Hardened L2/L3 Managed PoE++ Ethernet Switch

EX78900G Series User's Guide - GUI

FastFind Links

Disclaimer of Liability

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Warranty

For details on the EtherWAN warranty replacement policy, please visit our web site at:

https://www.etherwan.com/us/support/warranty-policy

Products Supported by this Manual:

EX78900G Series

Preface

Audience

This guide is designed for the person who installs, configures, deploys, and maintains the Ethernet network. This document assumes the reader has moderate hardware, computer, and networking skills. To be more familiar with networking technologies, please visit our free online training resources, EtherWAN Academy (academy.etherwan.com). You can also directly contact your sales representative in your respective region. For alternative ways to reach us, use info@etherwan.com for US customers; for other countries, info@etherwan.com.tw

Document Revision Level

This section provides a history of the revision changes to this document.

Revision	Document Version	Date	Description
A	Version 1	2024/06/20	Initial version

Changes in this Revision

This is first version of this document.

Document Conventions

This guide uses the following conventions to draw your attention to certain information.

Safety and Warnings

This guide uses the following symbols to draw your attention to certain information.

Symbol	Meaning	Description
	Note	Notes emphasize or supplement important points of the main text.
	Tip	Tips provide helpful information, guidelines, or suggestions for performing tasks more effectively.
	Warning	Warnings indicate that failure to take a specified action could result in damage to the device, or could result in serious bodily injury.

Contents

1 Introduction

The EX78900G series represents EtherWAN's latest advancement in 2.5G Ethernet switch technology, featuring comprehensive Layer 2 and Layer 3 management functionalities. This 2.5G managed PoE switch, compactly DIN-rail mounted, supports up to 8 gigabit PoE ports, providing a maximum of 90W of PoE power. It adheres to the IEEE 802.3.bt protocol while maintaining compatibility with IEEE 802.3af and IEEE 802.3at standards, allowing for versatile PoE power delivery ranging from 15W, 30W, 60W to 90W per Ethernet port.

Additionally, the switch integrates up to 4 tri-rate 2.5G SFP uplink ports, providing adaptability with triple-speed options of 100Mbps, 1000Mbps, and 2500Mbps for flexible connectivity expansion. The EX78900G series is designed to offer networks in urban infrastructure, transportation, security, and other critical sectors the trifecta of flexibility, speed, and reliability.

Unpacking and Installation

Unpacking

Unpack the items and confirm that no items are missing or damaged. Your package should include:

- EX78900G Ethernet switch with RJ-45/SFP/USB dust covers installed
- 1 RJ-45 Console cable

If any item is damaged or missing, notify your authorized EtherWAN representative. Keep the carton, including the original packing material, in case you need to store the product or return it.

Installing the Switch

- Installation: Din-rail mount.
- Select a power source within 6 feet (1.8 meters).
- Choose a dry area with ambient temperature between -40 and 75ºC (-40 and 167ºF).
- Keep away from heat sources, sunlight, warm air exhausts, hot-air vents, and heaters.
- Be sure there is adequate airflow.

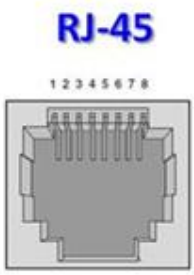
Connecting to the Data Ports

The EX78900G has the following ports:

- 8 x 1G RJ-45 ports
- 2 or 4 x 100/1G/2.5G tri-rate SFP ports
- 1 x RJ-45 console port
- 1 x USB port

Console Port

The console port uses an RJ-45 interface cable. Pin definitions are as follows:



Pin	Signal	Function
1	NC	Not Connected
2	NC	Not Connected
3	TxD	Transmit Data from Switch
4	GND	Ground
5	GND	Ground
6	RxD	Receive Data to Switch
7	NC	Not Connected
8	NC	Not Connected

Connecting Power

Terminal Block

The switch provides two power inputs on a terminal block. The terminal block has 5 terminal posts, consisting of a primary and secondary source, negative, and a single ground. Redundant power supply is supported. via the secondary source pins. However, only one power input is required to operate the switch. Input voltage is 46-57VDC. (54-57VDC to use IEEE 802.3bt devices).

Relay Output Alarm

The switch provides one dry contact for signaling of a user-defined power or port failure. The alarm relay default is “open” and forms a closed circuit when the event occurs. The relay output can be connected to an alarm signaling device, and supports both normally open and normally closed. Relay output current is 48VDC / 0.5A.

NOTE: The initial normal state of the relay is open, and if the switch loses *all* power, then this state will come into effect. This is important to remember when using the relay to indicate a power failure. The relay will close in an alarm state when there is redundant power input and an alarmed input fails.

Initial Configuration

Serial (RJ45): Connect to the switch using the enclosed console cable via the serial port (or USB to serial adapter) on the PC to the RJ-45 Management port located on the front panel above to the USB port.

Ethernet: Connect to any ethernet port on the switch using a CAT5e or better Ethernet cable with the other end connected to the Ethernet port on your PC. You will need to set the IP address on the PC to a 192.168.1.0/24 address to connect.

 For more information on setting up the connection, please refere to the EtherWAN Academy course, *"Managed Switch Basics"* and *"Introduction to EtherWAN Switches."*

Configuration via CLI

If using a terminal-emulation program such as Putty, configuration settings are: Baud rate: 115,200bps, Data bits: 8, Parity: none, Stop bit: 1, Flow control: none.

The default login name is "root," no password.

Configuration via Web Browser

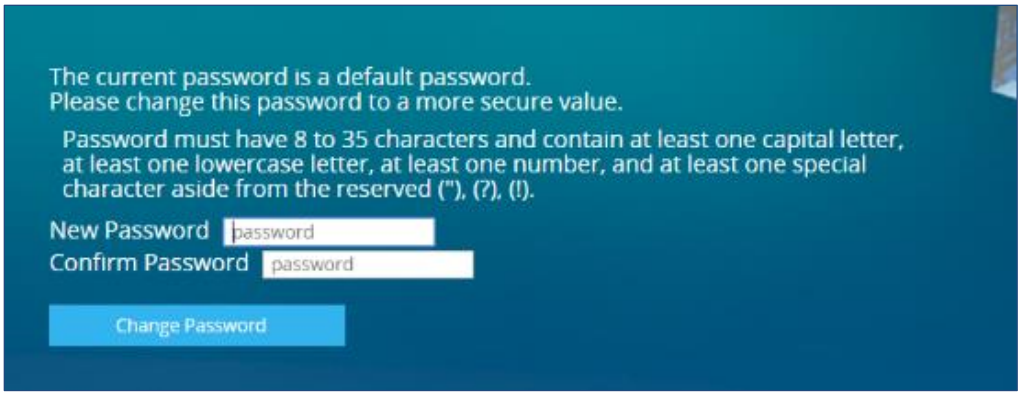
Log in to the switch by launching a web browser and entering 192.168.1.10 in the address bar.

Enter the default login ID: root (no password) and click "Login." The system information screen will display.

 **NOTE**: When logging into the GUI or the CLI for the first time, the switch will prompt you to change the default password to a new one. The new password must meet the following complexity requirements:

- Minimum 8 characters and maximum 35 characters in password length without leading or trailing blanks.
- The password must contain characters from the following categories:
  1. Uppercase English letters, (A to Z)
  2. Lowercase English letters, (a to z)
  3. Numbers, (0 to 9)
  4. Non-alphanumeric characters (e.g. @, #, $), but not including (", ?, !)

User account will be locked after 10 (configurable) password attempts and will stay locked for 5 minutes.



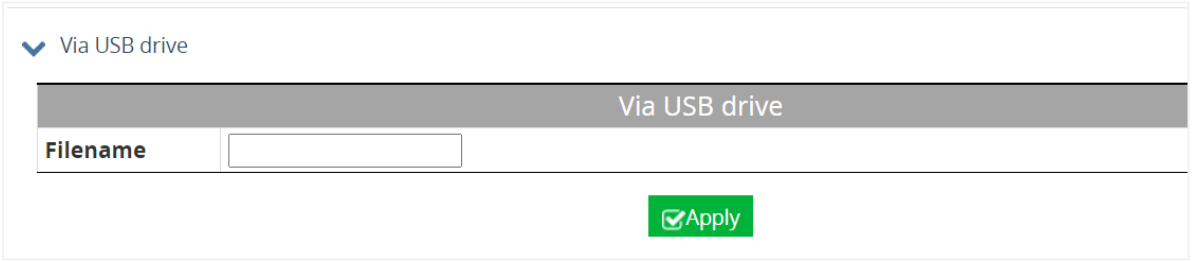
Reset Button

The switch has a physical reset button, to either just reboot the switch, or reset everything to the factory default configuration.

- To reboot the switch, press and hold the reset button for less than 10 seconds.
- To reset the switch to the factory default configuration, press and hold the reset button for more than 10 seconds.

Copy Configuration to USB

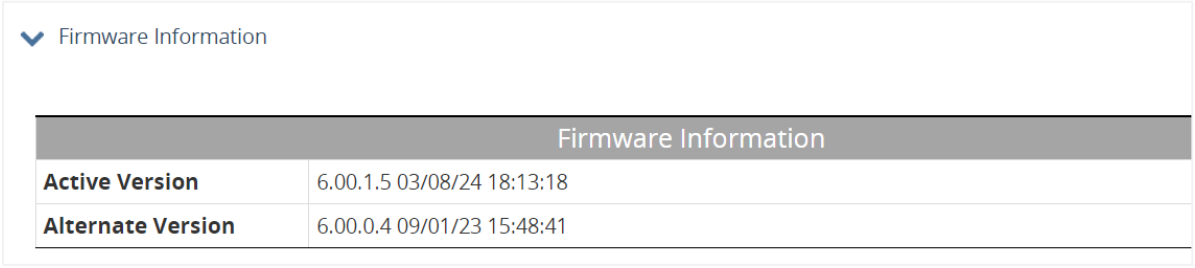
The USB port can be used to upgrade firmware from a FAT32 formatted USB flash drive. Plug the USB device into the USB port, and navigate to **System** → **Configuration** in the WebGUI, and type the firmware's <filename>. Or you can use "install image usb <filename>" command in the CLI.



Alternate (Backup) Firmware

Under certain circumstances, such as when there is a loss of power during an upgrade, the firmware build on the switch can become unstable. There are two firmware images stored on the switch: Active and Alternate. If the Active firmware image becomes unstable, the switch

will automatically boot from the Alternate image on the next boot. Navigating **System → System Information** to check Firmware Information.



2 Web Management Interface

About the Web-based graphical user interface (GUI)

The web interface allows for remote monitoring, configuration, and control of the switch through any standard web browser. All switch features that can be configured through the Command Line Interface can also be configured through the GUI.

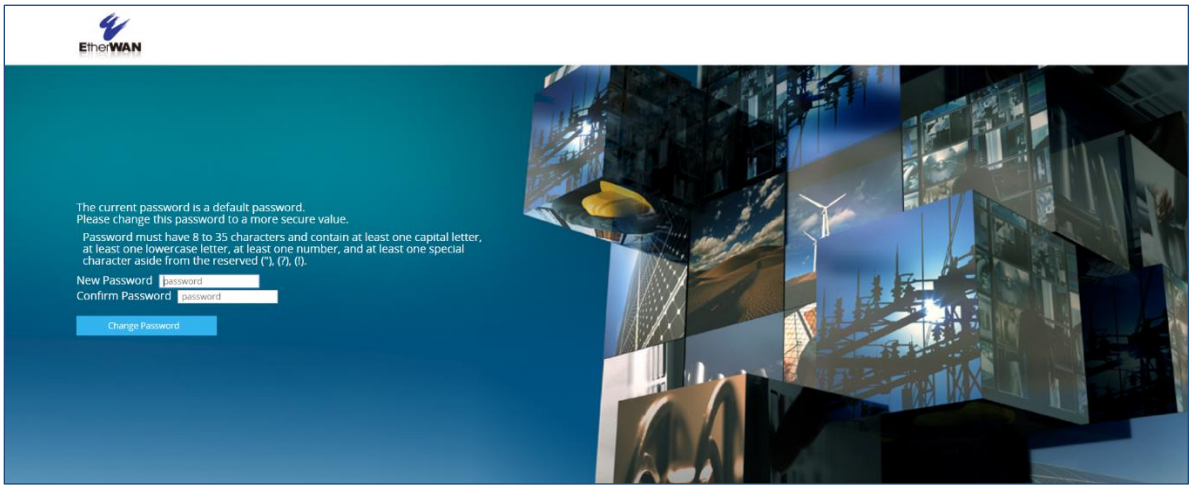
Default IP Address

The switch's default IP address is **192.168.1.10**. The management computer must be set up so that it is on the same network as the switch. For example, the IP address of the management computer can be set to 192.168.1.100 with a subnet mask of 255.255.255.0. DHCP is disabled by default.

Login Process and Default Credentials

Once a compatible IP address has been assigned to the management computer, the user is ready to log in to the switch. To log in, type the URL **http://192.168.1.10/** into the address field of the browser and hit return. (See figure below)

- The Default Login is **root** (case sensitive)
- There is no password by default
- Enter the login name and click the Login button



Login Screen

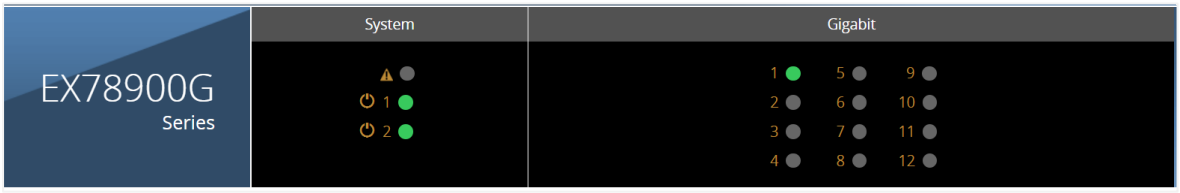
NOTE: When logging into the GUI or the CLI for the first time, the switch will prompt you to change the default password to a new one. The new password must meet the following complexity requirements:

- Minimum 8 characters and maximum 35 characters in password length without leading or trailing blanks.
- The password must contain characters from the following categories:
  1. Uppercase English letters, (A to Z)
  2. Lowercase English letters, (a to z)
  3. Numbers, (0 to 9)
  4. Non-alphanumeric characters (e.g. @,#,$), but not including (”, ?, !)

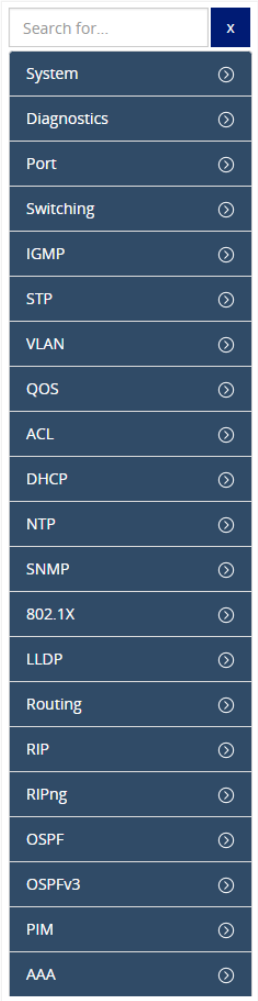
User account will be locked after 10 (configurable) password attempts and will stay locked for 5 minutes.

Navigating the GUI

At the top of every page of the web interface is a panel containing a graphic that shows status of power & ports on the switch, and an alarm indicator.



On the left side of the page is the navigation panel. Each section can be expanded and collapsed to view or hide the page headings within. At the top of the navigation panel is a search box, which can be used to quickly find a specific page in the GUI. Note that the search box works best with specific terms like “MSTP.” Generic search terms like “Setting” will yield many results, and it may be difficult to quickly identify the specific setting page needed.



Icons

The GUI uses a few simple icons to for viewing and editing switch configuration data.

 Refresh the panel

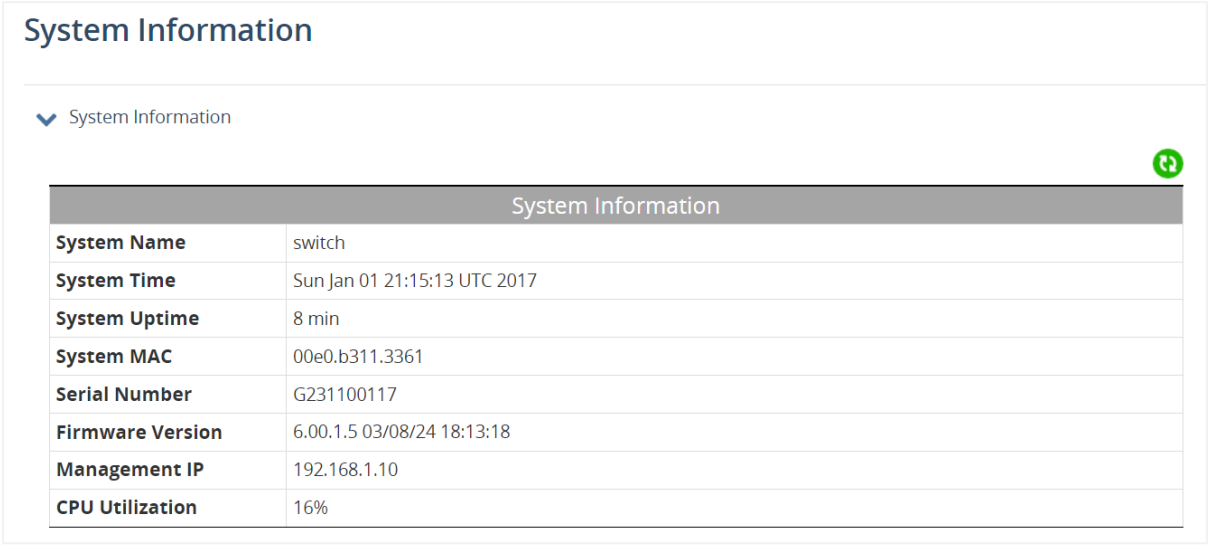
 Edit data in panel

 Add a new entry to the panel (Example: Add a new static route)

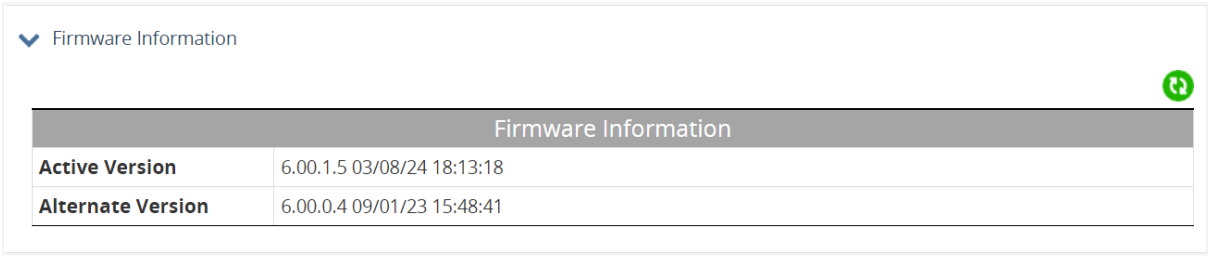
3 System Menu

System Information

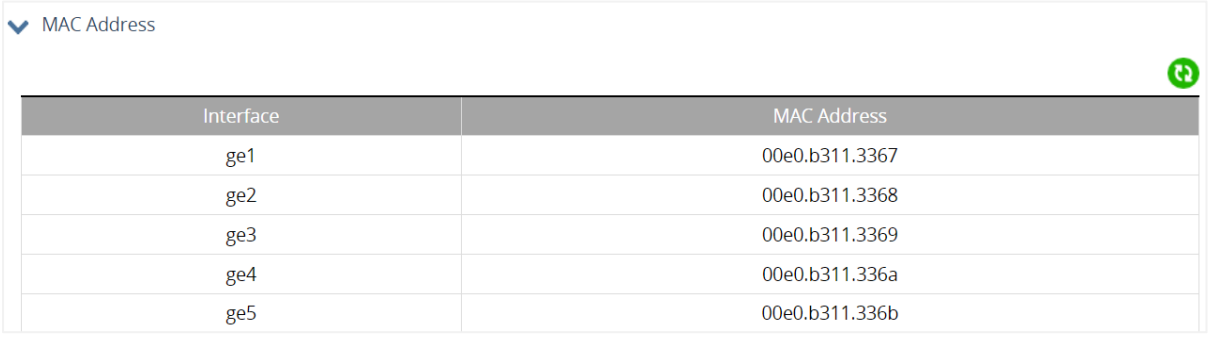
When you log into the switch GUI, you will be taken to the system information page. This is a read-only page with three panels. The first panel shows basic system info:



The second panel shows the active and alternate firmware versions.

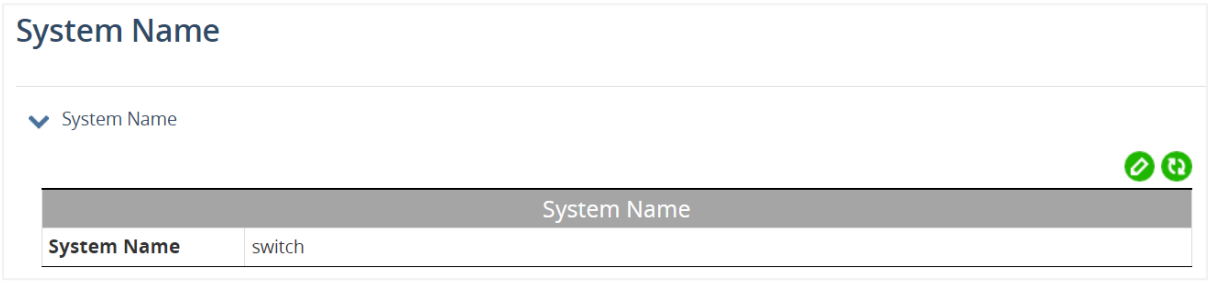


The third panel shows the MAC address of each port on the switch.



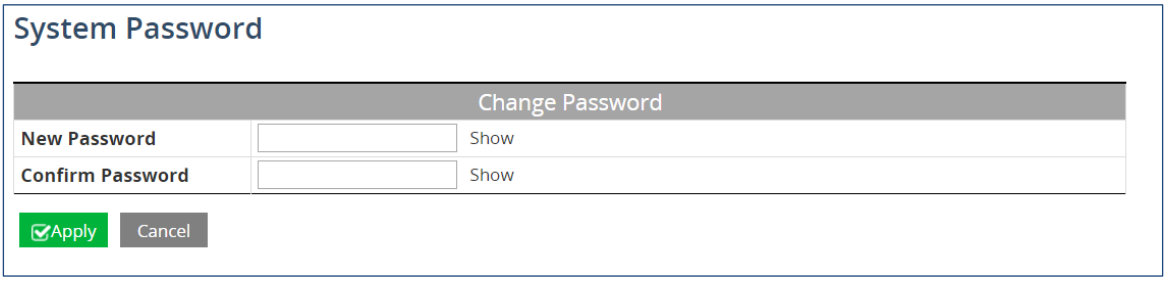
System Name

To change the system name, click the edit icon and enter a name in the field shown. The name may not contain spaces. Maximum length is 64 characters.



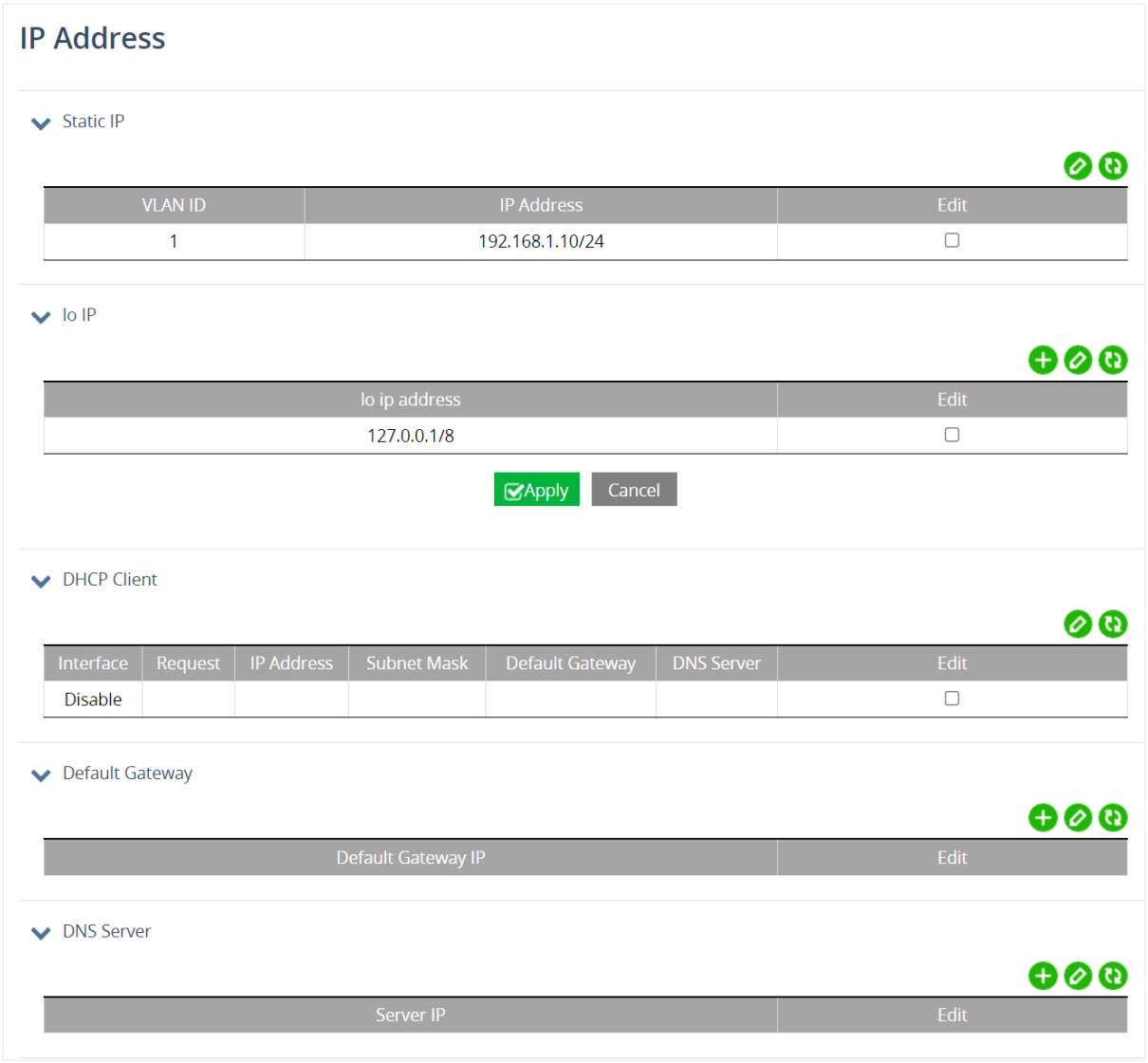
System Password

By default, there is no password assigned to the switch. To set a password, enter it into both fields and click “Apply.”



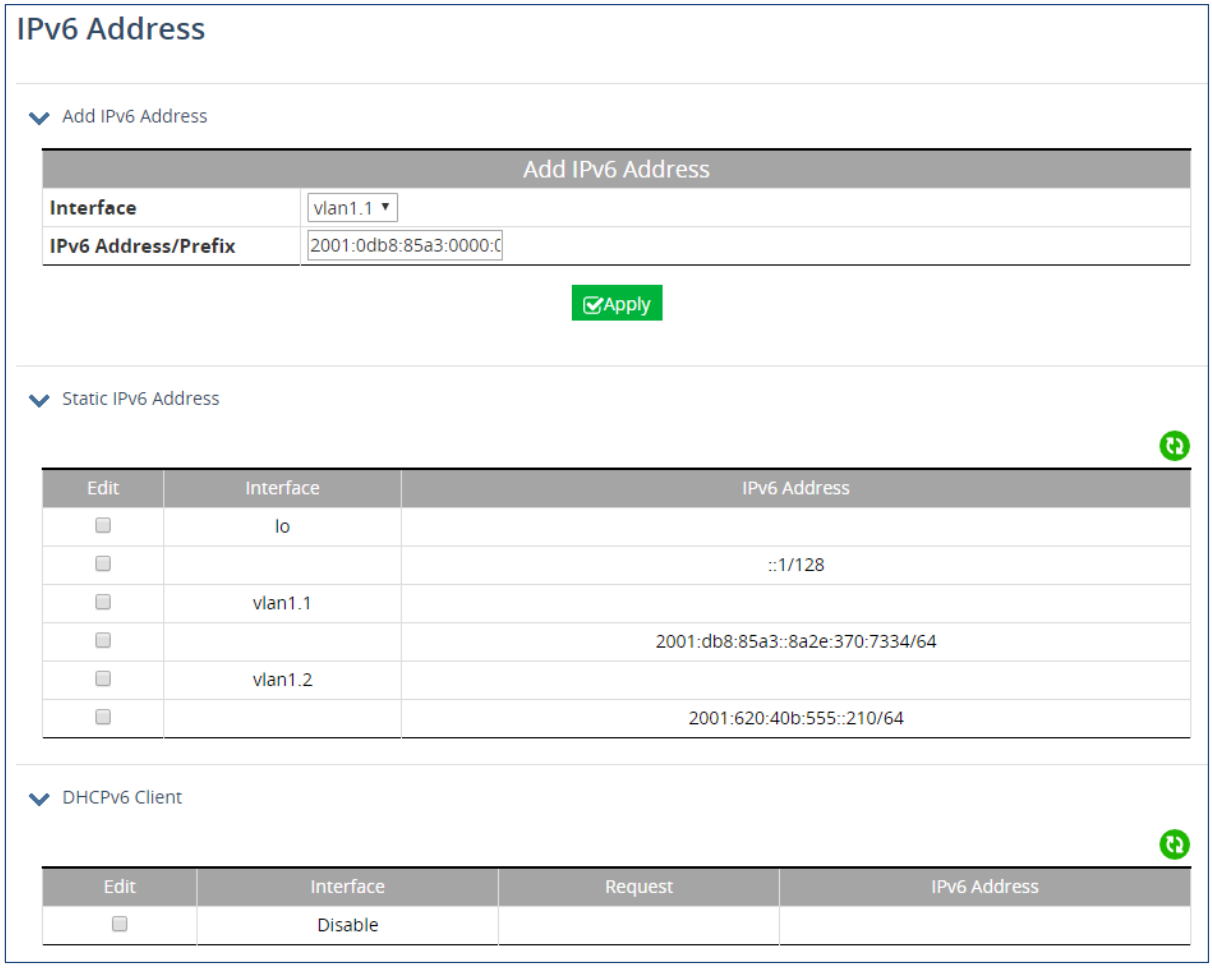
IP Address

The two panels on this page allow for the changing of the IP address of VLAN 1, configuration of DHCP client information, and for the creation of default gateways. Enter/delete DNS Server addresses at the bottom of this screen.



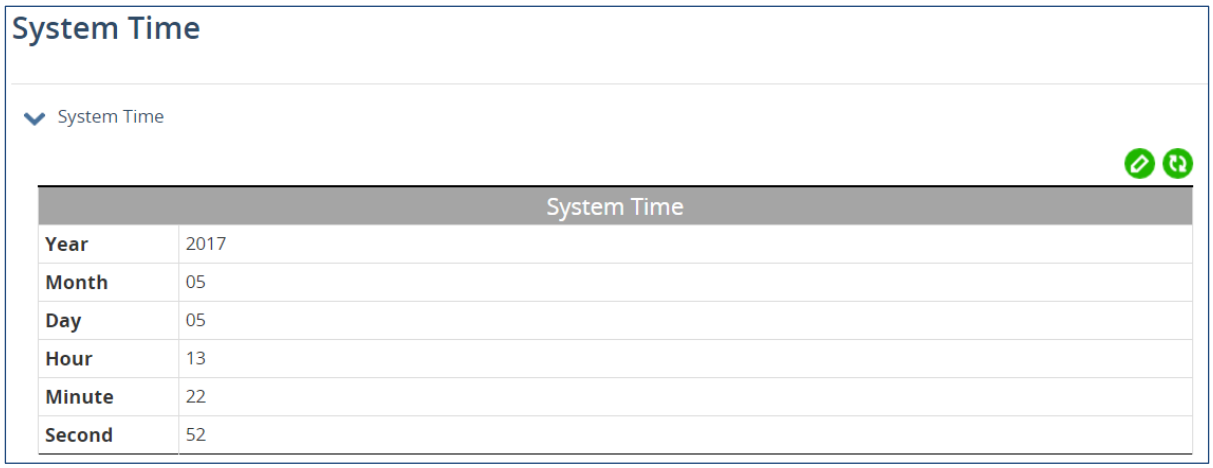
IPv6 Address

On this screen, you can add IPV6 addresses to an interface, static IPV6 addresses, and DHCPv6 Client information.



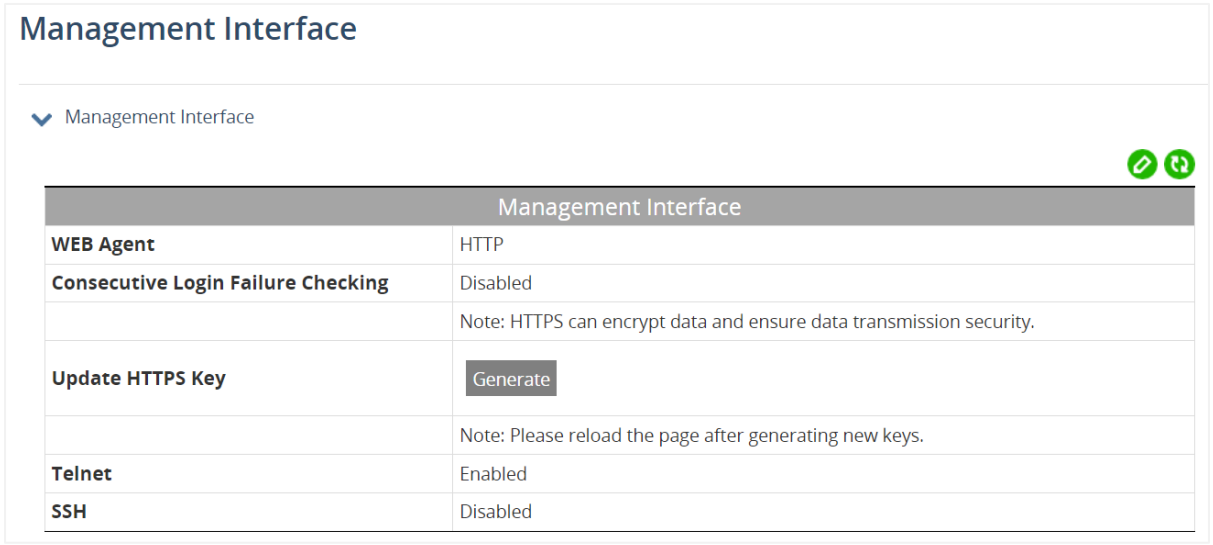
System Time

This page is for manual setting of the system time. Click the edit icon, and enter the time and date data in the corresponding fields. Click “Apply” when finished. To configure a network time server, refer to the NTP chapter.



