                     |
| <b>PoE</b>          | When checked, the configured PoE (Power over Ethernet) information for the interface is included in LLDP-MED information transmitted. |

### Coordinates Location

Coordinates Location

Latitude  ° North ▾
 Longitude  ° East ▾
 Altitude  Meters ▾
 Map Datum WGS84 ▾

| Setting         | Description   |
|-----------------|---|
| <b>Latitude</b> | <b>Latitude</b> should be normalized to within 0-90 degrees with a maximum of 4 digits. It is possible to specify the direction to either <b>North</b> of the equator or <b>South</b> of the equator. |

|                  |   |
|------------------|---|
| <b>Longitude</b> | <b>Longitude</b> should be normalized to within 0-180 degrees with a maximum of 4 digits. It is possible to specify the direction to either <b>East</b> of the prime meridian or <b>West</b> of the prime meridian.   |
| <b>Altitude</b>  | <p><b>Altitude</b> should be normalized to within -2097151.9 to 2097151.9 with a maximum of 1 digit.</p> <p>It is possible to select between two altitude types (meters or floors):</p> <ul style="list-style-type: none"> <li>• <b>Meters:</b> Representing meters of Altitude defined by the vertical datum specified.</li> <li>• <b>Floors:</b> Representing altitude in a form more relevant in buildings which have different floor-to-floor dimensions. An altitude = 0.0 is meaningful even outside a building and represents ground level at the given latitude and longitude. Inside a building, 0.0 represents the floor level associated with ground level at the main entrance.</li> </ul>  |
| <b>Map Datum</b> | <p>The <b>Map Datum</b> is used for the coordinates given in these options:</p> <ul style="list-style-type: none"> <li>• <b>WGS84:</b> (Geographical 3D) - World Geodesic System 1984, CRS Code 4327, Prime Meridian Name: Greenwich.</li> <li>• <b>NAD83/NAVD88:</b> 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).</li> <li>• <b>NAD83/MLLW:</b> 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.</li> </ul> |

**Civic Address Location**

IETF Geopriv Civic Address based Location Configuration Information (Civic Address LCI). The total number of characters for the combined civic address information must not exceed 250 characters. A couple of notes to the limitation of 250 characters:

1. A non-empty civic address location will use 2 extra characters in addition to the civic address location text.
2. The 2-letter country code is not part of the 250 characters limitation.

Civic Address Location

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

| Setting                         | Description   |
|---------------------------------|---|
| <b>Country code</b>             | The two-letter ISO 3166 country code in capital ASCII letters - Example: DK, DE, or US. |
| <b>State</b>                    | National subdivisions (state, canton, region, province, prefecture).                    |
| <b>County</b>                   | County, parish, gun (Japan), district.  |
| <b>City</b>                     | City, township, shi (Japan) - Example: Copenhagen.                                      |
| <b>City district</b>            | City division, borough, city district, ward, chou (Japan).                              |
| <b>Block (Neighborhood)</b>     | Neighborhood, block.  |
| <b>Street</b>                   | Street - Example: Poppelvej.  |
| <b>Leading street direction</b> | Leading street direction - Example: N.  |
| <b>Trailing street suffix</b>   | Trailing street suffix - Example: SW.   |
| <b>Street suffix</b>            | Street suffix - Example: Ave, Platz.  |
| <b>House no.</b>                | House number - Example: 21.   |
| <b>House no. suffix</b>         | House number suffix - Example: A, 1/2.  |
| <b>Landmark</b>                 | Landmark or vanity address - Example: Columbia University.                              |
| <b>Additional location info</b> | Additional location info - Example: South Wing.   |
| <b>Name</b>                     | Name (residence and office occupant) - Example: Flemming Jahn.                          |
| <b>Zip code</b>                 | Postal/zip code - Example: 2791.  |
| <b>Building</b>                 | Building (structure) - Example: Low Library.  |
| <b>Apartment</b>                | (Apartment, suite) - Example: Apt 42.   |
| <b>Floor</b>                    | Floor - Example: 4.   |
| <b>Room no.</b>                 | Room number - Example: 450F.  |
| <b>Place type</b>               | Place type - Example: Office.   |
| <b>Postal community name</b>    | Postal community name - Example: Leonia.  |
| <b>P.O. Box</b>                 | Post office box (P.O. BOX) - Example: 12345.  |
| <b>Additional code</b>          | Additional code - Example: 1320300003.  |



## 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.



The screenshot shows a configuration window titled "Emergency Call Service". Inside the window, there is a label "Emergency Call Service" followed by an empty text input field.

## 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. It should be noted that LLDP-MED is not intended to run on links other than between Network Connectivity Devices and Endpoints, and therefore does not need to advertise the multitude of network policies that frequently run on an aggregated link interior to the LAN.

## Policies

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

| Setting                 | Description  |
|-------------------------|--|
| <b>Delete</b>           | Check to delete the policy. It will be deleted during the next save.   |
| <b>Policy ID</b>        | ID for the policy. This is auto generated and shall be used when selecting the policies that shall be mapped to the specific interfaces.   |
| <b>Application Type</b> | <p>Intended use of the application types:</p> <ol style="list-style-type: none"> <li><b>Voice</b> - 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.</li> <li><b>Voice Signalling (conditional)</b> - for use in network topologies that require a different policy for the voice signalling than for the voice media. This application type should not be advertised if all the same network policies apply as those advertised in the Voice application policy.</li> <li><b>Guest Voice</b> - 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.</li> <li><b>Guest Voice Signalling (conditional)</b> - for use in network topologies that require a different policy for the guest voice signalling than for the guest voice media. This application type should not be advertised if all the same network policies apply as those advertised in the Guest Voice application policy.</li> <li><b>Softphone Voice</b> - for use by softphone applications on typical data centric devices, such as PCs or laptops. This class of endpoints frequently does not support multiple VLANs, if at all, and are typically configured to use an 'untagged' VLAN or a single 'tagged' data specific VLAN. When a network policy is defined for use with an 'untagged' VLAN (see Tagged flag below), then the L2 priority field is ignored and only the DSCP value has relevance.</li> <li><b>Video Conferencing</b> - for use by dedicated Video Conferencing equipment and other similar appliances supporting real-time interactive video/audio services.</li> <li><b>Streaming Video</b> - 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.</li> </ol> |

|                            |  |
|----------------------------|--|
|                            | <p>8. <b>Video Signaling (conditional)</b> - 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.</p>  |
| <b>Tag</b>                 | <p><b>Tag</b> indicating whether the specified application type is using a 'tagged' or an 'untagged' VLAN.</p> <p><b>Untagged</b> indicates that the device is using an untagged frame format and as such does not include a tag header as defined by IEEE 802.1Q-2003. In this case, both the VLAN ID and the Layer 2 priority fields are ignored and only the DSCP value has relevance.</p> <p><b>Tagged</b> 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.</p> |
| <b>VLAN ID</b>             | VLAN identifier (VID) for the interface as defined in IEEE 802.1Q-2003.  |
| <b>L2 Priority</b>         | 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.  |
| <b>DSCP</b>                | 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.   |
| <b>Adding a new policy</b> | Click " <b>Add New Policy</b> " button to add a new policy. Specify the Application Type, Tag, VLAN ID, L2 Priority, and DSCP for the new policy. Click Save. The number of policies supported is 32.  |

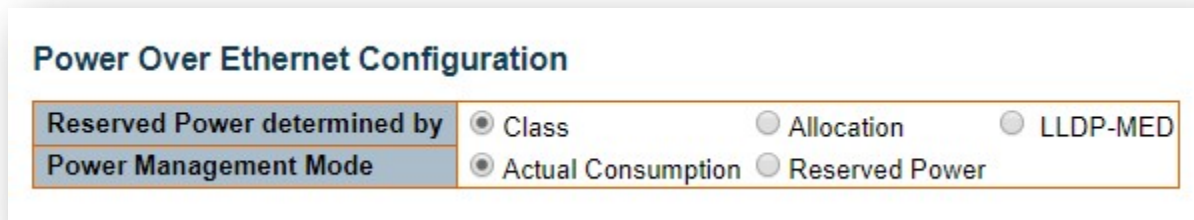
### ***Policies Interface Configuration***

Every interface may advertise a unique set of network policies or different attributes for the same network policies, based on the authenticated user identity or interface configuration.

| <b>Setting</b>   | <b>Description</b>  |
|------------------|---|
| <b>Interface</b> | The interface name to which the configuration applies.  |
| <b>Policy Id</b> | The set of policies that shall apply to a given interface. The set of policies is selected by check marking the checkboxes that correspond to the policies. |

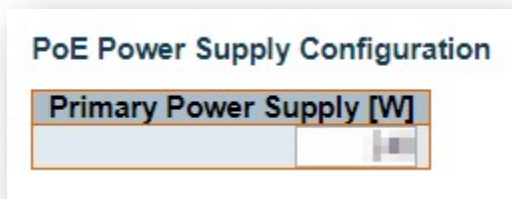
## Configuration > PoE > Power Budget

### Power Over Ethernet Configuration



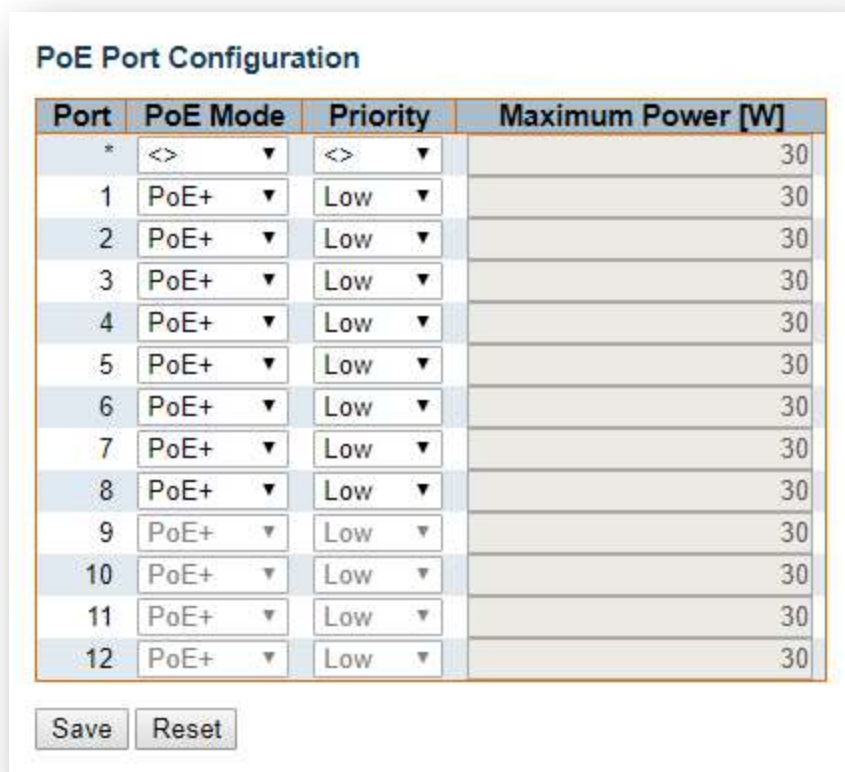
| Setting                      | Description  |
|------------------------------|--|
| Reserved Power determined by | <p>There are three modes for configuring how the ports/PDs may reserve power:</p> <ol style="list-style-type: none"> <li><b>Allocated mode:</b> In this mode, the user allocates the amount of power that each port may reserve. The allocated/reserved power for each port/PD is specified in the Maximum Power fields.</li> <li><b>Class mode:</b> In this mode, each port automatically determines how much power to reserve according to the class the connected PD belongs to and reserves the power accordingly. Four different port classes exist and one for 4, 7, 15.4, or 30 Watts.<br/>In this mode, the Maximum Power fields have no effect.</li> <li><b>LLDP-MED mode:</b> This mode is similar to the Class mode except that each port determines the amount of power it reserves by exchanging PoE information using the LLDP protocol and reserves power accordingly. If no LLDP information is available for a port, the port will reserve power using the class mode.<br/>In this mode the Maximum Power fields have no effect.</li> </ol> <p><b>For all modes:</b> If a port uses more power than the reserved power for the port, the port is shut down.</p> |
| Power Management Mode        | <p>There are 2 modes for configuring when to shut down the ports:</p> <ol style="list-style-type: none"> <li><b>Actual Consumption:</b> In this mode, the ports are shut down when the actual power consumption for all ports exceed the amount of power that the power supply can deliver or if the actual power consumption for a given port exceeds the reserved power for that port. The ports are shut down according to the ports priority. If two ports have the same priority, the port with the highest port number is shut down.</li> <li><b>Reserved Power:</b> In this mode, the ports are shut down when total reserved powered exceeds the amount of power that the power supply can deliver. In this mode, the port power is not turned on if the PD requests more power than available from the power supply.</li> </ol>   |

## PoE Power Supply Configuration



| Setting                         | Description  |
|---------------------------------|--|
| <b>Primary Power Supply [W]</b> | For being able to determine the amount of power the PD may use, it must be defined what amount of power a power source can deliver. Valid values are in the range 0 to 2000 watts. |

## PoE Port Configuration



| Setting         | Description  |
|-----------------|--|
| <b>PoE Mode</b> | The PoE Mode represents the PoE operating mode for the port: <ul style="list-style-type: none"> <li>• <b>Disabled:</b> PoE disabled for the port.</li> <li>• <b>PoE:</b> Enables PoE IEEE 802.3af (Class 4 PDs limited to 15.4W).</li> <li>• <b>PoE+:</b> Enables PoE+ IEEE 802.3at (Class 4 PDs limited to 30W).</li> </ul> |

|                      |   |
|----------------------|---|
| <b>Priority</b>      | The Priority represents the ports' priority. There are three levels of power priority named <b>Low</b> , <b>High</b> , and <b>Critical</b> .<br>The priority is used in the case where the remote devices require more power than the power supply can deliver. In this case, the port with the lowest priority will be turned off starting from the port with the highest port number. |
| <b>Maximum Power</b> | The Maximum Power value contains a numerical value that indicates the maximum power in watts that can be delivered to a remote device.<br>The maximum allowed value is 30 W.  |

## Configuration > PoE > Ping Alive

### PoE Ping Alive

This page allows the user to have control over the system's Powered Device failure check.

#### PoE Ping Alive

| Port | Enable                   | IP Address | Interval (sec) |
|------|--------------------------|------------|----------------|
| *    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 1    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 2    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 3    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 4    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 5    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 6    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 7    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 8    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 9    | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 10   | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 11   | <input type="checkbox"/> | 0.0.0.0    | 60             |
| 12   | <input type="checkbox"/> | 0.0.0.0    | 60             |

### Port Configuration

| Setting           | Description   |
|-------------------|---|
| <b>Port</b>       | The switch port number of the port.                             |
| <b>Enable</b>     | Controls whether PoE Ping Alive is enabled on this switch port. |
| <b>IP Address</b> | The IP for the Powered Device.                                  |
| <b>Interval</b>   | The time for IP checking period.                                |

## Configuration > PoE > PoE Schedule

### PoE Schedule Port Setting

This page is divided into Port Configuration and Schedule Setting. Port Configuration allows the user to set PoE schedule identifier and PoE schedule mode for each PoE port. Schedule Setting allows the user to add new schedule timetabling.

#### PoE Schedule Port Setting

**Port Configuration**

| Port | Mode      | Schedule ID |
|------|-----------|-------------|
| 1    | Disable ▼ |             |
| 2    | Disable ▼ |             |
| 3    | Disable ▼ |             |
| 4    | Disable ▼ |             |
| 5    | Disable ▼ |             |
| 6    | Disable ▼ |             |
| 7    | Disable ▼ |             |
| 8    | Disable ▼ |             |
| 9    | Disable ▼ |             |
| 10   | Disable ▼ |             |
| 11   | Disable ▼ |             |
| 12   | Disable ▼ |             |

**Schedule Setting**

| Delete | Schedule ID | Status |
|--------|-------------|--------|
| Delete |             | -      |

### Port Configuration

| Setting     | Description   |
|-------------|---|
| <b>Port</b> | The switch port number of the port.   |
| <b>Mode</b> | <p><b>Disable:</b> Disable schedule operation.</p> <p><b>Schedule On:</b> If the current time is within the range of schedule limitation, PSE will be providing PD with power.</p> <p><b>Schedule Off:</b> If current time is within the range of schedule limitation, PSE will not be providing PD with power.</p> |



|                    |   |
|--------------------|---|
| <b>Schedule ID</b> | Controls whether schedule needs to be executed. Schedule id is ranged from 1 to 32. |
|--------------------|---|

**Schedule Setting**

| Setting            | Description  |
|--------------------|--|
| <b>Schedule ID</b> | PoE schedule id. Schedule id is ranged from 1 to 32. |
| <b>Status</b>      | PoE schedule status.                                 |

**PoE Schedule Time Configuration**

Schedule Setting

| Delete                   | Schedule ID | Status |
|--------------------------|-------------|--------|
| <input type="checkbox"/> | 1           | Active |

← Click **“Scheduled Setting”** schedule ID number to edit PoE schedule time configuration

**PoE Schedule Time Configuration**

Schedule ID 1 ▼

Schedul Time Setting

| Schedule ID | 1                  |                  |
|-------------|--------------------|------------------|
| Weekday     | Start Time (HH:MM) | End Time (HH:MM) |
| Sunday      | 00:00              | 00:00            |
| Monday      | 00:00              | 00:00            |
| Tuesday     | 00:00              | 00:00            |
| Wednesday   | 00:00              | 00:00            |
| Thursday    | 00:00              | 00:00            |
| Friday      | 00:00              | 00:00            |
| Saturday    | 00:00              | 00:00            |

| Setting            | Description  |
|--------------------|--|
| <b>Schedule ID</b> | The schedule id number of the schedule.  |
| <b>Time</b>        | <b>Start Time:</b> Time tabling start time. Format: hh:mm; hh: 00 ~ 24, mm: 00 ~ 59.<br><b>End Time:</b> Time tabling end time. Format: hh:mm; hh: 00 ~ 24, mm: 00 ~ 59. |