Management Interface

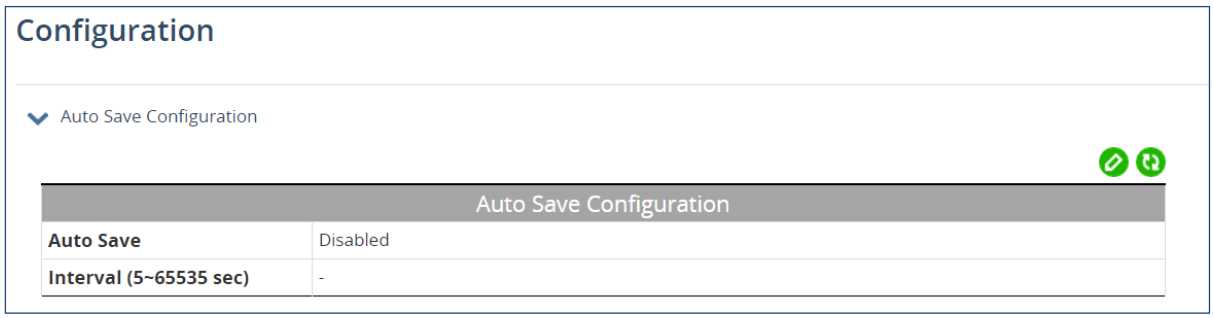
Enable / disable access to switch management through http, Telnet, and SSH on this page. Note that if you disable http without enabling https you will lose access to the GUI and need to use another management method to access the switch to save changes.



Warning! Enabling HTTP may lead to potential security vulnerabilities. Therefore, it is suggested to only enable HTTPS.

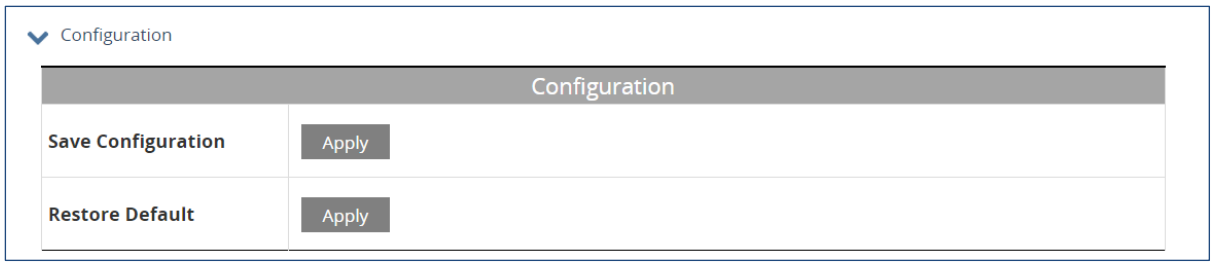
Configuration

This page is comprised of three panels. The first is for setting auto-save interval of the switch configuration. Auto-save is disabled by default.

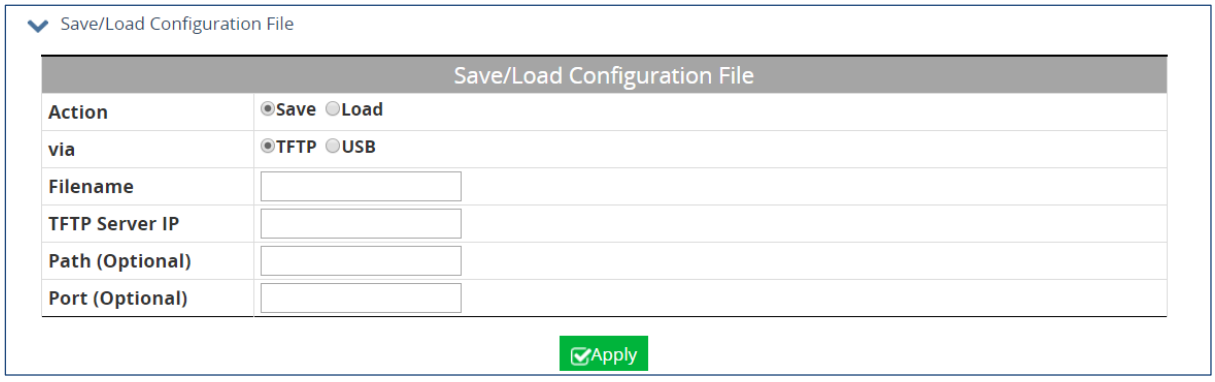


Saving Switch Configuration

The second panel is for saving the current switch configuration, and resetting the switch configuration to factory default. A confirmation message will display if the second option is chosen.

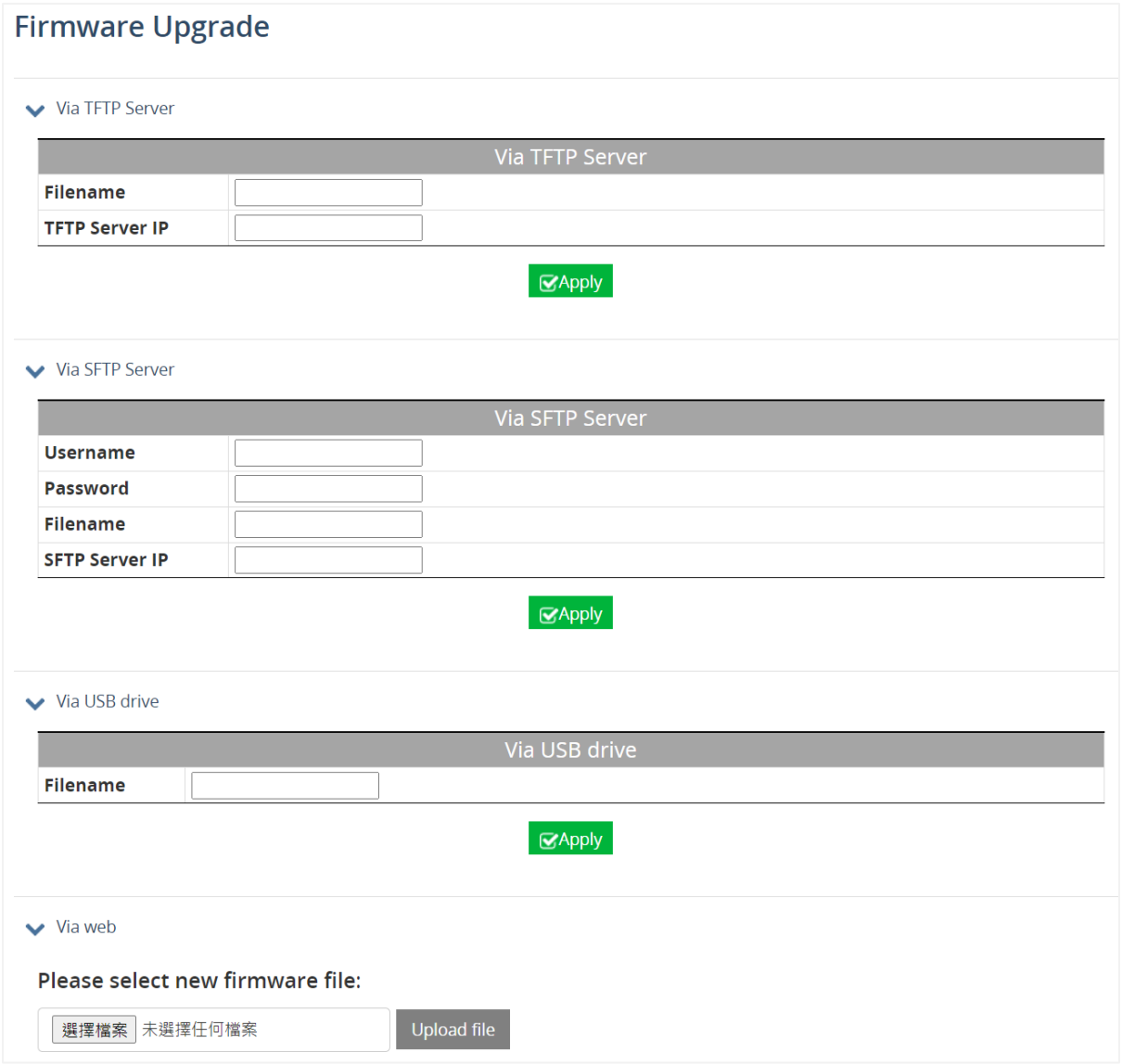


Load a switch configuration from, or save a configuration to, a TFTP server or USB flash drive using the third panel. Path and port fields are optional.



Firmware Upgrade

Firmware can be upgraded from either a TFTP server or from any drive that is accessible to the web browser. The firmware file for the switch should be in ".XZ" format and is downloadable from the product page on www.etherwan.com.



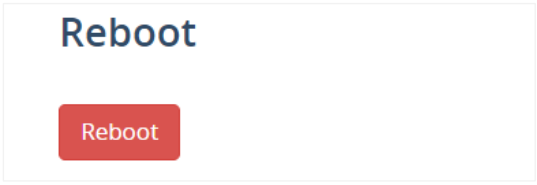
To upgrade the switch firmware:

1. Log in to the switch and navigate to System → Firmware Upgrade.
2. Upgrade Methods:
    a. TFTP: Enter the filename and TFTP server address and click "Apply"
    b. SFTP: Enter the username, password, filename and SFTP Server IP and click "Apply"
    c. Web: Select the fiile manually with the **Choose File** button and click "Upload File"

3. It will take several minutes to install the new firmware.
4. Click the **Reboot** button when you see the message “Firmware upgrade successful.” (Do not power off the switch or the firmware upgrade will fail)
5. Wait 90 seconds (60 seconds for switch reboot, and 30 seconds for system verification) and re-log in to the switch. Check the System Information screen to ensure that the firmware upgrade has been successful.

Reboot

Reboot the switch.

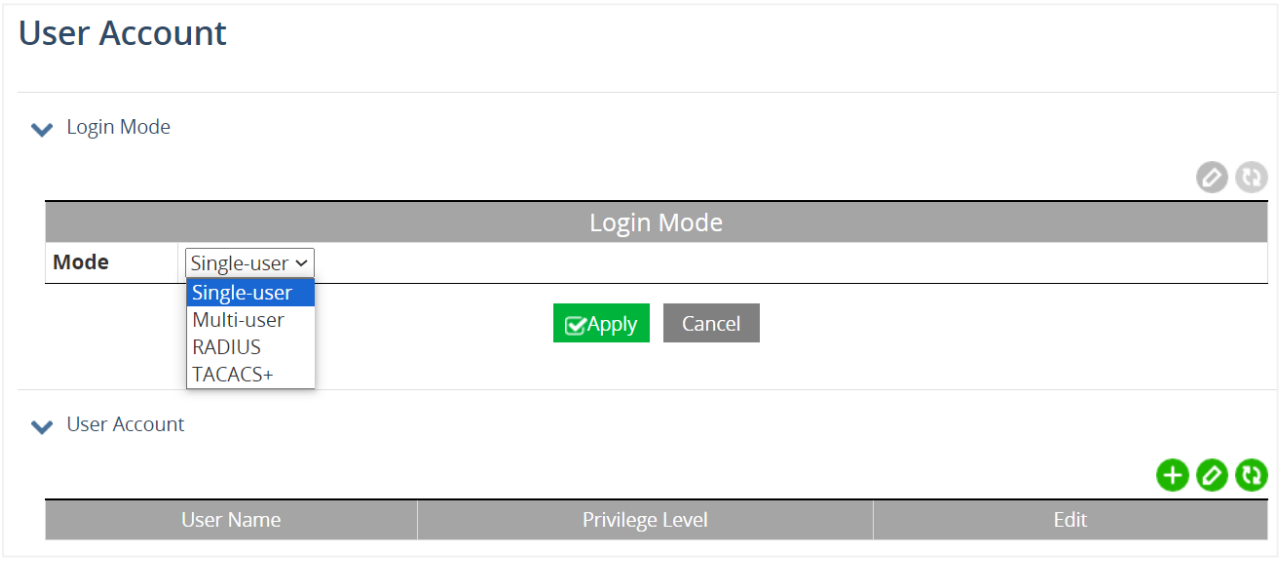


User Account

From the User Account page, multiple users can be setup with different access privileges to the switch. There are three modes that can be set using the drop-down menu, Single-User, Multi-User, RADIUS or TACACS+.

New user accounts can be added and deleted in the bottom section. Usernames can only contain alphanumeric characters.

Passwords must have 8 to 35 characters and contain at least one capital letter, at least one lowercase letter, at least one number, and at least one special character aside from the reserved (''), (?), (!).



Command Privilege

There are 3 different Privilege levels on the EtherWAN Managed Switch.

- **Admin** – Has access to all configuration and administration of the switch.
- **Technician** – Configurable by Admin – By default no configuration ability is given.
- **Operator** – Configurable by Admin – By default no configuration ability is given.

The User Privilege Configuration page allows specific configuration and/or administration levels to be assigned or removed from the Technician and Operator user roles. The privilege levels are: **Show**, **Hidden**, **Read-Only**, and **Read-Write**.

 **NOTE**: For each function, an Operator’s privilege cannot be higher than a Technician's.

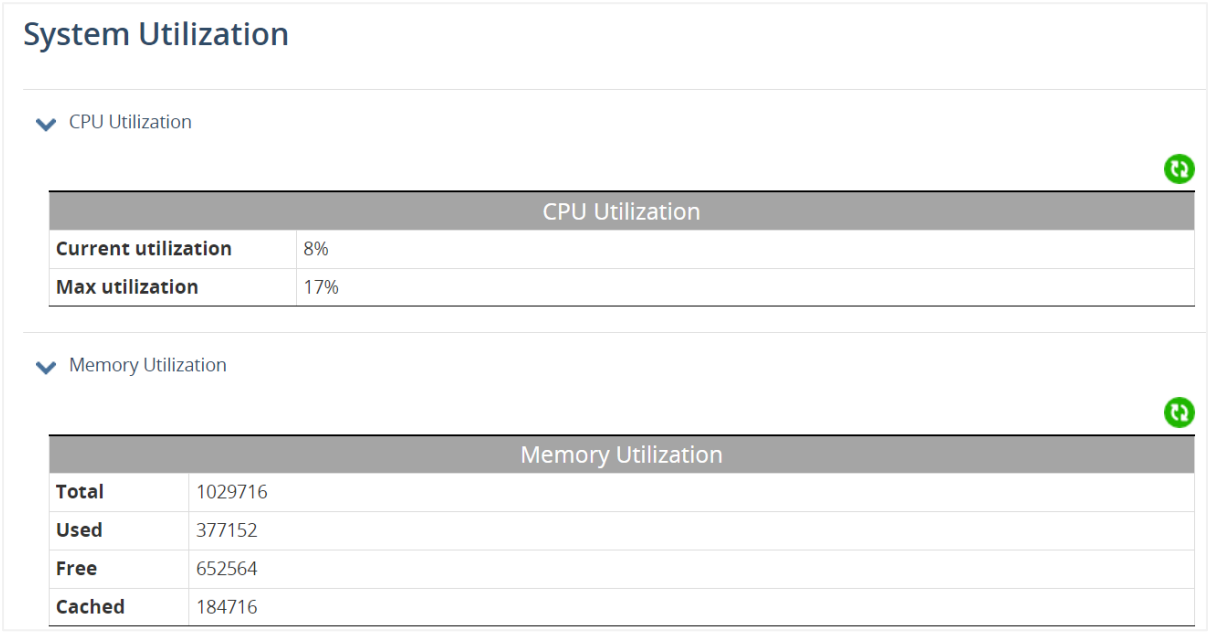
Command Privilege

Command Privilege

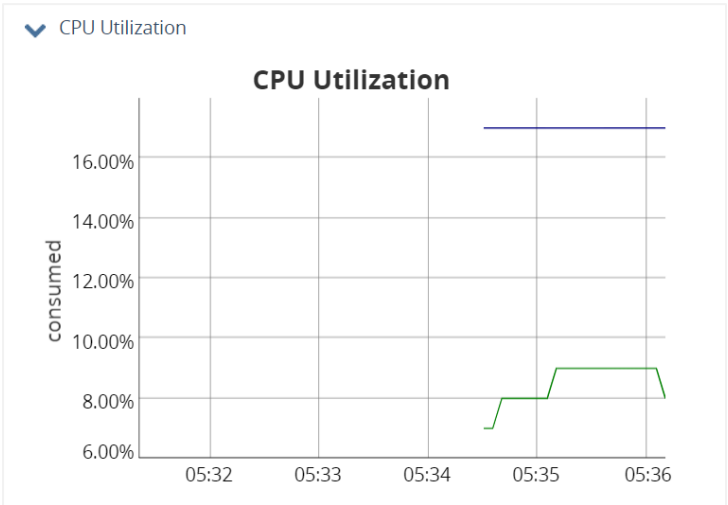
Command Group	Technician	Operator	Edit
System-Name&Password	Hide	Hide	☐
IP-Address	Read-only	Read-only	☐
Management-Interface	Read-only	Read-only	☐
Save-Configuration	Hide	Hide	☐
Firmware-Upgrade	Hide	Hide	☐
Reboot	Hide	Hide	☐
User-Account	Read-only	Read-only	☐
Command-Privilege	Read-only	Read-only	☐
Utilization	Read-write	Read-write	☐
RMON-Statistics	Read-only	Read-only	☐
Remote-Log	Read-only	Read-only	☐
Alarm-Setting	Read-only	Read-only	☐
Port-Mirroring	Read-only	Read-only	☐
Email-Alert	Read-only	Read-only	☐
Configuration	Read-only	Read-only	☐
Flow-Control	Read-only	Read-only	☐
Rate-Control	Read-only	Read-only	☐
Static-MAC-Entry	Read-only	Read-only	☐
Port-Trunking	Read-only	Read-only	☐
LACP-Trunking	Read-only	Read-only	☐
GVRP	Read-only	Read-only	☐
GMRP	Read-only	Read-only	☐
VLAN-Translation	Read-only	Read-only	☐
IGMP	Read-only	Read-only	☐
IGMP-Snooping	Read-only	Read-only	☐
STP	Read-only	Read-only	☐
VLAN	Read-only	Read-only	☐
QOS	Read-only	Read-only	☐
ACL	Read-only	Read-only	☐
DHCP	Read-only	Read-only	☐
NTP	Read-only	Read-only	☐
SNMP	Read-only	Read-only	☐
802.1X	Read-only	Read-only	☐
LLDP	Read-only	Read-only	☐
Static-Route	Read-only	Read-only	☐
Route-Map	Read-only	Read-only	☐
Proxy-ARP	Read-only	Read-only	☐
VRRP	Read-only	Read-only	☐
RIP	Read-only	Read-only	☐
OSPF	Read-only	Read-only	☐
PIM	Read-only	Read-only	☐
TACACS-Plus	Read-only	Read-only	☐
Configure-terminal	Read-write	Read-only	☐

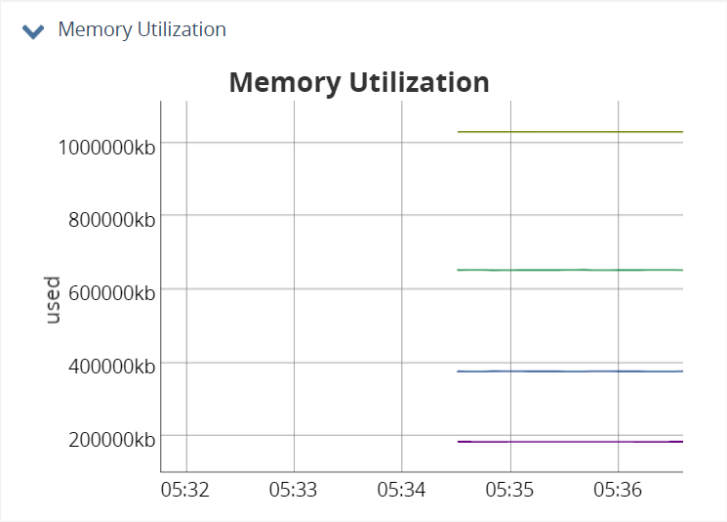
System Utilization

The System Utilization page is a read-only page for viewing the current CPU and memory utilization levels. The first panel shows utilizations as a percentage, and the second panel shows the total memory, amount used, amount free, and amount cached.



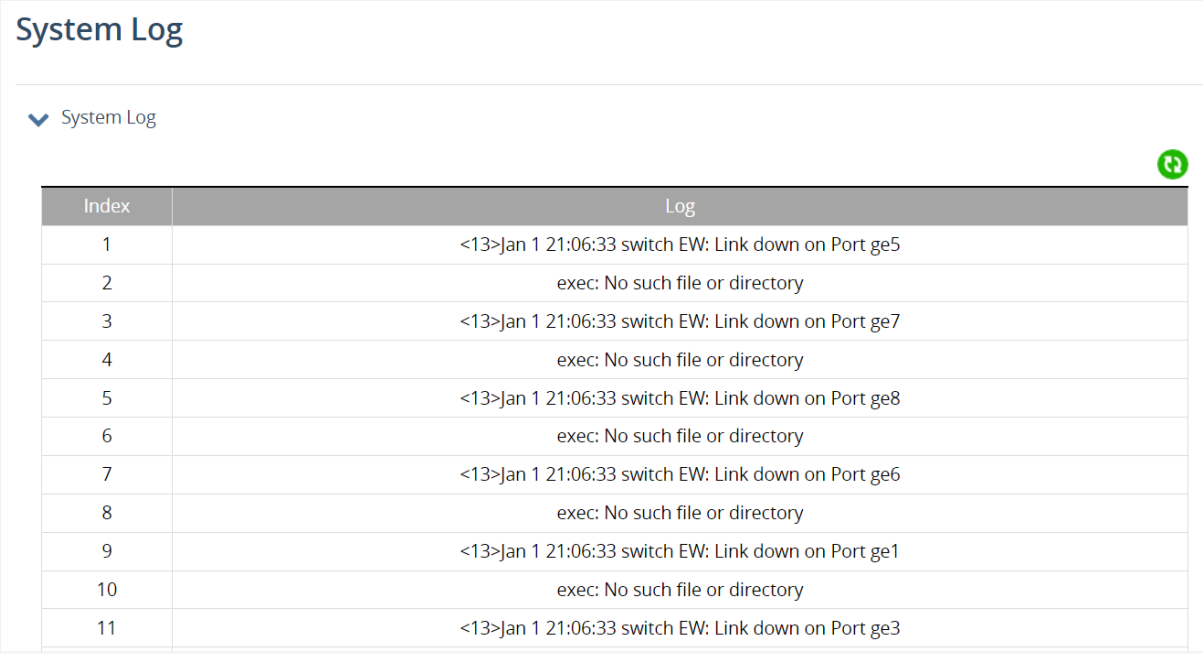
Below there are real-time graphs of CPU and memory usage. Mouse over any point on these graphs to see detailed information.





System Log

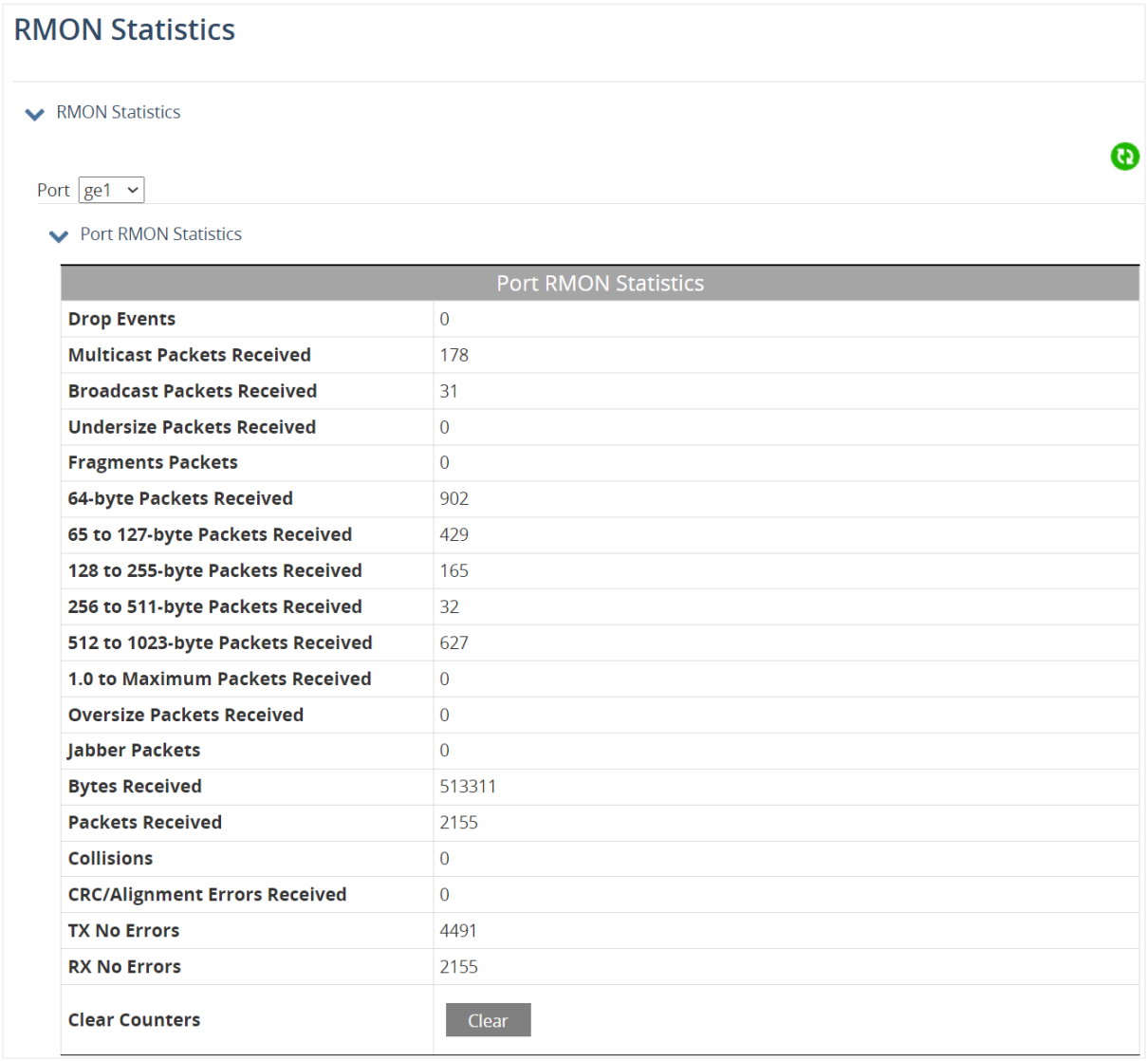
The System Log shows the data and time of system events, such as port links going up or down.



Index	Log
1	<13>Jan 1 21:06:33 switch EW: Link down on Port ge5
2	exec: No such file or directory
3	<13>Jan 1 21:06:33 switch EW: Link down on Port ge7
4	exec: No such file or directory
5	<13>Jan 1 21:06:33 switch EW: Link down on Port ge8
6	exec: No such file or directory
7	<13>Jan 1 21:06:33 switch EW: Link down on Port ge6
8	exec: No such file or directory
9	<13>Jan 1 21:06:33 switch EW: Link down on Port ge1
10	exec: No such file or directory
11	<13>Jan 1 21:06:33 switch EW: Link down on Port ge3

RMON Statistics

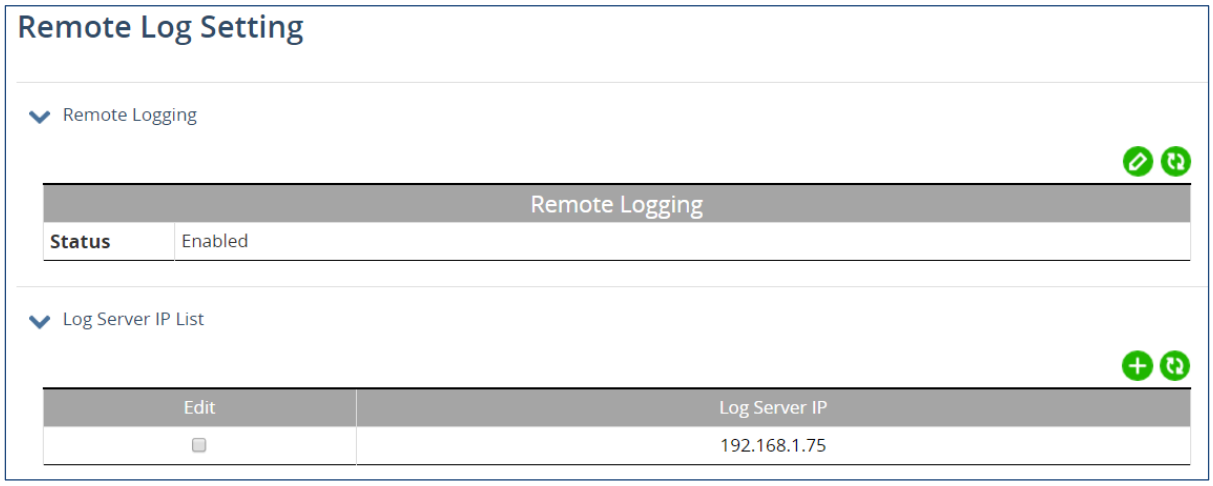
RMON Statistics gives a detailed listing of the types and quantity of packets that a particular port has seen since the last reboot of the switch.



Port RMON Statistics	
Drop Events	0
Multicast Packets Received	178
Broadcast Packets Received	31
Undersize Packets Received	0
Fragments Packets	0
64-byte Packets Received	902
65 to 127-byte Packets Received	429
128 to 255-byte Packets Received	165
256 to 511-byte Packets Received	32
512 to 1023-byte Packets Received	627
1.0 to Maximum Packets Received	0
Oversize Packets Received	0
Jabber Packets	0
Bytes Received	513311
Packets Received	2155
Collisions	0
CRC/Alignment Errors Received	0
TX No Errors	4491
RX No Errors	2155
Clear Counters	Clear

Remote Log Setting

Remote Logging to a Syslog server allows administrators to log important system and debugging information. The Remote Logging configuration page allows reporting to a Syslog server to be enabled or disabled as well as management of a list of Syslog servers to report to. Enable or disable remote logging in the top panel, and use the bottom panel to add, edit, or delete log server IP addresses.



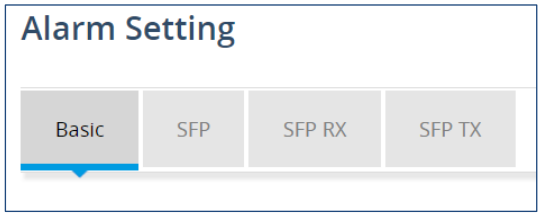
Alarm Setting

Alarms can be set for a variety of general switch conditions including link down and redundant power failure. When equipped with a DDM (Digital Diagnostics Monitoring) compatible SFP module, major and minor alarms can also be set for SFP voltage, power, and TX bias. By default, alarms are sent to the system log, and displayed on the top panel of the web interface. Alarms can also be sent as SNMP traps to an SNMP server. External alarm devices can be configured using the relay output alarm.

NOTE: To configure specific threshold values for DDM SFP alarms, you must use the command line interface (CLI).

The Alarm Setting page is divided into four sections, accessible by tabs at the top of the page.

In the first section, **Basic** alarms can be set for failure on any port, and either power input (if dual power inputs are used).



Alarm Trigger Link

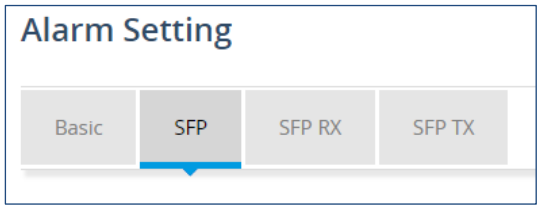
Port	Enabled	Status	Edit
ge1	No	Link-up	Apply Cancel
ge2	No	Link-down	
ge3	No	Link-down	
ge4	No	Link-down	
ge5	No	Link-down	
ge6	No	Link-down	
ge7	No	Link-down	
ge8	No	Link-down	
ge9	No	Link-down	
ge10	No	Link-down	
ge11	No	Link-down	
ge12	No	Link-down	

Alarm Trigger Power

Power	Enabled	Status	Edit
Power1	No	Up	
Power2	No	Up	

To set a link-down alarm check the box next to a port, and click “Apply”

Panels on the second tab panels allow for setting of major and minor alarms for SFP voltage.



Alarm Trigger SFP Temperature Major

PORT	Enabled	Status	Edit
ge9	No	Temper:SFP Module none detect (Major)	☐
ge10	No	Temper:SFP Module none detect (Major)	☐
ge11	No	Temper:SFP Module none detect (Major)	☐
ge12	No	Temper:SFP Module none detect (Major)	☐

Alarm Trigger SFP Temperature Minor

PORT	Enabled	Status	Edit
ge9	No	Temper:SFP Module none detect (Minor)	☐
ge10	No	Temper:SFP Module none detect (Minor)	☐
ge11	No	Temper:SFP Module none detect (Minor)	☐
ge12	No	Temper:SFP Module none detect (Minor)	☐

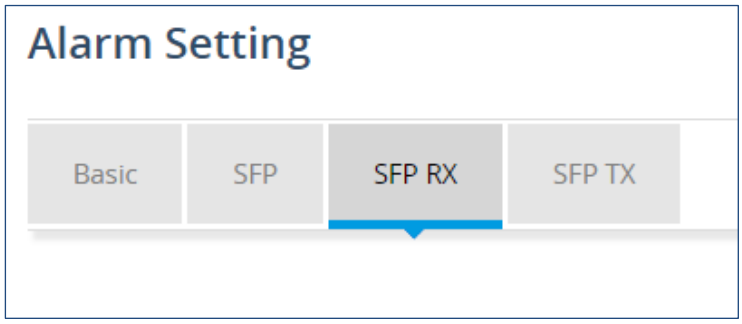
Alarm Trigger SFP Vcc Major

PORT	Enabled	Status	Edit
ge9	No	Vcc:SFP Module none detect (Major)	☐
ge10	No	Vcc:SFP Module none detect (Major)	☐
ge11	No	Vcc:SFP Module none detect (Major)	☐
ge12	No	Vcc:SFP Module none detect (Major)	☐

Alarm Trigger SFP Vcc Minor

PORT	Enabled	Status	Edit
ge9	No	Vcc:SFP Module none detect (Minor)	☐
ge10	No	Vcc:SFP Module none detect (Minor)	☐
ge11	No	Vcc:SFP Module none detect (Minor)	☐
ge12	No	Vcc:SFP Module none detect (Minor)	☐

On the third tab are panels to set major and minor alarms for RX power. This is the optical power ratio received in decibels (dB).