## Configuration > MEP

### Maintenance Entity Point

Maintenance Entity Point

| Delete | Instance | Domain | Mode | Direction | Residence Port | Level | Flow Instance | Tagged VID | This MAC | Alarm |
|--------|----------|--------|------|-----------|----------------|-------|---------------|------------|----------|-------|
| Delete | 1        | Port   | Mep  | Down      | 1              | 0     | 1             | 0          |          |       |

| Setting               | Description   |
|-----------------------|---|
| <b>Delete</b>         | This box is used to mark a MEP for deletion in the next save operation.   |
| <b>Instance</b>       | The ID of the MEP. Click on the ID of a MEP to enter the configuration page. The range is from <b>1</b> through <b>100</b> .  |
| <b>Domain</b>         | <b>Port:</b> This is a MEP in the Port Domain.  |
| <b>Mode</b>           | <b>MEP:</b> This is a Maintenance Entity End Point.<br><b>MIP:</b> This is a Maintenance Entity Intermediate Point.   |
| <b>Direction</b>      | <b>Down:</b> This is a Down MEP - monitoring ingress OAM and traffic on Residence Port.<br><b>Up:</b> This is an Up MEP   |
| <b>Residence Port</b> | The port where MEP is monitoring - see 'Direction'. For an EVC MEP, the port must be a port in the EVC. For a VLAN MEP the port must be a VLAN member.  |
| <b>Level</b>          | The MEG level of this MEP.  |
| <b>Flow Instance</b>  | The MEP is related to this flow - see 'Domain'. This is not relevant and not shown in case of Port MEP.   |
| <b>Tagged VID</b>     | <b>Port MEP:</b> An outer C/S-tag (depending on VLAN Port Type) is added with this VID. Entering '0' means no TAG added.<br><b>EVC MEP:</b> This is not used.<br><b>VLAN MEP:</b> This is not used.<br><b>EVC MIP:</b> On Serval, this is the Subscriber VID that identify the subscriber flow in this EVC where the MIP is active. |
| <b>This MAC</b>       | The MAC of this MEP - can be used by other MEP when unicast is selected (Info only).  |
| <b>Alarm</b>          | There is an active alarm on the MEP.  |

### MEP Configuration

Maintenance Entity Point

| Delete                   | Instance | Domain | Mode |
|--------------------------|----------|--------|------|
| <input type="checkbox"/> | 1        | Port   | Mep  |

Click **"Maintenance Entity Point"** Instance number to edit MEP configuration

### Instance Data

| Instance Data |        |      |           |                |               |            |              |                   |
|---------------|--------|------|-----------|----------------|---------------|------------|--------------|-------------------|
| Instance      | Domain | Mode | Direction | Residence Port | Flow Instance | Tagged VID | EPS Instance | This MAC          |
| 1             | Port   | Mep  | Down      | 1              |               | 3001       | 0            | 9C-8D-D3-00-40-DE |

| Setting               | Description   |
|-----------------------|---|
| <b>Instance</b>       | The ID of the MEP.  |
| <b>Domain</b>         | <b>Port:</b> This is a MEP in the Port Domain.  |
| <b>Mode</b>           | <b>MEP:</b> This is a Maintenance Entity End Point.<br><b>MIP:</b> This is a Maintenance Entity Intermediate Point.   |
| <b>Direction</b>      | <b>Down:</b> This is a Down MEP - monitoring ingress OAM and traffic on Residence Port.<br><b>Up:</b> This is an Up MEP.  |
| <b>Residence Port</b> | The port where MEP is monitoring - see 'Direction'. For an EVC MEP, the port must be a port in the EVC. For a VLAN MEP, the port must be a VLAN member.   |
| <b>Flow Instance</b>  | The MEP is related to this flow - see 'Domain'. This is not relevant and not shown in case of Port MEP.   |
| <b>Tagged VID</b>     | <b>Port MEP:</b> An outer C/S-tag (depending on VLAN Port Type) is added with this VID. Entering '0' means no TAG added.<br><b>EVC MEP:</b> This is not used.<br><b>VLAN MEP:</b> This is not used.<br><b>EVC MIP:</b> On Serval, this is the Subscriber VID that identify the subscriber flow in this EVC where the MIP is active. |
| <b>This MAC</b>       | The MAC of this MEP - can be used by other MEP when unicast is selected (Info only).  |

### Instance Configuration

| Level | Format    | Domain Name | MEG id        | MEP id | Tagged VID | Syslog                   |
|-------|-----------|-------------|---------------|--------|------------|--------------------------|
| 0 ▼   | ITU ICC ▼ |             | ICC000MEG0000 | 1      | 3001       | <input type="checkbox"/> |

| cLevel                              | cMEG                                | cMEP                                | cAIS                                | cLCK                                | cLoop                               | cConfig                             | cSSF                                | aBLK                                | aTSD                                | aTSF                                |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

| Setting                 | Description  |
|-------------------------|--|
| <b>Level</b>            | The MEG level of this MEP.   |
| <b>Format</b>           | This is the configuration of the two possible Maintenance Association Identifier formats: <ul style="list-style-type: none"> <li>• <b>ITU ICC:</b> This is defined by ITU (Y1731 Fig. A3). 'Domain Name' is not used. 'MEG ID' must be a maximum of 13 characters.</li> <li>• <b>IEEE String:</b> This is defined by IEEE (802.1ag Section 21.6.5). 'Domain Name' can be a maximum of 16 characters 'MEG ID' (Short MA Name).</li> <li>• <b>ITU CC ICC:</b> This is defined by ITU (Y1731 Fig. A5). 'Domain Name' is not used. 'MEG ID' must be a maximum of 15 characters.</li> </ul> |
| <b>Domain Name</b>      | This is the IEEE Maintenance Domain Name and is only used in case of 'IEEE String' format. This string can be empty giving Maintenance Domain Name Format 1 - Not present. This can be a maximum of 16 characters.   |
| <b>MEG Id</b>           | This is either ITU MEG ID or IEEE Short MA Name - depending on 'Format'. See 'Format'. In the case of ITU ICC format, this must be 13 characters. In the case of ITU CC ICC format, this must be 15 characters. In the case of IEEE String format, this can be maximum 16 characters.  |
| <b>MEP Id</b>           | This value will become the transmitted two-byte CCM MEP ID.  |
| <b>Tagged VID</b>       | This value will be the VID of a TAG added to the OAM PDU.  |
| <b>VOE</b>              | This will attempt to utilize VOE HW for MEP implementation. Not all platforms support VOE.   |
| <b>cLevel</b>           | Fault Cause indicating that a CCM is received with a lower level than the configured for this MEP.   |
| <b>cMEG</b>             | Fault Cause indicating that a CCM is received with a MEG ID different than configured for this MEP.  |
| <b>cMEP</b>             | Fault Cause indicating that a CCM is received with a MEP ID different than all 'Peer MEP ID' configured for this MEP.  |
| <b>cAIS</b>             | Fault Cause indicating that AIS PDU is received.   |
| <b>cLCK</b>             | Fault Cause indicating that LCK PDU is received.   |
| <b>cDEG</b>             | Fault Cause indicating that the server layer is indicating Signal Degraded.  |
| <b>cSSF</b>             | Fault Cause indicating that the server layer is indicating Signal Fail.  |
| <b>aBLK</b>             | The consequent action of blocking service frames in this flow is active.   |
| <b>aTSD</b>             | The consequent action of indicating Trail Signal Degrade is calculated.  |
| <b>aTSF</b>             | The consequent action of indicating Trail Signal Fail towards protection is active.  |
| <b>Delete</b>           | This box is used to mark a Peer MEP for deletion in the next save operation.   |
| <b>Peer MEP ID</b>      | This value will become an expected MEP ID in a received CCM - see 'cMEP'.  |
| <b>Unicast Peer MAC</b> | This MAC will be used when unicast is selected with this peer MEP. Also, this MAC is used to create HW checking of receiving CCM PDU (LOC detection) from this MEP.  |
| <b>cLOC</b>             | Fault Cause indicating that no CCM has been received (in 3.5 periods) - from this peer MEP.  |
| <b>cRDI</b>             | Fault Cause indicating that a CCM is received with Remote Defect Indication - from this peer MEP.  |
| <b>cPeriod</b>          | Fault Cause indicating that a CCM is received with a period different than what is configured for this MEP - from this peer MEP.   |

|                  |  |
|------------------|--|
| <b>cPriority</b> | Fault Cause indicating that a CCM is received with a priority different than what is configured for this MEP - from this peer MEP. |
|------------------|--|

**Functional Configuration**

**Functional Configuration**

| Continuity Check         |          |            |                          | APS Protocol             |          |         |         |            |
|--------------------------|----------|------------|--------------------------|--------------------------|----------|---------|---------|------------|
| Enable                   | Priority | Frame rate | TLV                      | Enable                   | Priority | Cast    | Type    | Last Octet |
| <input type="checkbox"/> | 0        | 1 f/sec ▼  | <input type="checkbox"/> | <input type="checkbox"/> | 0        | Multi ▼ | L-APS ▼ | 1          |

Fault Management
Performance Monitoring

| Setting                 | Description  |
|-------------------------|--|
| <b>Continuity Check</b> | <ul style="list-style-type: none"> <li><b>Enable:</b> Continuity Check based on transmitting/receiving CCM PDU can be enabled/disabled. The CCM PDU is always transmitted as Multi-cast Class 1.</li> <li><b>Priority:</b> The priority to be inserted as PCP bits in TAG (if any). In case of enable of Continuity Check and Loss Measurement both implemented on SW based CCM, 'Priority' has to be the same.</li> <li><b>Frame rate:</b> Selecting the frame rate of CCM PDU. This is the inverse of transmission period as described in Y.1731. This value has the following uses:                             <ol style="list-style-type: none"> <li>The transmission rate of the CCM PDU.</li> <li>Fault Cause cLOC is declared if no CCM PDU has been received within 3.5 periods - see 'cLOC'.</li> <li>Fault Cause cPeriod is declared if a CCM PDU has been received with a different period - see 'cPeriod'.</li> </ol>                             Selecting 300f/sec or 100f/sec will configure HW based CCM (if possible). Selecting other frame rates will configure SW based CCM. In case of enable of Continuity Check and Loss Measurement both implemented on SW based CCM, 'Frame Rate' has to be the same.                         </li> <li><b>TLV:</b> Enable/disable of TLV insertion in the CCM PDU.</li> </ul> |
| <b>APS Protocol</b>     | <ul style="list-style-type: none"> <li><b>Enable:</b> Automatic Protection Switching protocol information transportation based on transmitting/receiving R-APS/L-APS PDU can be enabled/disabled. Must be enabled to support ERPS/ELPS implementing APS. This is only valid with one Peer MEP configured.</li> <li><b>Priority:</b> The priority to be inserted as PCP bits in TAG (if any).</li> <li><b>Cast:</b> Selection of APS PDU transmitted unicast or multi-cast. The unicast MAC will be taken from the 'Unicast Peer MAC' configuration. Unicast is only valid for L-APS - see 'Type'. The R-APS PDU is always transmitted with multi-cast MAC described in G.8032.</li> </ul>  |

- **Type:**
  - a. **R-APS:** APS PDU is transmitted as R-APS - this is for ERPS.
  - b. **L-APS:** APS PDU is transmitted as L-APS - this is for ELPS.
- **Last Octet:** This is the last octet of the transmitted and expected RAPS multi-cast MAC. In G.8031 (03/2010), a RAPS multi-cast MAC is defined as 01-19-A7-00-00-XX. In current standard the value for this last octet is '01' and the usage of other values is for further study.

**TLV Configuration**

Configuration of the OAM PDU TLV. Currently only TLV in the CCM is supported.

| Organization Specific TLV (Global) |            |           |          |       |
|------------------------------------|------------|-----------|----------|-------|
| OUI First                          | OUI Second | OUI Third | Sub-Type | Value |
| 0                                  | 0          | 12        | 1        | 2     |

| Setting                                   | Description   |
|---|---|
| <b>Organization Specific - OUI First</b>  | The transmitted first value in the OS TLV OUI field.  |
| <b>Organization Specific - OUI Second</b> | The transmitted second value in the OS TLV OUI field. |
| <b>Organization Specific - OUI Third</b>  | The transmitted third value in the OS TLV OUI field.  |
| <b>Organization Specific - Sub-Type</b>   | The transmitted value in the OS TLV Sub-Type field.   |
| <b>Organization Specific - Value</b>      | The transmitted value in the OS TLV Value field.      |

### TLV Status

Display of the last received TLV. Currently only TLV in the CCM is supported.

| TLV Status        |                          |            |           |          |       |         |                |         |                     |         |  |
|-------------------|--------------------------|------------|-----------|----------|-------|---------|----------------|---------|---------------------|---------|--|
| Peer MEP ID       | CC Organization Specific |            |           |          |       |         | CC Port Status |         | CC Interface Status |         |  |
|                   | OUI First                | OUI Second | OUI Third | Sub-Type | Value | Last RX | Value          | Last RX | Value               | Last RX |  |
| No Peer MEP Added |                          |            |           |          |       |         |                |         |                     |         |  |

| Setting                                      | Description   |
|--|---|
| <b>CC Organization Specific - OUI First</b>  | The last received first value in the OUI field.         |
| <b>CC Organization Specific - OUI Second</b> | The last received second value in the OS TLV OUI field. |
| <b>CC Organization Specific - OUI Third</b>  | The last received third value in the OS TLV OUI field.  |
| <b>CC Organization Specific - Sub-Type</b>   | The last received value in the OS TLV Sub-Type field.   |
| <b>CC Organization Specific - Value</b>      | The last received value in the OS TLV Value field.      |
| <b>CC Organization Specific - Last RX</b>    | OS TLV was received in the last received CCM PDU.       |
| <b>CC Port Status - Value</b>                | The last received value in the PS TLV Value field.      |
| <b>CC Port Status - Last RX</b>              | PS TLV was received in the last received CCM PDU.       |
| <b>CC Interface Status - Value</b>           | The last received value in the IS TLV Value field.      |
| <b>CC Interface Status - Last RX</b>         | IS TLV was received in the last received CCM PDU.       |

### Link State Tracking



| Setting       | Description   |
|---------------|---|
| <b>Enable</b> | When LST is enabled in an instance, Local SF or received 'isDown' in CCM Interface Status TLV will bring down the residence port. Only valid in Up-MEP. The CCM rate must be 1 f/s or faster. |

## Fault Management

This page allows the user to inspect and configure the Fault Management of the current MEP Instance.

### Loop Back

#### Fault Management - Instance 1 - MEP id 1

#### Loop Back

| Enable                   | DEI                      | Priority | Cast    | Peer MEP | Unicast MAC       | To Send | Size | Interval |
|--------------------------|--------------------------|----------|---------|----------|-------------------|---------|------|----------|
| <input type="checkbox"/> | <input type="checkbox"/> | 0        | Multi ▾ | 1        | 00-00-00-00-00-00 | 10      | 64   | 100      |

| Setting            | Description   |
|--------------------|---|
| <b>Enable</b>      | Loop Back based on transmitting/receiving LBM/LBR PDU can be enabled/disabled. Loop Back is automatically disabled when all 'To Send' LBM PDU has been transmitted - waiting 5 sec. for all LBR from the end.   |
| <b>DEI</b>         | The DEI to be inserted as PCP bits in TAG (if any).   |
| <b>Priority</b>    | The priority to be inserted as PCP bits in TAG (if any).  |
| <b>Cast</b>        | Selection of LBM PDU transmitted unicast or multi-cast. The unicast MAC will be configured through 'Peer MEP' or 'Unicast Peer MAC'. Towards MIP only unicast Loop Back is possible.  |
| <b>Peer MEP</b>    | This is only used if the 'Unicast MAC' is configured to all zero. The LBM unicast MAC will be taken from the 'Unicast Peer MAC' configuration of this peer.   |
| <b>Unicast MAC</b> | This is only used if NOT configured to all zero. This will be used as the LBM PDU unicast MAC. This is the only way to configure Loop Back towards a MIP.   |
| <b>To Send</b>     | The number of LBM PDU to send in one loop test. The value 0 indicates infinite transmission (test behavior). This is HW based LBM/LBR and requires VOE.   |
| <b>Size</b>        | <p>The LBM frame size. This is entered as the wanted size (in bytes) of an untagged frame containing LBM OAM PDU - including CRC (four bytes).<br/>           Example when 'Size' = 64=&gt; Untagged frame size = DMAC(6) + SMAC(6) + TYPE(2) + LBM PDU LENGTH(46) + CRC(4) = 64 bytes</p> <p>The transmitted frame will be four bytes longer for each tag added - 8 bytes in case of a tunnel EVC.</p> <p>There are two frame MAX sizes to consider:</p> <ul style="list-style-type: none"> <li>• <b>Switch RX frame MAX size:</b> The MAX frame size (all inclusive) accepted on the switch port of 9600 Bytes.</li> <li>• <b>CPU RX frame MAX size:</b> The MAX frame size (all inclusive) possible to copy to CPU of 1526 Bytes.</li> </ul> <p>Consider that the Peer MEP must be able to handle the selected frame size.<br/>           Consider that in case of SW based MEP, the received LBR PDU must be copied to CPU.</p> <p>Warning will be given if selected frame size exceeds the CPU RX frame MAX size Frame.<br/>           MIN Size is 64 Bytes.</p> |



**Interval**

The interval between transmitting LBM PDU. In 10ms. in case 'To Send' != 0 (max 100 - '0' is as fast as possible) In 1us. in case 'To Send' == 0 (max 10.000)",

## Loop Back State

### Loop Back State

| Transaction ID | Transmitted | Reply MAC         | Received | Out Of Order |
|----------------|-------------|-------------------|----------|--------------|
| 1              | 0           | 00-00-00-00-00-00 | 0        | 0            |

| Setting               | Description  |
|-----------------------|--|
| <b>Transaction ID</b> | The transaction id of the first LBM transmitted. For each LBM transmitted, the transaction ID in the PDU is incremented.   |
| <b>Transmitted</b>    | The total number of LBM PDU transmitted.   |
| <b>Reply MAC</b>      | The MAC of the replying MEP/MIP. In case of multi-cast LBM, replies can be received from all peer MEP in the group. This MAC is not shown in case of 'To Send' == 0. |
| <b>Received</b>       | The total number of LBR PDU received from this 'Reply MAC'.  |
| <b>Out Of Order</b>   | The number of LBR PDU received from this 'Reply MAC' with incorrect 'Transaction ID'.  |