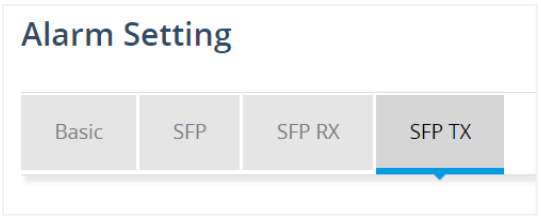
Alarm Trigger SFP RX-Power Major

PORT	Enabled	Status	Edit
ge9	No	Rx Power:SFP Module none detect (Major)	☐
ge10	No	Rx Power:SFP Module none detect (Major)	☐
ge11	No	Rx Power:SFP Module none detect (Major)	☐
ge12	No	Rx Power:SFP Module none detect (Major)	☐

Alarm Trigger SFP RX-Power Minor

PORT	Enabled	Status	Edit
ge9	No	Rx Power:SFP Module none detect (Minor)	☐
ge10	No	Rx Power:SFP Module none detect (Minor)	☐
ge11	No	Rx Power:SFP Module none detect (Minor)	☐
ge12	No	Rx Power:SFP Module none detect (Minor)	☐

The fourth tab contains panels for setting major and minor alarms for TX Bias and TX Power. TX Bias is the transmit bias power signal, in milliamperes (mA). TX Power is the transmit power signal, in decibels (dB).



Alarm Trigger SFP TX-Bias Major

PORT	Enabled	Status	Edit
ge9	No	Tx Bias:SFP Module none detect (Major)	☐
ge10	No	Tx Bias:SFP Module none detect (Major)	☐
ge11	No	Tx Bias:SFP Module none detect (Major)	☐
ge12	No	Tx Bias:SFP Module none detect (Major)	☐

Alarm Trigger SFP TX-Bias Minor

PORT	Enabled	Status	Edit
ge9	No	Tx Bias:SFP Module none detect (Minor)	☐
ge10	No	Tx Bias:SFP Module none detect (Minor)	☐
ge11	No	Tx Bias:SFP Module none detect (Minor)	☐
ge12	No	Tx Bias:SFP Module none detect (Minor)	☐

Alarm Trigger SFP TX-Power Major

PORT	Enabled	Status	Edit
ge9	No	Tx Power:SFP Module none detect (Major)	☐
ge10	No	Tx Power:SFP Module none detect (Major)	☐
ge11	No	Tx Power:SFP Module none detect (Major)	☐
ge12	No	Tx Power:SFP Module none detect (Major)	☐

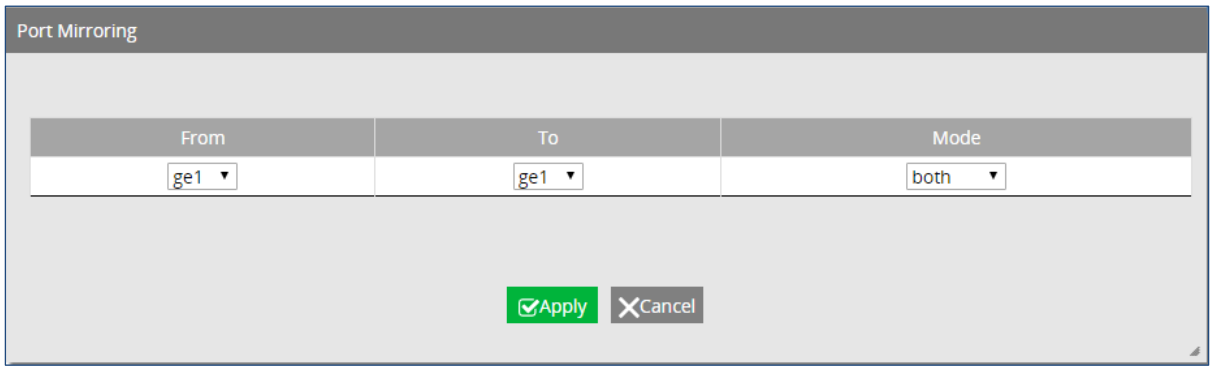
Alarm Trigger SFP TX-Power Minor

PORT	Enabled	Status	Edit
ge9	No	Tx Power:SFP Module none detect (Minor)	☐
ge10	No	Tx Power:SFP Module none detect (Minor)	☐
ge11	No	Tx Power:SFP Module none detect (Minor)	☐
ge12	No	Tx Power:SFP Module none detect (Minor)	☐

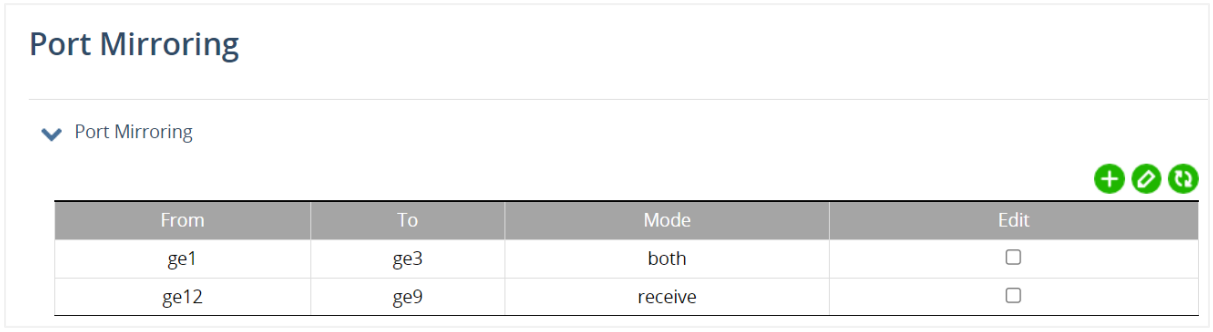
Port Mirroring

To configure port mirroring, click the add icon, and enter the **From** and **To** ports. Select the desired mode: transmit (mirror transmits traffic), receive (mirror receives traffic), or both (traffic is mirrored in both directions).

Port mirroring can only be configured on interfaces of the same type, e.g., only a switchport interface can mirror a switchport interface. Issuing a switchport command on a port where mirroring is enabled will remove port mirroring on that interface.



Existing mirrors can be viewed and deleted from the initial page.



Email Alert

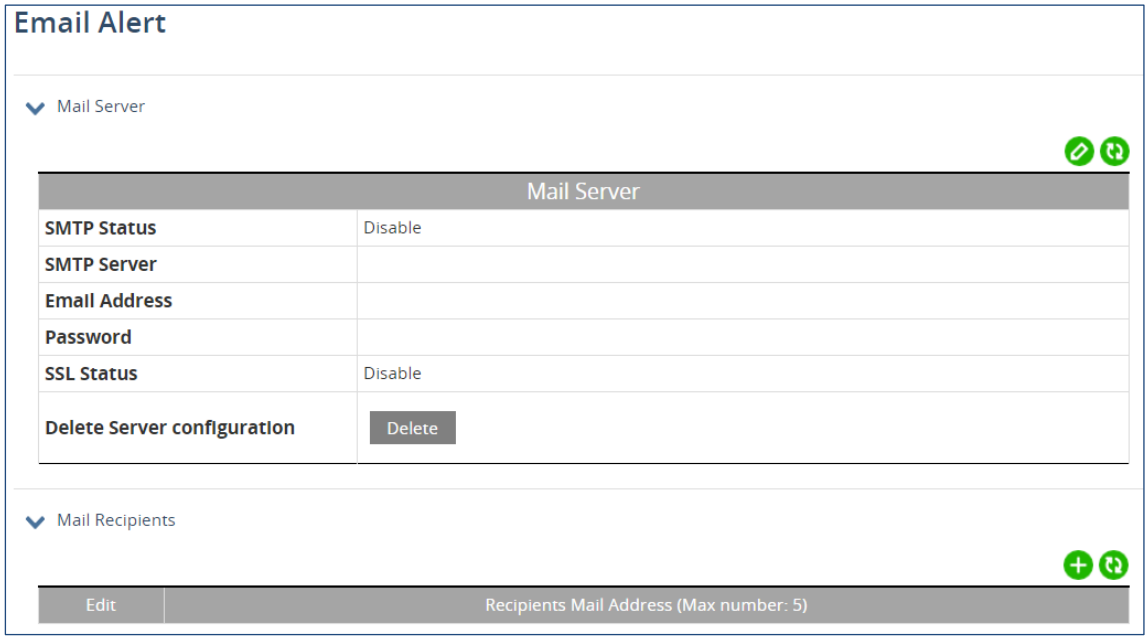
The switch can send email alerts to up to three recipients when an environmental alarm is triggered.
To enable email notifications, click the edit button and set the **SMTP Status** to **enable**.

To configure mail server and recipient email addresses:

1. Enter the name of the SMTP server to be used in the corresponding field, and the server port.
2. Enter the email address of the sending account.
3. Enter the password for the email account being used, and select Enable or disable for SSL (Secure Sockets Layer) Status.
4. Click the Update button.

NOTE: If SSL is disabled, port 25 will be used to send email. If SSL is enabled, port 465 will be used.

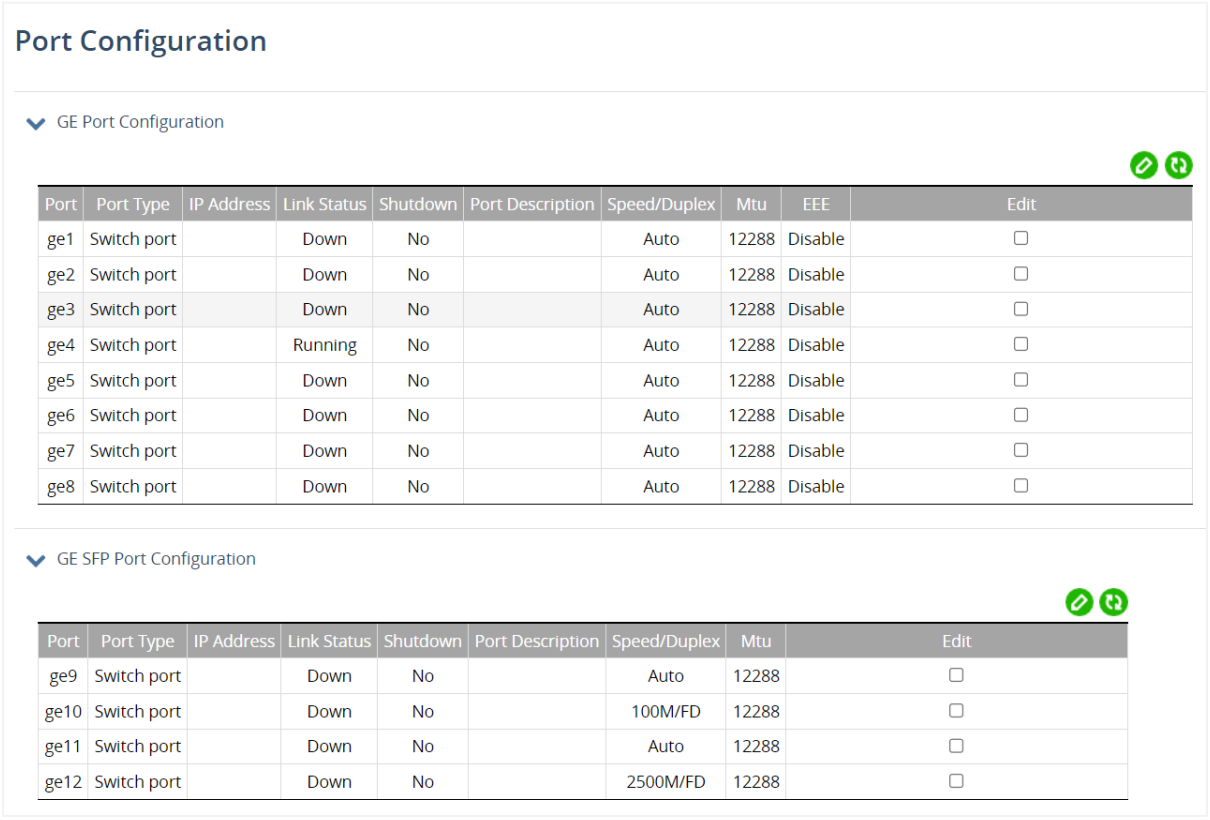
You can view, add, and delete email recipients in the fields at the bottom of the page. Only one email address can be added at a time.



5 Port

Port Configuration

Port configuration contains features as flow control, port speed, and duplex settings. These settings can be very useful when the switch is connected to a latency-critical device such as a VOIP phone, IP camera, or video multiplexor. The ability to alter port settings can make the difference between a poorly responding device and one that functions without loss of data or clarity.



The **Configuration** page shows (see figure below):

1. **Port Type** – Routed port or Switch port
2. **IP address** – For routed ports only, aaa.bbb.ccc.ddd/mm format
3. **Link Status** – Operational State of the Port's Link (Read-Only)
4. **Shutdown** – Shutdown state
5. **Port Description** – User-supplied description, 80 characters maximum

6. **Duplex / Speed** – Click on the drop-down box under Speed/Duplex and select the desired port speed / duplex settings for that port.
   - For 10/100/1000 TX ports – Have five options: Auto, 100M/FD, 100M/HD, 10M/FD, 10M/HD.
   - For 100/1000/2500 SFP ports – Have three options: Auto, 100M/FD, 2500M/FD. Note that the default seting is Auto, and it is running at a fixed speed 1000M.

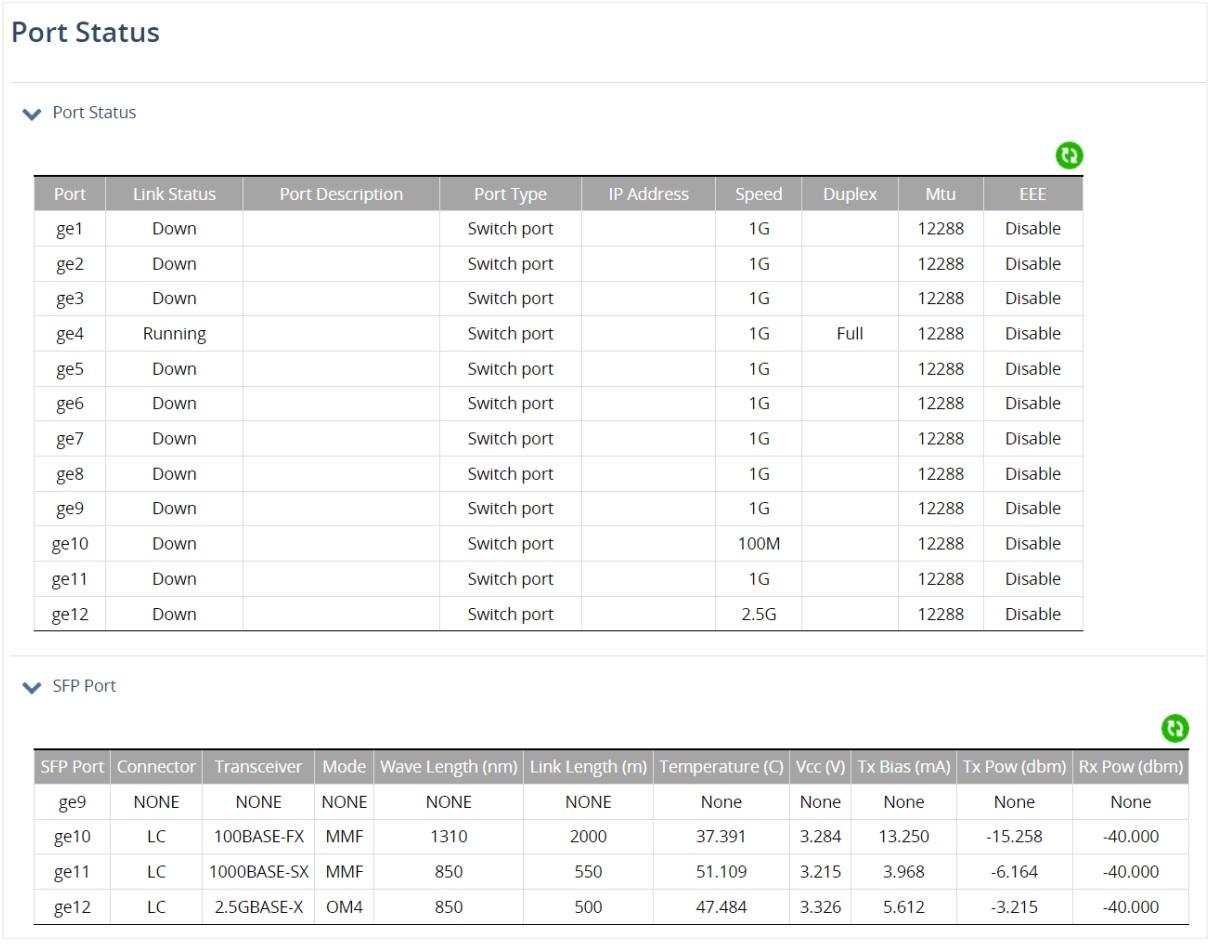
NOTE: It is recommended to manually select the speed required instead of using the Auto option.

7. **EEE** (Energy-Efficient Ethernet) – EEE reduces the switch's power consumption during periods of low activity. EEE is disabled by default.

Click the check box to modify the settings for a port and click "Apply" when finished.

Port Status

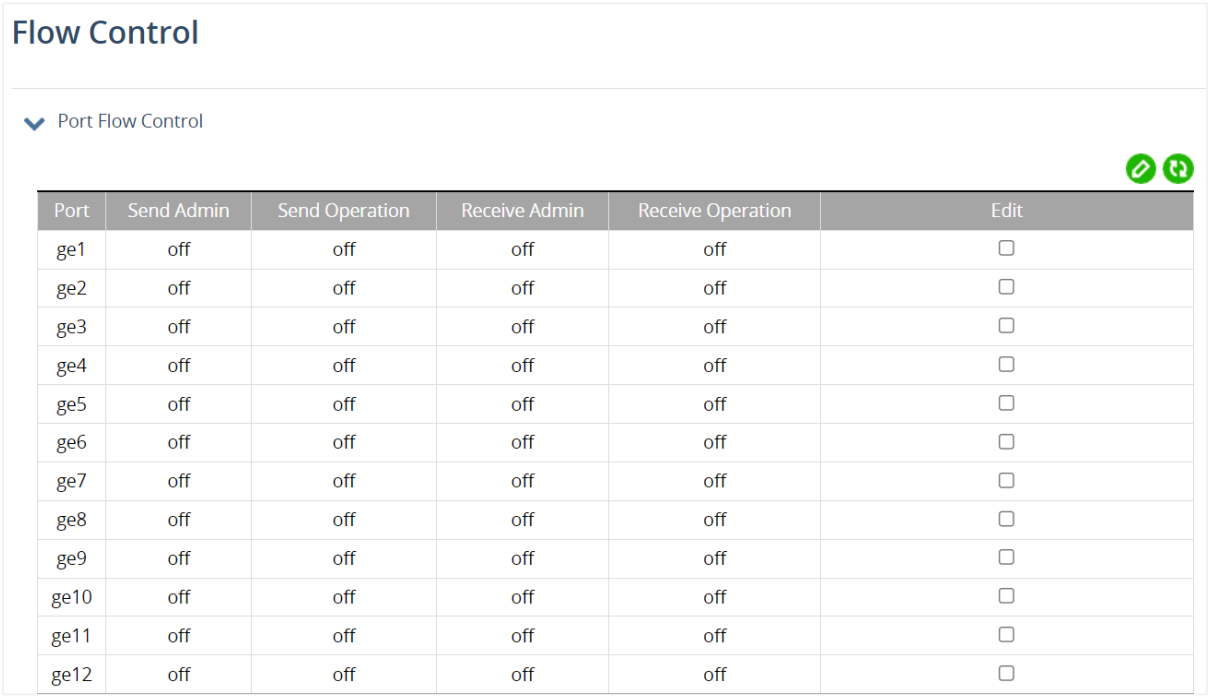
This is a read-only page that lists the settings described in the previous section.



Flow Control

Flow control allows switches of different speeds to communicate. When enabled, the lower speed switch can request that the higher speed switch refrains from sending packets. Transmissions are temporarily halted to prevent overflows. Flow control in enabled by default on all ports.

When enabling or editing flow control on a port, click the check box next to the port, then set the **Send Admin** and **Receive Admin** fields to **on** or **off**, enabling or disabling the port's ability to send and receive flow control administrative requests. Then click "Apply."

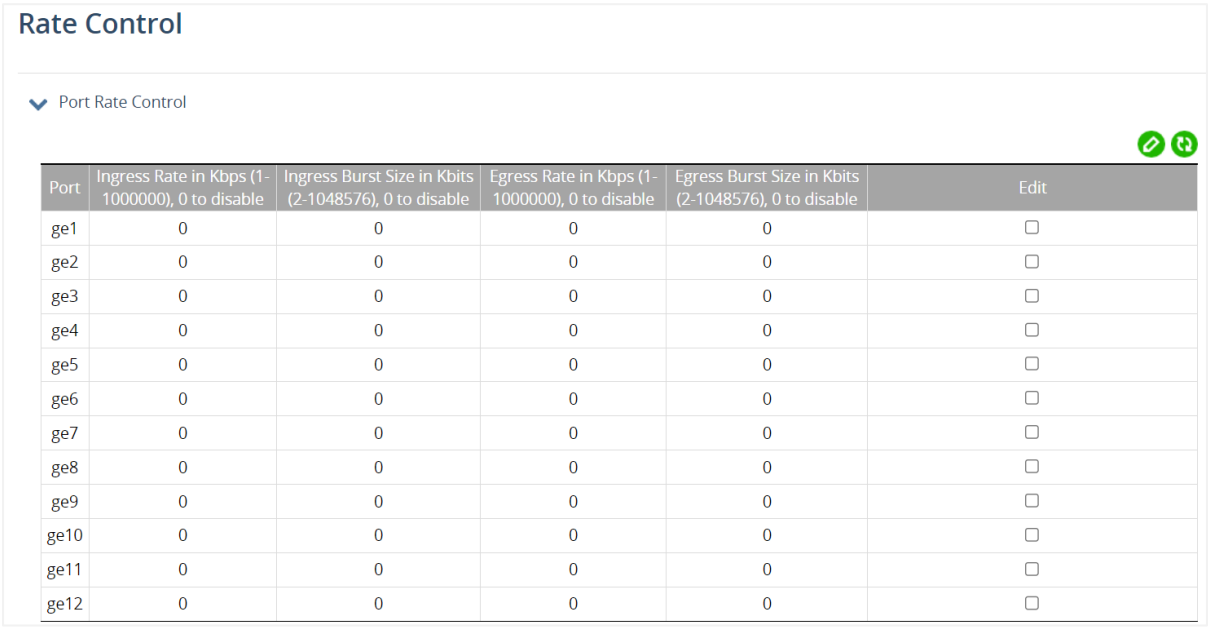


Port	Send Admin	Send Operation	Receive Admin	Receive Operation	Edit
ge1	off	off	off	off	☐
ge2	off	off	off	off	☐
ge3	off	off	off	off	☐
ge4	off	off	off	off	☐
ge5	off	off	off	off	☐
ge6	off	off	off	off	☐
ge7	off	off	off	off	☐
ge8	off	off	off	off	☐
ge9	off	off	off	off	☐
ge10	off	off	off	off	☐
ge11	off	off	off	off	☐
ge12	off	off	off	off	☐

Rate Control

Rate control forces a port to drop packets when an ingress / egress rate limit has been exceeded. Click on the check box next to a port, and enter the limits for **Ingress Rate in Kbps**, **Ingress Burst Size in Kbits**, **Egress Rate in Kbps**, and **Egress Burst Size in Kbits**. Then click “Apply.”

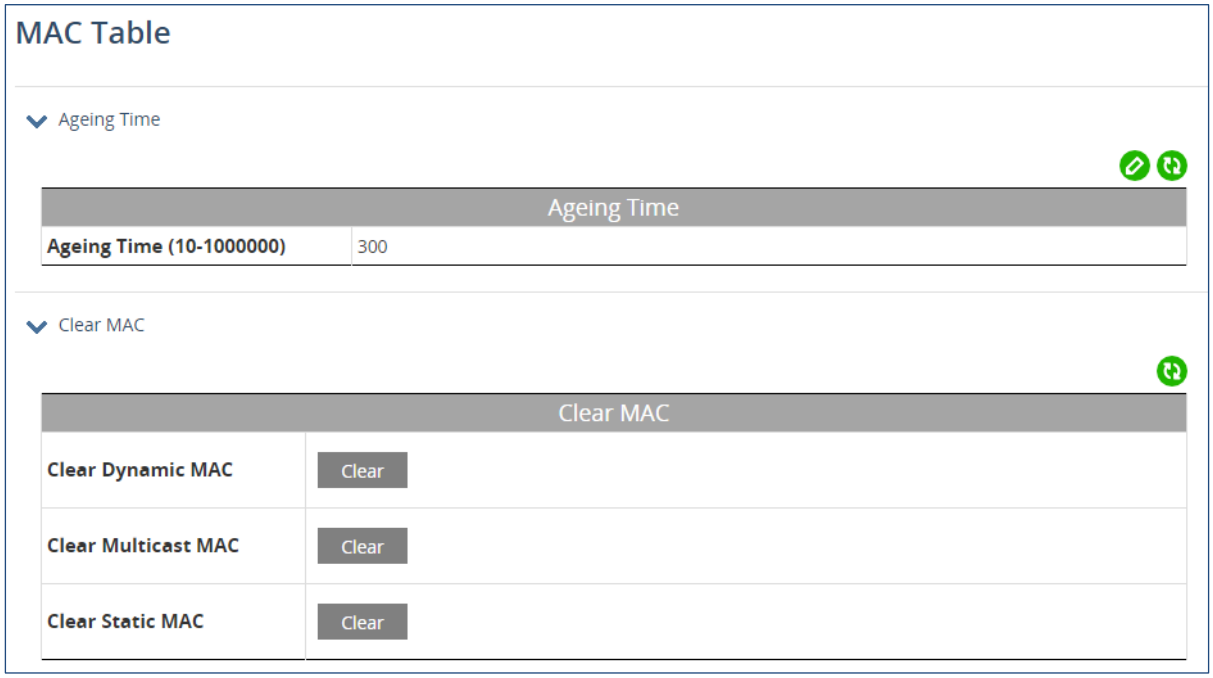
To disable Rate Control on a port, set all values to zero.

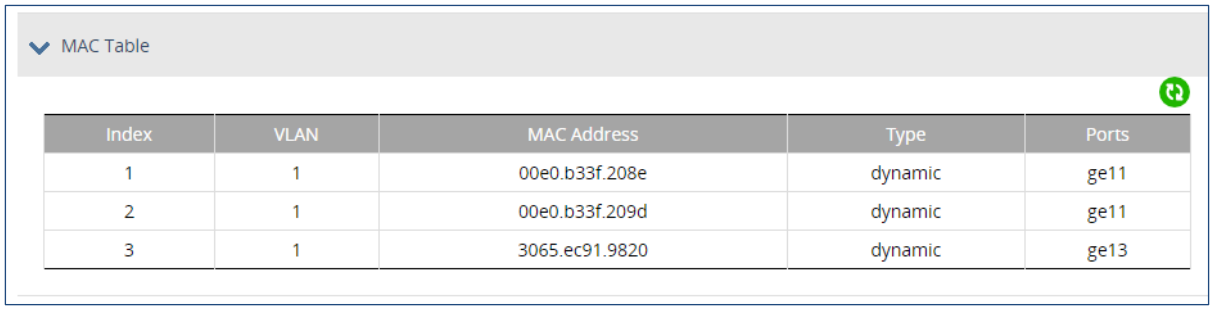


Port	Ingress Rate in Kbps (1-1000000), 0 to disable	Ingress Burst Size in Kbits (2-1048576), 0 to disable	Egress Rate in Kbps (1-1000000), 0 to disable	Egress Burst Size in Kbits (2-1048576), 0 to disable	Edit
ge1	0	0	0	0	☐
ge2	0	0	0	0	☐
ge3	0	0	0	0	☐
ge4	0	0	0	0	☐
ge5	0	0	0	0	☐
ge6	0	0	0	0	☐
ge7	0	0	0	0	☐
ge8	0	0	0	0	☐
ge9	0	0	0	0	☐
ge10	0	0	0	0	☐
ge11	0	0	0	0	☐
ge12	0	0	0	0	☐

MAC Table

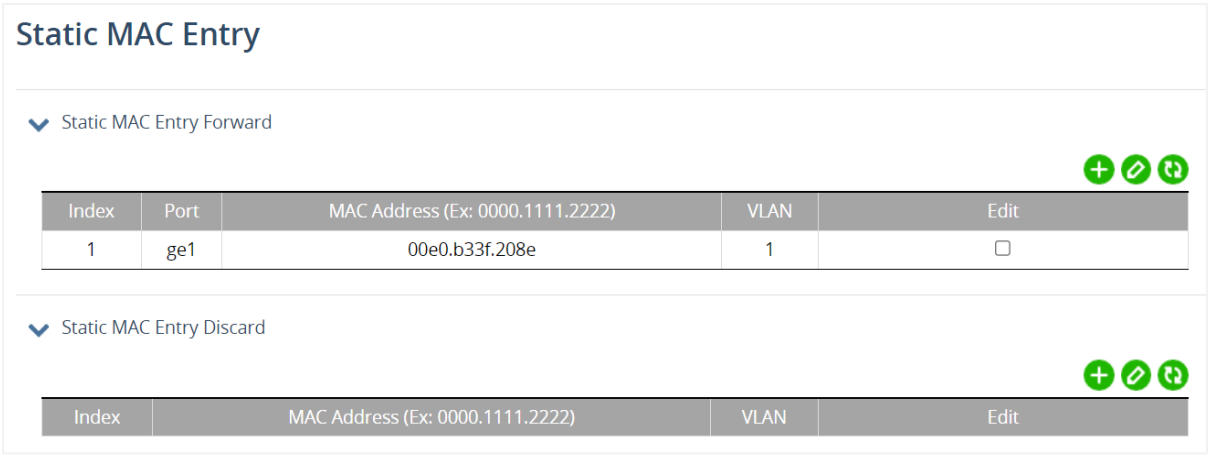
The MAC Table page contains a panel for setting the Ageing Time, one for clearing Dynamic, Mulitcast, and Static MAC addresses, and a read-only panel for viewing the current MAC Table. Change the Ageing time (the time that a networked device's MAC address will live in the switch's memory before being removed) by clicking the edit icon, and entering the desired Ageing Time in seconds. Then click "Apply."





Static MAC Entry

Static MAC Entry Forward allows you to specify a MAC address on a particular port and VLAN rather than adjusting the ageing time for the entire switch. Alternatively, you can prevent a MAC address from ever being registered with a switch by using **Static MAC Entry Discard**.

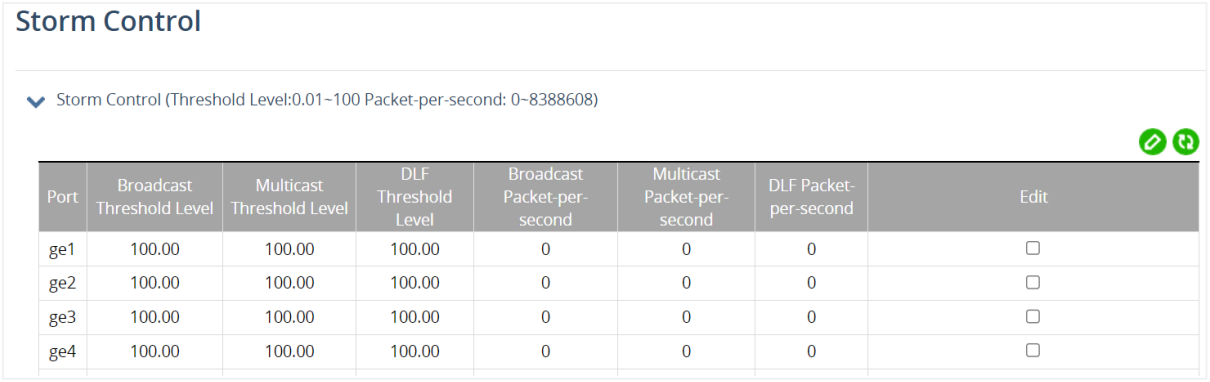


Storm Control

Set the rising threshold level for broadcast, multicast, or destination lookup failure traffic. The storm control action occurs when traffic utilization reaches the set level. Storm control blocks the forwarding of unnecessary flooded traffic.

To enable Storm Control on a port, select it by clicking the check box on the left. Then enter values for:

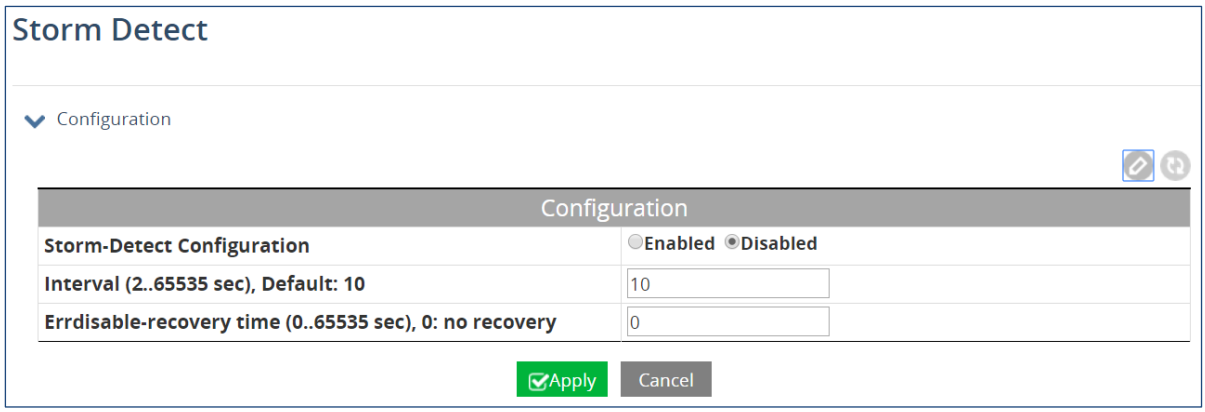
Broadcast Threshold Level: Broadcast rate limiting, based on percentage of the maximum speed (in packets per second) of the interface
Multicast Threshold Level: Multicast rate limiting, based on percentage of the maximum speed (in packets per second) of the interface
DLF Threshold Level: Destination lookup failure, based on percentage of the maximum speed (pps) of the interface
Broadcast Packet-per-second: Broadcast rate limiting, based on total number of packets
Multicast Packet-per-second: Multicast rate limiting, based on total number of packets
DLF Packet-per-second: Destination lookup failure, based on total number of packets



Storm Detect

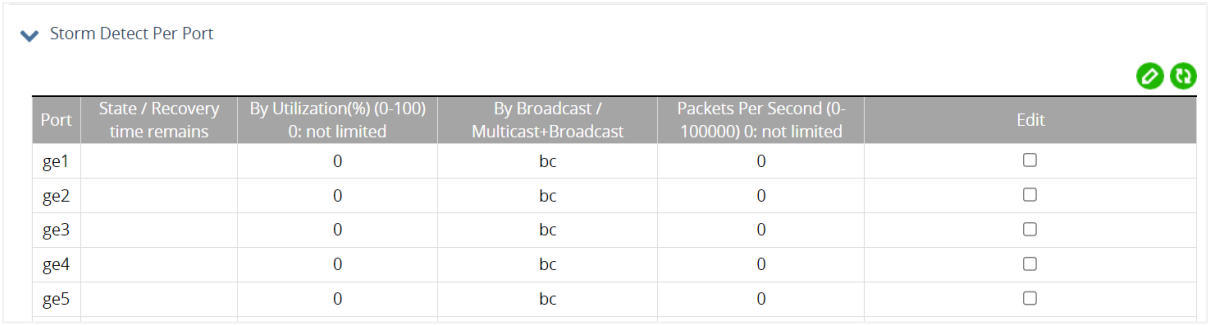
Storm Detect can disable a port that is receiving excessive Broadcast and/or Multicast packets. The switch can be configured to take action based on percentage of bandwidth utilization or number of packets per second.