## Link Trace

### Link Trace

| Enable                   | Priority | Peer MEP | Unicast MAC       | Time To Live |
|--------------------------|----------|----------|-------------------|--------------|
| <input type="checkbox"/> | 0        | 1        | 00-00-00-00-00-00 | 1            |

| Setting             | Description  |
|---------------------|--|
| <b>Enable</b>       | Link Trace based on transmitting/receiving LTM/LTR PDU can be enabled/disabled. Link Trace is automatically disabled when all 5 transactions are done with 5 sec. interval - waiting 5 sec. for all LTR in the end. The LTM PDU is always transmitted as Multi-cast Class 2. |
| <b>Priority</b>     | The priority to be inserted as PCP bits in TAG (if any).   |
| <b>Peer MEP</b>     | This is only used if the 'Unicast MAC' is configured to all zero. The Link Trace Target MAC will be taken from the 'Unicast Peer MAC' configuration of this peer.  |
| <b>Unicast MAC</b>  | This is only used if NOT configured to all zero. This will be used as the Link Trace Target MAC. This is the only way to configure a MIP as Target MAC.  |
| <b>Time To Live</b> | This is the LTM PDU TTL value as described in Y.1731. This value is decremented each time forwarded by a MIP. Will not be forwarded reaching zero.   |

## Link Trace State

### Link Trace State

| Transaction ID  | Time To Live | Mode | Direction | Forwarded | Relay | Last MAC | Next MAC |
|-----------------|--------------|------|-----------|-----------|-------|----------|----------|
| No Transactions |              |      |           |           |       |          |          |

| Setting               | Description  |
|-----------------------|--|
| <b>Transaction ID</b> | The transaction ID is incremented for each LTM send. This value is inserted in the transmitted LTM PDU and is expected to be received in the LTR PDU. Received LTR with wrong transaction ID is ignored. There are five transactions in one Link Trace activated.                                  |
| <b>Time To Live</b>   | This is the TTL value taken from the LTM received by the MIP/MEP sending this LTR - decremented as if forwarded.   |
| <b>Mode</b>           | Indicating if it was a MEP/MIP sending this LTR.   |
| <b>Direction</b>      | Indicating if MEP/MIP sending this LTR is ingress/egress.  |
| <b>Forwarded</b>      | Indicating if MEP/MIP sending this LTR has forwarded the LTM.  |
| <b>Relay</b>          | The Relay action can be one of the following: <ul style="list-style-type: none"> <li>• <b>MAC:</b> This was a hit on the LT Target MAC</li> <li>• <b>FDB:</b> LTM is forwarded based on hit in the Filtering DB</li> <li>• <b>MFDB:</b> LTM is forwarded based on hit in the MIP CCM DB</li> </ul> |
| <b>Last MAC</b>       | The MAC identifying the last sender of the LBM causing this LTR - initiating MEP or previous MIP forwarding.   |
| <b>Next MAC</b>       | The MAC identifying the next sender of the LBM causing this LTR - MIP forwarding or terminating MEP.   |

## Test Signal

| Test Signal              |                          |                          |          |          |      |      |            |                          |
|--------------------------|--------------------------|--------------------------|----------|----------|------|------|------------|--------------------------|
| Tx                       | Rx                       | DEI                      | Priority | Peer MEP | Rate | Size | Pattern    | Sequence Number          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0        | 1        | 1    | 64   | All Zero ▼ | <input type="checkbox"/> |

| Setting         | Description  |
|-----------------|--|
| <b>Enable</b>   | Test Signal based on transmitting TST PDU can be enabled/disabled.   |
| <b>DEI</b>      | The DEI to be inserted as PCP bits in TAG (if any).  |
| <b>Priority</b> | The priority to be inserted as PCP bits in TAG (if any).   |
| <b>Peer MEP</b> | The TST frame destination MAC will be taken from the 'Unicast Peer MAC' configuration of this peer.  |
| <b>Rate</b>     | The TST frame transmission bit rate - in Megabits per second. Limit is 400 Mbps. This is the bit rate of a standard frame without any encapsulation. If 1 Mbps rate is selected in an EVC MEP, the added tag will give a higher bitrate on the wire.   |
| <b>Size</b>     | <p>The TST frame size. This is entered as the wanted size (in bytes) of an untagged frame containing TST OAM PDU - including CRC (four bytes).<br/>           Example when 'Size' = 64=&gt; Untagged frame size = DMAC(6) + SMAC(6) + TYPE(2) + TST PDU LENGTH(46) + CRC(4) = 64 bytes<br/>           The transmitted frame will be four bytes longer for each tag added - 8 bytes in case of a tunnel EVC.<br/>           There are two frame MAX sizes to consider:</p> <ul style="list-style-type: none"> <li>• <b>Switch RX frame MAX size:</b> The MAX frame size (all inclusive) accepted on the switch port of 9600 Bytes</li> <li>• <b>CPU RX frame MAX size:</b> The MAX frame size (all inclusive) possible to copy to CPU of 1526 Bytes</li> </ul> <p>Consider that the Peer MEP must be able to handle the selected frame size.<br/>           Consider that in order to calculate the 'RX rate' a received TST PDU must be copied to CPU.<br/>           Warning will be given if selected frame size exceeds the CPU RX frame MAX size.<br/>           Frame MIN size is 64 Bytes.</p> |
| <b>Pattern</b>  | <p>The 'empty' TST PDU has the size of 12 bytes. In order to achieve the configured frame size, a data TLV will be added with a pattern.<br/>           Example when 'Size' = 64=&gt; Untagged frame size = DMAC(6) + SMAC(6) + TYPE(2) + TST PDU LENGTH(46) + CRC(4) = 64 bytes<br/>           The TST PDU needs to be 46 bytes so a pattern of 46-12=34 bytes will be added.<br/> <b>All Zero:</b> Pattern will be '00000000'<br/> <b>All One:</b> Pattern will be '11111111'<br/> <b>10101010:</b> Pattern will be '10101010'</p>   |

### Test Signal State

**Test Signal State**

| TX frame count | RX frame count | RX rate | Test time | Clear                    |
|----------------|----------------|---------|-----------|--------------------------|
| 0              | 0              | 0       | 0         | <input type="checkbox"/> |

| Setting               | Description   |
|-----------------------|---|
| <b>TX frame count</b> | The number of transmitted TST frames since last 'Clear'.  |
| <b>RX frame count</b> | The number of received TST frames since last 'Clear'.   |
| <b>RX rate</b>        | The current received TST frame bit rate in Kbps. This is calculated on a 1 s. basis, starting when the first TST frame is received after 'Clear'. The frame size used for this calculation is the first received after 'Clear'. |
| <b>Test time</b>      | The number of seconds passed since the first TST frame received after the last 'Clear'.   |
| <b>Clear</b>          | This will clear all Test Signal State. Transmission of TST frame will be restarted. Calculation of 'Rx frame count', 'RX rate', and 'Test time' will be started when receiving first TST frame.                                 |

### Client Configuration

Only a Port MEP is able to be a server MEP with flow configuration. The Priority in the client flow is always the highest priority configured in the EVC.

**Client Configuration**

| Flow     |        |        |        |        |        |        |        |        |        |        |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Domain   | VLAN ▼ | VLAN ▼ | VLAN ▼ | VLAN ▼ | VLAN ▼ | VLAN ▼ | VLAN ▼ | VLAN ▼ | VLAN ▼ | VLAN ▼ |
| Instance | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Level    | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| AIS prio | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    |
| LCK prio | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    | 0 ▼    |

| Setting         | Description  |
|-----------------|--|
| <b>Domain</b>   | The domain of the client layer flow.   |
| <b>Instance</b> | Client layer flow instance numbers.  |
| <b>Level</b>    | Client layer level - AIS and LCK PDU transmitted in this client layer flow will be on this level.                              |
| <b>AIS Prio</b> | The priority to be used when transmitting AIS in each client flow. Priority resulting in highest possible PCP can be selected. |
| <b>LCK Prio</b> | The priority to be used when transmitting LCK in each client flow. Priority resulting in highest possible PCP can be selected. |

## AIS

**AIS**

| Enable                   | Frame Rate | Protection               |
|--------------------------|------------|--------------------------|
| <input type="checkbox"/> | 1 f/sec ▼  | <input type="checkbox"/> |

| Setting           | Description   |
|-------------------|---|
| <b>Enable</b>     | Insertion of AIS signal (AIS PDU transmission) in client layer flows can be enable/disabled.  |
| <b>Frame Rate</b> | Selecting the frame rate of AIS PDU. This is the inverse of transmission period as described in Y.1731.                                   |
| <b>Protection</b> | Selecting this means that the first 3 AIS PDU is transmitted as fast as possible - in case of using this for protection in the end point. |

## Lock

**LOCK**

| Enable                   | Frame Rate |
|--------------------------|------------|
| <input type="checkbox"/> | 1 f/sec ▼  |

| Setting           | Description   |
|-------------------|---|
| <b>Enable</b>     | Insertion of LOCK signal (LCK PDU transmission) in client layer flows can be enable/disabled.           |
| <b>Frame Rate</b> | Selecting the frame rate of LCK PDU. This is the inverse of transmission period as described in Y.1731. |

## Performance Monitoring

This page allows the user to inspect and configure the performance monitor of the current MEP Instance.

### Performance Monitoring Data Set



| Setting | Description   |
|---------|---|
| Enable  | When enabled this MEP instance will contribute to the 'PM Data Set' gathered by the PM Session. |

### Loss Measurement

Loss Measurement

| Tx                       | Rx                       | Priority | Cast    | Peer MEP | Rate      | Size | Synthetic                | Ended    | FLR Interval | Meas. Interval | Loss Threshold | SLM Test ID |
|--------------------------|--------------------------|----------|---------|----------|-----------|------|--------------------------|----------|--------------|----------------|----------------|-------------|
| <input type="checkbox"/> | <input type="checkbox"/> | 0        | Multi ▾ | 1        | 1 f/sec ▾ | 64   | <input type="checkbox"/> | Single ▾ | 5            | 1000           | 0              | 0           |

| Setting  | Description  |
|----------|--|
| Tx       | Transmitting/receiving CCM or LMM/LMR or SLM/SLR/1SL PDUs - see 'Synthetic' and 'Ended'.<br>Service frame LM (not 'Synthetic') is only allowed with one Peer MEP configured. Synthetic frame LM is allowed with multiple Peer MEPs configured.                   |
| Rx       | Enable loss calculation when receiving LM PDUs (LMM/SLM/1SL). This is ignored when LM initiator is enabled.  |
| Priority | The priority to be inserted as PCP bits in TAG (if any). In case of enable of Continuity Check and Loss Measurement both implemented on SW based CCM, 'Priority' has to be the same.   |
| Cast     | Selection of LM PDU transmitted unicast or multicast. The unicast MAC will be taken from the 'Unicast Peer MAC' database. In case of enable of Continuity Check and dual ended Loss Measurement both implemented on SW based CCM, 'Cast' has to be the same.     |
| Peer MEP | Peer MEP-ID for unicast LM. The MAC is taken from the 'Unicast Peer MAC' database. Only used in case of multiple peers ('Synthetic' LM).   |
| Rate     | Selecting the frame rate of LM PDU. This is the inverse of transmission period as described in Y.1731.<br>Selecting 100f/sec is only valid in case of 'Synthetic' LM.<br>Selecting 6f/min is not valid in case of dual ended 'Service frame' LM (CCM PDU based). |

|                       |   |
|-----------------------|---|
|                       | In case of enable of Continuity Check and Loss Measurement both implemented on SW based CCM, 'Frame Rate' has to be the same.   |
| <b>Size</b>           | <p>The 'Synthetic' SLM/1SL frame size. This is entered as the wanted size (in bytes) of an untagged frame containing LM OAM PDU - including CRC (four bytes).<br/> Example when 'Size' = 64=&gt; Untagged frame size = DMAC(6) + SMAC(6) + TYPE(2) + LBM PDU LENGTH(46) + CRC(4) = 64 bytes<br/> The transmitted frame will be four bytes longer for each tag added - 8 bytes in case of a tunnel EVC.<br/> There are two frame MAX sizes to consider:</p> <ul style="list-style-type: none"> <li>• <b>Switch RX frame MAX size:</b> The MAX frame size (all inclusive) accepted on the switch port of Bytes</li> <li>• <b>CPU RX frame MAX size:</b> The MAX frame size (all inclusive) possible to copy to CPU of Bytes</li> </ul> <p>Consider that the Peer MEP must be able to handle the selected frame size.<br/> Consider that the received SLR PDU must be copied to CPU.<br/> Warning will be given if selected frame size exceeds the CPU RX frame MAX size.<br/> Frame MIN Size is 64 Bytes.</p> |
| <b>Synthetic</b>      | Synthetic frame LM is enable. This is SLM/SLR/1SL PDU based LM.   |
| <b>Ended</b>          | <p><b>Single:</b> Single ended Loss Measurement implemented on LMM/LMR or SLM/SLR.<br/> <b>Dual:</b> Dual ended Loss Measurement implemented on SW based CCM or 1SL.</p>  |
| <b>FLR Interval</b>   | This is the interval in number of measurement intervals where the interval Frame Loss Ratio is calculated.  |
| <b>Meas Interval</b>  | <p>This is the 'synthetic' LM measurement interval in milliseconds. This must be a whole number of the LM PDU transmission interval (inverse 'Rate'). This is the interval in time where the loss and FLR is calculated based on the counted number of SL OAM PDUs. It is in this interval that the calculated FLR is checked against availability, high loss, and degraded FLR threshold.<br/> Example: 'Rate' = 100f/sec =&gt; 'Meas Interval' = N*10 milliseconds.<br/> Example: 'Rate' = 10f/sec =&gt; 'Meas Interval' = N*100 milliseconds.<br/> In the case of service frame based LM, this attribute is not used and the measurement interval is always the LM PDU transmission interval.</p>  |
| <b>Loss Threshold</b> | Far end loss threshold count is incremented if a loss measurement is above this threshold.  |
| <b>SLM Test ID</b>    | The Test ID value to use in SLM PDUs (see G.8013, section 9.22.1). The default value is 0.  |



## Loss Measurement State

| Peer MEP ID       | Tx | Rx | Near End Loss Count | Far End Loss Count | Interval Elapsed | Interval Near End Loss Ratio |
|-------------------|----|----|---------------------|--------------------|------------------|------------------------------|
| No Peer MEP Added |    |    |                     |                    |                  |                              |

| Interval Far End Loss Ratio | Total Near End Loss Ratio | Total Far End Loss Ratio | Clear |
|-----------------------------|---------------------------|--------------------------|-------|
|                             |                           |                          |       |

| Setting                             | Description   |
|-------------------------------------|---|
| <b>Peer MEP</b>                     | The Peer MEP ID that the following state relates to.  |
| <b>Tx</b>                           | The accumulated transmitted LM PDUs - since last 'clear'.   |
| <b>Rx</b>                           | The accumulated received LM PDUs - since last 'clear'.  |
| <b>Near End Loss Count</b>          | The accumulated near end frame loss count - since last 'clear'.   |
| <b>Far End Loss Count</b>           | The accumulated far end frame loss count - since last 'clear'.  |
| <b>Interval Elapsed</b>             | The accumulated number of 'FLR Interval' elapsed - since last 'clear'.  |
| <b>Interval Near End Loss Ratio</b> | The near end frame loss ratio calculated based on the near end frame loss count and far end frame transmitted - in the latest 'FLR Interval'. This is shown in $(Loss/Tx)*10000$ . Same as 1/100 Percent. |
| <b>Interval Far End Loss Ratio</b>  | The far end frame loss ratio calculated based on the far end frame loss count and near end frame transmitted - in the latest 'FLR Interval'. This is shown in $(Loss/Tx)*10000$ . Same as 1/100 Percent.  |
| <b>Total Near End Loss Ratio</b>    | The near end frame loss ratio calculated based on the near end frame loss count and far end frame transmitted - since last 'clear'. This is shown in $(Loss/Tx)*10000$ . Same as 1/100 Percent.           |
| <b>Interval Far End Loss Ratio</b>  | The far end frame loss ratio calculated based on the far end frame loss count and near end frame transmitted - since last 'clear'. This is shown in $(Loss/Tx)*10000$ . Same as 1/100 Percent.            |
| <b>Clear</b>                        | Set of this check and save will clear the accumulated counters and restart ratio calculation.   |

### Loss Measurement Availability

**Loss Measurement Availability**

| Enable                   | Interval | FLR Threshold | Maintenance              |
|--------------------------|----------|---------------|--------------------------|
| <input type="checkbox"/> | 10       | 10            | <input type="checkbox"/> |

| Setting              | Description  |
|----------------------|--|
| <b>Enable</b>        | Enable/disable of loss measurement availability.   |
| <b>Interval</b>      | Availability interval - number of measurements with same availability in order to change availability state. |
| <b>FLR Threshold</b> | Availability frame loss ratio threshold in per mille.  |
| <b>Maintenance</b>   | Enable/disable of loss measurement availability maintenance.   |

### Loss Measurement Availability Status

Loss Measurement Availability State

| Peer MEP ID       | Near Availability Count | Far Availability Count | Near Unavailability Count | Far Unavailability Count | Near State | Far State |
|-------------------|-------------------------|------------------------|---------------------------|--------------------------|------------|-----------|
| No Peer MEP Added |                         |                        |                           |                          |            |           |

| Setting                   | Description                    |
|---------------------------|--------------------------------|
| <b>Near Avail Count</b>   | Near end availability count.   |
| <b>Far Avail Count</b>    | Far end availability count.    |
| <b>Near Unavail Count</b> | Near end unavailability count. |
| <b>Far Unavail Count</b>  | Far end unavailability count.  |
| <b>Near State</b>         | Near end availability state.   |
| <b>Far State</b>          | Far end availability state.    |