To enable Storm Detect globally, click the edit icon and then **Enable**. Then set the Storm Detect **interval** to a value between 2 and 65535 seconds. Set the **errdisable-recovery time** to value between 0 and 65535 seconds.



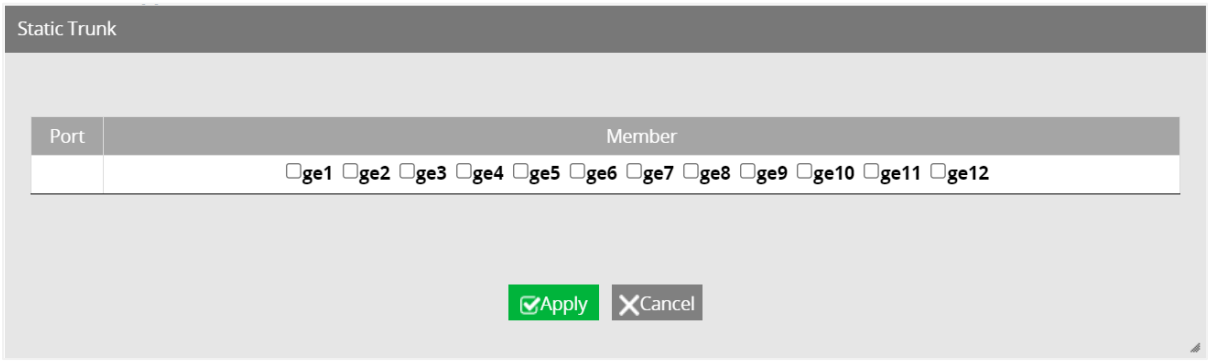
Configure the Storm Detect parameters for each port by clicking on the check box and entering values for:

By Utilization: Percentage of port's maximum speed
By Broadcast / Multicast+Broadcast: Type of packet to be monitored
Packets Per Second: Threshold for Storm Detect activation



Trunking

The switch supports Static Channel Trunking for up to 12 trunks. To add a trunk, click the add icon in either the **Static Trunk** or **LACP Trunk** section, and then select the ports to be added. Then click “Apply.”

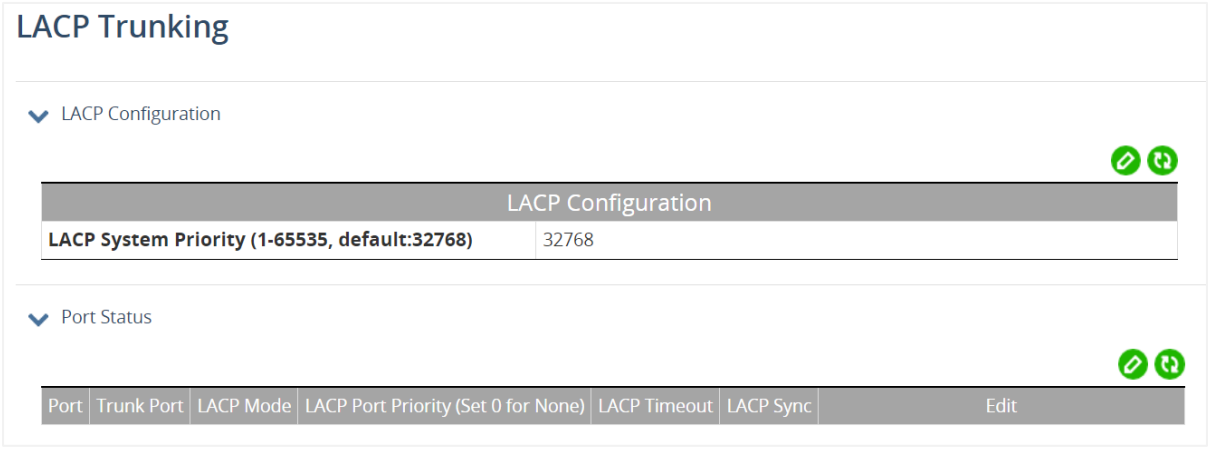


LACP Trunking

The Link Aggregation Control Protocol (LACP) provides a method to control the bundling of several physical ports together to form a single logical channel. LACP allows a device to negotiate an automatic bundling of links by sending LACP packets to the peer (directly connected device that also implements LACP). This means that both sides of the LACP channel must be configured for LACP which implies both devices must support it.

The LACP system priority is used with the MAC address of the switch to create a system ID and to negotiate with other switches. A higher number means a lower priority.

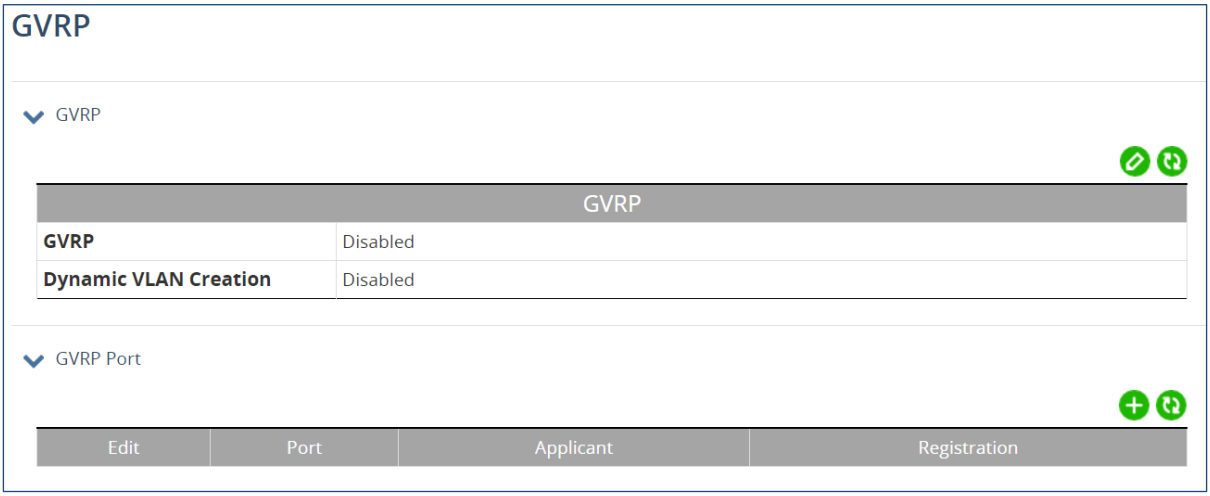
LACP port priority is set on each LACP port. The port priority is used with the port number to create the port identifier. The port priority determines which ports will be put in standby mode when aggregation for all ports is impossible.

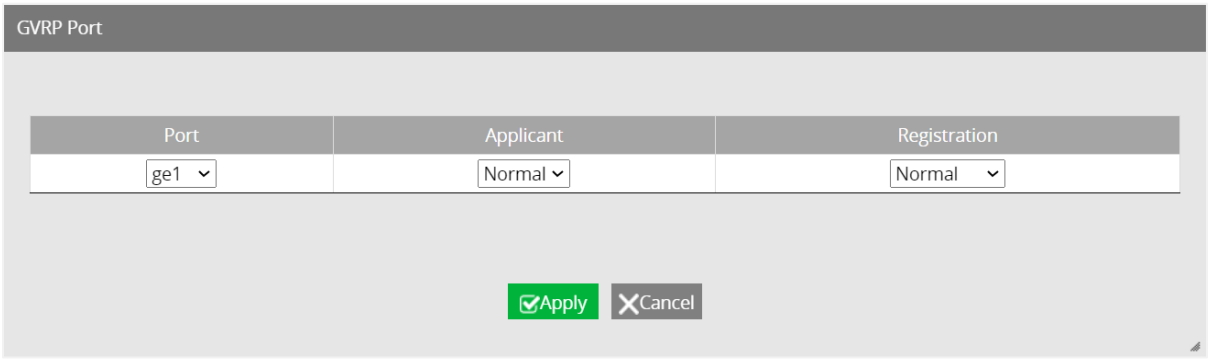


GVRP

GVRP is used to dynamically create VLANs on a switch. Any IEEE 802.1Q compliant switch must implement this protocol.

To enable GVRP, click the edit icon and then the radio button next to **GVRP** and/or **Dynamic VLAN Creation**. Then add a GVRP port by clicking the add icon, and selecting the desired port, **normal** or **active** status for the Applicant, and **normal**, **fixed**, or **forbidden** for Registration.





Add GVRP Port

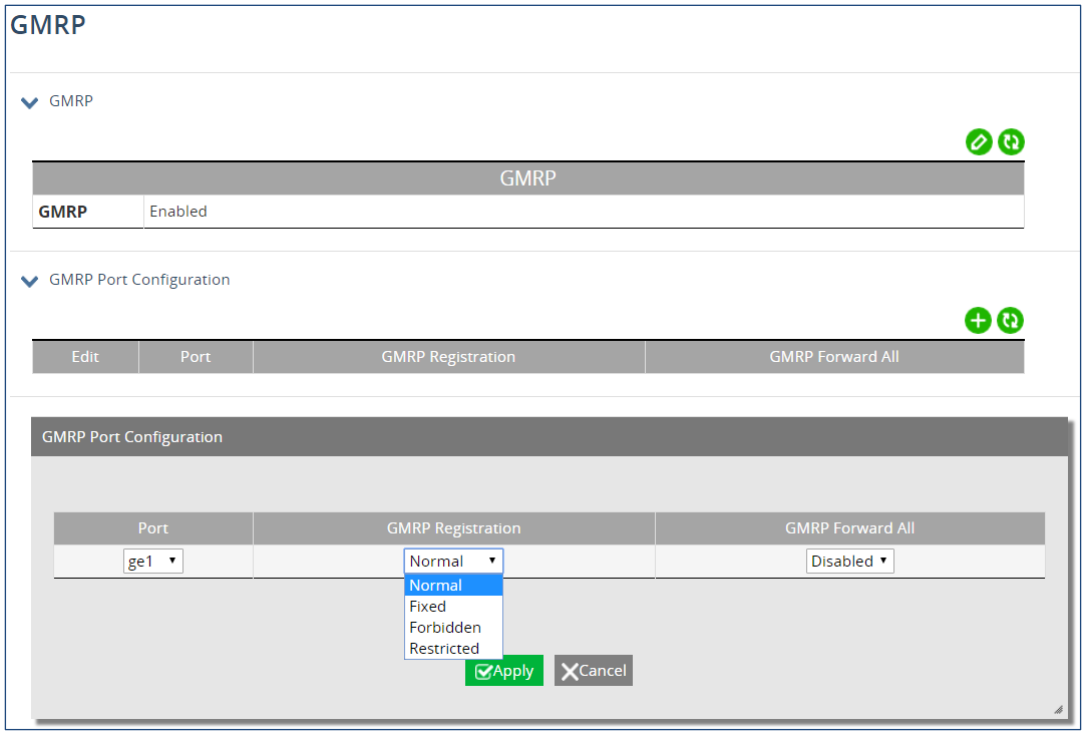
GMRP

The settings in the GMRP feature controls how the switch automates the process of multicast packet forwarding, both within a single switch as wells as between switches in a bridged network. With the GMRP feature enabled, when the switch receives any GMRP multicast group registration requests from either a multicast client or a neighbor switch, the switch will register these multicast groups on these ports and will only transmit the multicast packets that belong to these groups to these ports. The switch will also automatically propagate these multicast group registrations onto the neighbor switches to allow the neighbor switches to forward the multicast packets that belong to these groups to the local switch.

The ports on the EtherWAN switch can be configured with the GMRP feature in five modes:

- Normal
- Fixed
- Forbidden
- Restricted

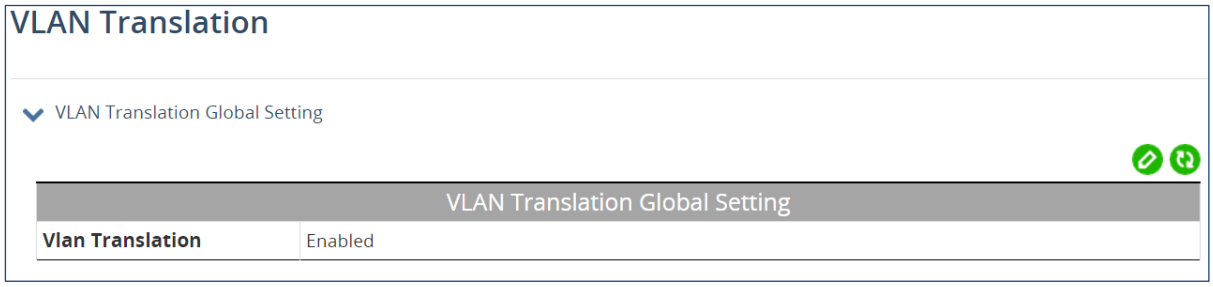
GMRP Forward All can be enabled or disabled when configuring GMRP ports.



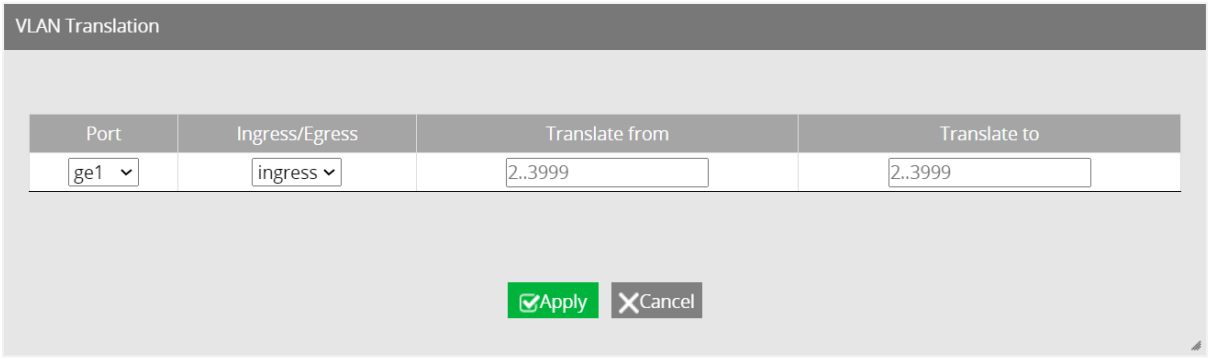
VLAN Translation

In VLAN translation, a VLAN tag is removed from an Ethernet frame and rewritten to a different VLAN. This effectively “translates” the frame from one VLAN ID to another. This can be very useful when merging two networks in which the same VLAN is used by both.

To enable VLAN translation, click the edit icon and then click the radio button next to **enable**.



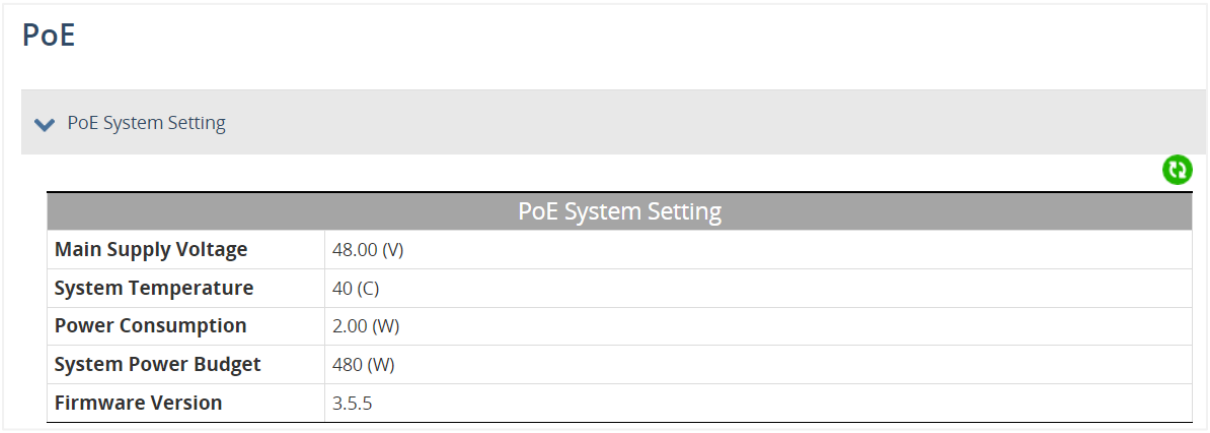
To add a new translation entry, click the add icon. Select the port, and whether the translation is to take effect on packet **ingress** or **egress**. Then enter the corresponding VLAN IDs in the **Translate from** and **Translate to** fields. Then click “Apply.”



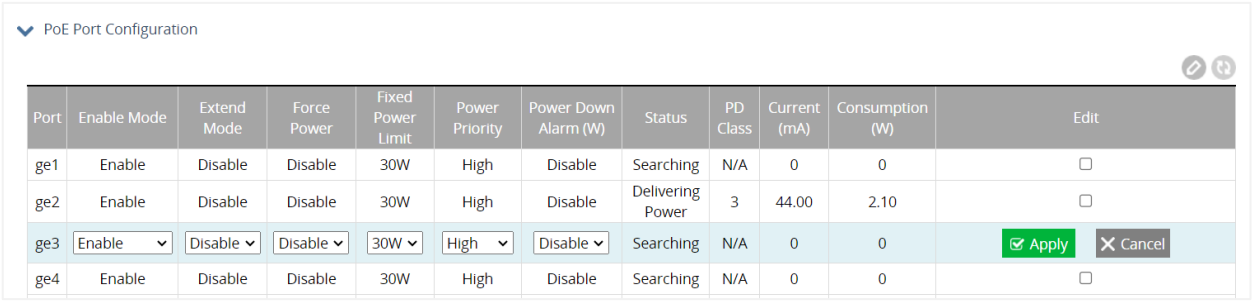
PoE

The PoE page provides access to PoE System Setting information and PoE Port configuration. The System Setting information:

1. Main Supply Voltage
2. System Temperature
3. Power Consumption – Actual wattage supplied to attached PoE device(s)
4. System Power Budget – The maximum and default values



The PoE Port Configuration section provides the following configurable settings and information:



Port	Enable Mode	Extend Mode	Force Power	Fixed Power Limit	Power Priority	Power Down Alarm (W)	Status	PD Class	Current (mA)	Consumption (W)	Edit
ge1	Enable	Disable	Disable	30W	High	Disable	Searching	N/A	0	0	☐
ge2	Enable	Disable	Disable	30W	High	Disable	Delivering Power	3	44.00	2.10	☐
ge3	Enable	Disable	Disable	30W	High	Disable	Searching	N/A	0	0	Apply Cancel
ge4	Enable	Disable	Disable	30W	High	Disable	Searching	N/A	0	0	☐

1. **Enable Mode** – Set the PoE Enable Mode by selecting one of the following settings in the drop-down box under PoE Mode
   - Enable – Enable PoE on a specific port
   - Disable – Disable PoE on a specific port
   - Scheduling – Schedule time of day that PoE will be enabled per port
2. **Extend Mode** – This allows the port to deliver PoE power up to 250 meters at a speed of 10Mbps.

NOTE: It is suggested to pre-test the function before deployment. The maximum available transmission distance of PoE depends on the negotiation result of PD and PSE. Some PDs using EtherWAN PoE/PSE switches may only support a standard distance of 100 meters. Contact EtherWAN if assistance is needed. The input power voltage from the switch must be at least 57 volts to make PoE Extend Mode work.

NOTE: If PoE extend mode is enabled, **EEE** and **auto-negotiation** of the port will be disabled, instead, the port will be set at full duplex. Only 10Mbps speed is available if this feature is enabled.

3. **Force Power** – If enable Force Power on a specific port, the port will supply power to the connected PD without any detection or negotiation.
4. **Fixed Power Limit** – Provides a fixed maximum Wattage to the attached PoE (PD) device. Use the Drop-Down box to set 15W (2 pairs), 15W, 30W (2 pairs), 30W, 60W, 60W Pre-BT, or 90W.

NOTE. PoE port's fixed power setting restrictions:

(1). Total PoE power budget for the entire system:

- 480 Watts for EX78924G & EX78922G within an operating temperature range of -40 to 70°C
- 400 Watts for EX78924G & EX78922G within an operating temperature range of -40 to 75°C
- 240 Watts for EX78912G within an operating temperature range of -40 to 75°C

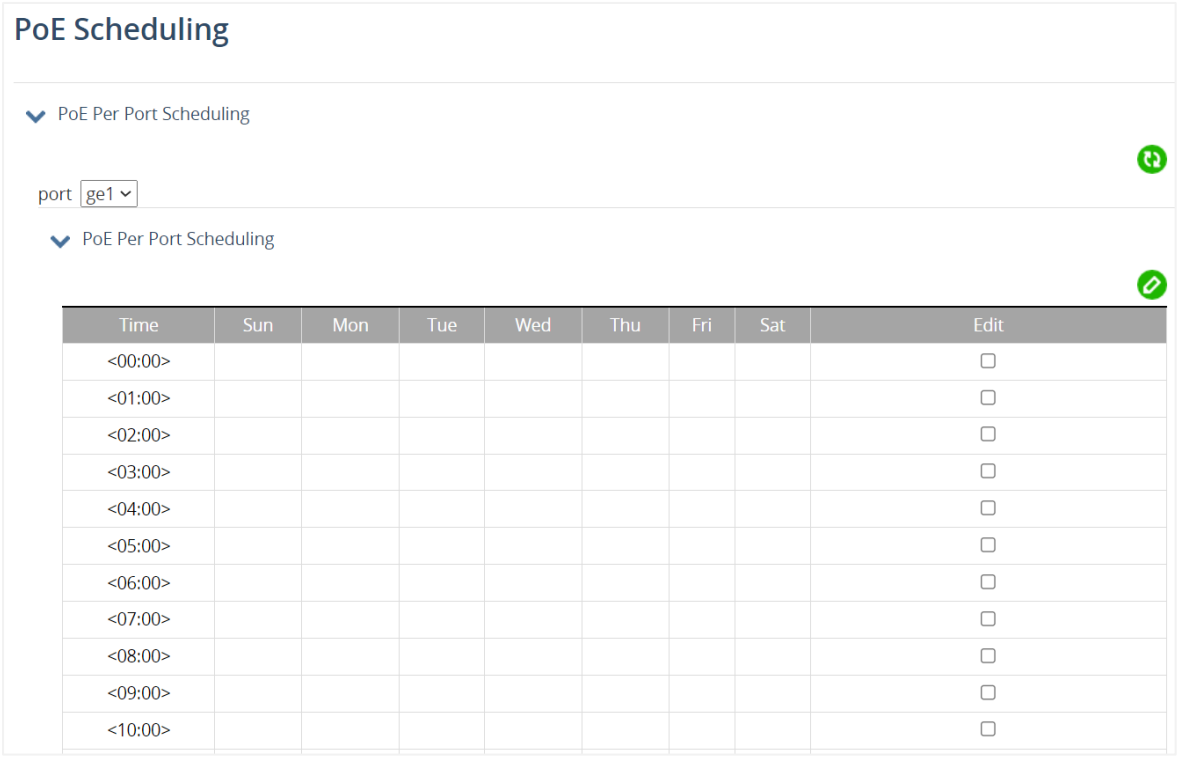
(2). The 4 or 8 PoE ports can be divided into 2 or 4 groups. The maximum PoE output is 120W for each group, and the maximum PoE output per port is 90W.

- Group 1 comprises of Port 1 and Port 2
- Group 2 comprises of Port 3 and Port 4
- Group 3 comprises of Port 5 and Port 6
- Group 4 comprises of Port 7 and Port 8

5. **Power Priority** – Use the Drop-Down box in the Power Priority column to set the priority to Critical, High, or Low.
6. **Power Down Alarm** – If enabled, the Power Down Alarm will trigger the switch relay when a loss of PoE power on a port occurs.
7. **Status** – Informational only. Provides the status of the PoE port.
8. **PD Class** - Informational only. Provides the PoE Classification of the PoE (PD) device attached to the PoE port in accordance with 802.3bt standards.
9. **Current (mA)** – Informational only. Shows the current draw from the attached PoE (PD) device.
10. **Consumption (W)** - Informational only. Shows the power consumption of the attached PoE (PD) device.

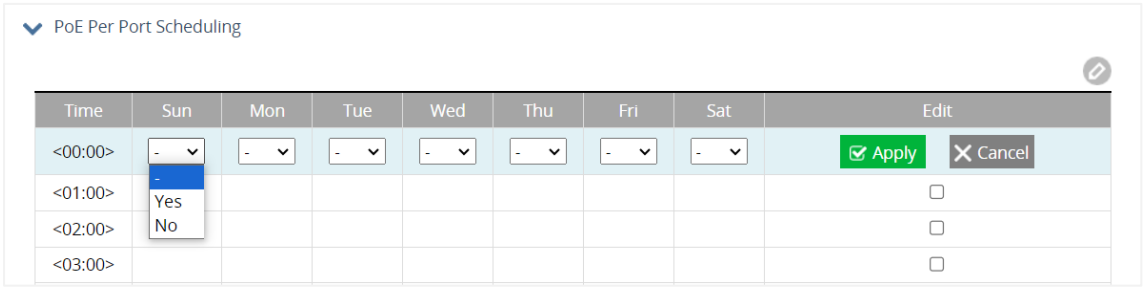
PoE Scheduling

PoE Scheduling allows PoE ports to have their power up time scheduled by the hour of the day and day of the week. For a port to follow a schedule defined here, the port must be set to Scheduling on the PoE page (see PoE Port Configuration section).



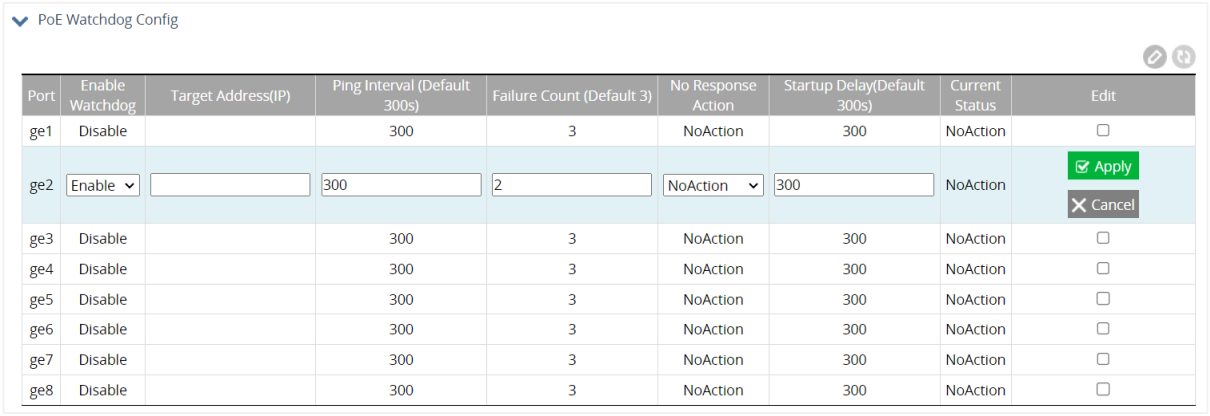
Each PoE port on the switch can be scheduled to power up and down automatically. To configure a port:

1. Select the port from the drop-down list
2. Select the hour(s) of the day for each day of the week
3. Click on the Apply button.



PoE Watchdog

PoE Watchdog is a management feature to help system administrators monitor and manage critical PoE powered devices. PoE Watchdog is only supported on PoE enabled ports. Once enabled, the switch will continuously ping a user specified IP address across the port. If the switch does not receive a reply within a specified interval, it can automatically power down or power cycle the powered device.



1. **Enable Watchdog** – Set the PoE Watchdog by selecting one of the following settings in the drop-down box.
   - Enable – Enable PoE Watchdog on a specific port.
   - Disable – Disable PoE Watchdog on a specific port.
2. **Target Address (IP)** – Set the IP address to which the device is connected.
3. **Ping Interval (Default 300s)** – Set the ping interval.
4. **Failure Count (Default 3)** – Set the failure count.
5. **No Response Action** – Set the response action when switch does not receive a reply from the specified IP address across the port.
   - No Action
   - Power Cycle – To reboot the PD.
   - Power Off – To power off the PD.
6. **The StartUp Delay (Default 300s)** – is the initial time delay before the system sends out the first ICMP echo request on the port (Range: 30 - 600 sec).

7 IGMP

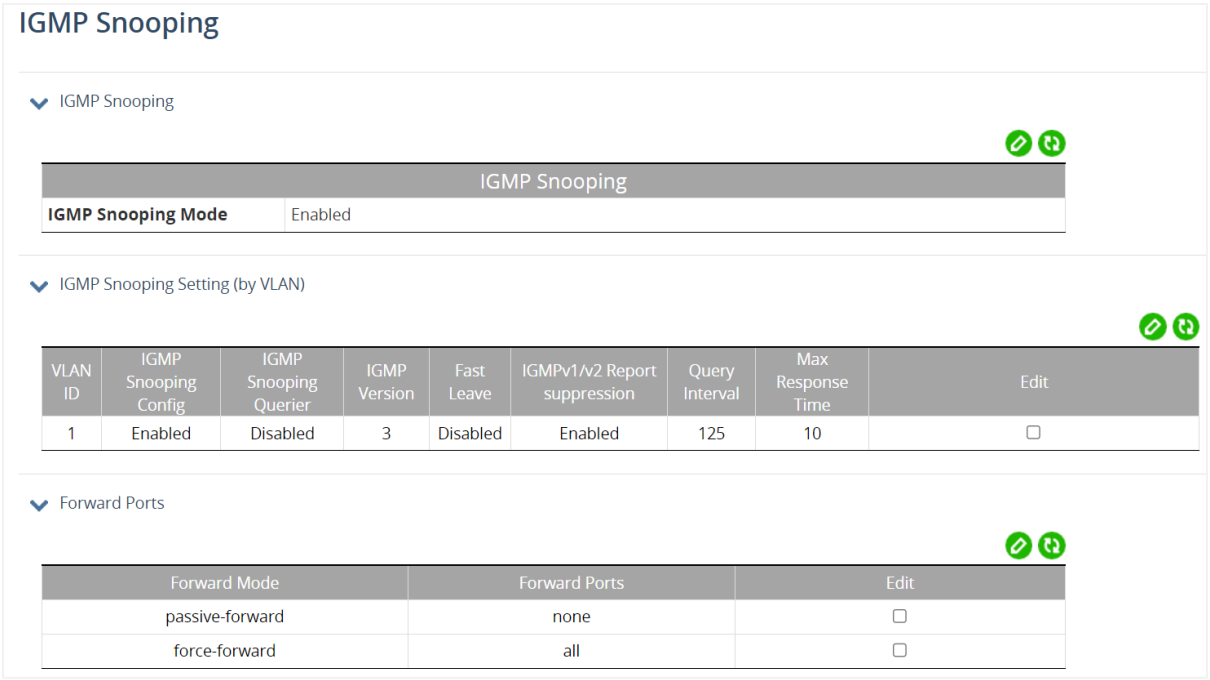
IGMP Snooping

A switch running IGMP snooping will dynamically determine which hosts connected to a particular VLAN in the switch should receive specific multicasts. The switch “snoops” (listens in on) IGMP messages and other multicast transmissions. The switch then determines which ports are associated with each multicast transmission.

Enable IGMP snooping by clicking the edit icon in the first panel, and selecting **enabled**. Then click “Apply.”

To configure IGMP settings for a specific VLAN, click the check box next to the VLAD ID. Then set the parameters for **IGMP Snooping Status**, **IGMP Snooping Querier**, **IGMP Version** (1 -3), **Fast Leave**, **IGMPv1/v2 Report suppression**, and **IGMPv3 Report suppression.**

In the bottom panel, select which ports will take a **passive-forward** role, and which ones will be **force-forward**.



8 STP

The Spanning Tree algorithm works by designating a single switch (The Root Bridge) in the network, as the root or the parent to all the switches. All the switches in the network will use the same algorithm to form unique paths all the way back to the Root Bridge. Some switches establish a blocking point (a port on a switch) somewhere along the path to prevent a loop. There are 3 versions of the Spanning Tree protocol, STP, RSTP, MSTP, and they are all backwards compatible with each other.

Spanning Tree Protocol (STP)

This is the original Spanning Tree protocol, and it has been superseded by both the RSTP and MSTP protocol. It is based on a network with a maximum diameter of no more than **17 switches**. It uses timers to synchronize any changes in the network topology, and this could take minutes. It is not recommended that you use this version of the Spanning Tree protocol.

Rapid Spanning Tree protocol (RSTP)

The RSTP protocol is the new enhanced version of the original STP protocol. It uses an enhanced negotiation mechanism to directly synchronize any topology changes between switches; it no longer uses timers as in the original STP protocol, which results in a faster re-convergence time. The maximum allowed network diameter for the RSTP protocol is **40 switches**.

Multiple Spanning Tree Protocol (MSTP)

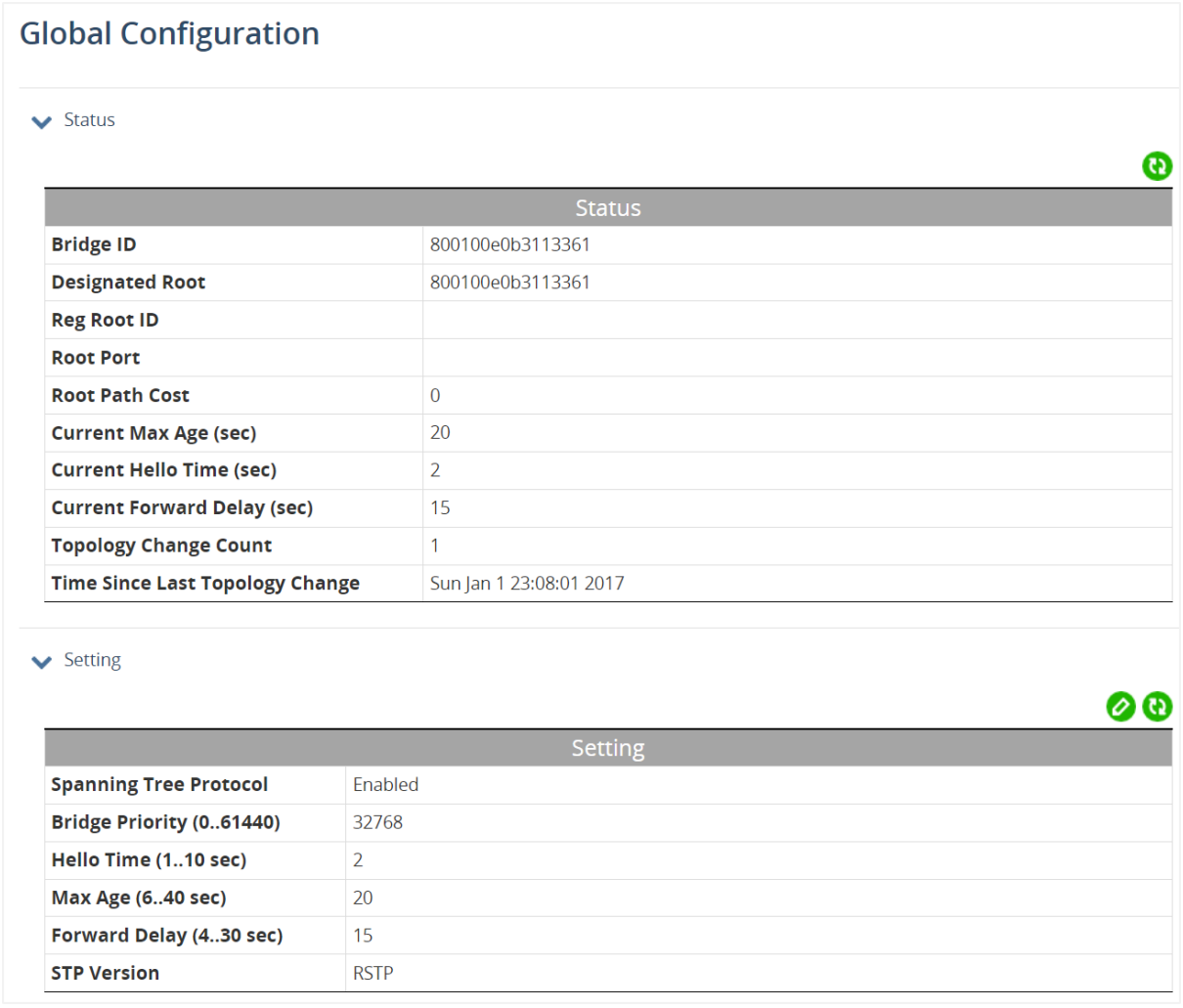
The MSTP protocol extends the RSTP protocol by simultaneously running multiple instances of the Spanning Tree Protocol and mapping different VLANs to each instance, thus providing load balance across multiple switches. The MSTP protocol accomplishes this by creating new extended sections within the RSTP protocol, called Regions. Each region runs its own instance of the Spanning Tree Protocol. Within each Region, the MSTP protocol can accommodate a network diameter of up to 40 switches. There can be a maximum of 40 Regions in a single MSTP network.