### Loss Measurement High Loss Interval

**Loss Measurement High Loss Interval**

| Enable                   | FLR Threshold | Consecutive Interval |
|--------------------------|---------------|----------------------|
| <input type="checkbox"/> | 100           | 100                  |

| Setting              | Description   |
|----------------------|---|
| <b>Enable</b>        | Enable/disable of loss measurement high loss interval.      |
| <b>FLR Threshold</b> | High Loss Interval frame loss ratio threshold in per mille. |

|                             |   |
|-----------------------------|---|
| <b>Consecutive Interval</b> | High Loss Interval consecutive interval (number of measurements). |
|-----------------------------|---|

**Loss Measurement High Loss Interval Status**

**Loss Measurement High Loss Interval State**

| Peer MEP ID       | Near Count | Far Count | Near Consecutive Count | Far Consecutive Count |
|-------------------|------------|-----------|------------------------|-----------------------|
| No Peer MEP Added |            |           |                        |                       |

| Setting                       | Description   |
|-------------------------------|---|
| <b>Near Count</b>             | Near end high loss interval count - number of measurements where availability state is available and FLR is above high loss interval FLR threshold. |
| <b>Far Count</b>              | Far end high loss interval count - number of measurements where availability state is available and FLR is above high loss interval FLR threshold.  |
| <b>Near Consecutive Count</b> | Near end high loss interval consecutive count.  |
| <b>Far Consecutive Count</b>  | Far end high loss interval consecutive count.   |

**Loss Measurement Signal Degrade**

**Loss Measurement Signal Degrade**

| Enable                   | TX Minimum | FLR Threshold | Bad Threshold | Good Threshold |
|--------------------------|------------|---------------|---------------|----------------|
| <input type="checkbox"/> | 0          | 10            | 10            | 10             |

| Setting               | Description  |
|-----------------------|--|
| <b>Enable</b>         | Enable/disable of loss measurement signal degrade.   |
| <b>TX Minimum</b>     | Minimum number of frames that must be transmitted in a measurement before frame loss ratio is tested against loss ratio threshold. |
| <b>FLR Threshold</b>  | Signal Degraded frame loss ratio threshold in per mille.   |
| <b>Bad Threshold</b>  | Number of consecutive bad interval measurements required to set degrade state.   |
| <b>Good Threshold</b> | Number of consecutive good interval measurements required to clear degrade state.  |

## Delay Measurement

| Delay Measurement        |          |         |          |          |               |        |     |       |      |                          |                         |
|--------------------------|----------|---------|----------|----------|---------------|--------|-----|-------|------|--------------------------|-------------------------|
| Enable                   | Priority | Cast    | Peer MEP | Ended    | Tx Mode       | Calc   | Gap | Count | Unit | Synchronized             | Counter Overflow Action |
| <input type="checkbox"/> | 0        | Multi ▾ | 1        | Single ▾ | Standardize ▾ | Flow ▾ | 10  | 10    | us ▾ | <input type="checkbox"/> | Keep ▾                  |

| Setting                        | Description   |
|--------------------------------|---|
| <b>Enable</b>                  | Delay Measurement based on transmitting 1DM/DMM PDU can be enabled/disabled. Delay Measurement based on receiving and handling 1DM/DMR PDU is always enabled.   |
| <b>Priority</b>                | The priority to be inserted as PCP bits in TAG (if any).  |
| <b>Cast</b>                    | Selection of 1DM/DMM PDU transmitted unicast or multicast. The unicast MAC will be configured through 'Peer MEP'.   |
| <b>Peer MEP</b>                | This is only used if the 'Cast' is configured to Uni. The 1DM/DMR unicast MAC will be taken from the 'Unicast Peer MAC' configuration of this peer.   |
| <b>Ended</b>                   | <b>Single:</b> Single-ended Delay Measurement implemented on DMM/DMR.<br><b>Dual:</b> Dual-ended Delay Measurement implemented on 1DM.  |
| <b>Tx Mode</b>                 | <b>Standardize:</b> Y.1731 standardize way to transmit 1DM/DMR.<br><b>Proprietary:</b> Vitesse proprietary way with follow-up packets to transmit 1DM/DMR.  |
| <b>Calc</b>                    | This is only used if the 'Ended' is configured to single-ended.<br><b>Round trip:</b> The frame delay calculated by the transmitting and receiving timestamps of initiators. Frame Delay = RxTimeb-TxTimeStampf<br><b>Flow:</b> The frame delay calculated by transmitting and receiving timestamps of initiators and remotes. Frame Delay = (RxTimeb-TxTimeStampf)-(TxTimeStampb-RxTimeStampf) |
| <b>Gap</b>                     | The gap between transmitting 1DM/DMM PDU in 10ms. The range is 10 to 65535.   |
| <b>Count</b>                   | The number of last records to calculate. The range is 10 to 2000.   |
| <b>Unit</b>                    | The time resolution.  |
| <b>Synchronized</b>            | Enable to use DMM/DMR packet to calculate dual-ended DM. If the option is enabled, the following action will be taken. When DMR is received, two-way delay (roundtrip or flow) and both near-end-to-far-end and far-end-to-near-end one-way delays are calculated. When DMM or 1DM is received, only far-end-to-near-end one-way delay is calculated.   |
| <b>Counter Overflow Action</b> | The action to counter when overflow happens.  |

## Delay Measurement State

| Delay Measurement State |    |    |            |          |              |                 |            |            |                  |                     |                |                |          |                          |
|-------------------------|----|----|------------|----------|--------------|-----------------|------------|------------|------------------|---------------------|----------------|----------------|----------|--------------------------|
|                         | Tx | Rx | Rx Timeout | Rx Error | Av Delay Tot | Av Delay last N | Delay Min. | Delay Max. | Av Delay-Var Tot | Av Delay-Var last N | Delay-Var Min. | Delay-Var Max. | Overflow | Clear                    |
| One-way                 |    |    |            |          |              |                 |            |            |                  |                     |                |                |          |                          |
| F-to-N                  | 0  | 0  | 0          | 0        | 0            | 0               | 0          | 0          | 0                | 0                   | 0              | 0              | 0        | 0                        |
| N-to-F                  | 0  | 0  | 0          | 0        | 0            | 0               | 0          | 0          | 0                | 0                   | 0              | 0              | 0        | 0                        |
| Two-way                 | 0  | 0  | 0          | 0        | 0            | 0               | 0          | 0          | 0                | 0                   | 0              | 0              | 0        | <input type="checkbox"/> |

| Setting                                  | Description  |
|--|--|
| <b>Tx</b>                                | The accumulated transmit count - since last 'clear'.   |
| <b>Rx</b>                                | The accumulated receive count - since last 'clear'.  |
| <b>Rx Timeout</b>                        | The accumulated receive timeout count for two-way only - since last 'clear'.   |
| <b>Rx Error</b>                          | The accumulated receive error count - since last 'clear'. This is counting if the frame delay is larger than 1 second or if far end residence time is larger than the round-trip time.                                 |
| <b>Av Delay Tot</b>                      | The average total delay - since last 'clear'.  |
| <b>Av Delay last N</b>                   | The average delay of the last n packets - since last 'clear'.  |
| <b>Delay Min.</b>                        | The minimum delay - since last 'clear'.  |
| <b>Delay Max.</b>                        | The maximum delay - since last 'clear'.  |
| <b>Av Delay-Var Tot</b>                  | The average total delay variation - since last 'clear'.  |
| <b>Av Delay-Var last N</b>               | The average delay variation of the last n packets - since last 'clear'.  |
| <b>Delay-Var Min.</b>                    | The minimum delay variation - since last 'clear'.  |
| <b>Delay-Var Max.</b>                    | The maximum delay variation - since last 'clear'.  |
| <b>Overflow</b>                          | The number of counter overflow - since last 'clear'.   |
| <b>Clear</b>                             | Set of this check and save will clear the accumulated counters.  |
| <b>Far-end-to-near-end one-way delay</b> | The one-way delay is from remote devices to the local devices. Here are the conditions to calculate this delay. 1. 1DM received. 2. DMM received with Synchronized enabled. 3. DMR received with Synchronized enabled. |
| <b>Near-end-to-far-end one-way delay</b> | The one-way delay is from the local devices to remote devices. The only case to calculate this delay is below. DMR received with Synchronized enabled.   |

### Delay Measurement Bins

A Measurement Bin is a counter that stores the number of delay measurements falling within a specified range during a Measurement Interval.

| Delay Measurement Bins  |                           |                       |
|-------------------------|---------------------------|-----------------------|
| Measurement Bins for FD | Measurement Bins for IFDV | Measurement Threshold |
| 3                       | 3                         | 5000                  |

| Setting                          | Description   |
|----------------------------------|---|
| <b>Measurement Bins for FD</b>   | <p>Configurable number of Frame Delay Measurement Bins per Measurement Interval.</p> <p>The minimum number of FD Measurement Bins per Measurement Interval supported is 2.<br/>                     The maximum number of FD Measurement Bins per Measurement Interval supported is 10.<br/>                     The default number of FD Measurement Bins per Measurement Interval supported is 3.</p>                 |
| <b>Measurement Bins for IFDV</b> | <p>Configurable number of Inter-Frame Delay Variation Measurement Bins per Measurement Interval.</p> <p>The minimum number of FD Measurement Bins per Measurement Interval supported is 2.<br/>                     The maximum number of FD Measurement Bins per Measurement Interval supported is 10.<br/>                     The default number of FD Measurement Bins per Measurement Interval supported is 2.</p> |
| <b>Measurement Threshold</b>     | <p>Configurable the Measurement Threshold for each Measurement Bin.</p> <p>The unit for a measurement threshold is in microseconds (us).<br/>                     The default configured measurement threshold for a Measurement Bin is an increment of 5000 us.</p>  |

### Delay Measurement Bins for FD

|         | bin0 | bin1 | bin2 |
|---------|------|------|------|
| One-way |      |      |      |
| F-to-N  | 0    | 0    | 0    |
| N-to-F  | 0    | 0    | 0    |
| Two-way | 0    | 0    | 0    |

A Measurement Bin is a counter that stores the number of delay measurements falling within a specified range during a Measurement Interval. Below is the following example: if the measurement threshold is 5000 us and the total number of Measurement Bins is four.

| Bin  | Threshold | Range                                |
|------|-----------|--------------------------------------|
| bin0 | 0 us      | 0 us <= measurement < 5,000 us       |
| bin1 | 5,000 us  | 5,000 us <= measurement < 10,000 us  |
| bin2 | 10,000 us | 10,000 us <= measurement < 15,000 us |
| bin3 | 15,000 us |                                      |

### Delay Measurement Bins for IFDV

|         | bin0 | bin1 | bin2 |
|---------|------|------|------|
| One-way |      |      |      |
| F-to-N  | 0    | 0    | 0    |
| N-to-F  | 0    | 0    | 0    |
| Two-way | 0    | 0    | 0    |

F-to-N :Far-end-to-near-end  
 N-to-F :Near-end-to-far-end

A Measurement Bin is a counter that stores the number of delay measurements falling within a specified range during a Measurement Interval. Below is the following example: if the measurement threshold is 5000 us and the total number of Measurement Bins is four.

| Bin  | Threshold | Range                                |
|------|-----------|--------------------------------------|
| bin0 | 0 us      | 0 us <= measurement < 5,000 us       |
| bin1 | 5,000 us  | 5,000 us <= measurement < 10,000 us  |
| bin2 | 10,000 us | 10,000 us <= measurement < 15,000 us |
| bin3 | 15,000 us |                                      |

## Configuration > ERPS

### Ethernet Ring Protection Switching

\*\*\*\*\*  
 Spanning-Tree and LLDP must be disabled on the ring ports. MEPs must be created to configure ERPS. Management VLAN 1 cannot be used when configuring ERPS. Please create a new Management VLAN when configuring ERPS. A separate VLAN must be created for R-APS Control Frames.  
 \*\*\*\*\*

**Ethernet Ring Protection Switching** Refresh

| Delete | ERPS ID | Port 0 | Port 1 | Port 0 APS MEP | Port 1 APS MEP | Port 0 SF MEP | Port 1 SF MEP | Ring Type | Interconnected Node      | Virtual Channel          | Major Ring ID | Alarm                              |
|--------|---------|--------|--------|----------------|----------------|---------------|---------------|-----------|--------------------------|--------------------------|---------------|------------------------------------|
| Delete | 1       | 1      | 1      | 1              | 1              | 1             | 1             | Major ▼   | <input type="checkbox"/> | <input type="checkbox"/> | 0             | <span style="color: red;">●</span> |

| Setting                     | Description   |
|-----------------------------|---|
| <b>Delete</b>               | This box is used to mark an ERPS for deletion in the next save operation.   |
| <b>ERPS ID</b>              | The ID of the created Protection Group. It must be an integer value between 1 and 64. The maximum number of ERPS Protection Groups that can be created are 64. Click on the ID of a Protection group to enter the configuration page.                         |
| <b>Port 0</b>               | This will create a Port 0 of the switch in the ring.  |
| <b>Port 1</b>               | This will create Port 1 of the switch in the Ring. As interconnected sub-ring will have only one ring port, Port 1 is configured as 0 for interconnected sub-ring. 0 in this field indicates that no Port 1 is associated with this instance.                 |
| <b>Port 0 SF MEP</b>        | The Port 0 Signal Fail reporting MEP.   |
| <b>Port 1 SF MEP</b>        | The Port 1 Signal Fail reporting MEP. As only one SF MEP is associated with interconnected sub-ring without virtual channel, it is configured as 0 for such ring instances. 0 in this field indicates that no Port 1 SF MEP is associated with this instance. |
| <b>Port 0 APS MEP</b>       | The Port 0 APS PDU handling MEP.  |
| <b>Port 1 APS MEP</b>       | The Port 1 APS PDU handling MEP. As only one APS MEP is associated with an interconnected sub-ring without virtual channel, it is configured as 0 for such ring instances. 0 in this field indicates that no Port 1 APS MEP is associated with this instance. |
| <b>Ring Type</b>            | Type of Protecting ring. It can be either a major ring or a sub-ring.   |
| <b>Interconnect ed Node</b> | Interconnected Node indicates that the ring instance is interconnected. Click on the checkbox to configure this. “Yes” indicates it is an interconnected node for this instance. “No” indicates that the configured instance is not interconnected.           |



|                        |  |
|------------------------|--|
| <b>Virtual Channel</b> | Sub-rings can either have virtual channel or not on the interconnected node. This is configured using Virtual Channel checkbox. “Yes” indicates it is a sub-ring with virtual channel. “No” indicates sub-ring doesn't have virtual channel. |
| <b>Major Ring ID</b>   | Major ring group ID for the interconnected sub-ring. It is used to send topology change updates on major ring. If ring is major, this value is the same as the protection group ID of this ring.   |
| <b>Alarm</b>           | There is an active alarm on the ERPS.  |

## ERPS Configuration

### Instance Data

#### ERPS Configuration 1

#### Instance Data

| ERPS ID | Port 0 | Port 1 | Port 0 SF MEP | Port 1 SF MEP | Port 0 APS MEP | Port 1 APS MEP | Ring Type  |
|---------|--------|--------|---------------|---------------|----------------|----------------|------------|
| 1       | 1      | 2      | 5             | 4             | 4              | 5              | Major Ring |

| Setting               | Description   |
|-----------------------|---|
| <b>ERPS ID</b>        | The ID of the Protection Group.                                   |
| <b>Port 0</b>         | This is a Port 0 of the switch in the ring.                       |
| <b>Port 1</b>         | This is a Port 1 of the switch in the ring.                       |
| <b>Port 0 SF MEP</b>  | The Port 0 Signal Fail reporting MEP instance.                    |
| <b>Port 1 SF MEP</b>  | The Port 1 Signal Fail reporting MEP instance.                    |
| <b>Port 0 APS MEP</b> | The Port 0 APS PDU handling MEP instance.                         |
| <b>Port 1 APS MEP</b> | The Port 1 APS PDU handling MEP instance.                         |
| <b>Ring Type</b>      | Type of Protecting ring. It can be either major ring or sub-ring. |

### Instance Configuration

Ethernet Ring Protection Switching

| Delete                   | ERPS ID | Port 0 | Port 1 | Port 0 APS MEP |
|--------------------------|---------|--------|--------|----------------|
| <input type="checkbox"/> | 1       | 1      | 2      | 1              |



Click **“Ethernet Ring Protection Switching”** ERPS ID number to config instance

#### Instance Configuration

| Configured                           | Guard Time | WTR Time | Hold Off Time | Version | Revertive                           | VLAN config                 |
|--------------------------------------|------------|----------|---------------|---------|-------------------------------------|-----------------------------|
| <span style="color: green;">●</span> | 500        | 1min ▾   | 0             | v2 ▾    | <input checked="" type="checkbox"/> | <a href="#">VLAN Config</a> |

| Setting           | Description  |
|-------------------|--|
| <b>Configured</b> | <ul style="list-style-type: none"> <li><b>Red:</b> This ERPS is only created and has not yet been configured - is not active.</li> <li><b>Green:</b> This ERPS is configured - is active.</li> </ul>                       |
| <b>Guard Time</b> | Guard timeout value to be used to prevent ring nodes from receiving outdated R-APS messages.<br>The period of the guard timer can be configured in 10 ms steps between 10 ms and 2 seconds, with a default value of 500 ms |
| <b>WTR Time</b>   | The Wait To Restore timing value to be used in revertive switching.  |

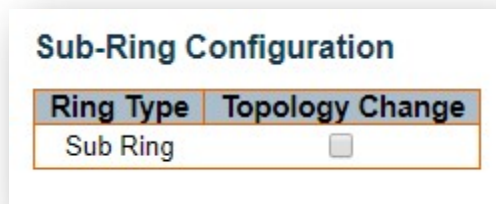
|                      |   |
|----------------------|---|
|                      | The period of the WTR time can be configured by the operator in 1-minute steps between 5 and 12 minutes with a default value of 1 minutes.  |
| <b>Hold Off Time</b> | The timing value to be used to make persistent checks on Signal Fail before switching.<br>The range of the hold off timer is 0 to 10 seconds in steps of 100 ms.  |
| <b>Version</b>       | ERPS Protocol Version - v1 or v2.   |
| <b>Revertive</b>     | In Revertive mode, after the conditions causing a protection switch has cleared, the traffic channel is restored to the working transport entity, i.e. blocked on the RPL.<br>In Non-Revertive mode, the traffic channel continues to use the RPL, if it has not failed, after a protection switch condition has cleared. |
| <b>VLAN config</b>   | VLAN configuration of the Protection Group. Click on the "VLAN Config" link to configure VLANs for this protection group.   |

**RPL Configuration**



| Setting         | Description   |
|-----------------|---|
| <b>RPL Role</b> | It can be either RPL owner or RPL Neighbor.   |
| <b>RPL Port</b> | This allows the user to select the east port or west port as the RPL block.   |
| <b>Clear</b>    | If the owner has to be changed, then the clear check box allows the user to clear the RPL owner for that ERPS ring. |

**Sub-Ring Configuration**



| Setting                | Description  |
|------------------------|--|
| <b>Topology Change</b> | Clicking this checkbox indicates that the topology changes in the sub-ring are propagated in the major ring. |

### Instance Command

**Instance Command**

| Command | Port   |
|---------|--------|
| None ▼  | None ▼ |

| Setting              | Description   |
|----------------------|---|
| <b>Command</b>       | Administrative command. A port can be administratively configured to be in either manual switch or forced switch state. |
| <b>Forced Switch</b> | Forced Switch command forces a block on the ring port where the command is issued.                                      |
| <b>Manual Switch</b> | In the absence of a failure or FS, Manual Switch command forces a block on the ring port where the command is issued.   |
| <b>Clear</b>         | The Clear command is used for clearing an active local administrative command (e.g. Forced Switch or Manual Switch).    |
| <b>Port</b>          | Port selection - Port0 or Port1 of the Protection Group on which the command is applied.                                |

### Instance State

**Instance State**

| Protection State | Port 0 | Port 1 | Transmit APS | Port 0 Receive APS | Port 1 Receive APS | WTR Remaining | RPL Un-blocked                       | No APS Received                      | Port 0 Block Status | Port 1 Block Status | FOP Alarm                            |
|------------------|--------|--------|--------------|--------------------|--------------------|---------------|--------------------------------------|--------------------------------------|---------------------|---------------------|--------------------------------------|
| Pending          | OK     | OK     | NR BPR0      |                    |                    | 0             | <span style="color: green;">●</span> | <span style="color: green;">●</span> | Blocked             | Unblocked           | <span style="color: green;">●</span> |

| Setting                   | Description   |
|---------------------------|---|
| <b>Protection State</b>   | ERPS state according to State Transition Tables in G.8032.                            |
| <b>Port 0</b>             | <b>OK:</b> State of East port is ok.<br><b>SF:</b> State of East port is Signal Fail. |
| <b>Port 1</b>             | <b>OK:</b> State of West port is ok.<br><b>SF:</b> State of West port is Signal Fail. |
| <b>Transmit APS</b>       | The transmitted APS according to State Transition Tables in G.8032.                   |
| <b>Port 0 Receive APS</b> | The received APS on Port 0 according to State Transition Tables in G.8032.            |
| <b>Port 1 Receive APS</b> | The received APS on Port 1 according to State Transition Tables in G.8032.            |
| <b>WTR Remaining</b>      | Remaining WTR timeout in milliseconds.  |
| <b>RPL Un-blocked</b>     | APS is received on the working flow.  |
| <b>No APS Received</b>    | RAPS PDU is not received from the other end.  |

|                            |   |
|----------------------------|---|
| <b>Port 0 Block Status</b> | Block status for Port 0 (Both traffic and R-APS block status). R-APS channel is never blocked on sub-rings without virtual channel. |
| <b>Port 1 Block Status</b> | Block status for Port 1 (Both traffic and R-APS block status). R-APS channel is never blocked on sub-rings without virtual channel. |
| <b>FOP Alarm</b>           | Failure of Protocol Defect(FOP) status. If FOP is detected, red LED glows; otherwise green LED glows.                               |

**ERPS VLAN Configuration #**

**Instance Configuration**

|                |                                     |                    |
|----------------|-------------------------------------|--------------------|
| <b>Version</b> | <b>Revertive</b>                    | <b>VLAN config</b> |
| v2 ▾           | <input checked="" type="checkbox"/> | VLAN Config        |

← Click **“Instance Configuration”** VLAN config to setting ERPS VLAN ID number

**ERPS VLAN Configuration 1**

**Delete**  **VLAN ID**

| Setting                  | Description   |
|--------------------------|---|
| <b>Delete</b>            | To delete a VLAN entry, check this box. The entry will be deleted during the next save.   |
| <b>VLAN ID</b>           | Indicates the ID of this particular VLAN.   |
| <b>Adding a New VLAN</b> | Click <b>“Add New Entry”</b> button to add a new VLAN ID. Legal values for a VLAN ID are 1 through 4095. The VLAN is enabled when you click on Save. A VLAN without any port members will be deleted when you click Save. The <b>“Delete”</b> button can be used to undo the addition of new VLANs. |

## Configuration > MAC Table

### MAC Address Table Configuration

The MAC Address Table is configured on this page. Set timeouts for entries in the dynamic MAC Table and configure the static MAC table here.

#### Aging Configuration

**Aging Configuration**

|                         |   |
|-------------------------|---|
| Disable Automatic Aging | <input type="checkbox"/>                                      |
| Aging Time              | <input style="width: 80px;" type="text" value="300"/> seconds |

| Setting                        | Description  |
|--------------------------------|--|
| <b>Disable Automatic Aging</b> | Disable the automatic aging of dynamic entries by checking Disable automatic aging.  |
| <b>Aging Time</b>              | 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. The allowed range is 10 to 1000000 seconds. |

#### 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.

**MAC Table Learning**

|         |  | Port Members |   |   |   |   |   |   |   |   |    |
|---------|--|--------------|---|---|---|---|---|---|---|---|----|
|         |  | 1            | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Auto    |  | ●            | ● | ● | ● | ● | ● | ● | ● | ● | ●  |
| Disable |  | ○            | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○  |
| Secure  |  | ○            | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○  |

| Setting        | Description   |
|----------------|---|
| <b>Auto</b>    | Learning is done automatically as soon as a frame with unknown SMAC is received.  |
| <b>Disable</b> | No learning is done.  |
| <b>Secure</b>  | Only static MAC entries are learned, all other frames are dropped.<br><b>NOTE:</b> Make sure that the link used for managing the switch is added to the Static Mac Table before changing to secure learning mode, otherwise the |

management link is lost and can only be restored by using another non-secure port or by connecting to the switch via the serial interface.

### Static MAC Table Configuration

The static entries in the MAC table are shown in this table. The static MAC table can contain 64 entries. The MAC table is sorted first by VLAN ID and then by MAC address.

**Static MAC Table Configuration**

|        | VLAN ID | MAC Address       | Port Members             |                          |                          |                          |                          |                          |                          |                          |                          |                          |
|--------|---------|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Delete |         |                   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        | 8                        | 9                        | 10                       |
| Delete | 1       | 00-00-00-00-00-00 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Setting             | Description   |
|---------------------|---|
| <b>Delete</b>       | Check to delete the entry. It will be deleted during the next save.                                       |
| <b>VLAN ID</b>      | The VLAN ID of the entry.   |
| <b>MAC Address</b>  | The MAC address of the entry.   |
| <b>Port Members</b> | Checkmarks indicate which ports are members of the entry. Check or uncheck as needed to modify the entry. |

## Configuration > VLANs

This page allows for controlling VLAN configuration on the switch.  
 The page is divided into a global section and a per-port configuration section.

\*\*\*\*\*  
 Management VLAN 1 cannot be used on Trunk Ports. Please create a new Management VLAN when configuring Trunk Ports.  
 \*\*\*\*\*

### Global VLAN Configuration

**Global VLAN Configuration**

|                                     |      |
|-------------------------------------|------|
| <b>Allowed Access VLANs</b>         | 1    |
| <b>Ethertype for Custom S-ports</b> | 88A8 |

| Setting                             | Description   |
|-------------------------------------|---|
| <b>Allowed Access VLANs</b>         | This field shows the allowed Access VLANs, i.e. it only affects ports configured as Access ports. Ports in other modes are members of the VLANs specified in the Allowed VLANs field. By default, only VLAN 1 is enabled. It is <b>HIGHLY</b> recommended to change the default management VLAN 1. 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.<br>The following example will create VLANs 1, 10, 11, 12, 13, 200, and 300:<br><b>1,10-13,200,300</b> . Spaces are allowed in between the delimiters. |
| <b>Ethertype for Custom S-ports</b> | 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 VLAN Configuration

| Port | Mode   | Port VLAN | Port Type | Ingress Filtering                   | Ingress Acceptance  | Egress Tagging | Allowed VLANs | Forbidden VLANs |
|------|--------|-----------|-----------|-------------------------------------|---------------------|----------------|---------------|-----------------|
| *    | <>     | 1         | <>        | <input type="checkbox"/>            | <>                  | <>             | 1             |                 |
| 1    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 2    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 3    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 4    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 5    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 6    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 7    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 8    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 9    | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |
| 10   | Access | 1         | C-Port    | <input checked="" type="checkbox"/> | Tagged and Untagged | Untag All      | 1             |                 |

Save Reset

| Setting | Description  |
|---------|--|
| Mode    | <p>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.</p> <p><b>Access:</b><br/>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:</p> <ul style="list-style-type: none"> <li>• Member of exactly one VLAN, the Port VLAN (a.k.a. Access VLAN), which by default is 1</li> <li>• Accepts untagged and C-tagged frames</li> <li>• Discards all frames not classified to the Access VLAN</li> <li>• On egress all frames are transmitted untagged</li> </ul> <p><b>Trunk:</b><br/>Trunk ports can carry traffic on multiple VLANs simultaneously and are normally used to connect to other switches. Trunk ports have the following characteristics:</p> <ul style="list-style-type: none"> <li>• By default, a trunk port is a member of all VLANs (1-4095)</li> <li>• The VLANs that a trunk port is a member of may be limited by the use of Allowed VLANs</li> <li>• Frames classified to a VLAN that the port is not a member of are discarded</li> <li>• 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</li> <li>• Egress tagging can be changed to tag all frames, in which case only tagged frames are accepted on ingress</li> </ul> <p><b>Hybrid:</b><br/>Hybrid ports resemble trunk ports in many ways, but adds additional port configuration features. In addition to the characteristics described for trunk ports, hybrid ports have these abilities:</p> <ul style="list-style-type: none"> <li>• Can be configured to be VLAN tag unaware, C-tag aware, S-tag aware, or S-custom-tag aware</li> <li>• Ingress filtering can be controlled</li> <li>• Ingress acceptance of frames and configuration of egress tagging can be configured independently</li> </ul> |

|                         |  |
|-------------------------|--|
| <p><b>Port VLAN</b></p> | <p>Determines the ports VLAN ID (a.k.a. PVID). Allowed VLANs are in the range 1 through 4095. The default being 1.</p> <p>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).</p> <p>On egress, frames classified to the Port VLAN do not get tagged if Egress Tagging configuration is set to untag Port VLAN.</p> <p>The Port VLAN is called an “Access VLAN” for ports in Access mode and Native VLAN for ports in Trunk or Hybrid mode.</p>   |
| <p><b>Port Type</b></p> | <p>Ports in hybrid mode allow for changing the port type, that is, whether a frame 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.</p> <p><b>Unaware:</b><br/>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.</p> <p><b>C-Port:</b><br/>On ingress, frames with a VLAN tag with TPID = 0x8100 get classified to the VLAN ID embedded in the tag.<br/>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.</p> <p><b>S-Port:</b><br/>On egress, if frames must be tagged, they will be tagged with an S-tag.<br/>On ingress, frames with a VLAN tag with TPID = 0x88A8 get classified to the VLAN ID embedded in the tag.<br/>Priority-tagged frames are classified to the Port VLAN.<br/>If the port is configured to accept Tagged Only frames (see Ingress Acceptance below), frames without this TPID are dropped.<br/><b>Note:</b> If the S-port is configured to accept Tagged and Untagged frames (see Ingress Acceptance below), frames with a C-tag are treated like frames with an S-tag.<br/>If the S-port is configured to accept Untagged Only frames, S-tagged frames will be discarded (except for priority S-tagged frames). C-tagged frames are initially considered untagged and will therefore not be discarded. Later on in the ingress classification process, they will get classified to the VLAN embedded in the tag instead of the port VLAN ID.</p> <p><b>S-Custom-Port:</b><br/>On egress, if frames must be tagged, they will be tagged with the custom S-tag.<br/>On ingress, frames with a VLAN tag with a TPID equal to the Ethertype configured for Custom-S ports get classified to the VLAN ID embedded in the tag.<br/>Priority-tagged frames are classified to the Port VLAN.<br/>If the port is configured to accept Tagged Only frames (see Ingress Acceptance below), frames without this TPID are dropped.</p> |

|                           |  |
|---------------------------|--|
|                           | <p><b>Note:</b> If the Custom S-port is configured to accept Tagged and Untagged frames (see Ingress Acceptance below), frames with a C-tag are treated like frames with a custom S-tag.</p> <p>If the Custom S-port is configured to accept Untagged Only frames, custom S-tagged frames will be discarded (except for priority custom S-tagged frames). C-tagged frames are initially considered untagged and will therefore not be discarded. Later on in the ingress classification process, they will get classified to the VLAN embedded in the tag instead of the port VLAN ID.</p> |
| <b>Ingress Filtering</b>  | <p>Hybrid ports allow for changing ingress filtering. Access and Trunk ports always have ingress filtering enabled.</p> <p>If ingress filtering is enabled (checkbox is checked), frames classified to a VLAN that the port is not a member of get discarded.</p> <p>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.</p>  |
| <b>Ingress Acceptance</b> | <p>Hybrid ports allow for changing the type of frames that are accepted on ingress.</p> <p><b>Tagged and Untagged:</b> Both tagged and untagged frames are accepted. See Port Type for a description of when a frame is considered tagged.</p> <p><b>Tagged Only:</b> Only frames tagged with the corresponding Port Type tag are accepted on ingress.</p> <p><b>Untagged Only:</b> Only untagged frames are accepted on ingress. See Port Type for a description of when a frame is considered untagged.</p>  |
| <b>Egress Tagging</b>     | <p>Ports in Trunk and Hybrid mode may control the tagging of frames on egress.</p> <p><b>Untag Port VLAN:</b> Frames classified to the Port VLAN are transmitted untagged. Other frames are transmitted with the relevant tag.</p> <p><b>Tag All:</b> All frames, whether classified to the Port VLAN or not, are transmitted with a tag.</p> <p><b>Untag All:</b> 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.</p>  |
| <b>Allowed VLANs</b>      | <p>Ports in Trunk and Hybrid mode may control which VLANs they are allowed to become members of. Access ports can only be a member of one VLAN – the Access VLAN.</p> <p>The field's syntax is identical to the syntax used in the Enabled VLANs field. By default, a Trunk or Hybrid port will become member of all VLANs, and is therefore set to <b>1-4095</b>.</p> <p>The field may be left empty, which means that the port will not become a member of any VLANs.</p>  |
| <b>Forbidden VLANs</b>    | <p>A port may be configured to never become a 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.</p>  |

|  |   |
|--|---|
|  | <p>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.</p> |
|--|---|

## Configuration > Private VLANs > Membership

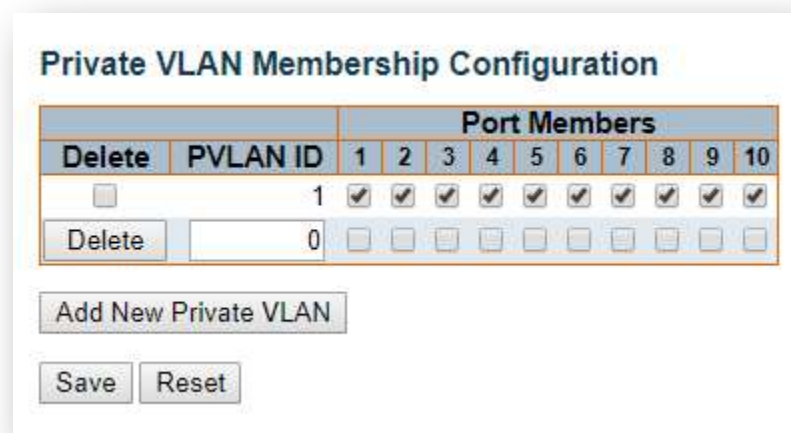
### Private VLAN Membership Configuration

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.



| Setting                | Description   |
|------------------------|---|
| <b>Delete</b>          | To delete a private VLAN entry, check this box. The entry will be deleted during the next save.   |
| <b>Private VLAN ID</b> | Indicates the ID of this particular private VLAN.   |
| <b>Port Members</b>    | 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. |

## Configuration > Private VLANs > Port Isolation

### Port Isolation Configuration

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.

**Port Isolation Configuration**

| Port Number              |                          |                          |                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        | 8                        | 9                        | 10                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

#### Port Number

| Setting   | Description                              | Factory Default |
|-----------|--|-----------------|
| Checked   | Port isolation is enabled on that port.  | Unchecked       |
| Unchecked | Port isolation is disabled on that port. |                 |

## Configuration > VCL > MAC-based VLAN

### MAC-Based VLAN Membership 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.

#### MAC-based VLAN Membership Configuration

|        | MAC Address       | VLAN ID | Port Members             |                          |                          |                          |                          |                          |                          |                          |                          |                          |
|--------|-------------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Delete |                   |         | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        | 8                        | 9                        | 10                       |
| Delete | 00-00-00-00-00-00 | 1       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Setting             | Description  |
|---------------------|--|
| <b>Delete</b>       | To delete a MAC to VLAN ID mapping entry, check this box and press Save. The entry will be deleted in the stack.   |
| <b>MAC Address</b>  | Indicates the MAC address of the mapping.  |
| <b>VLAN ID</b>      | Indicates the VLAN ID the above MAC will be mapped to.   |
| <b>Port Members</b> | 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. |

#### “Add New Entry” button

Click “Add New Entry” button to add a new MAC to VLAN ID mapping entry. An empty row is added to the table, and the mapping can be configured as needed. Any unicast MAC address can be used to configure the mapping. No broadcast or multicast MAC addresses are allowed. Legal values for a VLAN ID are **1** through **4095**.