Global Configuration

Spanning Tree Protocol is enabled by default. To enable/disable STP, click the edit icon in the lower panel of the page, and click the corresponding radio button. The set values for the following fields:

- **Bridge Priority** – Bridge Priority is used to set the Root and backup Root Bridge. Default is 32768. Range is 0 to 61440.
- **Hello Time** – The rate at which BPDUs (Bridge Protocol Data Units) are sent. Default is 2 seconds. Range is 1 to 10 seconds.

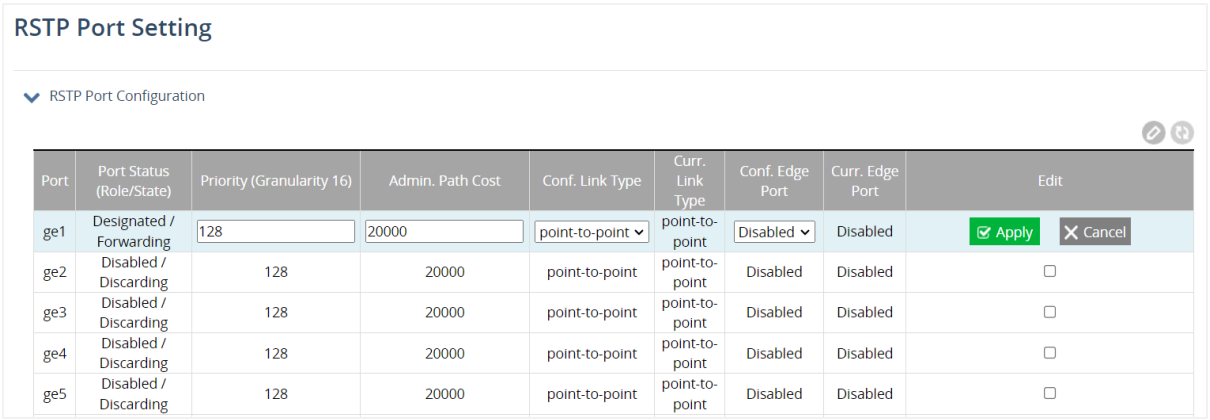
- **Max Age** – Hop count limit for BPDU packets. Range is 6 to 40. Default is 20.
- **Forward Delay –** Range is 4 to 30 seconds. Default is 15 seconds.
- **STP Version –** Select from MSTP, RSTP, or STP compatible



RSTP Port Setting

Configure individual port RSTP settings on this page. Click the checkbox next to the desired ports, and set the following parameters:

- **Port Priority** – Port Priority range is between 0 and 240 in multiples of 16.
- **Admin Path Cost** – range is between 1 and 200,000,000.
- **Conf. Link Type** – This is the spanning tree link type. Choose **auto (**link type is set based on the interface's duplex setting**)**, **point-to-point**, or **shared**.
- **Conf. Edge Port –** Select **enable** to make the interface an edge port.



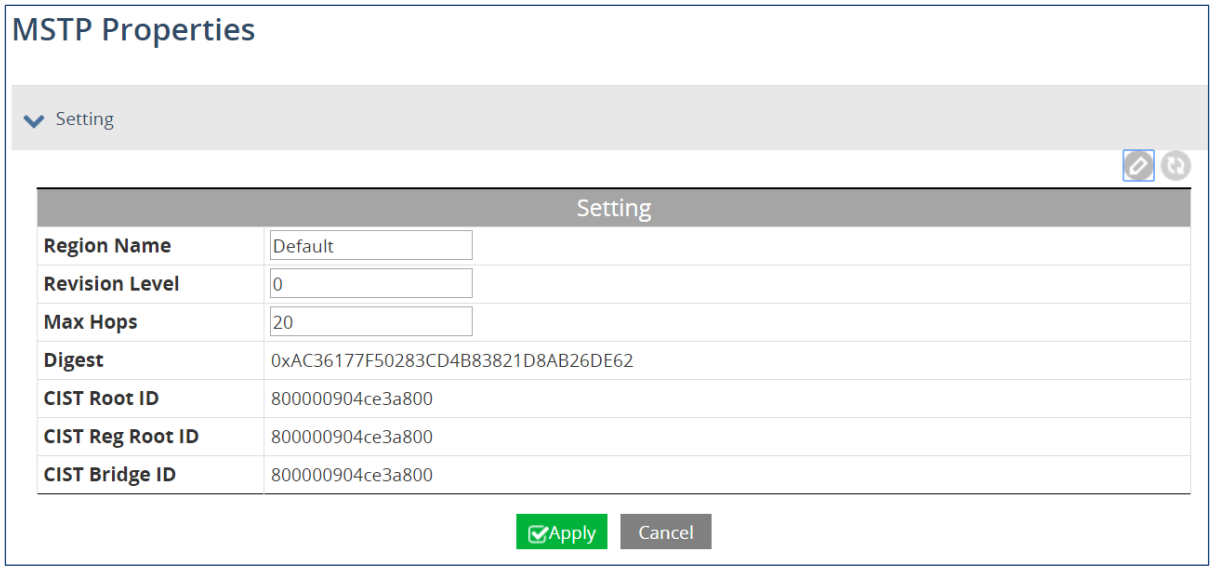
MSTP Properties

To form a MSTP Region, the switches that will be connected together to form the MSTP Region must have the same values for these parameters:

- Region name
- Revision level
- Configuration Digest

The first two parameters can be configured directly on the MSTP Properties screen. **Configuration Digest** will be automatically calculated by the switch based on the **VLAN** to **MSTI (Multiple Spanning Tree Instance)** mapping. The **VLAN** to **MSTI** instance mapping must be the same for all the switches within the same **MSTP Region.**

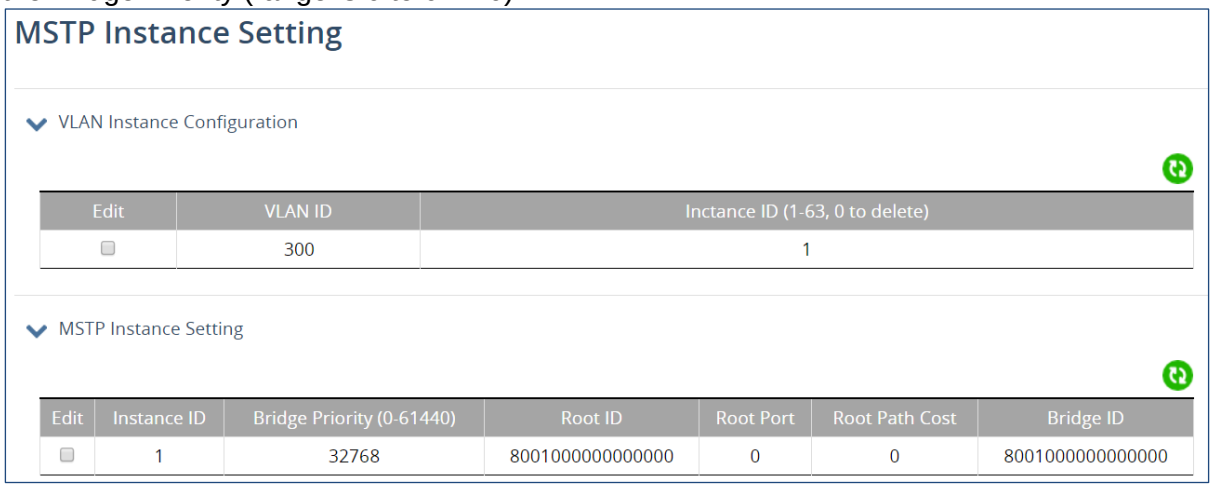
Click the edit icon, and enter the **Region Name**, **Revision Level**, and **Max Hops**. Then click “Apply.”



MSTP Instance Setting

Select the **VLAN** that you want to map to an MSTP instance by clicking the corresponding check box next to the VLAN ID. Then enter the instance ID and click “Apply.”

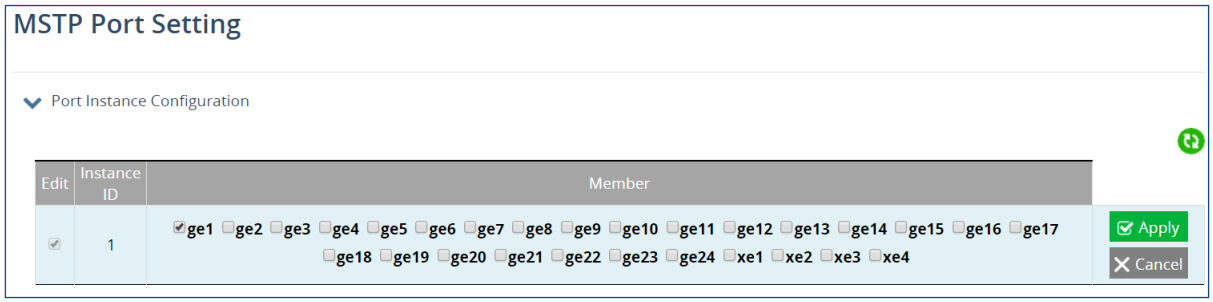
Configure the MSTP instance by clicking the check box next to the Instance ID and entering the Bridge Priority (range is 0 to 61440).



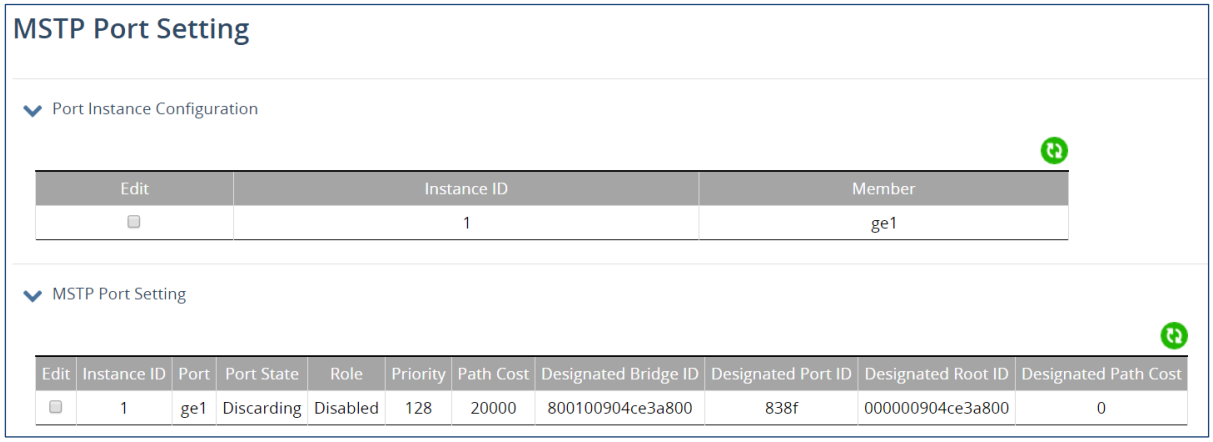
MSTP Port Setting

You can adjust the location of the blocking port in a MSTP network by modifying the **Port Priority** and the **Path Cost** of the ports on the switch. Modifying the **Port Priority** adjusts the blocking port between two switches. Modify the **Port Cost** adjusts the location of the blocking port in a MSTP loop.

First assign ports to an MSTP instance by clicking the check box next to the instance ID, and then the check boxes next to the ports you want to add.



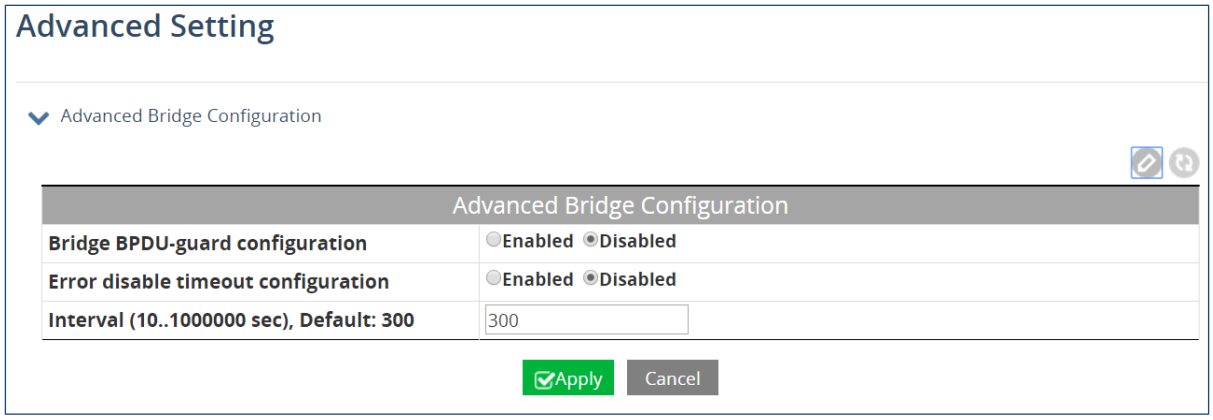
To modify the **Port Priority** and the **Path Cost**, click the check box next to the corresponding MSTP instance in the bottom panel, and enter values in those fields. Then click “Apply.”



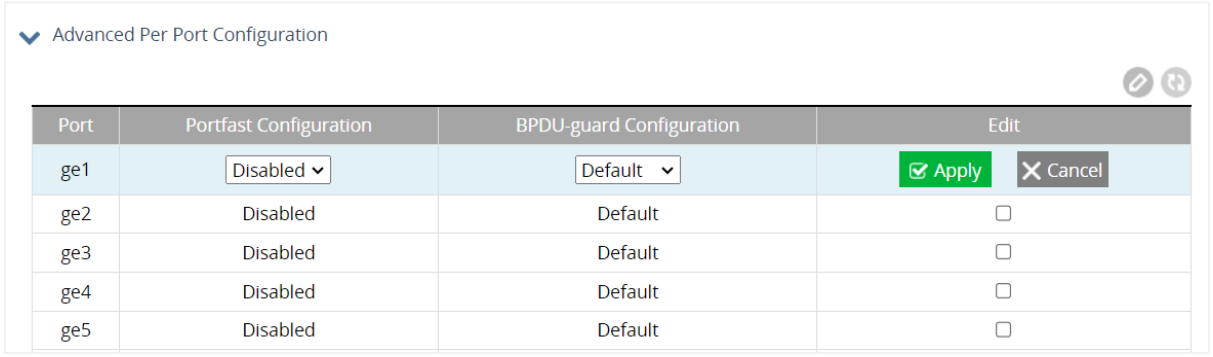
Advanced Setting

The top panel of the Advanced Setting page contains three settings which determine how the switch handles BPDU packets.

- **Bridge bpdu-guard configuration -** When the BPDU Guard feature is set for a bridge, all portfast-enabled ports of the bridge that have **bpdu-guard** set to default shut down the port on receiving a BPDU. In this case, the BPDU is not processed.
- **Error disable timeout configuration –** Enabling this allows a Disabled port to re-enable itself automatically after the specified Interval.
- **Interval –** Default is 300 seconds. This is the length of time a port will remain disabled after shutting down due to the **bpdu-guard**.



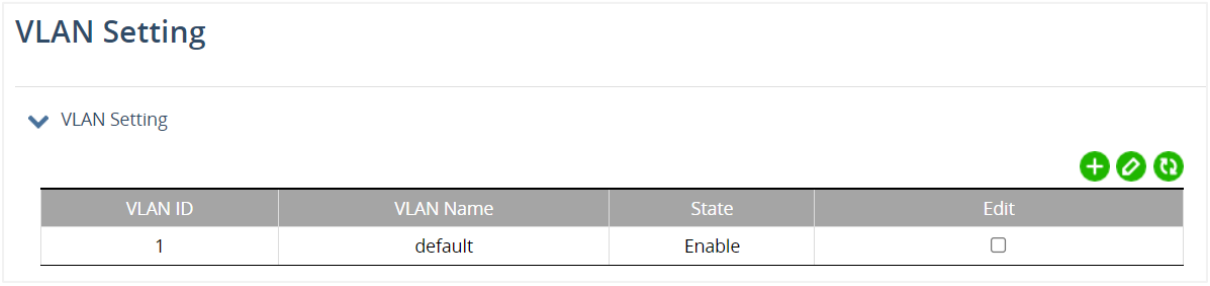
In the Advanced Power Port configuration panel, you can enable **Portfast**, which sets a port as an edge-port to enable rapid transitions and enable disable **BPDU-Guard Configuration**. When set to default, the port will use the Advanced Bridge Configuration settings. Enable or Disable to override the Bridge BPDU-Guard settings.



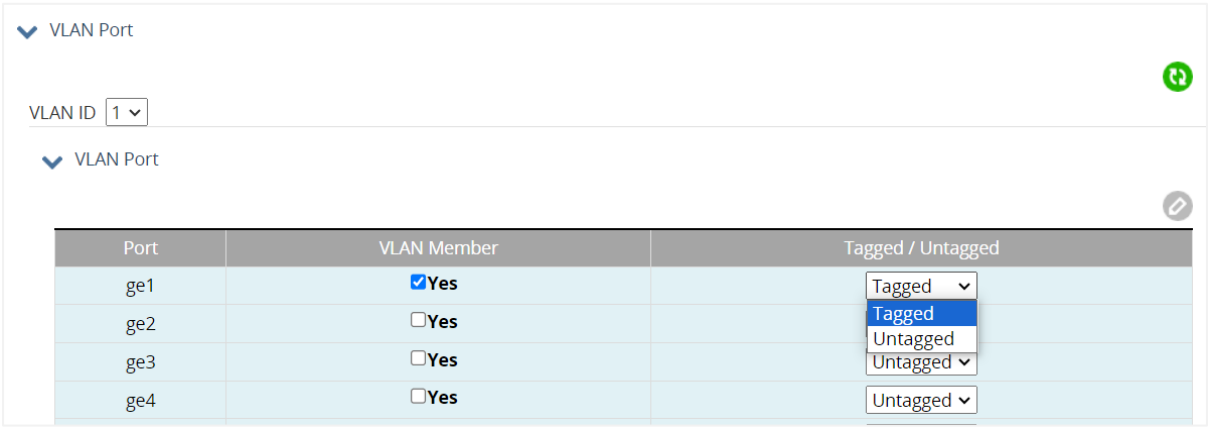
9 VLAN

VLAN Setting

VLANS are created and modified in the VLAN Setting panel. Click the add icon, and then enter the VLAN ID and the VLAN name. The VLAN name should not be more than 32 characters and cannot include spaces. If you do not specify a VLAN name, the system will create one. Click “Apply” when finished.

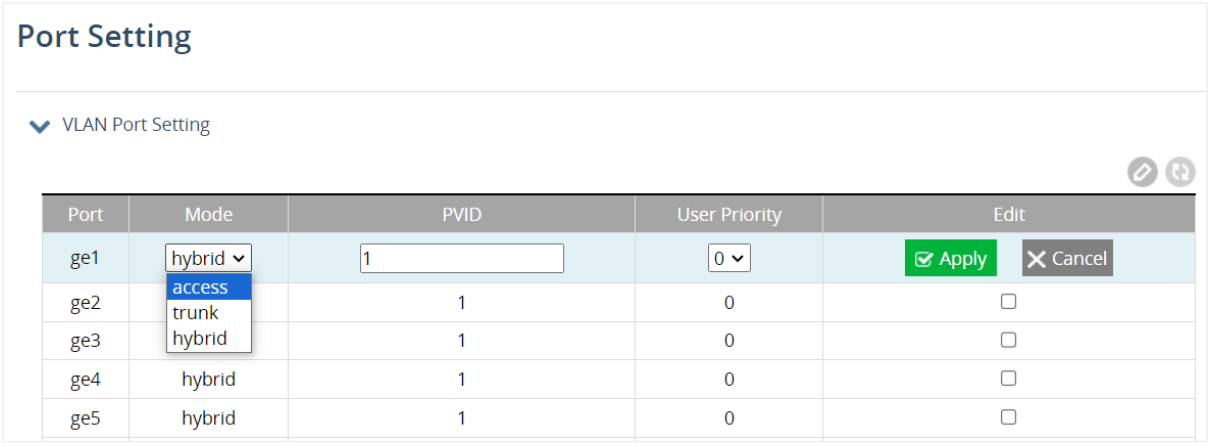


After a VLAN has been created, use the VLAN Port panel to attach specific ports to the VLAN, and to set as Tagged or Untagged. Click “Apply” when finished.



Port Setting

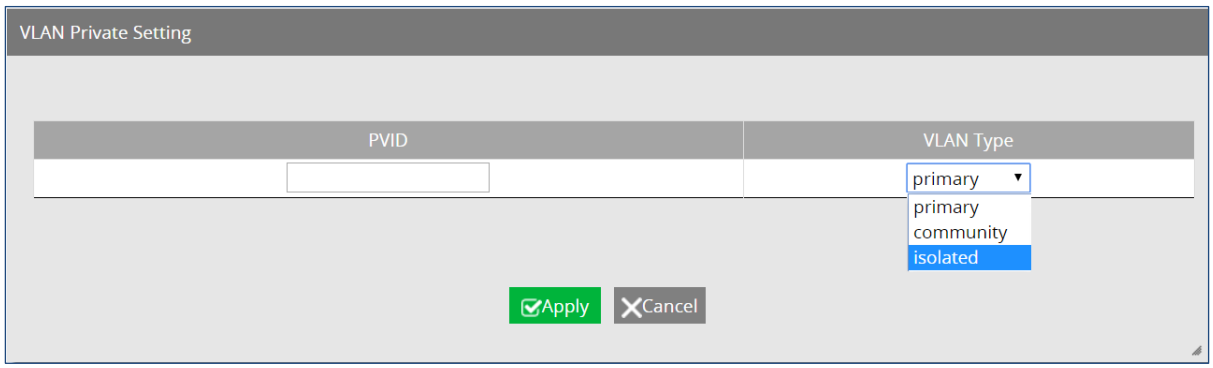
Configure the port type (**access**, **trunk**, or **hybrid**), **PVID**, and **User Priority** for each switch port.



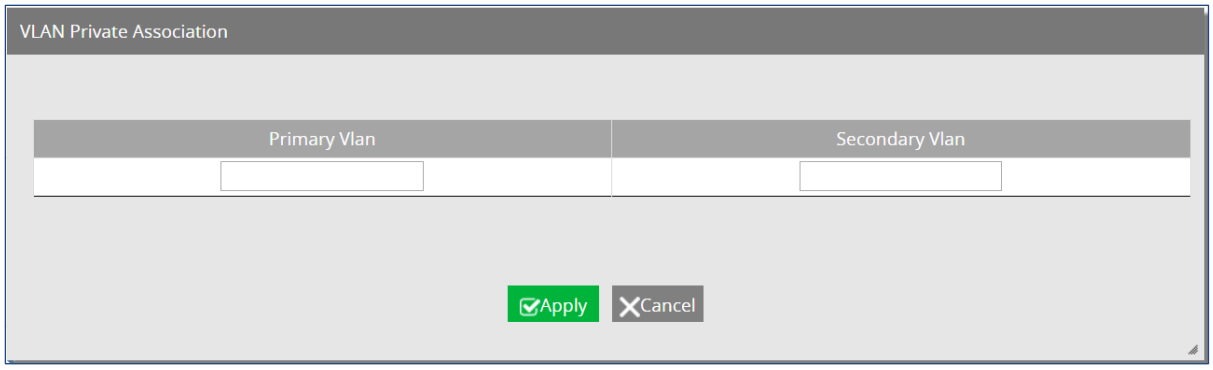
Private VLAN

In private VLANs, a primary VLAN is broken into secondary VLANs, classified as either **community** or **isolated**. Hosts in an isolated secondary VLAN can't communicate with anything except the **promiscuous** port, which is usually a gateway. In private VLANs, a primary VLAN is broken into secondary VLANs, classified as either **community** or **isolated**. Hosts in an isolated secondary VLAN can't communicate with anything except the **promiscuous** port, which is usually a gateway or uplink. Hosts within the same community can communicate with other members of that community VLAN.

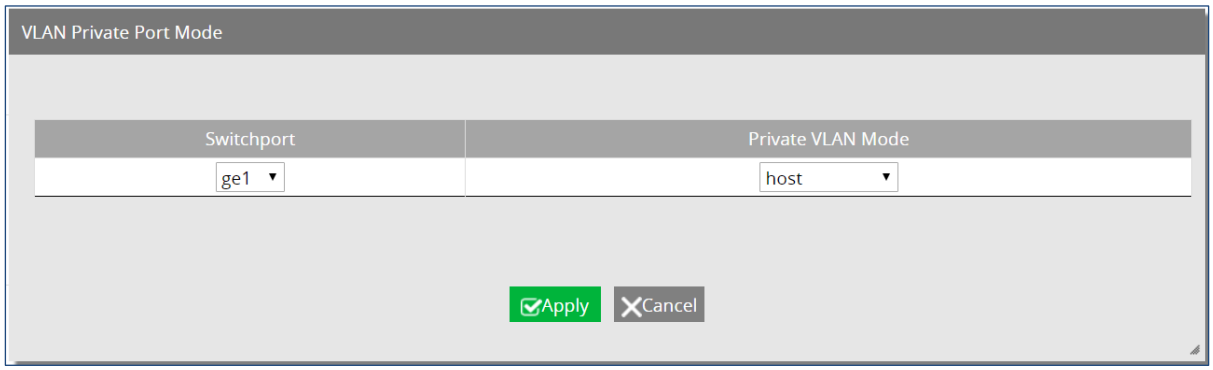
The first panel of the Private VLAN screen is Private VLAN Setting, where VLANs are added and set as primary, community, or isolated. Note that the VLANS added here must have been already created on the VLAN Setting screen. To add a private VLAN, click the add icon, and enter the VLAN ID. Then select the **VLAN Type**, and click “Apply.”



Private VLAN associations are set up in the second panel. Click the add icon, and enter the VLAN ID of the primary and secondary VLANs. Then click “Apply.”



In the third panel, configure port status in a private VLAN. Click the add icon, then the select the port using the drop-down menu. Set the port as either **host** or **promiscuous**. Then click "Apply." Note that ports still must be made a member of the secondary VLAN on the VLAN Setting screen.



MAC/Subnet/Protocol Based VLAN

In port based VLANs, a port is mapped directly to a VLAN. Instead of a port, you can also map MAC addresses, IPv4 addresses, or an Ethernet protocol to a specific VLAN. Each mapping must have its own rule number. When aping to a protocol, you must also specify the type of packet encapsulation: **ethv2**, **snapllc**, or **nosnapllc**.

Multiple rules can be grouped into a single **VLAN Classifier Group**, which can be created in the third panel. In the fourth panel, a VLAN Classifier Group can be assigned to a port.

MAC/Subnet/Protocol Based VLAN

MAC-Based VLAN

Edit	Rule	MAC Address (in HHHH.HHHH.HHHH format)	VLAN Identifier
☐	1	9465.9cfe.9709	500

Subnet-Based VLAN

Edit	Rule	IPv4 address (in A.B.C.D/E format)	VLAN Identifier
☐	2	10.10.10.10/24	600

Protocol-Based VLAN

Edit	Rule	Ethernet Protocol	Ethernet Decimal (0-65535)	Packet Encapsulation	VLAN Identifier
☐	3	decdnaremoteconsole - DEC DNA Remote Console		ethv2	500

VLAN Classifier Group

Edit	Group (1-16)	Rules
☐	10	1

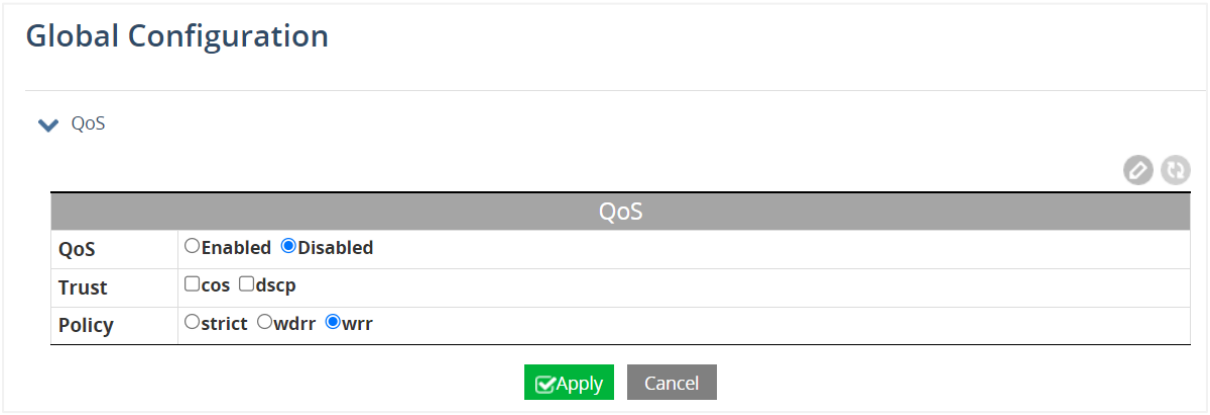
VLAN Classifier Port Setting

Edit	Port	Group (1-16)	VLAN
☐	ge5	10	500

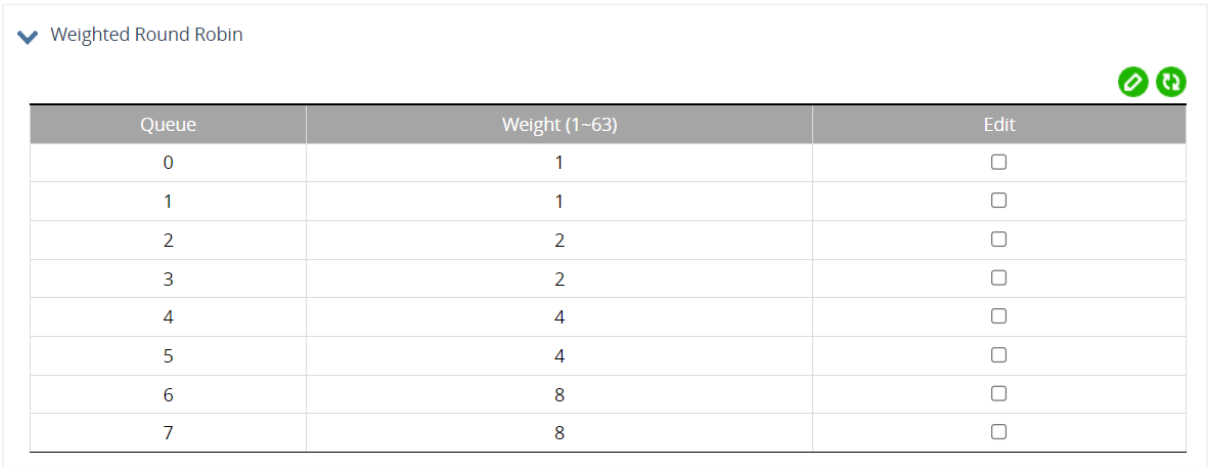
10 QOS

Global Configuration

To enable QoS (Quality of Service), click the edit icon on the first panel and select the radio button next to **enabled**. Then select either **cos** (Class of Service) or **dscp** (Diffserv Code Point). Choose a queuing policy: **strict** (strict priority), **wdrr** (weighted deficit round robin), or **wrr** (weighted round robin).



Enter the weight and the 802.1p priority for each queue in the second and third panels.