## Configuration > VCL > Protocol-based VLAN > Protocol to Group

### Protocol to Group Mapping Table

This page allows you to add new Protocol to Group Name (each protocol can be part of only one Group) mapping entries as well as allowing you to see and delete already mapped entries for the switch.

#### Protocol to Group Mapping Table

| Delete                   | Frame Type | Value         | Group Name |
|--------------------------|------------|---------------|------------|
| <input type="checkbox"/> | Ethernet ▼ | Etype: 0x0800 |            |

| Setting           | Description   |
|-------------------|---|
| <b>Delete</b>     | To delete a Protocol to Group Name map entry, check this box. The entry will be deleted from the switch during the next save.   |
| <b>Frame Type</b> | <p>Frame Type can have one of the following values:</p> <ul style="list-style-type: none"> <li>• <b>Ethernet</b></li> <li>• <b>LLC</b></li> <li>• <b>SNAP</b></li> </ul> <p><b>NOTE:</b> When changing the Frame type field, the valid value of the following text field will vary depending on the new frame type you selected.</p>  |
| <b>Value</b>      | <p>Valid values that can be entered in this text field depend on the option selected from the preceding Frame Type selection menu.</p> <p>Below is the criteria for the three different Frame Types:</p> <ul style="list-style-type: none"> <li>• <b>Ethernet:</b> Value in the text field when Ethernet is selected as a Frame Type is called etype. Valid values for etype range between 0x0600 and 0xffff.</li> <li>• <b>LLC:</b> Valid value in this case is comprised of two different sub-values.               <ol style="list-style-type: none"> <li>a. <b>DSAP:</b> 1-byte long string (0x00-0xff)</li> <li>b. <b>SSAP:</b> 1-byte long string (0x00-0xff)</li> </ol> </li> <li>• <b>SNAP:</b> Valid value in this case is also comprised of two different sub-values.               <ol style="list-style-type: none"> <li>a. <b>OUI:</b> OUI (Organizationally Unique Identifier) is a parameter in the format of xx-xx-xx where each pair (xx) in the string is a hexadecimal value ranging between 0x00 and 0xff.</li> <li>b. <b>PID:</b> PID (Protocol ID). If OUI is hexadecimal 000000, then the protocol ID is the Ethernet type (EtherType) field value for the protocol running on top of SNAP; if OUI is an OUI for a particular organization, the protocol ID is a value assigned by that</li> </ol> </li> </ul> |

|                   |  |
|-------------------|--|
|                   | organization to the protocol running on top of SNAP. In other words, if the value of OUI field is 00-00-00 then the value of PID will be etype (0x0600-0xffff) and if the value of OUI is anything other than 00-00-00 then valid values of PID will be any value between 0x0000 and 0xffff. |
| <b>Group Name</b> | A valid Group Name is a 16-character long string, unique for every entry, which consists of a combination of alphabets (a-z or A-Z) and integers (0-9).<br><b>NOTE:</b> Special characters and underscores ( _ ) are not allowed.  |

## Configuration > VCL > Protocol-based VLAN > Group to VLAN

### Group Name to VLAN mapping Table

This page allows you to map a Group Name (already configured or to be configured in the future) to a VLAN for the switch.

#### Group Name to VLAN mapping Table

|        | Group Name                                | VLAN ID                                   | Port Members             |                          |                          |                          |                          |                          |                          |                          |                          |                          |
|--------|---|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Delete |   |   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        | 8                        | 9                        | 10                       |
| Delete | <input style="width: 100%;" type="text"/> | <input style="width: 100%;" type="text"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Setting             | Description   |
|---------------------|---|
| <b>Delete</b>       | To delete a Group Name to VLAN mapping, check this box. The entry will be deleted from the switch during the next save.   |
| <b>Group Name</b>   | A valid Group Name is a string, at most 16 characters long, which consists of a combination of alphabets (a-z or A-Z) and integers (0-9) with no special characters allowed. You may either use a Group that already includes one or more protocols (see Protocol to Group mappings), or create a Group to VLAN ID mapping that will become active the moment you add one or more protocols inside that Group. Furthermore, the Group to VLAN ID mapping is not unique, as long as the port lists of these mappings are mutually exclusive (e.g. Group1 can be mapped to VID 1 on port#1 and to VID 2 on port#2). |
| <b>VLAN ID</b>      | Indicates the VLAN ID to which the Group Name will be mapped. A valid VLAN ID ranges from 1 to 4095.  |
| <b>Port Members</b> | A row of check boxes for each port is displayed for each Group Name to VLAN ID mapping. 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.   |

#### “Add New Entry” button

Click “Add New Entry” button 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**.

## Configuration > VCL > IP Subnet-based VLAN

### IP Subnet-based VLAN Membership Configuration

The IP subnet to VLAN ID mappings can be configured here. This page allows adding, updating, and deleting IP subnet to VLAN ID mapping entries and assigning them to different ports.

#### IP Subnet-based VLAN Membership Configuration

|        |            |             |         | Port Members             |                          |                          |                          |                          |                          |                          |                          |                          |                          |
|--------|------------|-------------|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Delete | IP Address | Mask Length | VLAN ID | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        | 8                        | 9                        | 10                       |
| Delete | 0.0.0.0    | 24          | 1       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Setting             | Description  |
|---------------------|--|
| <b>Delete</b>       | To delete a mapping, check this box and press save. The entry will be deleted in the stack.  |
| <b>IP Address</b>   | Indicates the subnet's IP address (any of the subnet's host addresses can be also provided here, the application will convert it automatically).   |
| <b>Mask Length</b>  | Indicates the subnet's mask length.  |
| <b>VLAN ID</b>      | Indicates the VLAN ID the subnet will be mapped to. IP Subnet to VLAN ID is a unique matching.   |
| <b>Port Members</b> | 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. |

#### “Add New Entry” button

Click “Add New Entry” button to add a new IP subnet to VLAN ID mapping entry. An empty row is added to the table, and the mapping can be configured as needed. Any IP address/mask can be configured for the mapping. Legal values for the VLAN ID are **1** to **4095**.

## Configuration > QoS > Port Classification

### QoS Ingress Port Classification

#### QoS Ingress Port Classification

| Port | CoS  | DPL  | PCP  | DEI  | Tag Class. | DSCP Based               | Address Mode |
|------|------|------|------|------|------------|--------------------------|--------------|
| *    | <> ▼ | <> ▼ | <> ▼ | <> ▼ |            | <input type="checkbox"/> | <> ▼         |
| 1    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 2    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 3    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 4    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 5    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 6    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 7    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 8    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 9    | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |
| 10   | 0 ▼  | 0 ▼  | 0 ▼  | 0 ▼  | Disabled   | <input type="checkbox"/> | Source ▼     |

| Setting     | Description  |
|-------------|--|
| <b>Port</b> | The port number for which the configuration below applies.   |
| <b>CoS</b>  | <p>Controls the default class of service.</p> <p>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.</p> <p>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.</p> <p>The classified CoS can be overruled by a QCL entry.</p> <p><b>NOTE:</b> If the default CoS has been dynamically changed, then the actual default CoS is shown in parentheses after the configured default CoS.</p> |
| <b>DPL</b>  | <p>Controls the default drop precedence level.</p> <p>All frames are classified to a drop precedence level.</p> <p>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.</p> <p>The classified DPL can be overruled by a QCL entry.</p>  |
| <b>PCP</b>  | <p>Controls the default PCP value.</p> <p>All frames are classified to a PCP value.</p> <p>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.</p>  |

|                     |  |
|---------------------|--|
| <b>DEI</b>          | Controls the default DEI value.<br>All frames are classified to a DEI value.<br>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.   |
| <b>Tag Class.</b>   | Shows the classification mode for tagged frames on this port. <ul style="list-style-type: none"> <li>• <b>Disabled:</b> Use default CoS and DPL for tagged frames.</li> <li>• <b>Enabled:</b> Use mapped versions of PCP and DEI for tagged frames.</li> </ul> Click on the mode in order to configure the mode and/or mapping.<br><b>NOTE:</b> 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. |
| <b>DSCP Based</b>   | Click to Enable DSCP Based QoS Ingress Port Classification.  |
| <b>Address Mode</b> | The IP/MAC address mode specifying whether the QCL classification must be based on source (SMAC/SIP) or destination (DMAC/DIP) addresses on this port. The allowed values are: <ul style="list-style-type: none"> <li>• <b>Source:</b> Enable SMAC/SIP matching.</li> <li>• <b>Destination:</b> Enable DMAC/DIP matching.</li> </ul>   |

### QoS Ingress Port Tag Classification Port #

The classification mode for tagged frames are configured on this page.

#### Tagged Frames Settings



| Setting         | Description  | Factory Default |
|-----------------|--|-----------------|
| <b>Enabled</b>  | Use mapped versions of PCP and DEI for tagged frames.              | Disabled        |
| <b>Disabled</b> | Use default QoS class and Drop Precedence Level for tagged frames. |                 |

#### (PCP, DEI) to (QoS class, DP level) Mapping

Controls the mapping of the classified (PCP, DEI) to (QoS class, DP level) values when Tag Classification is set to **Enabled**.

## Configuration > QoS > Port Policing

### QoS Ingress Port Policers

**QoS Ingress Port Policers**

| Port | Enable                   | Rate | Unit   | Flow Control             |
|------|--------------------------|------|--------|--------------------------|
| *    | <input type="checkbox"/> | 500  | <> ▼   | <input type="checkbox"/> |
| 1    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 2    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 3    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 4    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 5    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 6    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 7    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 8    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 9    | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |
| 10   | <input type="checkbox"/> | 500  | kbps ▼ | <input type="checkbox"/> |

| Setting             | Description  |
|---------------------|--|
| <b>Port</b>         | The port number for which the configuration below applies.   |
| <b>Enable</b>       | Enable or disable the port policer for this switch port.   |
| <b>Rate</b>         | Controls the rate for the port policer. This value is restricted to 100-3276700 when unit is kbps or fps, and 1-3276 when unit is Mbps or kfps (kilo-frames per second). The rate is internally rounded up to the nearest value supported by the port policer. |
| <b>Unit</b>         | Controls the unit of measure for the port policer rate as kbps, Mbps, fps or kfps.   |
| <b>Flow Control</b> | If flow control is enabled and the port is in flow control mode, then pause frames are sent instead of discarding frames.  |

## Configuration > QoS > Queue Policing

### QoS Ingress Queue Policers

QoS Ingress Queue Policers

| Port | Queue 0<br>Enable        | Queue 1<br>Enable        | Queue 2<br>Enable        | Queue 3<br>Enable        | Queue 4<br>Enable        | Queue 5<br>Enable        | Queue 6<br>Enable        | Queue 7<br>Enable        |
|------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| *    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Setting       | Description   |
|---------------|---|
| <b>Port</b>   | The port number for which the configuration below applies.  |
| <b>Enable</b> | Enable or disable the queue policer for this switch port.   |
| <b>Rate</b>   | Controls the rate for the queue policer. This value is restricted to 100-3276700 when unit is kbps, and 1-3276 when unit is Mbps. The rate is internally rounded up to the nearest value supported by the queue policer. This field is only shown if at least one of the queue policers is enabled. |
| <b>Unit</b>   | Controls the unit of measure for the queue policer rate as kbps or Mbps. This field is only shown if at least one of the queue policers are enabled.  |



## Configuration > QoS > Port Scheduler

### QoS Egress Port Schedulers

| Port      | Mode            | Weight |    |    |    |    |    |
|-----------|-----------------|--------|----|----|----|----|----|
|           |                 | Q0     | Q1 | Q2 | Q3 | Q4 | Q5 |
| <u>1</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>2</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>3</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>4</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>5</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>6</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>7</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>8</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>9</u>  | Strict Priority | -      | -  | -  | -  | -  | -  |
| <u>10</u> | Strict Priority | -      | -  | -  | -  | -  | -  |

| Setting     | Description   |
|-------------|---|
| <b>Port</b> | The logical port for the settings contained in the same row. Click on the port number in order to configure the schedulers. |
| <b>Mode</b> | Shows the scheduling mode for this port.  |
| <b>Q X</b>  | Shows the weight for this queue and port.   |

## Configuration > QoS > Port Shaping

### QoS Egress Port Shapers

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

| Setting | Description  |
|---------|--|
| Port    | The logical port for the settings contained in the same row. Click on the port number in order to configure the shapers. |
| Q X     | Shows "-" for disabled or actual queue shaper rate - e.g. "800 Mbps".  |
| Port    | Shows "-" for disabled or actual port shaper rate - e.g. "800 Mbps".   |

## Configuration > QoS > Port Tag Remarking

### QoS Egress Port Tag Remarking

| Port | Mode       |
|------|------------|
| 1    | Classified |
| 2    | Classified |
| 3    | Classified |
| 4    | Classified |
| 5    | Classified |
| 6    | Classified |
| 7    | Classified |
| 8    | Classified |
| 9    | Classified |
| 10   | Classified |

| Setting | Description   |
|---------|---|
| Port    | The logical port for the settings contained in the same row. Click on the port number in order to configure tag remarking.  |
| Mode    | Shows the tag remarking mode for this port. <ul style="list-style-type: none"> <li>• <b>Classified:</b> Use classified PCP/DEI values.</li> <li>• <b>Default:</b> Use default PCP/DEI values.</li> <li>• <b>Mapped:</b> Use mapped versions of QoS class and DP level.</li> </ul> |

## Configuration > QoS > Port DSCP

### QoS Port DSCP Configuration

#### QoS Port DSCP Configuration

| Port | Ingress                  |           | Egress    |
|------|--------------------------|-----------|-----------|
|      | Translate                | Classify  | Rewrite   |
| *    | <input type="checkbox"/> | <> ▼      | <> ▼      |
| 1    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 2    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 3    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 4    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 5    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 6    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 7    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 8    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 9    | <input type="checkbox"/> | Disable ▼ | Disable ▼ |
| 10   | <input type="checkbox"/> | Disable ▼ | Disable ▼ |

| Setting        | Description   |
|----------------|---|
| <b>Port</b>    | The Port column shows the list of ports for which you can configure DSCP ingress and egress settings.   |
| <b>Ingress</b> | <p><b>Translate:</b> To Enable the Ingress Translation click the checkbox.</p> <p><b>Classify:</b> Classification for a port has 4 different values.</p> <ol style="list-style-type: none"> <li>1. <b>Disable:</b> No Ingress DSCP Classification.</li> <li>2. <b>DSCP=0:</b> Classify if incoming (or translated if enabled) DSCP is 0.</li> <li>3. <b>Selected:</b> Classify only selected DSCP for which classification is enabled as specified in DSCP Translation window for the specific DSCP.</li> <li>4. <b>All:</b> Classify all DSCP.</li> </ol>  |
| <b>Egress</b>  | <p><b>Disable:</b> No Egress rewrite.</p> <p><b>Enable:</b> Rewrite enabled without remapping.</p> <p><b>Remap DP Unaware:</b> DSCP from analyzer is remapped and frame is remarked with remapped DSCP value. The remapped DSCP value is always taken from the DSCP Translation &gt; Egress Remap DP0 table.</p> <p><b>Remap DP Aware:</b> DSCP from analyzer is remapped and frame is remarked with remapped DSCP value. Depending on the DP level of the frame, the remapped DSCP value is either taken from the DSCP Translation &gt; Egress Remap DP0 table or from the DSCP Translation &gt; Egress Remap DP1 table.</p> |

## Configuration > QoS > DSCP-Based QoS

### DSCP-based QoS Ingress Classification

**DSCP-Based QoS Ingress Classification**

| DSCP      | Trust                    | QoS Class | DPL  |
|-----------|--------------------------|-----------|------|
| *         | <input type="checkbox"/> | <> ▼      | <> ▼ |
| 0 (BE)    | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 1         | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 2         | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 3         | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 4         | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 5         | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 6         | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 7         | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 8 (CS1)   | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 9         | <input type="checkbox"/> | 0 ▼       | 0 ▼  |
| 10 (AF11) | <input type="checkbox"/> | 0 ▼       | 0 ▼  |

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|    |                          |     |     |
|----|--------------------------|-----|-----|
| 59 | <input type="checkbox"/> | 0 ▼ | 0 ▼ |
| 60 | <input type="checkbox"/> | 0 ▼ | 0 ▼ |
| 61 | <input type="checkbox"/> | 0 ▼ | 0 ▼ |
| 62 | <input type="checkbox"/> | 0 ▼ | 0 ▼ |
| 63 | <input type="checkbox"/> | 0 ▼ | 0 ▼ |

Save Reset

| Setting          | Description  |
|------------------|--|
| <b>DSCP</b>      | Maximum number of supported DSCP values are 64.  |
| <b>Trust</b>     | Controls whether a specific DSCP value is trusted. Only frames with trusted DSCP values are mapped to a specific QoS class and Drop Precedence Level. Frames with untrusted DSCP values are treated as a non-IP frame. |
| <b>QoS Class</b> | QoS class value can be any of 0-7  |
| <b>DPL</b>       | Drop Precedence Level (0-1)  |

## Configuration > QoS > DSCP Translation

### DSCP Translation

**DSCP Translation**

| DSCP      | Ingress   |                          | Egress    |           |
|-----------|-----------|--------------------------|-----------|-----------|
|           | Translate | Classify                 | Remap DP0 | Remap DP1 |
| *         | <>        | <input type="checkbox"/> | <>        | <>        |
| 0 (BE)    | 0 (BE)    | <input type="checkbox"/> | 0 (BE)    | 0 (BE)    |
| 1         | 1         | <input type="checkbox"/> | 1         | 1         |
| 2         | 2         | <input type="checkbox"/> | 2         | 2         |
| 3         | 3         | <input type="checkbox"/> | 3         | 3         |
| 4         | 4         | <input type="checkbox"/> | 4         | 4         |
| 5         | 5         | <input type="checkbox"/> | 5         | 5         |
| 6         | 6         | <input type="checkbox"/> | 6         | 6         |
| 7         | 7         | <input type="checkbox"/> | 7         | 7         |
| 8 (CS1)   | 8 (CS1)   | <input type="checkbox"/> | 8 (CS1)   | 8 (CS1)   |
| 9         | 9         | <input type="checkbox"/> | 9         | 9         |
| 10 (AF11) | 10 (AF11) | <input type="checkbox"/> | 10 (AF11) | 10 (AF11) |

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•

|    |    |                          |    |    |
|----|----|--------------------------|----|----|
| 60 | 60 | <input type="checkbox"/> | 60 | 60 |
| 61 | 61 | <input type="checkbox"/> | 61 | 61 |
| 62 | 62 | <input type="checkbox"/> | 62 | 62 |
| 63 | 63 | <input type="checkbox"/> | 63 | 63 |

Save    Reset

| Setting        | Description   |
|----------------|---|
| <b>DSCP</b>    | Maximum number of supported DSCP values are 64 and valid DSCP value ranges from 0 to 63.  |
| <b>Ingress</b> | Ingress side DSCP can be first translated to new DSCP before using the DSCP for QoS class and DPL map. <ul style="list-style-type: none"> <li>• <b>Translate:</b> DSCP at Ingress side can be translated to any of (0-63) DSCP values.</li> <li>• <b>Classify:</b> Click to enable Classification at Ingress side.</li> </ul> |

**Egress**

- **Remap DP0:** Select the DSCP value from select menu to which you want to remap. DSCP value ranges from 0 to 63.
- **Remap DP1:** Select the DSCP value from select menu to which you want to remap. DSCP value ranges form 0 to 63.

## Configuration > QoS > DSCP Classification

### DSCP Classification

**DSCP Classification**

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


| Setting          | Description  |
|------------------|--|
| <b>QoS Class</b> | Actual QoS class.  |
| <b>DSCP DP0</b>  | Select the classified DSCP value (0-63) for Drop Precedence Level 0. |
| <b>DSCP DP1</b>  | Select the classified DSCP value (0-63) for Drop Precedence Level 1. |









## Configuration > QoS > QoS Control List

### QoS Control List Configuration

This page 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.

| QoS Control List Configuration |      |      |      |          |     |     |     |            |        |         |         |         |         |         |   |
|--------------------------------|------|------|------|----------|-----|-----|-----|------------|--------|---------|---------|---------|---------|---------|---|
| QCE                            | Port | DMAC | SMAC | Tag Type | VID | PCP | DEI | Frame Type | Action |         |         |         |         |         |   |
|                                |      |      |      |          |     |     |     |            | CoS    | DPL     | DSCP    | PCP     | DEI     |         | Policy  |
| 1                              | Any  | Any  | Any  | Any      | Any | Any | Any | Any        | 0      | Default | Default | Default | Default | Default |  |

You can modify each QCE (QoS Control Entry) in the table using the following buttons:

- : Inserts a new QCE before the current row.
- : Edits the QCE.
- : Moves the QCE up the list.
- : Moves the QCE down the list.
- : Deletes the QCE.
- : The lowest plus sign adds a new entry at the bottom of the QCE listings.

| Setting         | Description  |
|-----------------|--|
| <b>QCE</b>      | Indicates the QCE ID.  |
| <b>Port</b>     | Indicates the list of ports configured with the QCE or 'Any'.  |
| <b>DMAC</b>     | Indicates the destination MAC address. Possible values are: <ul style="list-style-type: none"> <li>• <b>Any</b>: Match any DMAC.</li> <li>• <b>Unicast</b>: Match unicast DMAC.</li> <li>• <b>Multicast</b>: Match multicast DMAC.</li> <li>• <b>Broadcast</b>: Match broadcast DMAC.</li> </ul> The default value is 'Any'. |
| <b>SMAC</b>     | Match specific source MAC address or 'Any'.<br>If a port is configured to match on destination addresses, this field indicates the DMAC.   |
| <b>Tag Type</b> | Indicates tag type. Possible values are: <ul style="list-style-type: none"> <li>• <b>Any</b>: Match tagged and untagged frames.</li> <li>• <b>Untagged</b>: Match untagged frames.</li> <li>• <b>Tagged</b>: Match tagged frames.</li> </ul> The default value is 'Any'.   |
| <b>VID</b>      | Indicates (VLAN ID), either a specific VID or a range of VIDs. VID can be in the range 1-4095 or 'Any'.  |

|                   |   |
|-------------------|---|
| <b>PCP</b>        | Priority Code Point: Valid values of PCP are specific (0, 1, 2, 3, 4, 5, 6, 7) or a range (0-1, 2-3, 4-5, 6-7, 0-3, 4-7) or 'Any'.  |
| <b>DEI</b>        | Drop Eligible Indicator: Valid value of DEI are 0, 1 or 'Any'.  |
| <b>Frame Type</b> | Indicates the type of frame. Possible values are: <ol style="list-style-type: none"> <li><b>Any:</b> Match any frame type.</li> <li><b>Ethernet:</b> Match EtherType frames.</li> <li><b>LLC:</b> Match (LLC) frames.</li> <li><b>SNAP:</b> Match (SNAP) frames.</li> <li><b>IPv4:</b> Match IPv4 frames.</li> <li><b>IPv6:</b> Match IPv6 frames.</li> </ol>   |
| <b>Action</b>     | Indicates the classification action taken on ingress frame if parameters configured are matched with the frame's content.<br>Possible actions are: <ol style="list-style-type: none"> <li><b>CoS:</b> Classify Class of Service.</li> <li><b>DPL:</b> Classify Drop Precedence Level.</li> <li><b>DSCP:</b> Classify Differentiated Services Code Point value.</li> <li><b>PCP:</b> Classify Priority Code Point value.</li> <li><b>DEI:</b> Classify Drop Eligible Indicator value.</li> <li><b>Policy:</b> Classify ACL Policy number.</li> </ol> |

### QCE Configuration

This page allows the user to edit / insert a single QoS Control Entry at a time. A QCE consists of several parameters. These parameters vary according to the frame type that you select.

#### QCE Configuration

| Port Members                        |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1                                   | 2                                   | 3                                   | 4                                   | 5                                   | 6                                   | 7                                   | 8                                   | 9                                   | 10                                  |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

#### Key Parameters

|            |       |
|------------|-------|
| DMAC       | Any ▼ |
| SMAC       | Any ▼ |
| Tag        | Any ▼ |
| VID        | Any ▼ |
| PCP        | Any ▼ |
| DEI        | Any ▼ |
| Frame Type | Any ▼ |

#### Action Parameters

|        |           |
|--------|-----------|
| CoS    | 0 ▼       |
| DPL    | Default ▼ |
| DSCP   | Default ▼ |
| PCP    | Default ▼ |
| DEI    | Default ▼ |
| Policy |           |

Save
Reset
Cancel

## Port Members

Check the checkbox button to include the port in the QCL entry. By default all ports are included.

## Key Parameters

| Setting           | Description   |
|-------------------|---|
| <b>DMAC</b>       | Destination MAC address. Possible values are <b>Unicast, Multicast, Broadcast</b> or <b>Any</b> .   |
| <b>SMAC</b>       | Source MAC address: <b>xx-xx-xx-xx-xx-xx</b> or <b>Any</b> . If a port is configured to match on DMAC/DIP, this field is the Destination MAC address.   |
| <b>Tag</b>        | Value of Tag field can be <b>Untagged, Tagged, C-Tagged, S-Tagged, or Any</b> .   |
| <b>VID</b>        | Valid value of VLAN ID can be any value in the range <b>1-4095</b> or <b>Any</b> ; user can enter either a specific value or a range of VIDs.   |
| <b>PCP</b>        | Valid value PCP are specific ( <b>0, 1, 2, 3, 4, 5, 6, 7</b> ) or a range ( <b>0-1, 2-3, 4-5, 6-7, 0-3, 4-7</b> ), or <b>Any</b> .  |
| <b>DEI</b>        | Valid value of DEI can be 0, 1, or <b>Any</b> .   |
| <b>Frame Type</b> | Frame Type can have any of the following: <ol style="list-style-type: none"> <li>1. <b>Any</b></li> <li>2. <b>EtherType</b></li> <li>3. <b>LLC</b></li> <li>4. <b>SNAP</b></li> <li>5. <b>IPv4</b></li> <li>6. <b>IPv6</b></li> </ol> |

### All frame types are explained below.

1. **Any:** Allow all types of frames.
2. **EtherType:** Ether Type Valid Ether Type can be 0x600-0xFFFF excluding 0x800(IPv4) and 0x86DD(IPv6) or 'Any'.
3. **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'.
4. **SNAP:** PID Valid PID(a.k.a Ether Type) can be 0x0000-0xFFFF or 'Any'.
5. **IPv4:**
  - **Protocol:** IP protocol number: (0-255, 'TCP' or 'UDP') or 'Any'.
  - **Source IP:** Specific Source IP address in value/mask format or 'Any'. IP and Mask are in the format x.y.z.w where x, y, z, and w are decimal numbers between 0 and 255. When Mask is converted to a 32-bit binary string and read from left to right, all bits following the first zero must also be zero. If a port is configured to match on DMAC/DIP, this field is the Destination IP address.
  - **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.

## 6. 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'. If a port is configured to match on DMAC/DIP, this field is the Destination IP address.
- **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

| Setting       | Description  |
|---------------|--|
| <b>CoS</b>    | Class of Service: (0-7) or 'Default'.                                  |
| <b>DP</b>     | Drop Precedence Level: (0-1) or 'Default'.                             |
| <b>DSCP</b>   | DS1CP: (0-63, BE, CS1-CS7, EF or AF11-AF43) or 'Default'.              |
| <b>PCP</b>    | PCP: (0-7) or 'Default'. Note: PCP and DEI cannot be set individually. |
| <b>DEI</b>    | DEI: (0-1) or 'Default'.   |
| <b>Policy</b> | ACL Policy number: (0-255) or 'Default' (empty field).                 |

## Configuration > QoS > Storm Policing

### Global Storm Policer Configuration

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.

**Global Storm Policer Configuration**

| Frame Type | Enable                   | Rate | Unit  |
|------------|--------------------------|------|-------|
| Unicast    | <input type="checkbox"/> | 1    | fps ▼ |
| Multicast  | <input type="checkbox"/> | 1    | fps ▼ |
| Broadcast  | <input type="checkbox"/> | 1    | fps ▼ |

| Setting           | Description  |
|-------------------|--|
| <b>Frame Type</b> | The frame type for which the configuration below applies.  |
| <b>Enable</b>     | Enable or disable the global storm policer for the given frame type.   |
| <b>Rate</b>       | Controls the rate for the global storm policer. This value is restricted to 1-1024000 when unit is fps (frames per second), and 1-1024 when the unit is kfps (kilo-frames per second). The rate is internally rounded up to the nearest value supported by the global storm policer. |
| <b>Unit</b>       | Controls the unit of measure for the global storm policer rate as fps or kfps.   |

## Configuration > Mirroring

### Mirroring & Remote Mirroring Configuration

Mirroring is a feature for switched port analyzer. The administrator can use the Mirroring to debug network problems. The selected traffic can be mirrored or copied on a destination port where a network analyzer can be attached to analyze the network traffic.

Remote Mirroring is an extend function of Mirroring. It can extend the destination port to another switch, so the administrator can analyze the network traffic on the other switches.

If you want to get the tagged mirrored traffic, you have to set VLAN egress tagging as **Tag All** on the reflector port. On the other hand, if you want to get untagged mirrored traffic, you have to set VLAN egress tagging as **Untag ALL** on the reflector port.

| Mirroring & Remote Mirroring Configuration |            |
|--|------------|
| Mode                                       | Disabled ▼ |
| Type                                       | Mirror ▼   |
| VLAN ID                                    | 200        |
| Reflector Port                             | Port 1 ▼   |

| Setting               | Description   |
|-----------------------|---|
| <b>Mode</b>           | To enable/disable the mirror or Remote Mirroring function.  |
| <b>Type</b>           | <p>Select switch type.</p> <ul style="list-style-type: none"> <li>• <b>Mirror:</b> The switch is running on mirror mode. The source port(s) and destination port are located on this switch.</li> <li>• <b>Source:</b> The switch is a source node for monitor flow. The source port(s), reflector port, and intermediate port(s) are located on this switch.</li> <li>• <b>Intermediate:</b> The switch is a forwarding node for monitor flow and the switch is an option node. The object is to forward traffic from source switch to destination switch. The intermediate ports are located on this switch.</li> <li>• <b>Destination:</b> The switch is an end node for monitor flow. The destination port(s) and intermediate port(s) are located on this switch.</li> </ul> |
| <b>VLAN ID</b>        | The VLAN ID points out where the monitor packet will copy to. The default VLAN ID is 200.   |
| <b>Reflector Port</b> | <p>The reflector port is a method to redirect the traffic to Remote Mirroring VLAN. Any device connected to a port set as a reflector port loses connectivity until the Remote Mirroring is disabled.</p> <p>In the stacking mode, you need to select switch ID to select the correct device. If you shut down a port, it cannot be a candidate for a reflector port.</p> <p>If you shut down the port which is a reflector port, the remote mirror function cannot work.</p> <p><b>Note1:</b> The reflector port needs to select only on Source switch type.</p> <p><b>Note2:</b> The reflector port needs to disable MAC Table learning and STP.</p> <p><b>Note3:</b> The reflector port only supports on pure copper ports.</p>  |

## Source VLAN(s) Configuration

The switch can support VLAN-based Mirroring. If you want to monitor some VLANs on the switch, you can set the selected VLANs on this field.

**Source VLAN(s) Configuration**

Source VLANs

**NOTE:** The Mirroring session shall have either ports or VLANs as sources, but not both.

## Port Configuration

**Port Configuration**

| Port | Source     | Intermediate             | Destination              |
|------|------------|--------------------------|--------------------------|
| 1    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 2    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 3    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 4    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 5    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 6    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 7    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 8    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 9    | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| 10   | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |
| CPU  | Disabled ▼ | <input type="checkbox"/> | <input type="checkbox"/> |

| Setting     | Description  |
|-------------|--|
| <b>Port</b> | The logical port for the settings contained in the same row. |

|                     |  |
|---------------------|--|
| <b>Source</b>       | <p>Select mirror mode.</p> <ul style="list-style-type: none"> <li>• <b>Disabled:</b> Neither frames transmitted nor frames received are mirrored.</li> <li>• <b>Both:</b> Frames received and frames transmitted are mirrored on the Intermediate/Destination port.</li> <li>• <b>Rx only:</b> Frames received on this port are mirrored on the Intermediate/Destination port. Frames transmitted are not mirrored.</li> <li>• <b>Tx only:</b> Frames transmitted on this port are mirrored on the Intermediate/Destination port. Frames received are not mirrored.</li> </ul> |
| <b>Intermediate</b> | <p>Select intermediate port.<br/>This checkbox is designed for Remote Mirroring.<br/>The intermediate port is a switched port to connect to another switch.<br/><b>NOTE:</b> The intermediate port needs to disable MAC Table learning.</p>  |
| <b>Destination</b>  | <p>Select destination port.<br/>This checkbox is designed for mirror or Remote Mirroring.<br/>The destination port is a switched port that you receive a copy of traffic from the source port.<br/><b>Note1:</b> On mirror mode, the device only supports one destination port.<br/><b>Note2:</b> The destination port needs to disable MAC Table learning.</p>  |



## Configuration > GVRP > Global config

### GVRP Configuration

**GVRP Configuration**

Enable GVRP

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

#### Enable GVRP

The GVRP feature is globally enabled by setting the check mark in the checkbox named Enable GVRP and pressing the Save button.

#### Join-time

| Setting | Description  | Factory Default |
|---------|--|-----------------|
| 1 ~ 20  | Join-time is a value in the range of 1-20cs, i.e. in units of one hundredth of a second. | 20              |

#### Leave-time

| Setting  | Description   | Factory Default |
|----------|---|-----------------|
| 60 ~ 300 | Leave-time is a value in the range of 60-300cs, i.e. in units of one hundredth of a second. | 60              |

#### LeaveAll-time

| Setting     | Description  | Factory Default |
|-------------|--|-----------------|
| 1000 ~ 5000 | LeaveAll-time is a value in the range of 1000-5000cs, i.e. in units of one hundredth of a second. The default is 1000cs. | 1000            |

#### Max VLANs

| Setting                 | Description  | Factory Default |
|-------------------------|--|-----------------|
| maximum number of VLANs | When GVRP is enabled, a maximum number of VLANs supported by GVRP is specified. This number can only be changed when GVRP is turned off. | 20              |

## Configuration > GVRP > Port config

### GVRP Port Configuration

This configuration can be performed either before or after GVRP is configured globally - the protocol operation will be the same.

#### GVRP Port Configuration

| Port | Mode       |
|------|------------|
| *    | <> ▼       |
| 1    | Disabled ▼ |
| 2    | Disabled ▼ |
| 3    | Disabled ▼ |
| 4    | Disabled ▼ |
| 5    | Disabled ▼ |
| 6    | Disabled ▼ |
| 7    | Disabled ▼ |
| 8    | Disabled ▼ |
| 9    | Disabled ▼ |
| 10   | Disabled ▼ |
| 11   | Disabled ▼ |
| 12   | Disabled ▼ |

| Setting     | Description  |
|-------------|--|
| <b>Port</b> | The logical port that is to be configured.   |
| <b>Mode</b> | Mode can be either <b>Disabled</b> or <b>GVRP</b> enabled. These values turn the GVRP feature off or on respectively for the port in question. |

## Configuration > sFlow

This page allows for configuring sFlow. The configuration is divided into two parts: Configuration of the sFlow receiver (a.k.a. sFlow collector) and configuration of per-port flow and counter samplers. sFlow configuration is not persisted to non-volatile memory which means that a reboot will disable sFlow sampling.