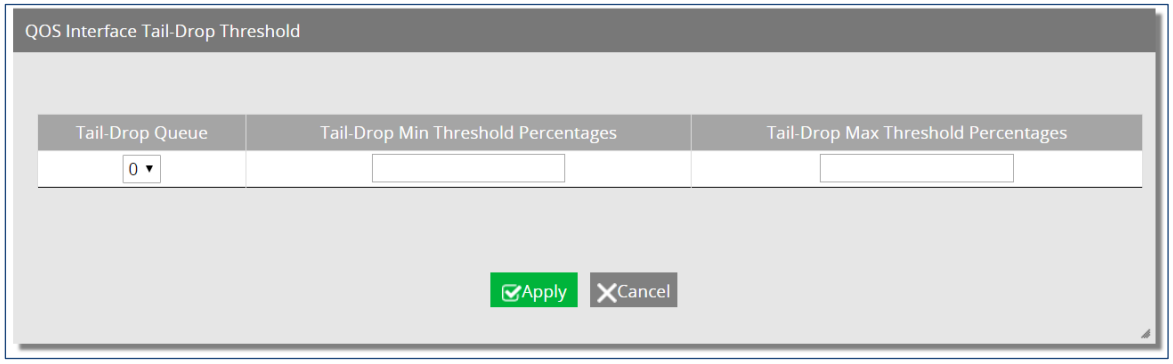


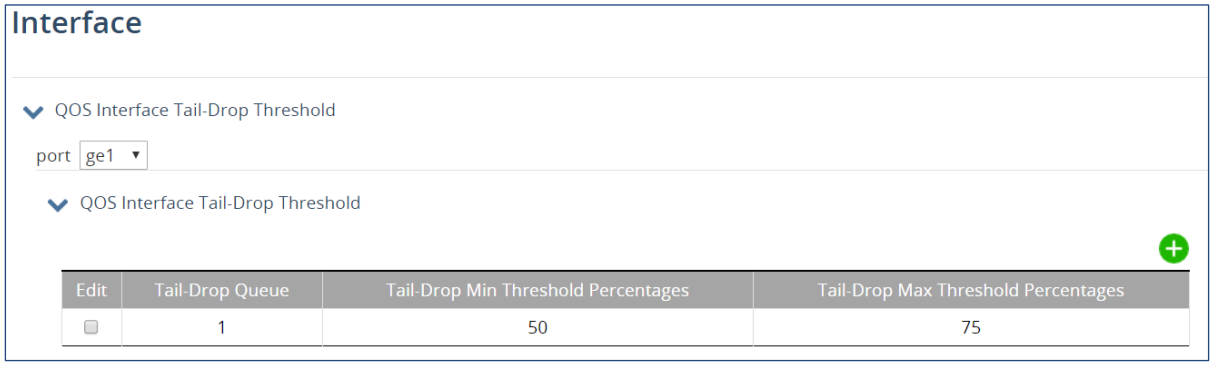
802.1p Priority

VLAN Priority	Queue	Edit
0	0	☐
1	1	☐
2	2	☐
3	3	☐
4	4	☐
5	5	☐
6	6	☐
7	7	☐

Interface

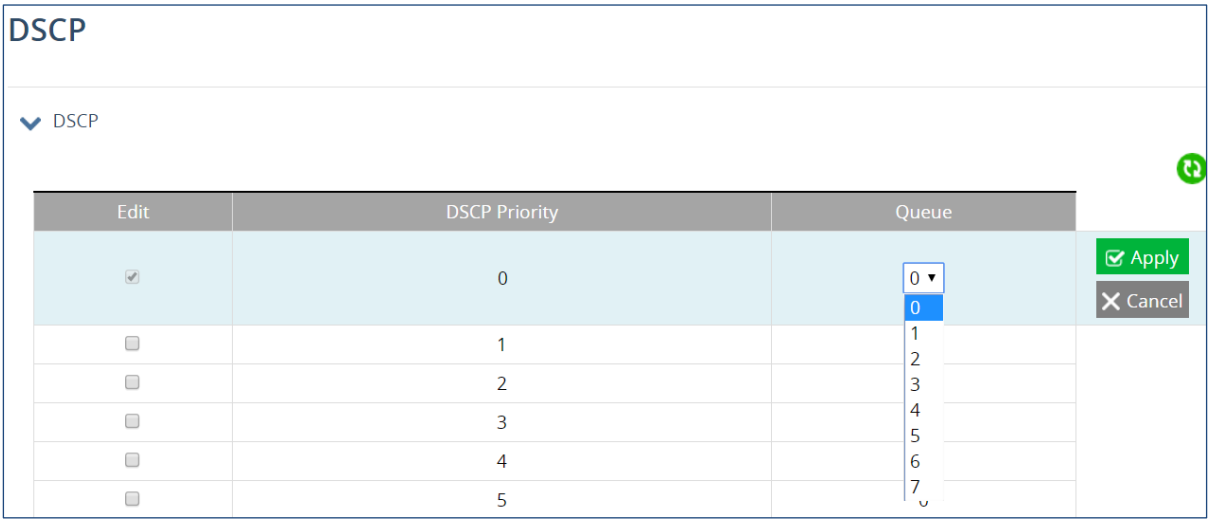
Tail drop is a queue management algorithm that determines when the switch needs to drop packets. When the queue is filled to its maximum capacity, the newly arriving packets are dropped until the queue has enough room to accept incoming traffic. Note that the minimum threshold cannot exceed the maximum threshold.





DSCP

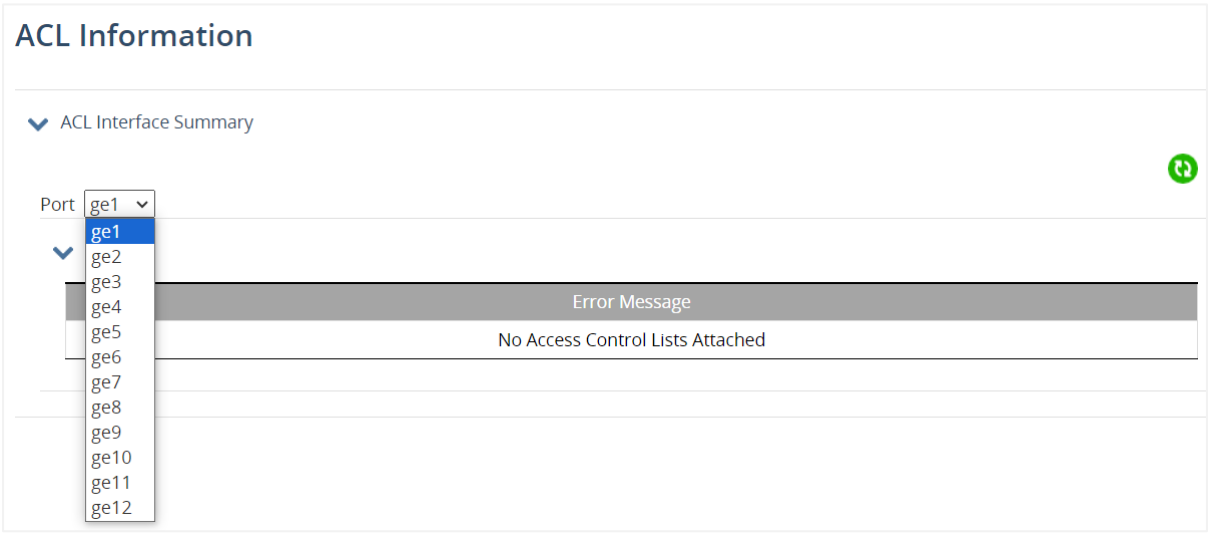
The DSCP screen lets you choose DSCP priorities, which are by default assigned to the lowest-priority queue, 0. For each DSCP priority, you can change the value of the queue to between 0 and 7.



11 ACL

ACL Information

The ACL Information screen is a read-only page for viewing which ACL Policy Maps are applied to which ports. Just select the port to be viewed with the drop-down menu.

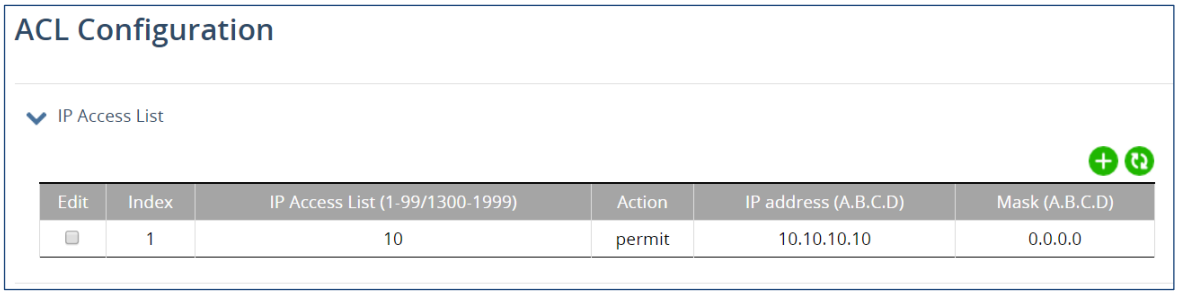


ACL Configuration

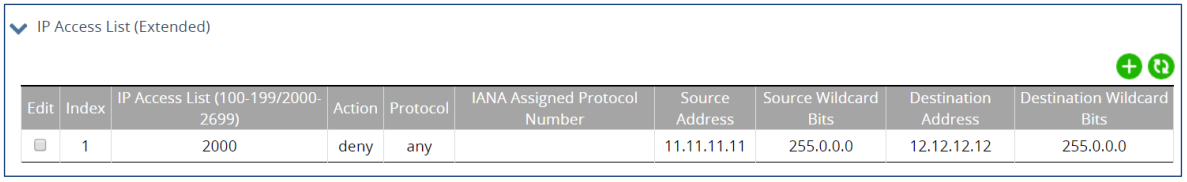
To enable ACL on the switch, QoS must first be enabled.

1. Create and configure an ACL Access List first.
2. Next, you will need to create and configure an ACL Class Map,
3. Associate the previously created ACL Access Lists to this ACL Class Map.
4. Next, create and configure an ACL Policy Map
5. Associate all the appropriate and necessary ACL Classes into this ACL Policy Map.
6. Then apply this ACL Policy Map (and all the Access Lists that it contains) to a specific port.

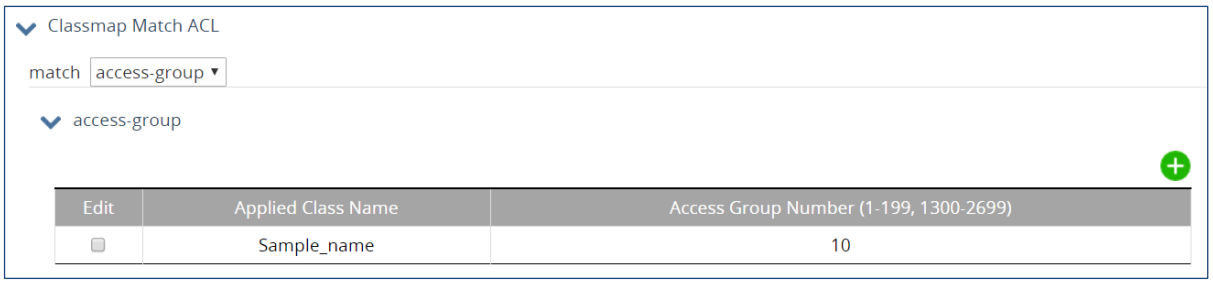
Create a standard IP Access List in the first panel by clicking the add icon and entering the required parameters.



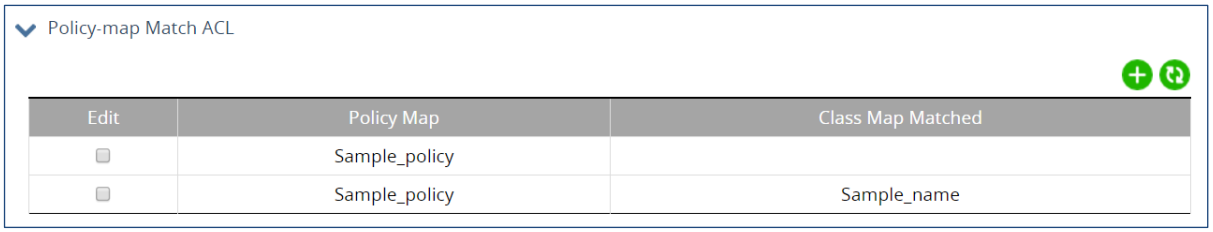
In the second panel, Extended IP ACLs are created in the same way.



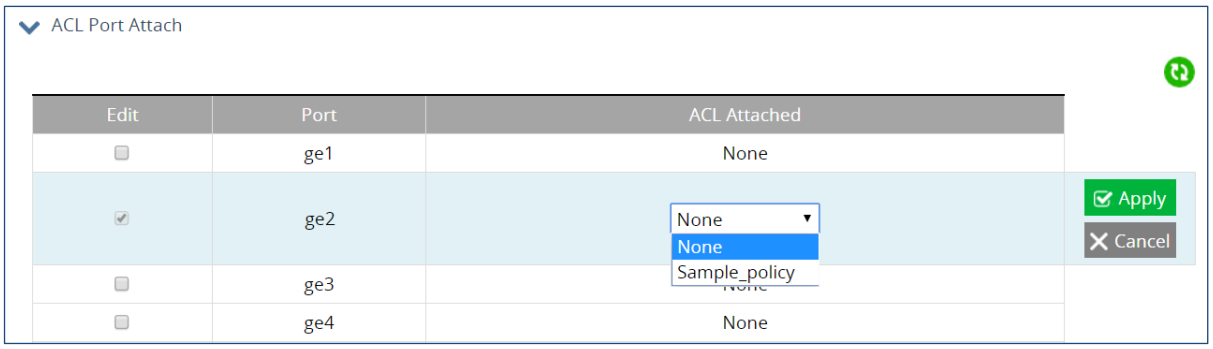
In third panel, Class Maps are created and assigned an Access List.



In the fourth panel, ACL Policy Maps are created and assigned one or more Class Maps.

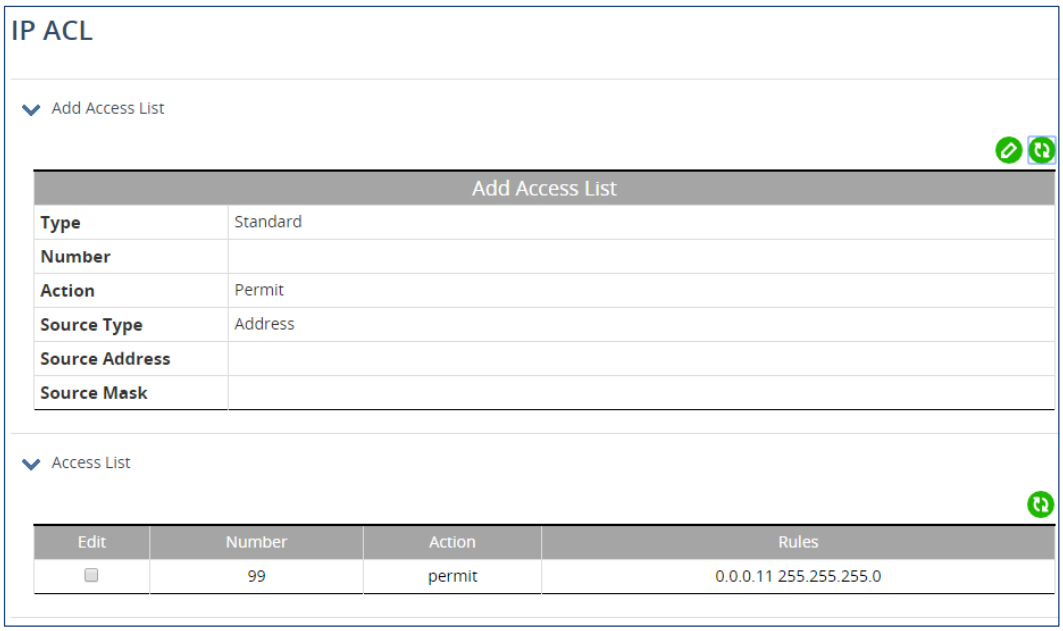


In the fifth and final panel, existing ACL policies can be applied to ports.

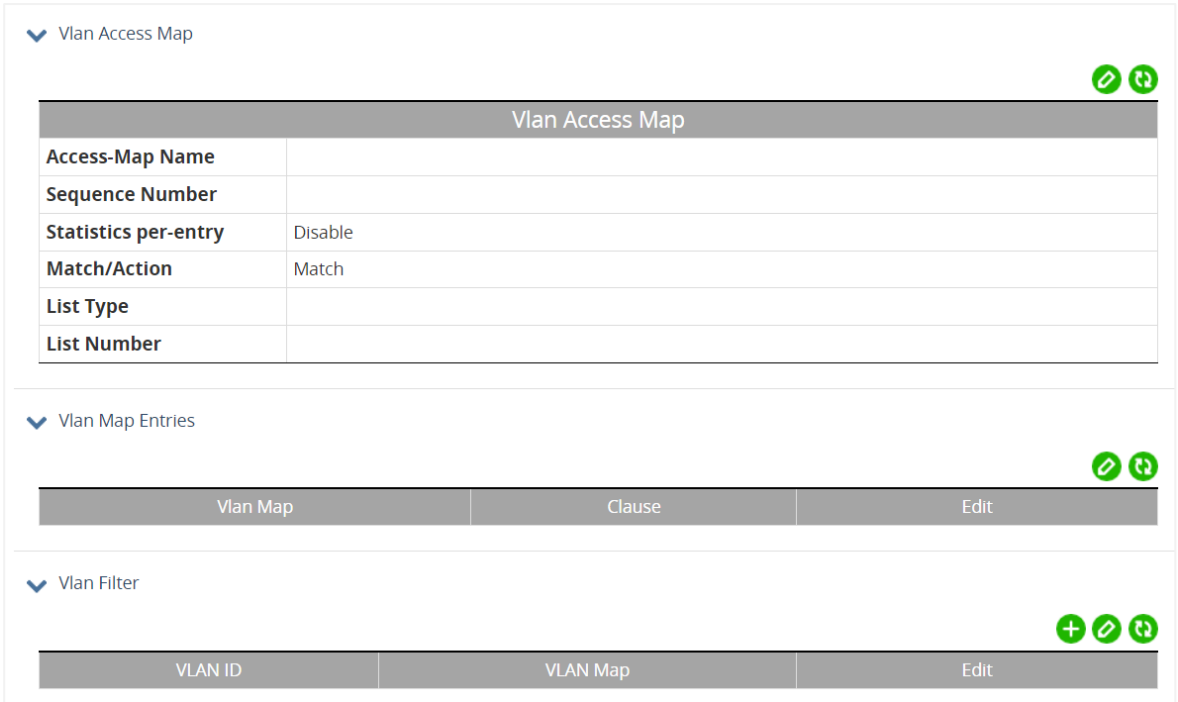


IP ACL

IP Access Control Lists (ACLs) allow/deny packets based on Protocol Type, Source Type, Source Address, Destination Type, and/or Destination Address. Defined IP Acess Lists can be viewed in the second panel.

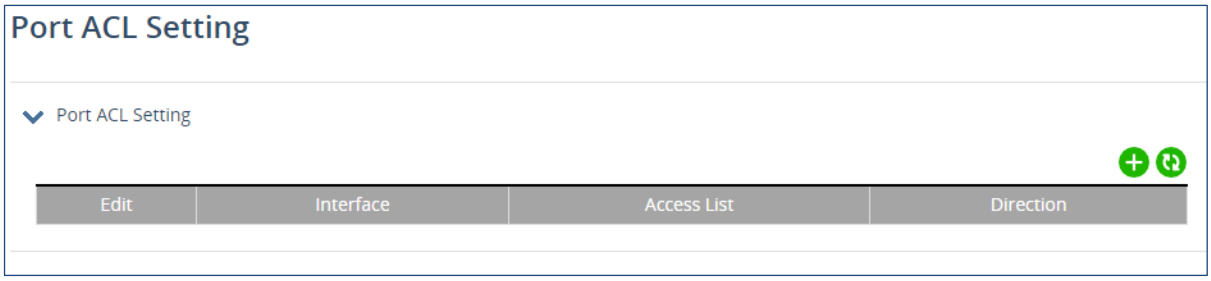


Vlan Access Map, Vlan Map Entries, and Vlan Filter can be viewed in the lower panel.



Port ACL Setting

The section allows for configuration of ACL parameters for individual switch ports. Click the Add icon, and then enter the interface, access list, and direction (inbound or outbound). Then click Apply.

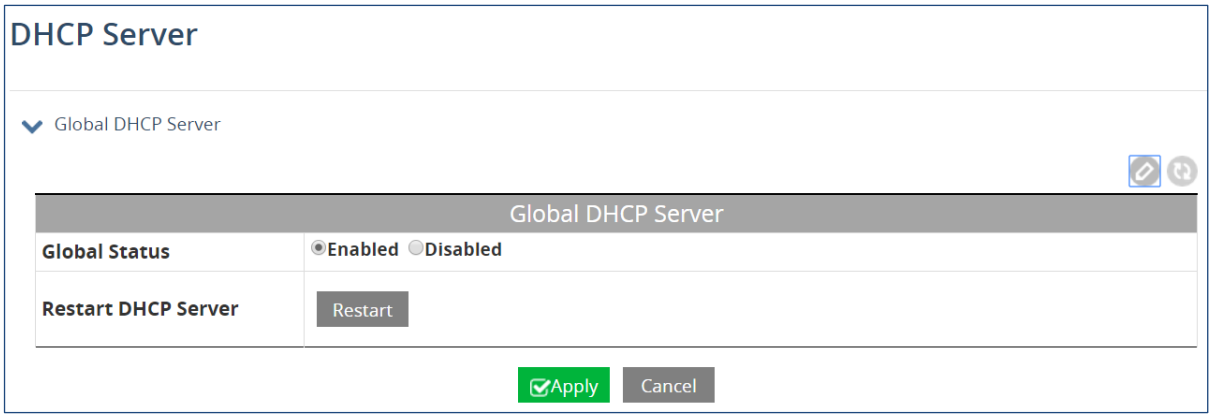


12 DHCP

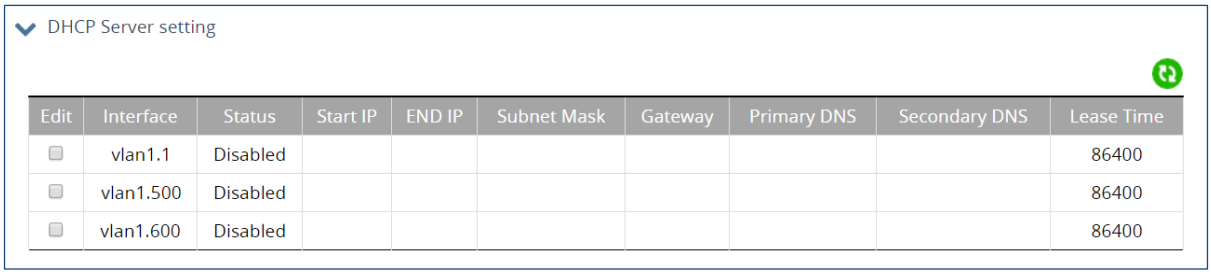
DHCP Server

The EtherWAN switch can function as a DHCP server for a single VLAN (it can be any VLAN) on the switch. When functioning as a DHCP server, the EtherWAN switch can be configured with a range of IP addresses, default gateway and DNS servers, which will allow the switch to use the dynamic configuration function of the DHCP protocol to provide any TCP/IP device that is a DHCP client, to dynamically obtain an IP address, default router, and DNS servers. The EtherWAN DHCP server can also be configured with a lease period that the DHCP clients are allowed the use of their assigned IP address. In this simple implementation, both the DHCP Client and the DHCP Server must be on the same network (same VLAN).

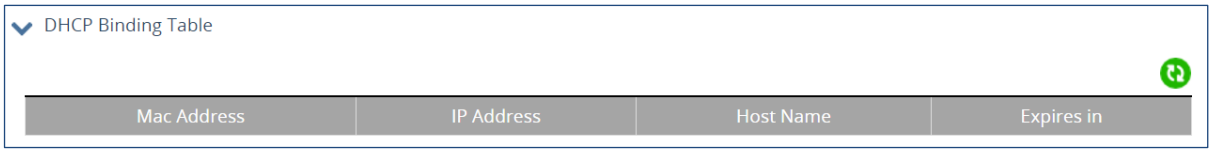
To enable DHCP, click the edit icon on the first panel, and click the radio button next to **enabled**. Then click “Apply.”



In the second panel, select the VLAN for which you want to configure DHCP, and enter the start IP, end IP, Subnet mask, Gateway, Primary & Secondary DNS, and Lease Time.

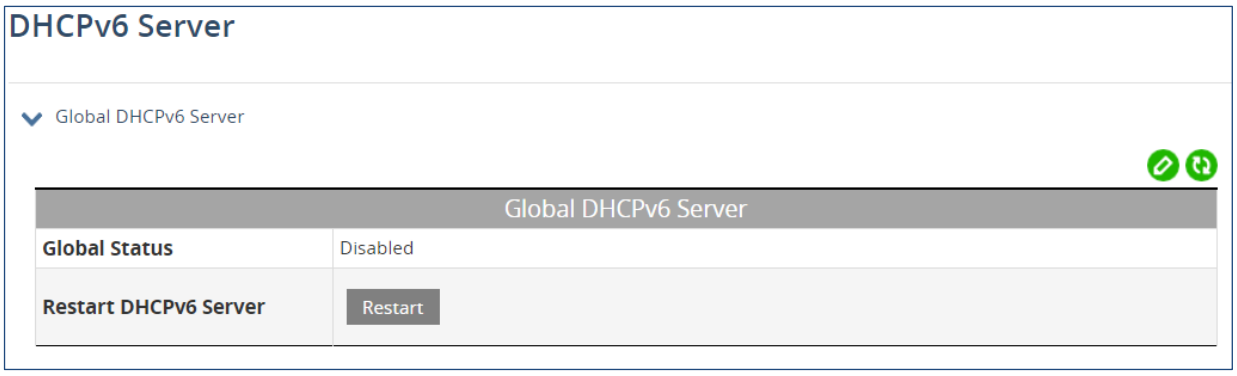


The DHCP Binding table at the bottom is a read-only table that displays which IP addresses have been allocated to which DHCP clients.

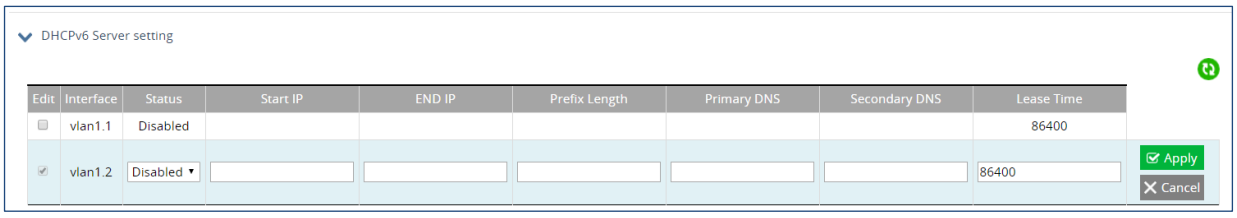


DHCPv6 Server

To configure the switch as a DHCPv6 server, set the global status to enabled.



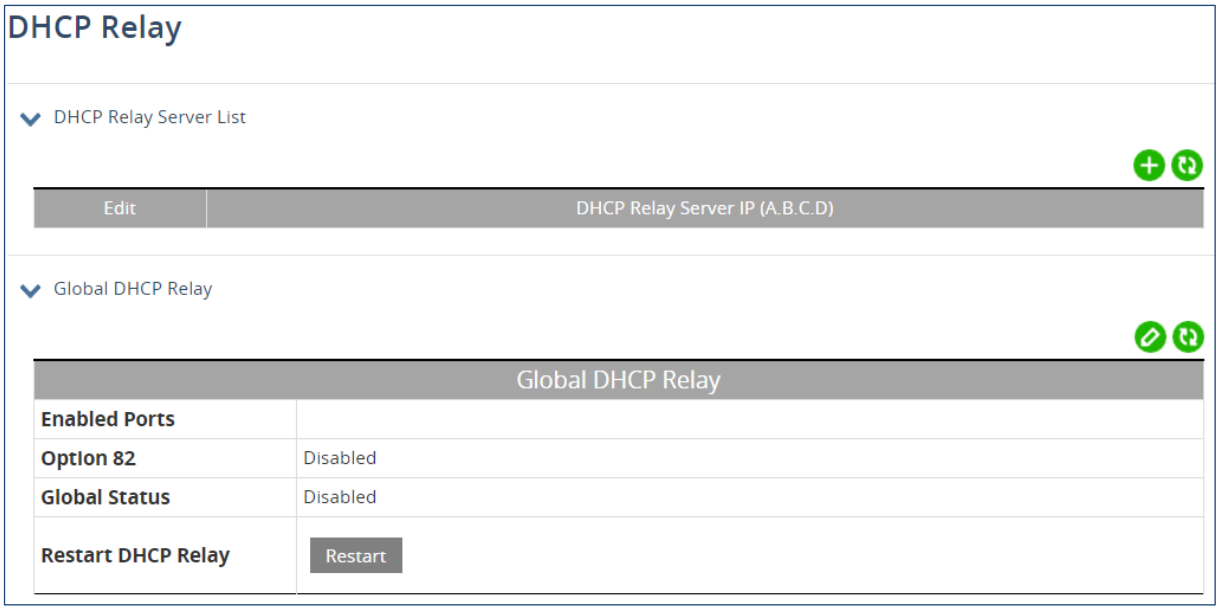
In the second panel, enter the starting and ending IP addresses, the prefix length, primary and secondary DNS, and the lease time.



The third panel is the DHCPv6 Binding Table.

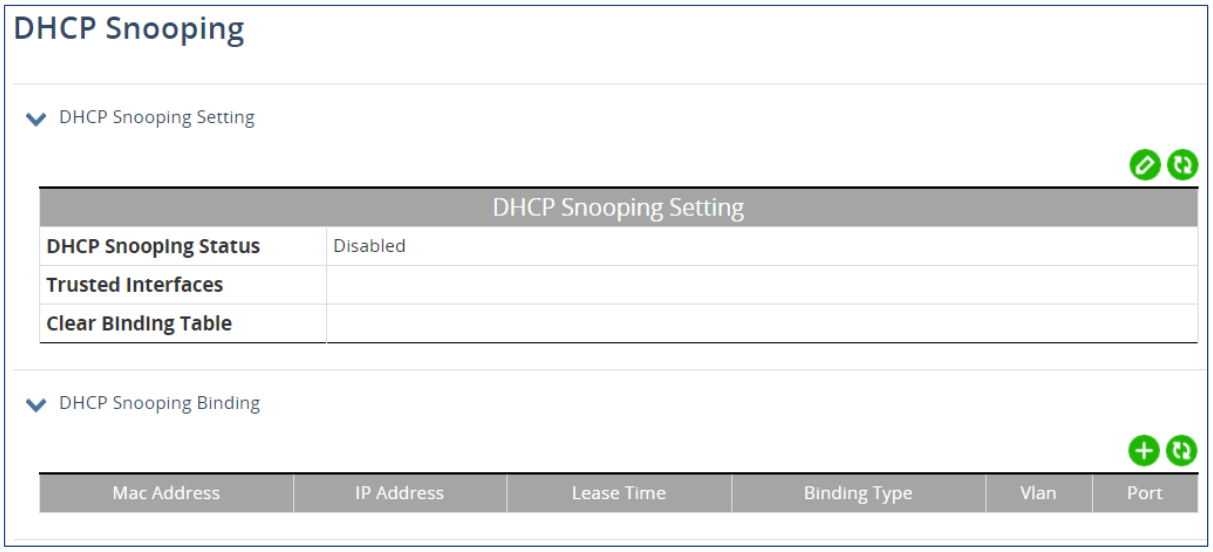
DHCP Relay

DHCP relays pass a client's requests to the DHCP server, even when the server is on a different VLAN. To configure a DHCP relay, first enter the IP address of a DHCP relay server. Then select the ports and enable Option 82 (for added security) and Global Status if desired.



DHCP Snooping

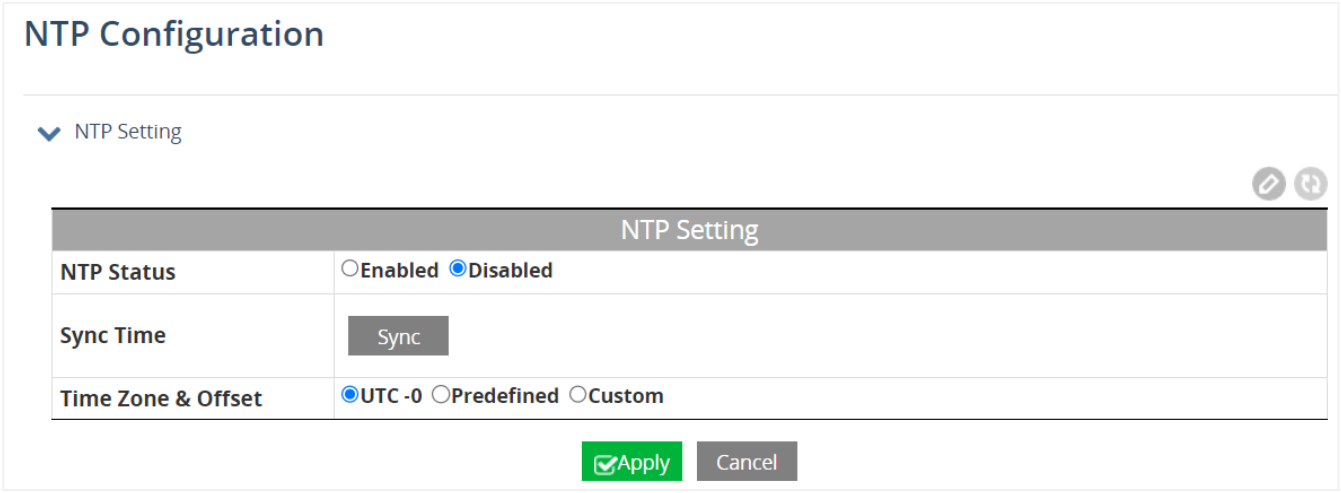
DHCP snooping allows for the drooping of undesired DHCP traffic. It is most commonly used to prevent unauthorized DHCP servers from offering IP addresses to DHCP clients. Set the DHCP Snooping Status to enabled and check the box next to trusted interfaces. You can also clear the binding table for static, dynamic, or all entries.



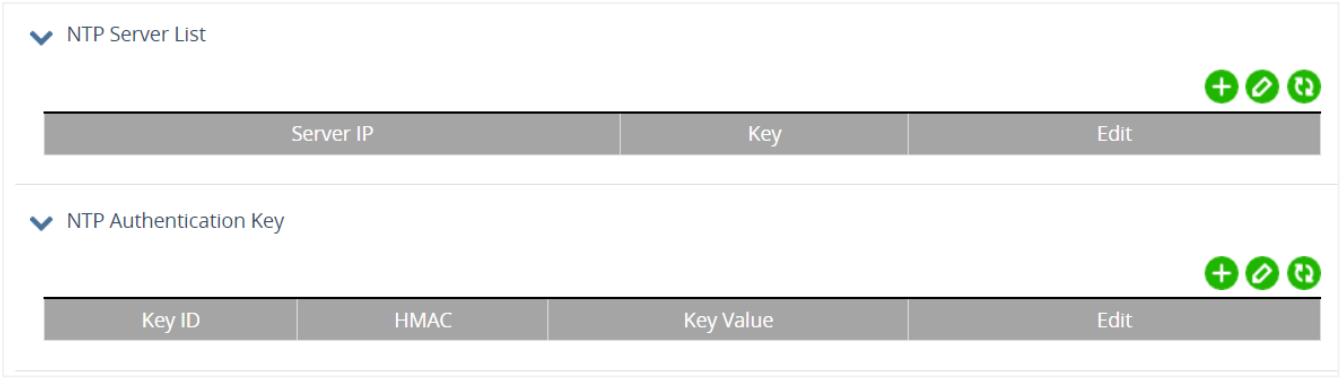
13 NTP

NTP Configuration

To enable Network Time Protocol (NTP), click the edit icon on the first panel, and click the radio button next to **enabled**. Then click “Apply.” Use the “Sync” button to force the switch to synchronize the system time with the server.