### Agent Configuration

#### sFlow Configuration

##### Agent Configuration

|            |           |
|------------|-----------|
| IP Address | 127.0.0.1 |
|------------|-----------|

#### IP Address

| Setting    | Description   | Factory Default |
|------------|---|-----------------|
| 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.<br>Both IPv4 and IPv6 addresses are supported. | 127.0.0.1       |

### Receiver Configuration

#### Receiver Configuration

|                            |   |  |
|----------------------------|---|--|
| <b>Owner</b>               | <span style="border: 1px solid #ccc; padding: 2px;">&lt;none&gt;</span> | <span style="border: 1px solid #ccc; padding: 2px;">Release</span> |
| <b>IP Address/Hostname</b> | <span style="border: 1px solid #ccc; padding: 2px;">0.0.0.0</span>      |  |
| <b>UDP Port</b>            | <span style="border: 1px solid #ccc; padding: 2px;">6343</span>         |  |
| <b>Timeout</b>             | <span style="border: 1px solid #ccc; padding: 2px;">0</span>            | seconds  |
| <b>Max. Datagram Size</b>  | <span style="border: 1px solid #ccc; padding: 2px;">1400</span>         | bytes  |

#### Owner

Basically, sFlow can be configured in two ways: Through local management using the Web or CLI interface, or through SNMP. This read-only field shows the owner of the current sFlow configuration and assumes values as follows:

- If sFlow is currently unconfigured/unclaimed, Owner contains **none**.
- If sFlow is currently configured through Web or CLI, Owner contains **Configured through local management**.
- If sFlow is currently configured through SNMP, Owner contains a string identifying the sFlow receiver.

If sFlow is configured through SNMP, all controls - except for the Release-button - are disabled to avoid inadvertent reconfiguration.

The “**Release**” button allows for releasing the current owner and disable sFlow sampling. The button is disabled if sFlow is currently unclaimed. If configured through SNMP, the release must be confirmed (a confirmation request will appear).

### IP Address/Hostname

| Setting           | Description   | Factory Default |
|-------------------|---|-----------------|
| <b>IP Address</b> | The IP address or hostname of the sFlow receiver. Both IPv4 and IPv6 addresses are supported. | 0.0.0.0         |

### UDP Port

| Setting            | Description  | Factory Default |
|--------------------|--|-----------------|
| <b>port number</b> | The UDP port on which the sFlow receiver listens to sFlow datagrams. | 6343            |

### Timeout

| Setting               | Description   | Factory Default |
|-----------------------|---|-----------------|
| <b>0 ~ 2147483647</b> | The number of seconds remaining before sampling stops and the current sFlow owner is released. While active, the current time left can be updated with a click on the Refresh-button. If locally managed, the timeout can be changed on the fly without affecting any other settings. Valid range is 0 to 2147483647 seconds. | 0               |

### Max. Datagram Size

| Setting           | Description  | Factory Default |
|-------------------|--|-----------------|
| <b>200 ~ 1468</b> | 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. | 1400            |

## Port Configuration

**Port Configuration**

| Port | Flow Sampler             |               |             | Counter Poller           |          |
|------|--------------------------|---------------|-------------|--------------------------|----------|
|      | Enabled                  | Sampling Rate | Max. Header | Enabled                  | Interval |
| -    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 1    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 2    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 3    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 4    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 5    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 6    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 7    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 8    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 9    | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |
| 10   | <input type="checkbox"/> | 0             | 128         | <input type="checkbox"/> | 0        |

| Setting                           | Description   |
|-----------------------------------|---|
| <b>Port</b>                       | The port number for which the configuration below applies.  |
| <b>Flow Sampler Enabled</b>       | Enables/disables flow sampling on this port.  |
| <b>Flow Sampler Sampling Rate</b> | 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. Valid range is 1 to 4294967295. |
| <b>Flow Sampler Max. Header</b>   | The maximum number of bytes that should be copied from a sampled packet to the sFlow datagram. Valid range is 14 to 200 bytes with default being 128 bytes. If the maximum datagram size does not take into account the maximum header size, samples may be dropped.  |
| <b>Counter Poller Enabled</b>     | Enables/disables counter polling on this port.  |
| <b>Counter Poller Interval</b>    | With counter polling enabled, this specifies the interval - in seconds - between counter poller samples. Valid range is 1 to 3600 seconds.  |

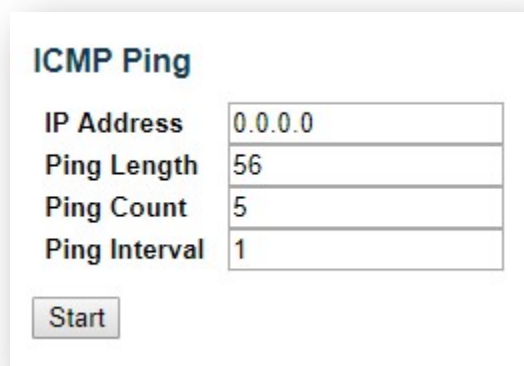
# Diagnostics

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## Diagnostics > Ping

### ICMP Ping

This page allows you to issue ICMP PING packets to troubleshoot IP connectivity issues. After you press Start, ICMP packets are transmitted, and the sequence number and round trip time are displayed upon reception of a reply. The amount of data received inside of an IP packet of type ICMP ECHO\_REPLY will always be 8 bytes more than the requested data space (the ICMP header). The page refreshes automatically until responses to all packets are received or until a timeout occurs.



The screenshot shows a dialog box titled "ICMP Ping" with four input fields and a "Start" button. The fields are: IP Address (0.0.0.0), Ping Length (56), Ping Count (5), and Ping Interval (1).

| ICMP Ping     |         |
|---------------|---------|
| IP Address    | 0.0.0.0 |
| Ping Length   | 56      |
| Ping Count    | 5       |
| Ping Interval | 1       |

Start

## Diagnostics > Ping6

### ICMPv6 Ping

This page allows you to issue ICMPv6 PING packets to troubleshoot IPv6 connectivity issues. After you press Start, ICMPv6 packets are transmitted, and the sequence number and round trip time are displayed upon reception of a reply. The page refreshes automatically until responses to all packets are received or until a timeout occurs.

#### ICMPv6 Ping

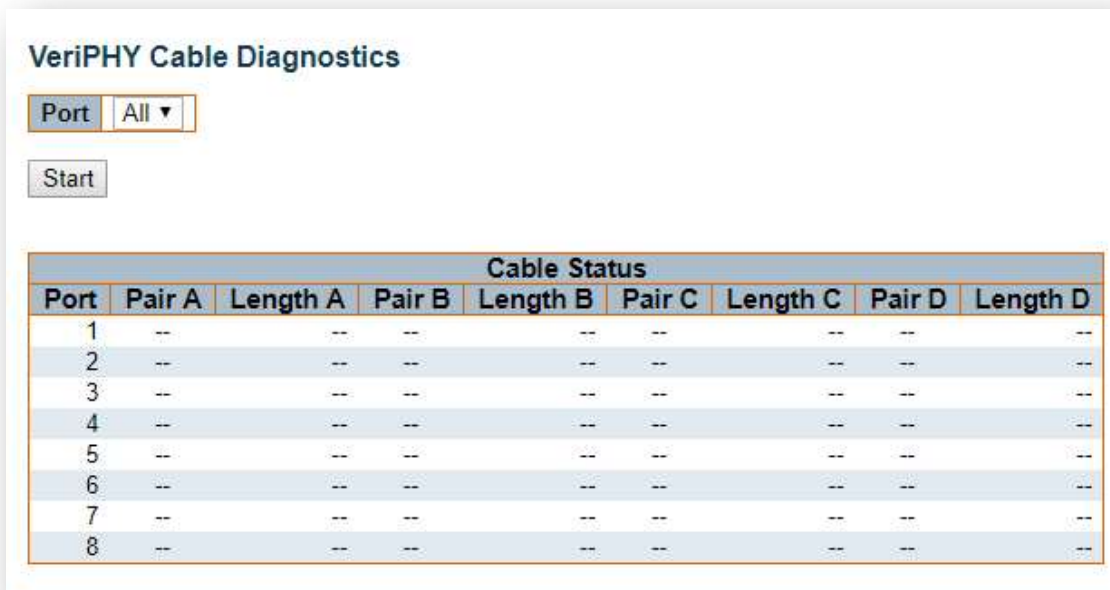
|                  |  |
|------------------|--|
| IP Address       | <input type="text" value="0:0:0:0:0:0:0:0"/> |
| Ping Length      | <input type="text" value="56"/>              |
| Ping Count       | <input type="text" value="5"/>               |
| Ping Interval    | <input type="text" value="1"/>               |
| Egress Interface | <input type="text"/>                         |

## Diagnostics > VeriPHY

### VeriPHY Cable Diagnostics

This page is used for running the VeriPHY Cable Diagnostics for 10/100 and 1G copper ports. Press Start to run the diagnostics. This will take approximately 5 seconds. If all ports are selected, this can take approximately 15 seconds. When completed, the page refreshes automatically, and you can view the cable diagnostics results in the cable status table. Note that VeriPHY is only accurate for cables of length 7 - 140 meters.

10 and 100 Mbps ports will be linked down while running VeriPHY. Therefore, running VeriPHY on a 10 or 100 Mbps management port will cause the switch to stop responding until VeriPHY is complete.



### Cable Status

| Setting       | Description  |
|---------------|--|
| <b>Port</b>   | Port number.   |
| <b>Pair</b>   | The status of the cable pair. <ul style="list-style-type: none"> <li>• <b>OK</b> - Correctly terminated pair.</li> <li>• <b>Open</b> - Open pair.</li> <li>• <b>Short</b> - Shorted pair.</li> <li>• <b>Short A</b> - Cross-pair short to pair A.</li> <li>• <b>Short B</b> - Cross-pair short to pair B.</li> <li>• <b>Short C</b> - Cross-pair short to pair C.</li> <li>• <b>Short D</b> - Cross-pair short to pair D.</li> <li>• <b>Cross A</b> - Abnormal cross-pair coupling with pair A.</li> <li>• <b>Cross B</b> - Abnormal cross-pair coupling with pair B.</li> <li>• <b>Cross C</b> - Abnormal cross-pair coupling with pair C.</li> <li>• <b>Cross D</b> - Abnormal cross-pair coupling with pair D.</li> </ul> |
| <b>Length</b> | The length (in meters) of the cable pair. The resolution is 3 meters.  |



# Maintenance

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## Maintenance > Restart Device

### Restart Device

You can restart the switch on this page. After restart, the switch will boot normally. Click **Yes** to restart device.

Click **No** to return to the Port State page without restarting.

#### Restart Device

Are you sure you want to perform a Restart?

## Maintenance > Factory Defaults

### Factory Defaults

You can reset the configuration of the switch on this page. Only the IP configuration is retained. The new configuration is available immediately which means that no restart is necessary.

Click **Yes** to reset the configuration to Factory Defaults.

Click **No** to return to the Port State page without resetting the configuration.

#### Factory Defaults

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

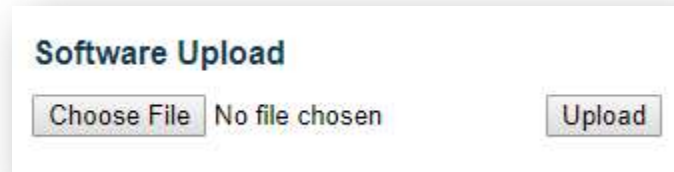
**NOTE:** Restoring factory default can also be performed by making a physical loopback between port 1 and port 2 within the first minute from switch reboot. In the first minute after boot, loopback packets will be transmitted at port 1. If a loopback packet is received at port 2, the switch will do a restore to default.

## Maintenance > Software > Upload

### Software Upload

This page facilitates an update of the firmware controlling the switch. Click **Choose File** to the location of a software image and click **Upload**.

After the software image is uploaded, a page announces that the firmware update is initiated. After about a minute, the firmware is updated and the switch restarts.



#### **WARNING:**

While the firmware is being updated, Web access appears to be defunct. The front LED flashes Green/Off with a frequency of 10 Hz while the firmware update is in progress. Do not restart or power off the device at this time or the switch may fail to function afterwards.

## Maintenance > Software > Image Select

### Software Image Selection

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

#### Software Image Selection

| Active Image |                           |
|--------------|---------------------------|
| Image        | managed                   |
| Version      | V3.0                      |
| Date         | 2018-03-16T16:00:49+08:00 |

| Alternate Image |                           |
|-----------------|---------------------------|
| Image           | managed.bk                |
| Version         | V3.0                      |
| Date            | 2018-03-16T16:00:49+08:00 |

**NOTE:** In case the active firmware image is the alternate image, only the “Active Image” table is shown. In this case, the Activate Alternate Image button is also disabled. If the alternate image is active (due to a corruption of the primary image or by manual intervention), uploading a new firmware image to the device will automatically use the primary image slot and activate this. The firmware version and date information may be empty for older firmware releases. This does not constitute an error.

Click **Activate Alternate Image** to use the alternate image. This button may be disabled depending on system state.

Click **Cancel** to activate the backup image. Navigates away from this page.

## Maintenance > Configuration > Save startup-config

### Save Running Configuration to startup-config

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

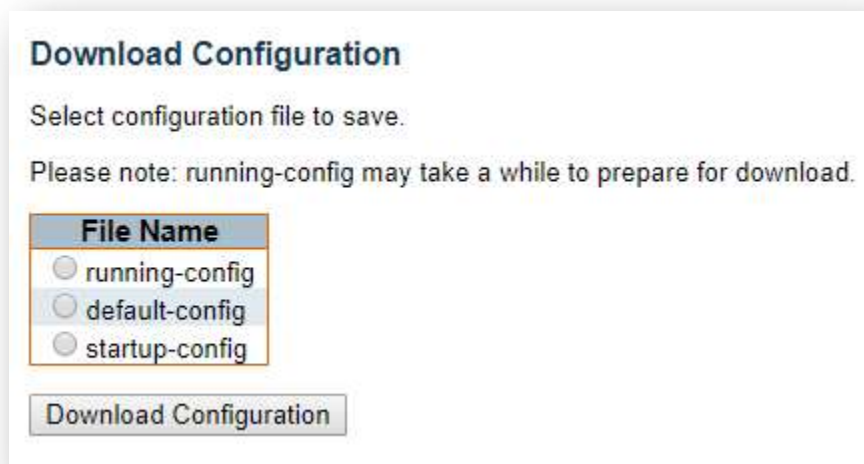
#### Save Running Configuration to startup-config

Please note: The generation of the configuration file may be time consuming, depending on the amount of non-default configuration.

Save Configuration

## Maintenance > Configuration > Download

### Download Configuration



The screenshot shows a dialog box titled "Download Configuration". It contains the following text and elements:

- Title: **Download Configuration**
- Text: "Select configuration file to save."
- Note: "Please note: running-config may take a while to prepare for download."
- A table with the following structure:

| File Name                            |
|--------------------------------------|
| <input type="radio"/> running-config |
| <input type="radio"/> default-config |
| <input type="radio"/> startup-config |
- A button labeled "Download Configuration"

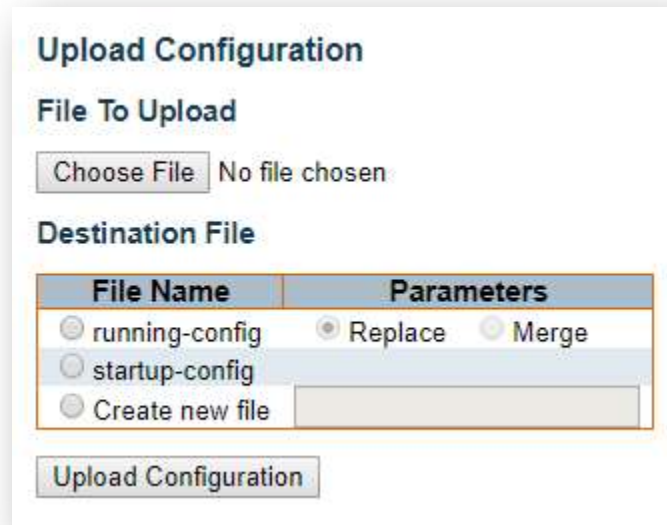
It is possible to download any of the files on the switch to the web browser. Select the file and click **Download Configuration**.

- **running-config:** A virtual file that represents the currently active configuration on the switch. This file is volatile.
- **default-config:** A read-only file with vendor-specific configuration. This file is read when the system is restored to default settings.
- **startup-config:** The startup configuration for the switch, read at boot time. If this file doesn't exist at boot time, the switch will start up in default configuration.

Download of running-config may take a little while to complete as the file must be prepared for download.

## Maintenance > Configuration > Upload

### Upload Configuration



The screenshot shows a dialog box titled "Upload Configuration". It has two main sections: "File To Upload" and "Destination File".

**File To Upload:** Contains a "Choose File" button and the text "No file chosen".

**Destination File:** Contains a table with two columns: "File Name" and "Parameters".

| File Name                             | Parameters   |
|---------------------------------------|--|
| <input type="radio"/> running-config  | <input checked="" type="radio"/> Replace <input type="radio"/> Merge |
| <input type="radio"/> startup-config  |  |
| <input type="radio"/> Create new file |  |

Below the table is an "Upload Configuration" button.

It is possible to upload a file from the web browser to all the files on the switch, except default-config which is read-only.

Select the file to upload, select the destination file on the target, then click **Upload Configuration**.

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 in the uploaded file.
- **Merge mode:** The uploaded file is merged into running-config.

If the flash file system is full (i.e. contains default-config and 32 other files usually including startup-config), it is not possible to create new files. Instead an existing file must be overwritten or another file must be deleted.

## Maintenance > Configuration > Activate

### Activate Configuration

It is possible to activate any of the configuration files present on the switch, except for running-config which represents the currently active configuration.

Select the file to activate and click Activate Configuration. This will initiate the process of completely replacing the existing configuration with that of the selected file.

#### Activate Configuration

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

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

##### File Name

default-config

startup-config

Activate Configuration



## Maintenance > Configuration > Delete

### Delete Configuration File

It is possible to delete any of the writable files stored in flash including startup-config. If this is done and the switch is rebooted without a prior save operation, this effectively resets the switch to default configuration.



The dialog box is titled "Delete Configuration File". Below the title is the instruction "Select configuration file to delete." There is a section labeled "File Name" containing a radio button next to the text "startup-config". At the bottom of the dialog is a button labeled "Delete Configuration File".