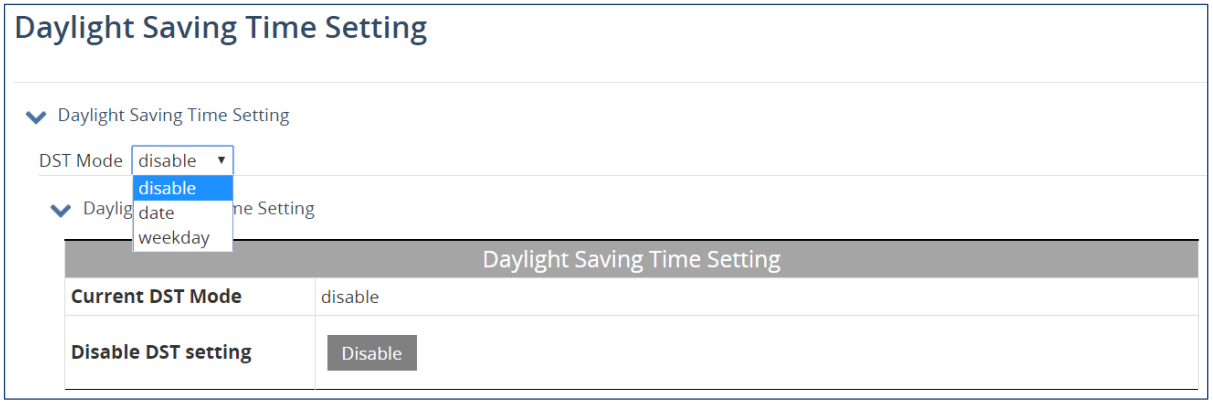


Add NTP servers in the second panel by clicking the add icon, entering the IP address of the NTP server, and then clicking “Apply.” You can see a list of all current NTP servers in this panel.

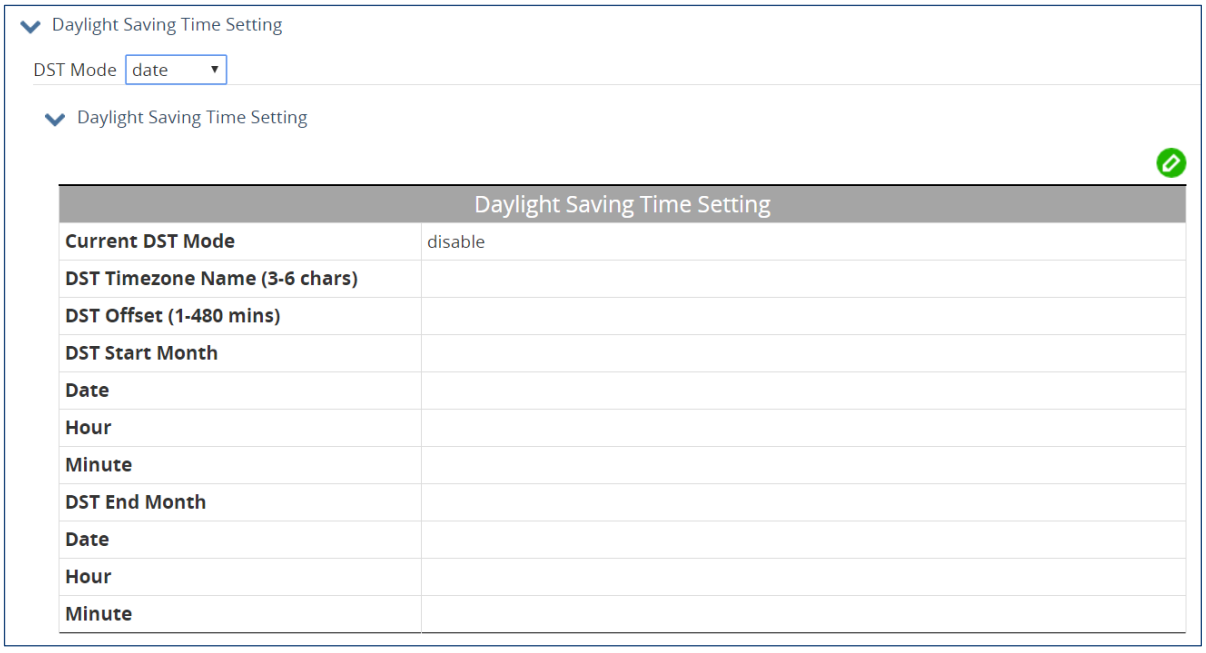


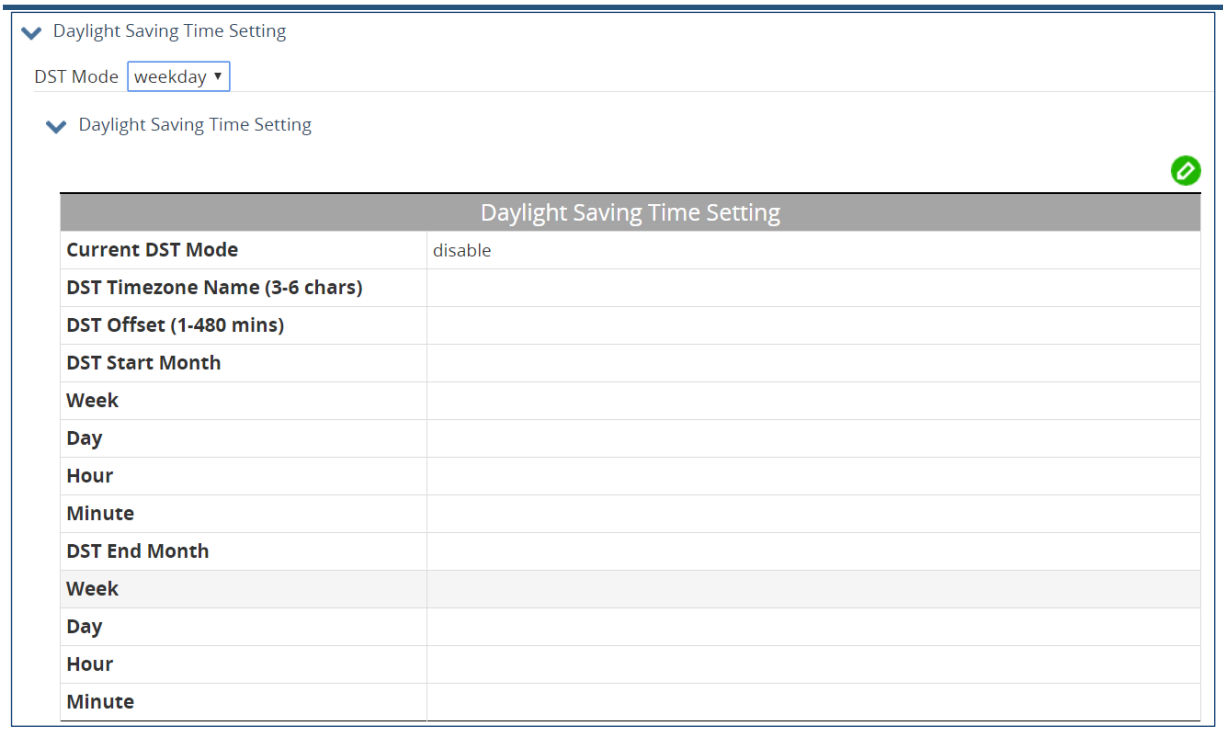
Daylight Saving Time Setting

There are two ways to set daylight saving on the switch: Weekday Mode and Date Mode. To enable daylight saving time, select the desired mode.



The only difference between the two modes is the method by which the starting and ending dates are entered.




Daylight Saving Time Setting
DST Mode
weekday
Daylight Saving Time Setting
Daylight Saving Time Setting
Current DST Mode
disable
DST Timezone Name (3-6 chars)
DST Offset (1-480 mins)
DST Start Month
Week
Day
Hour
Minute
DST End Month
Week
Day
Hour
Minute

14 SNMP

SNMP General Setting

SNMP is a TCP/IP application layer network management protocol that allows any TCP/IP device to be managed across a TCP/IP network. It is based on the client-server paradigm. The server (called a SNMP Agent) runs a process on the managed device that listens for a client's NMS (Network Management Station) polling requests to fetch or set a data item on the managed device. The SNMP Agent can also send alert messages (called Traps) to an NMS automatically, based on the occurrence of certain events on the device that the Agent resides.

To configure SNMP general settings, click the edit icon, and enter values for the following fields:

1. Set the SNMP Status to **enable**.
2. Enter a short description (up to 256 characters) into the **Description** field.
3. Enter a name into the entry field next to **Location**.
4. Enter a name (up to 256 characters) into the entry field next to **Contact**.
5. Enter a trap community name (up to 256 characters) into any of the fields next to Trap Community Name 1 – 5. Community names identify the SNMP Trap community group that the traps on this switch should be sending to. The identical Trap community names should also be set on the NMS hosts that will be receiving the traps. Each name defined corresponds with the **Trap host IP address** fields with the same number below.

 **Warning!** Use of the default Community settings may lead to potential security vulnerabilities. Therefore, it is suggested to set your own Community Name or leave the Community Name blank.

6. Enter an IP address for the NMS host(s) that should be receiving traps from this switch, into the fields next to any of the 5 **Trap Host IP Address** fields.
7. Enable or disable the **Link Down Trap**. This will allow or stop the switch from sending a trap to the identified trap community groups when any port on the switch moves from the link up state to the link down state.
8. Enable or disable the **Link Up Trap**. This will allow or stop the switch from sending a trap to the identified trap community groups when any port on the switch moves from the link down state to the link up state.

9. Enable or disable the **MAC Notification Trap**. This will allow or stop the switch from sending a trap to the identified trap community groups anytime there is a change in the MAC table on certain selected ports of the switch.
10. Set the interval between the MAC notification traps that you want the switch to send by entering the interval (in number of seconds from 1 to 65535) into the entry field next to **MAC Notification Interval (1 to 65535 seconds)**.
11. Set the size of the MAC notification history table by entering the total number of records (from 1 to 500) that the switch will keep for user to review at any one time into the entry field next to **MAC Notification History Size (1 to 500)**.
12. Select which ports on the switch for which traps should be sent when there is a new MAC address added to the MAC table for the port, by checking the corresponding check boxes for these ports in the **MAC Notification Added** section.
13. Select which ports on the switch for which traps should be sent when there is a MAC address being removed from the MAC table for the port, by checking the corresponding check boxes for these ports in the **MAC Notification Removed** section.
14. Click the “Apply” button when finished.
15. Save the configuration.

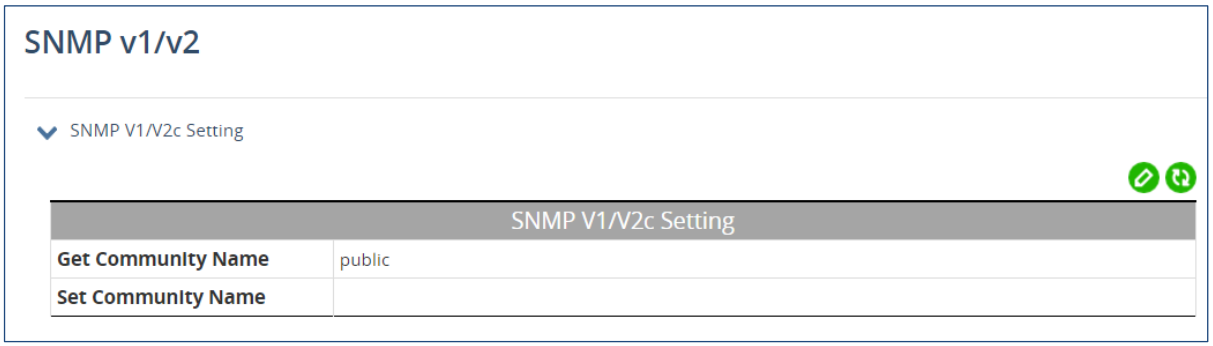
SNMP General Setting

SNMP General Setting

SNMP General Setting	
SNMP Status	Enable
Description	12 GbE Managed Switch
Location	
Contact	
Trap Community Name 1	
Trap Community Name 2	
Trap Community Name 3	
Trap Community Name 4	
Trap Community Name 5	
Trap Host 1 IP Address	
Trap Host 2 IP Address	
Trap Host 3 IP Address	
Trap Host 4 IP Address	
Trap Host 5 IP Address	
Link Down Trap	Disabled
Link Up Trap	Disabled
PoE Interface Down Trap	Disabled
PoE Interface Up Trap	Disabled
PoE OverLoad Trap	Disabled
PoE Watchdog Trap	Disabled
Power Down Trap	Disabled
Power Up Trap	Disabled
MAC Notification Trap	Disabled
MAC Notification Interval (1 to 65535 seconds)	1
MAC Notification History Size (1 to 500)	1
MAC Notification Added	
MAC Notification Removed	

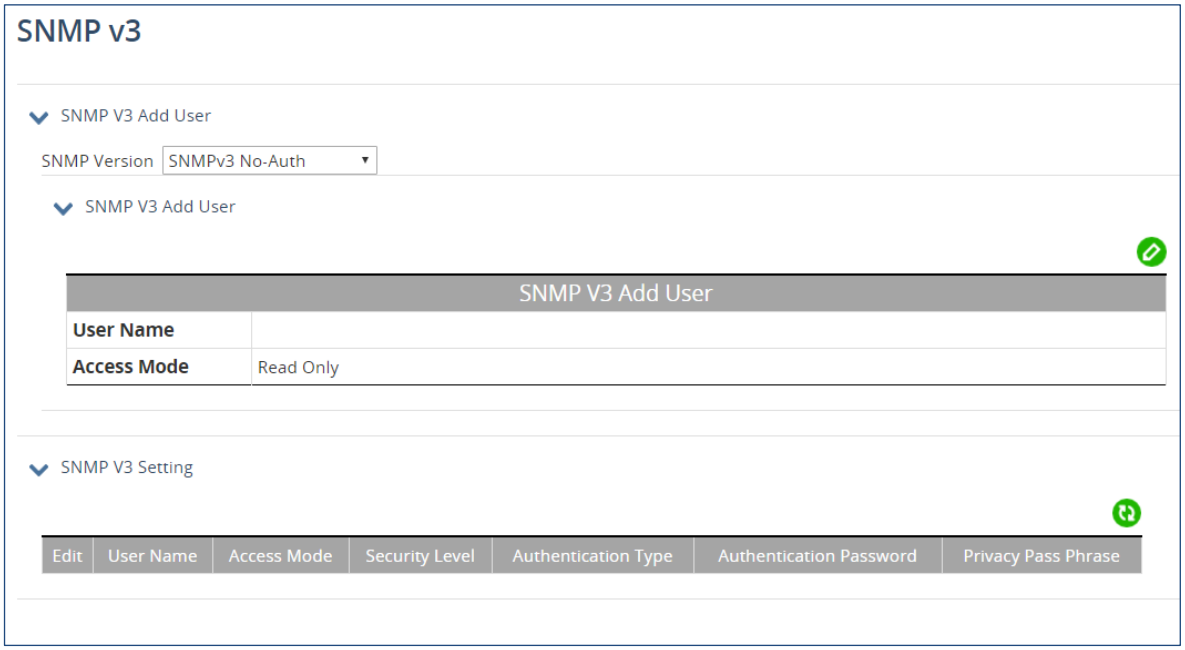
SNMP v1/v2

Click the edit icon and enter the SNMP community name into the **Get Community Name** field. This will allow the NMS to poll status information from the switch (read only). Then enter the SNMP community name, into the **Set Community Name** field. This will allow an NMS to change the status of a data item in the switch.

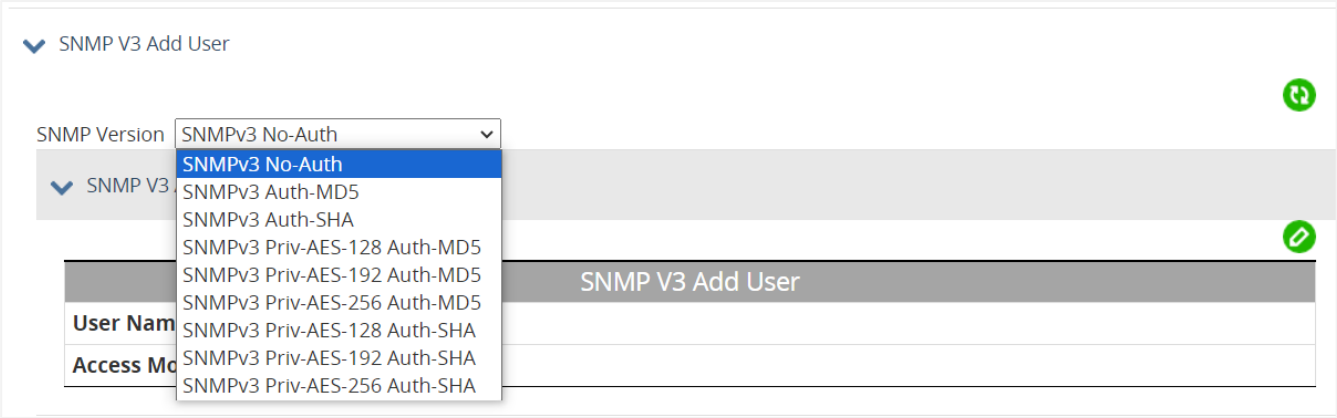


SNMP v3

The top panel of this screen is SNMP v3 Add User. To add a user, click the edit icon, and then enter the username. Set the Access mode to **Read Only** or **Read/Write**. Then click “Apply.”



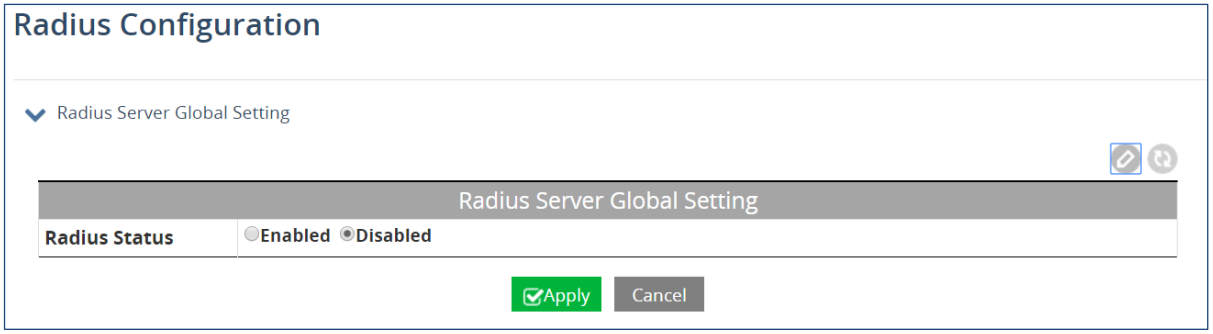
In the first panel, select SNMP Version from the drop-down menu.



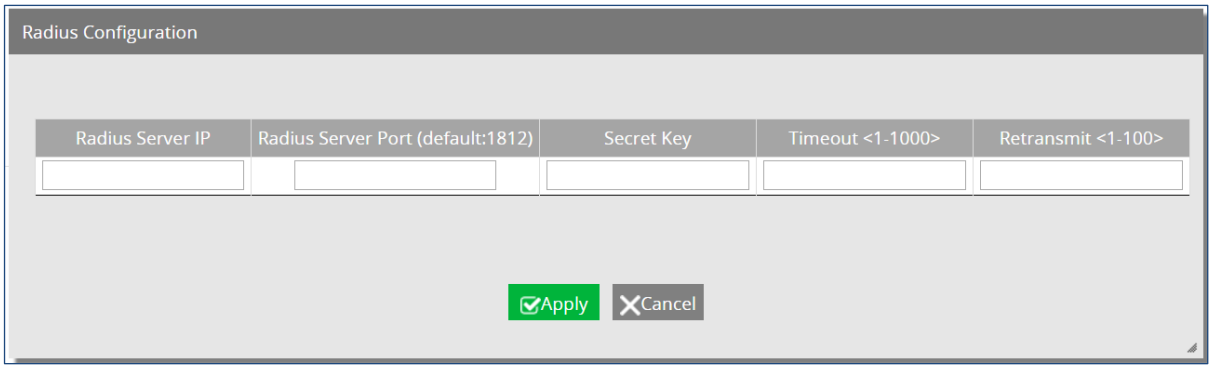
Radius Configuration

By default, the 802.1X function is globally disabled on the switch. If you want to use the 802.1X port-based security on a port, you must enable it globally on the switch first, and then enable it on a per port basis.

To enable Radius globally, click the edit icon on the first panel, and click the radio button next to **enabled**. Then click “Apply.”



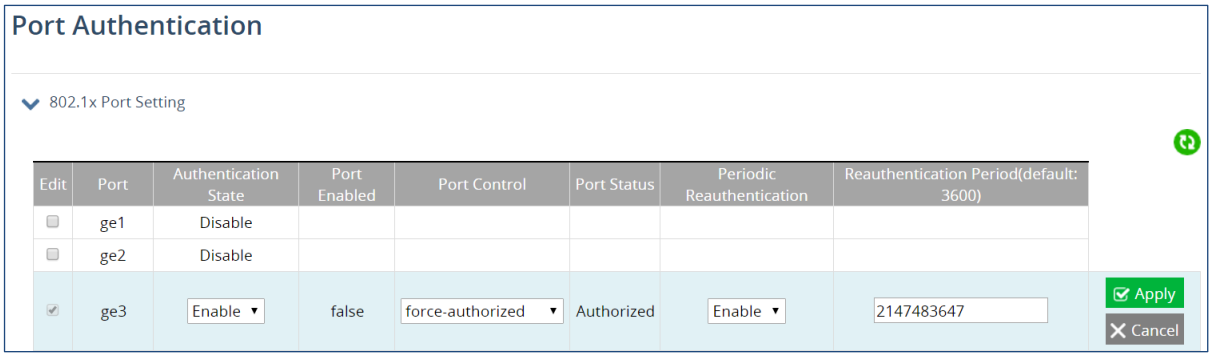
To add a Radius server, click the add icon in the second panel. Enter the **Radius Server IP address**, **Radius Server Port**, **Secret Key**, **Timeout**, and **Retransmit** values.



Port Authentication

Click the check box next to the port for which you want to configure Radius and set the Authentication state to **enable**. Set the Port control feature to **auto** (enables 802.1X authentication, port starts in unauthorized state), **force-authorized** (disables 802.1X authentication, port transitions to the authorized state without authentication), or **force-unauthorized** (port stays in unauthorized state and ignores authentication attempts).

Enable **Periodic Reauthentication** if needed. If Periodic Reauthentication is enabled, enter a value for the interval (in seconds) between reauthorization attempts. Click “Apply” when finished.

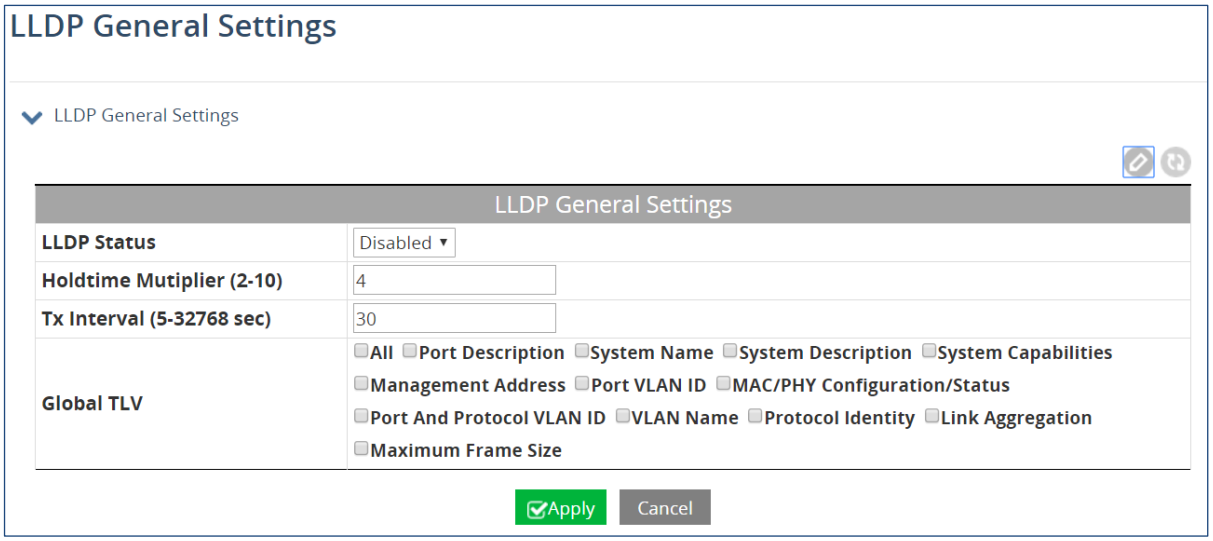


16 LLDP

The Link Layer Discovery Protocol (LLDP) allows network devices to advertise their identity, capabilities, and neighbors on a local network.

LLDP General Settings

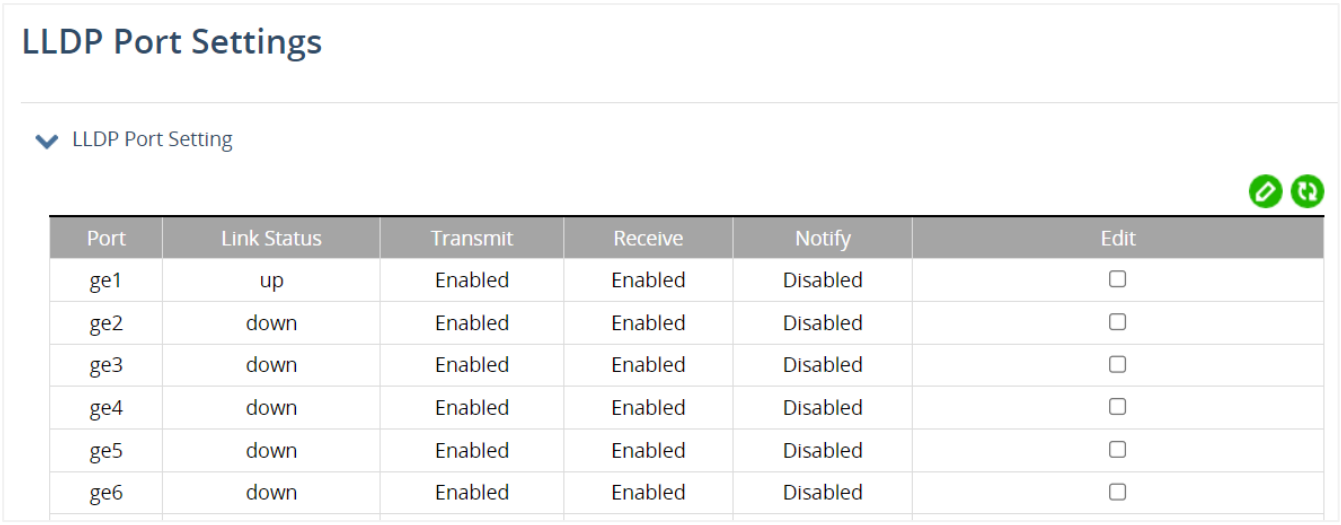
To enable LLDP, click the edit icon on the first panel, and select **enabled** from the drop-down menu. Enter a value for the **Holdtime Multiplier**, which is used to compute the actual time-to-live (TTL) value used in an LLDP frame. Then enter the **TX Interval**, which adjusts the time that LLDP information is transmitted by the switch. Finally, select items that will be advertised in the **Global TLV** (Time – Length – Value) by clicking in the corresponding check boxes. Click “Apply” when finished.



LLDP Port Settings

LLDP Ports Settings allows the individual ports on the switch to be configured for LLDP independently of one another. Each port can be configured to transmit LLDP information, receive LLDP information, and notify (via SNMP or Syslog) if there are changes in the LLDP information received from neighboring devices.

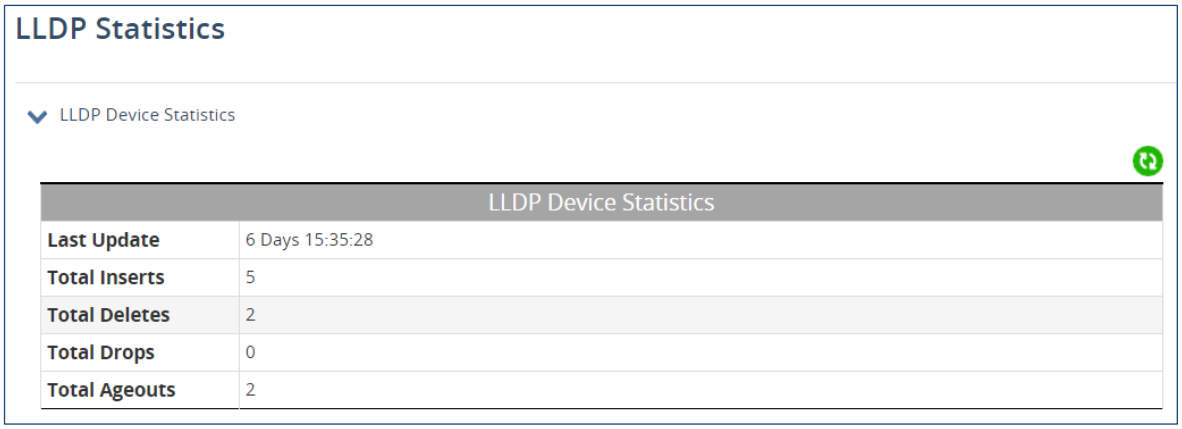
Click the check box next to the port for which LLDP is to be configured. Select enabled or disabled for the **Transmit**, **Receive**, and **Notify** fields.



Port	Link Status	Transmit	Receive	Notify	Edit
ge1	up	Enabled	Enabled	Disabled	☐
ge2	down	Enabled	Enabled	Disabled	☐
ge3	down	Enabled	Enabled	Disabled	☐
ge4	down	Enabled	Enabled	Disabled	☐
ge5	down	Enabled	Enabled	Disabled	☐
ge6	down	Enabled	Enabled	Disabled	☐

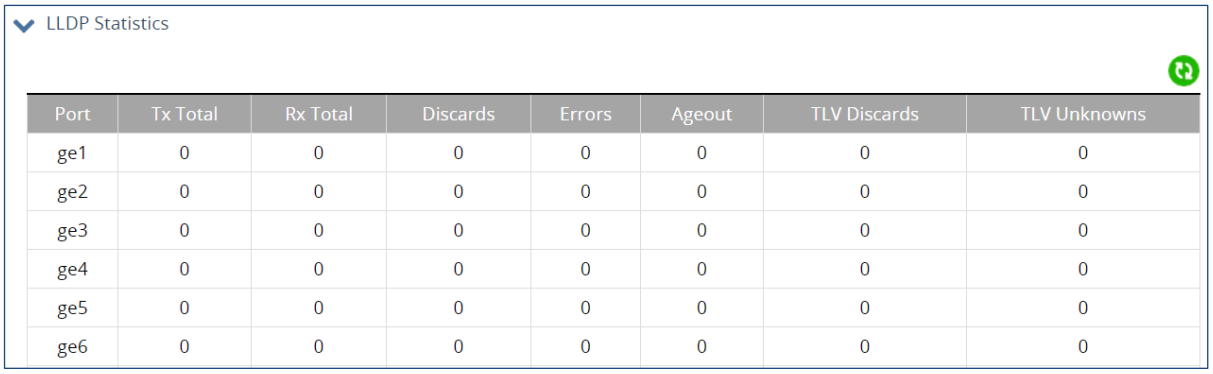
LLDP Statistics

The top panel of the LLDP Statistics screen is LLDP Device Statistics, a read-only panel that shows total values for **Last Update**, **Total Inserts**, **Total Deletes**, **Total Drops**, and **Total Ageouts**.



LLDP Device Statistics	
Last Update	6 Days 15:35:28
Total Inserts	5
Total Deletes	2
Total Drops	0
Total Ageouts	2

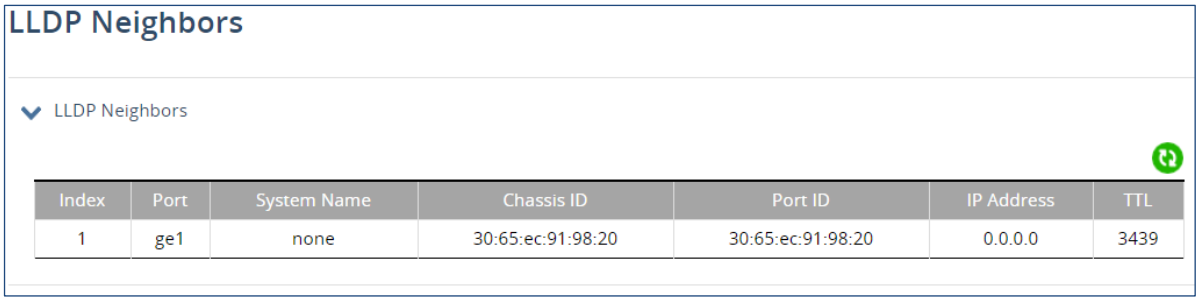
The second panel shows LLDP statistics per port, including **Tx Total**, **Rx Total**, **Discards**, **Errors**, **Ageout**, **TLV Discards**, and **TLV Unknowns**.



Port	Tx Total	Rx Total	Discards	Errors	Ageout	TLV Discards	TLV Unknowns
ge1	0	0	0	0	0	0	0
ge2	0	0	0	0	0	0	0
ge3	0	0	0	0	0	0	0
ge4	0	0	0	0	0	0	0
ge5	0	0	0	0	0	0	0
ge6	0	0	0	0	0	0	0

LLDP Neighbors

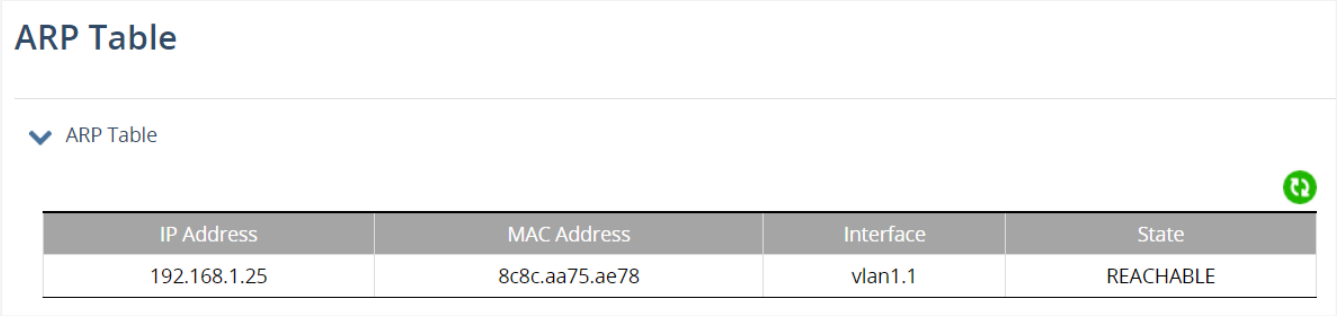
LLDP Neighbors is a read-only page (see Figure 108) that will display all the LLDP capable devices detected by the switch. The following information about connected LLDP-enabled devices is displayed in a tabular format. The columns displayed are: **Port**, **Chassis ID**, **Port ID**, **IP Address**, and **TTL** (Time to Live).



Index	Port	System Name	Chassis ID	Port ID	IP Address	TTL
1	ge1	none	30:65:ec:91:98:20	30:65:ec:91:98:20	0.0.0.0	3439

17 Routing

ARP Table



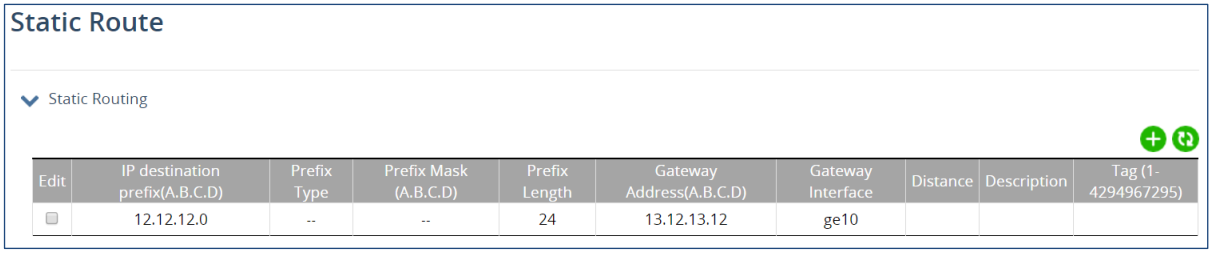
Static Route

Static routes are created by specifying the next hop to which the switch forwards data for a specific subnet. Configured static routes will be added to the routing table database and stored in the switch.

To add a new static route, click the add icon, and then enter values for the following fields:

IP destination prefix (A.B.C.D) — Subnet IP destination prefix
Prefix Type — *Mask* or *Length,* corresponding field type below appears based on selection.
Prefix Mask— A.B.C.D format, if Prefix Type is Mask
Prefix Length — 0 - 32
Gateway Address — A.B.C.D format
Gateway Interface — Gateway nexthop interface name
Distance — 1 – 255, Administrative Distance
Description — Description of the static route
Tag — Range is 1-4294967295, Tag used as a “match” value to control redistribution via route maps

Click “Apply” when finished. Existing routes can be edited by clicking the checkbox next to the IP destination prefix on the left.



To add an IPv6 route, enter values for these fields:

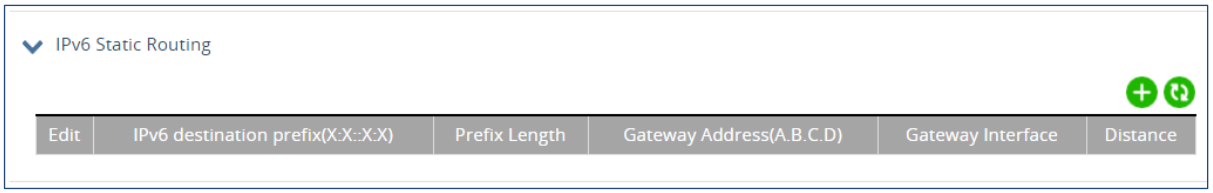
IPv6 destination prefix – (X:X::X:X) format

Prefix Length – Length of IPv6 prefix

Gateway Type – Address or interface

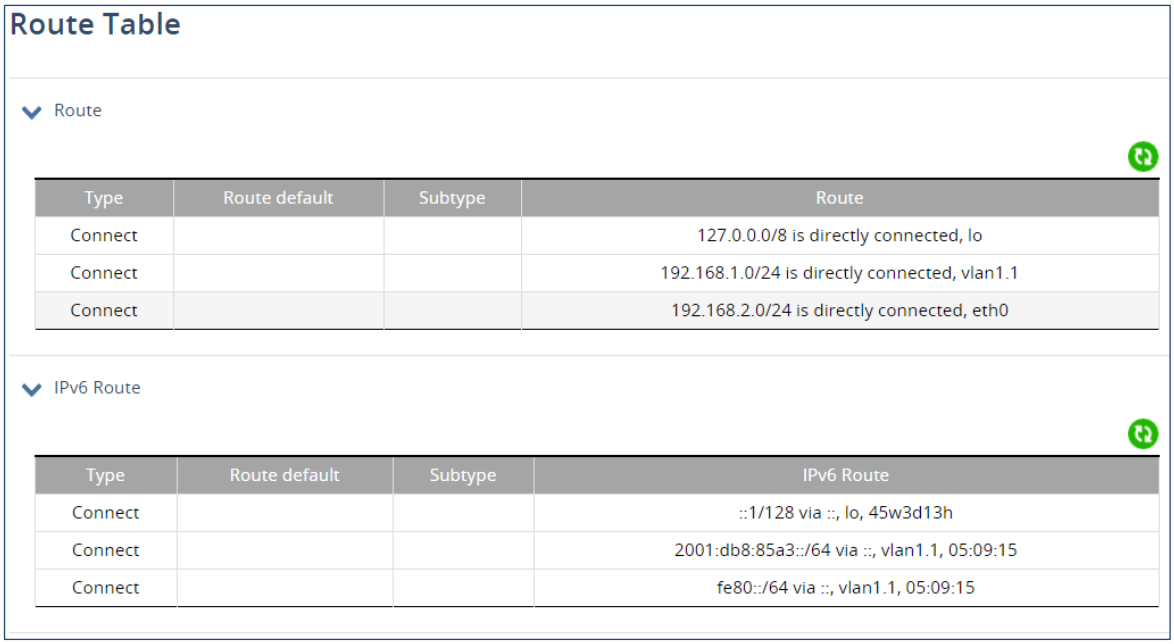
Gateway Address - (A.B.C.D) format

Distance – From 1 to 255, Administrative Distance



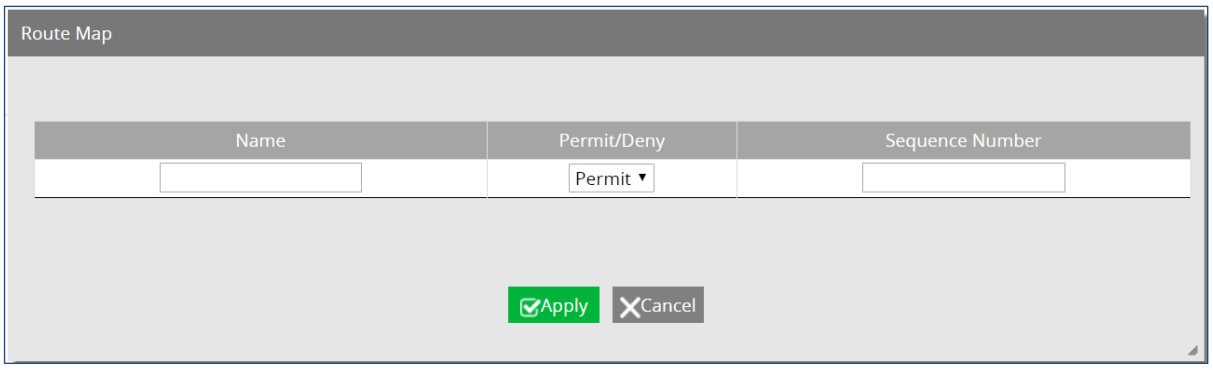
Route Table

The routing table is a read-only screen that shows existing routes.

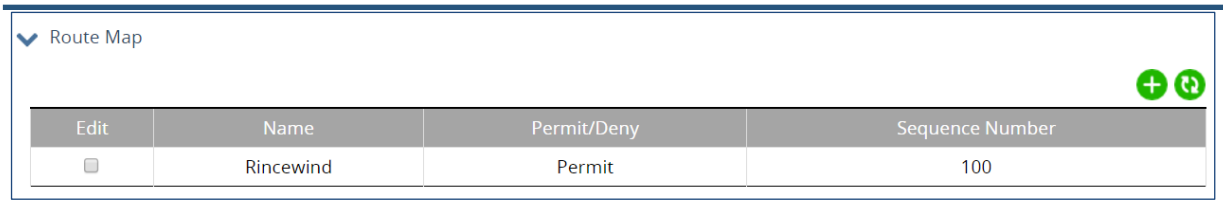


Route Map

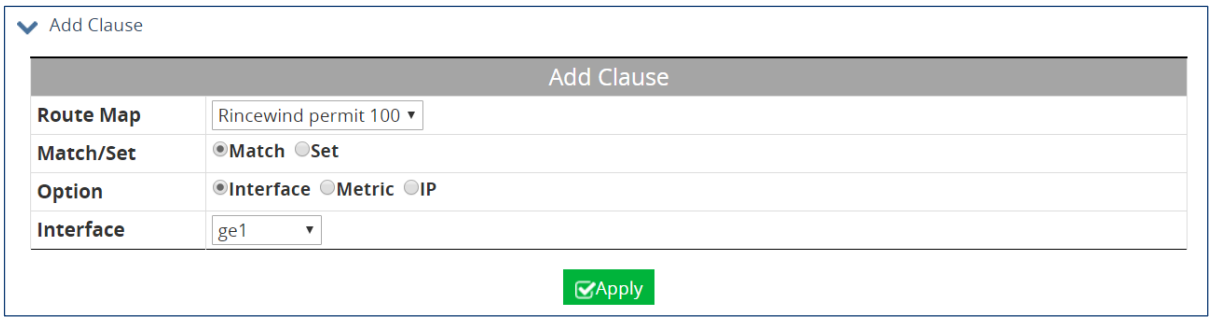
Route Maps can be used for both redistribution and policy routing. To create a route map, click the add icon. Enter the **name** of the route map, the type (**Permit** or **Deny**), and the sequence number (Sequence to insert to or delete from an existing route-map entry. Then click “Apply.”



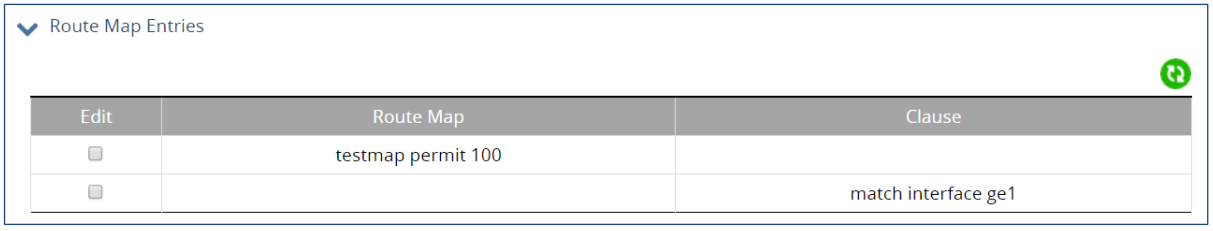
Existing route maps can be deleted by clicking the corresponding check box and clicking “Delete.”



Add match Clauses in the second panel. These are the conditions that must be met in order for a route map to redistribute from one routing protocol to another.



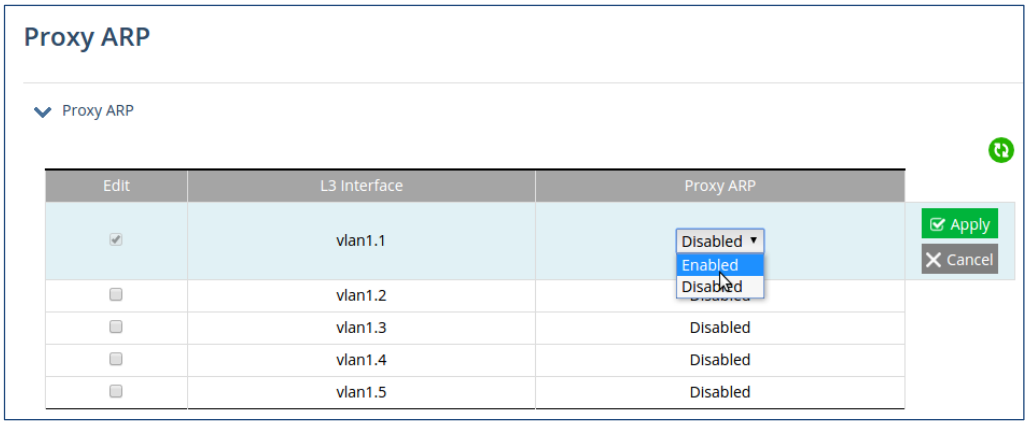
The Route Map Entries panel is a read-only panel that shows configured Route Maps.



Proxy ARP

Proxy ARP allows the switch to answer ARP queries for a network address that is not on that network. The ARP Proxy is aware of the location of the traffic's destination and offers its own MAC address as the (seemingly) final destination. The "captured" traffic is then typically routed by the Proxy to the intended destination via another interface or via a tunnel.

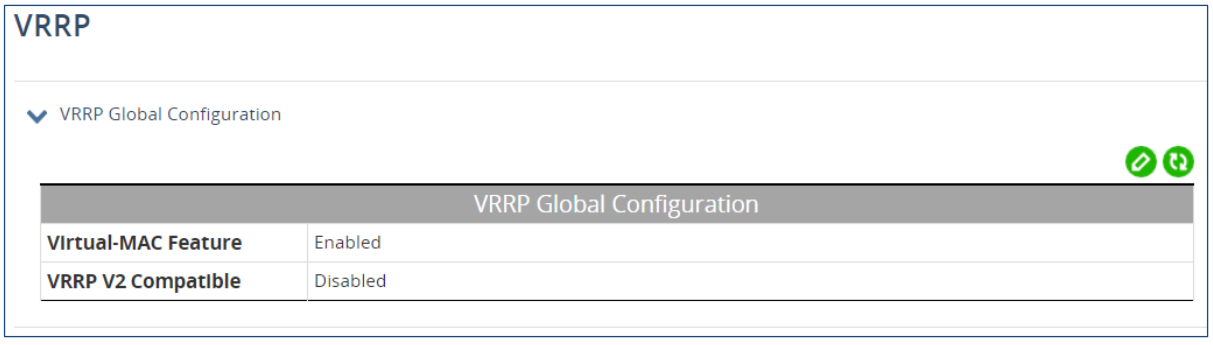
To enable Proxy ARP, select an interface or VLAN by clicking the check box at the left. Select enable, and then click “Apply.”



VRRP

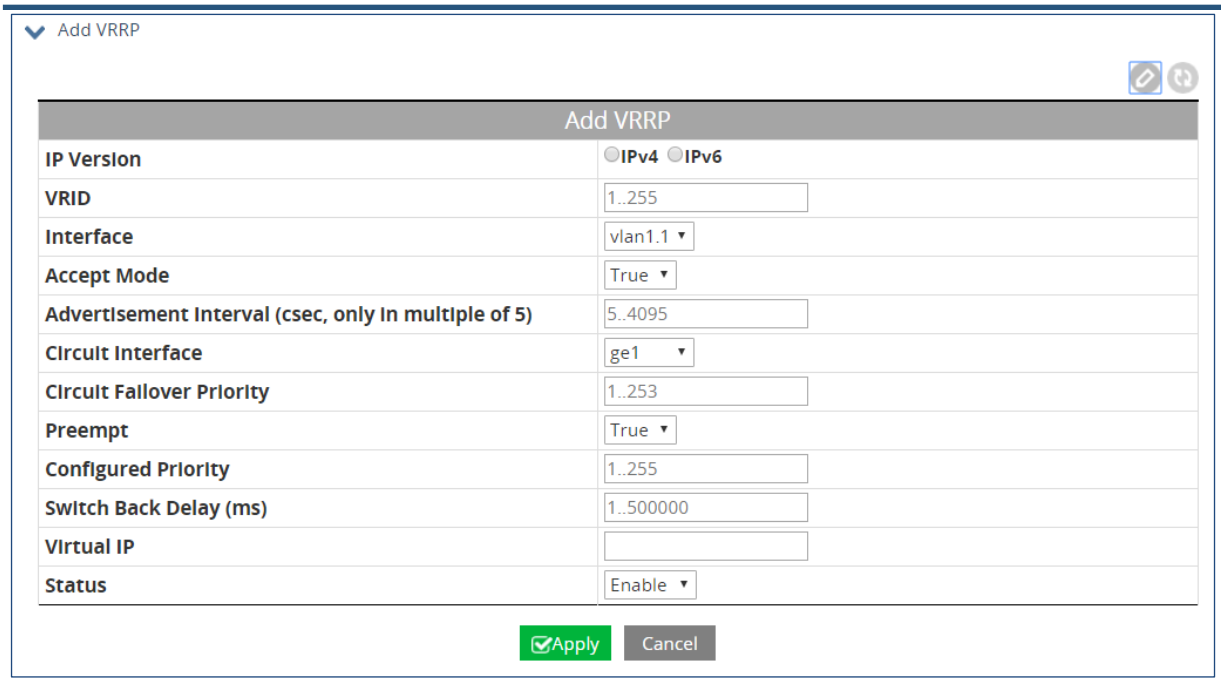
VRRP (Virtual Router Redundancy Protocol) is a distance-vector routing protocol that uses hop count as a routing metric. VRRP eliminates the risk of a single point of failure inherent in a static default routing environment. It specifies an election protocol that dynamically assigns responsibility for a virtual router to one of the VRRP routers on a LAN. One of the major advantages of VRRP is that it makes default path available without requiring configuration of dynamic routing on every end-host.

The virtual-MAC Feature allows the backup device to use the MAC address of the primary device.

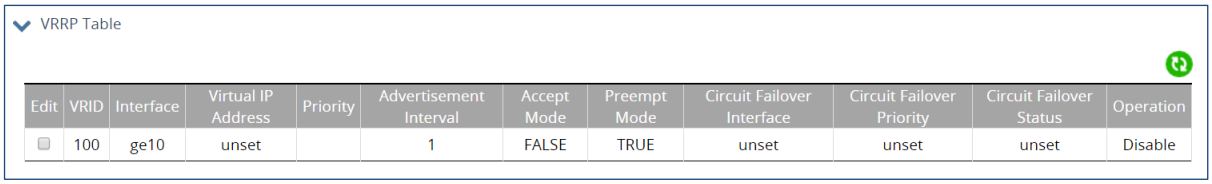


To configure VRRP:

- Click the edit icon.
- Select the IP version (IPv4 or IPv6)
- Enter a Virtual Router Identifier (VRID), from 1 – 255.
- Select the physical interface or VLAN that will be used for virtual routing.
- Set **Accept Mode** to true or false. Accept Mode allows the switch to respond to pings (ICMP EchoRequests) sent to the VRRP virtual IP address.
- Set the **Advertisement Interval** (the rate at which the Master router sends advertisement packets to all members of the VRRP group) in seconds. Range is from 1 – 10. These packets indicate that the master router is still operational.
- Select the circuit interface to be used for circuit failover.
- Set the **Circuit Failover Priority**. This is the value by which the virtual router decrements its priority value during a circuit failover event. Configure this value to be greater than the difference of priorities between the master and backup routers.
- Set the **Preempt Mode** to True or False. If true, this specifies that the router with the highest priority will function as a backup to the Master router when master is unavailable.
- Set the priority. If you are configuring the master router, set this value to 255. For other VRRP routers, use a value from 1 - 254. If the master router fails, the router with the highest priority will become the new master.
- Set the **Switch Back Delay** for the timer for the master VRRP router.
- Enter the virtual IP address for the VRRP session.
- Set the status to enable.
- Click the “Apply” button.



Details of existing instances of VRRP can be viewed in the VRRP table at the bottom of the screen.



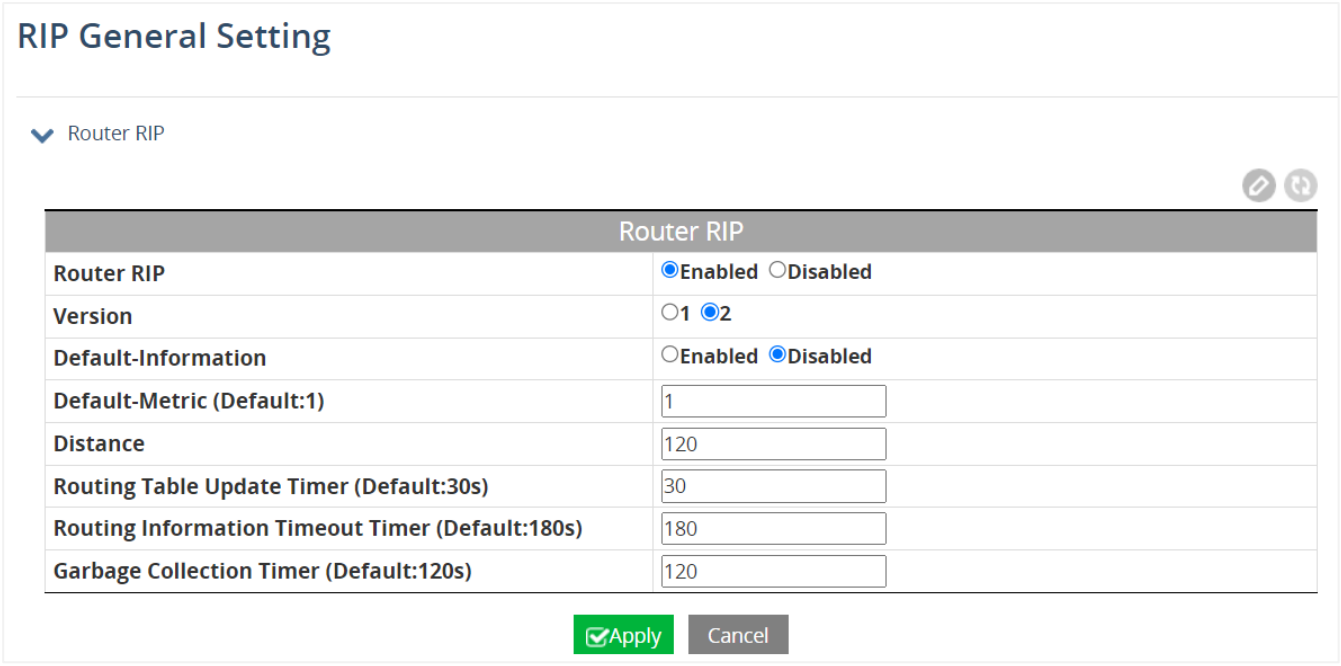
18 RIP

RIP General Setting

The Routing Information Protocol (RIP) is a distance-vector routing protocol that uses hop count as a routing metric. RIP prevents routing loops by setting a limit on the number of hops allowed in a path from source to destination.

To enable and configure RIP on the managed switch:

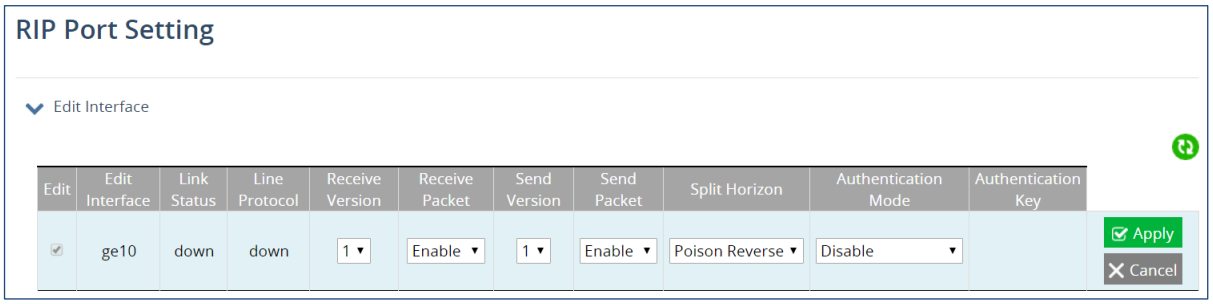
- Click the edit icon.
- Set the Router RIP field to **Enable**.
- Choose RIP version 1 or 2.
- Enable/disable **Default Information** to distribute default routes.
- Set the **Default Matrix** value in the range of 1 to 16.
- Set the Distance from 1 to 255 (Default value is 120)
- Set the timings for the **Routing Table Update Timer**, the **Routing Information Timeout Timer**, and the **Garbage Collection Timer** (Default values are 30, 180, and 120 seconds respectively).
- Click “Apply”.



RIP Port Setting

For a port to be displayed on this screen, the interface must first be added on the RIP Network by Interface panel. To configure RIP port settings:

1. Select the interface by clicking the corresponding check box.
2. Set the RIP receive version (1, 2, or both)
3. Set Receive packets to enable or disable.
4. Set the Send Version to 1 or 2.
5. Set Send Packet to Enable or Disable.
6. For the Split Horizon Field, select enable, disable, or poison reverse.
7. Set the Authentication Mode to **disable**, **MD5**, or **simple password**.
8. If the Authentication Mode is MD5 or Simple Password, set the Authentication Key (1 – 16 characters).
9. Click “Apply.”



RIP Route

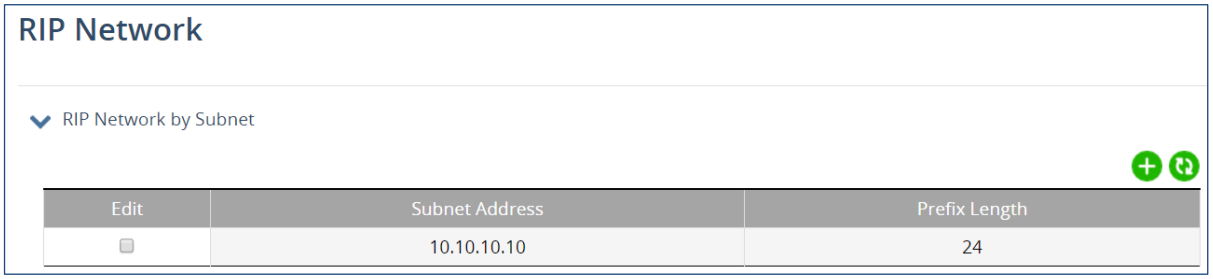
The RIP route table is a read-only page that shows existing RIP routes. The Routing Table fields are:

- **Route Code** – (R)ip, (K)ernel, (C)onnected, (S)tatic
- **Network** – IP address of destination network
- **Next Hop** – Next closest router or Layer 3 switch towards destination
- **Metric** – Number of hops
- **From** – IP address of source router
- **I/F** – Interface

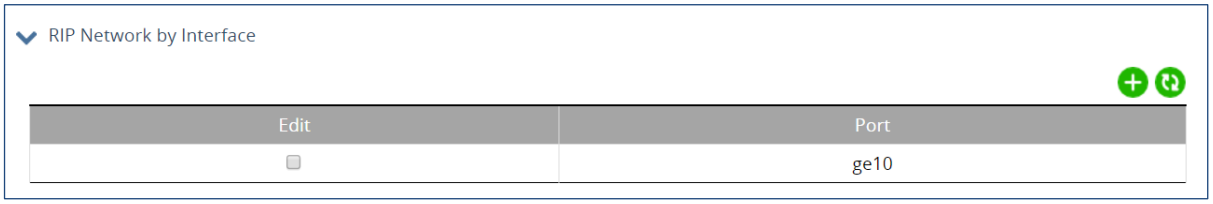
- **Time** – Duration of time since last update

RIP Network

On the RIP Network screen, you can add or delete subnet addresses and interfaces to be advertised by RIP. To add a subnet, click the add icon in the top panel, and enter the subnet address and prefix length. Then click “Apply.”



To add an interface, click the add icon, select the interface from the drop-down list, and then click “Apply.”

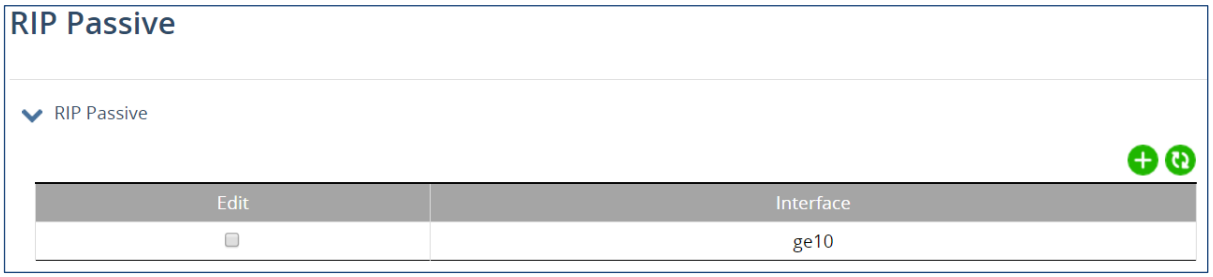


RIP Neighbor

The RIP Neighbor screen is used to add/delete RIP neighbor IP addresses. To add a neighbor, click the add icon and then add the IP address of the neighboring router or Layer 3 switch, and click “Apply.” Select existing neighbors from the list and click “Delete” to remove them.

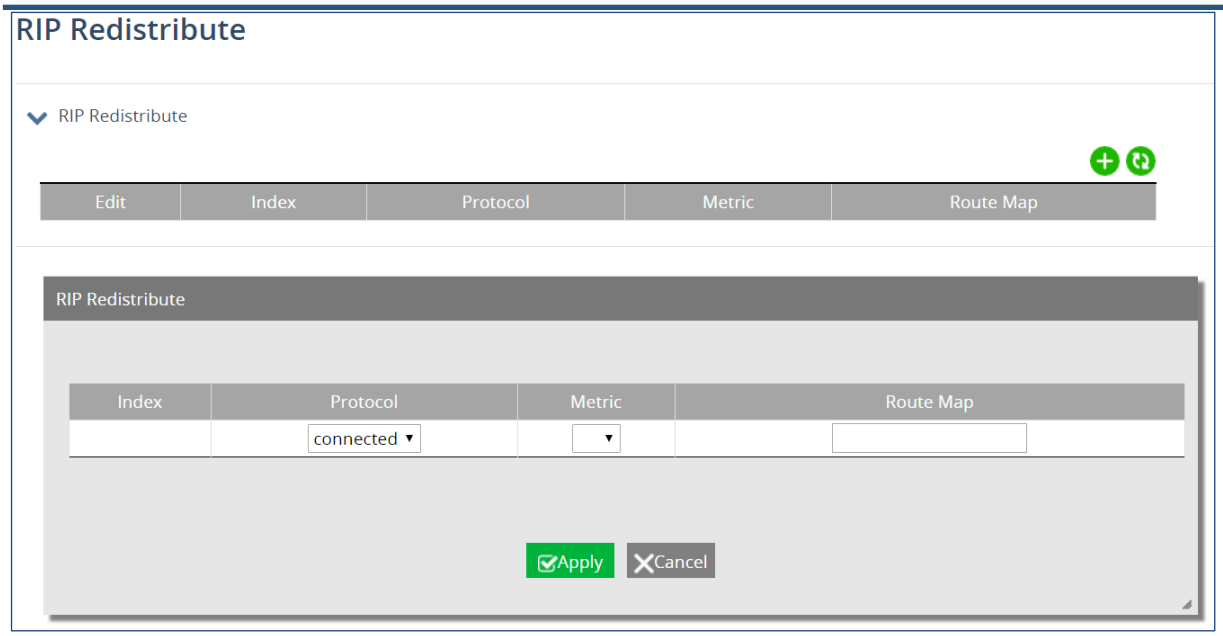
RIP Passive

On the RIP Passive screen, you can select an interface to be “passive,” that is, to prevent the RIP routing process from sending multicast/broadcast updates on that interface. Click the add icon, select the desired interface from the drop-down menu, then click “Apply” to make that interface passive. You can select and delete passive interfaces from the Passive Interface List by clicking the check box next to the interface and then clicking “Delete.” Doing so will return that interface to sending multicast/broadcast updates normally.



RIP Redistribute

Redistribution is using a routing protocol to advertise routes that have been learned by another routing protocol, static routes, or directly connected routes. To add an item to the redistribute list, select the protocol (**connected** or **static**), a route map that has been previously defined, and the desired metric, then click the “Apply” button.


RIP Redistribute
RIP Redistribute
Edit
Index
Protocol
Metric
Route Map
RIP Redistribute
Index
Protocol
Metric
Route Map
connected
Apply
Cancel

19 OSPF

OSPF General Setting

OSPF (Open Shortest Path First) is a link state routing protocol. It is a classless protocol with support for VLSM and CIDR, manual route summarization, incremental updates, and equal cost load balancing. OSPF uses only the interface cost as its metric. The administrative distance default value is 110. OSPF uses multicast addresses 224.0.0.5 and 224.0.0.6 for routing updates.

Devices running OSPF establish neighbor relationships, and then exchange routes. Instead of exchanging routing tables, devices exchange information about known network topologies. Each OSPF enabled device then calculates best routes and adds them to the routing table.

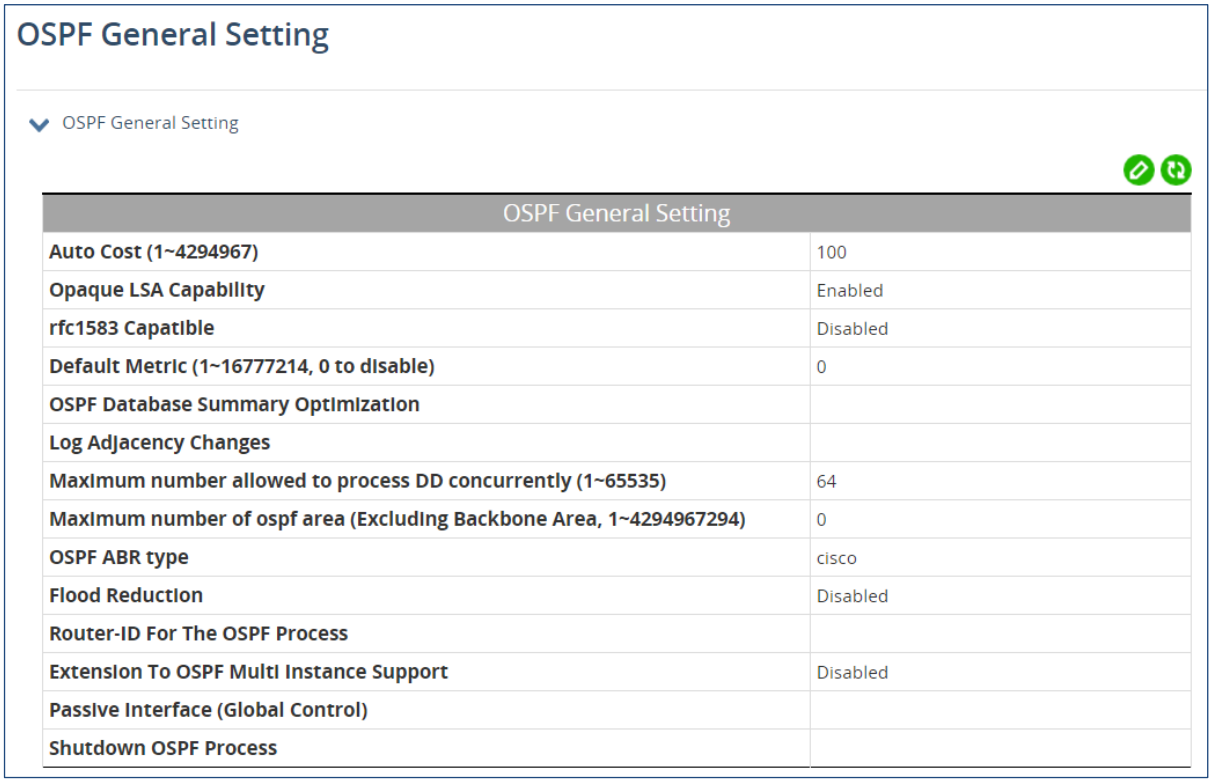
The following fields must be the same on both OSPF-enabled devices in order for them to become neighbors:

- subnet
- area id
- hello and dead interval timers
- authentication
- area stub flag
- MTU

To enable and configure OSPF, add a new OSPF process in the first panel, and in the second panel enter values for the following fields:

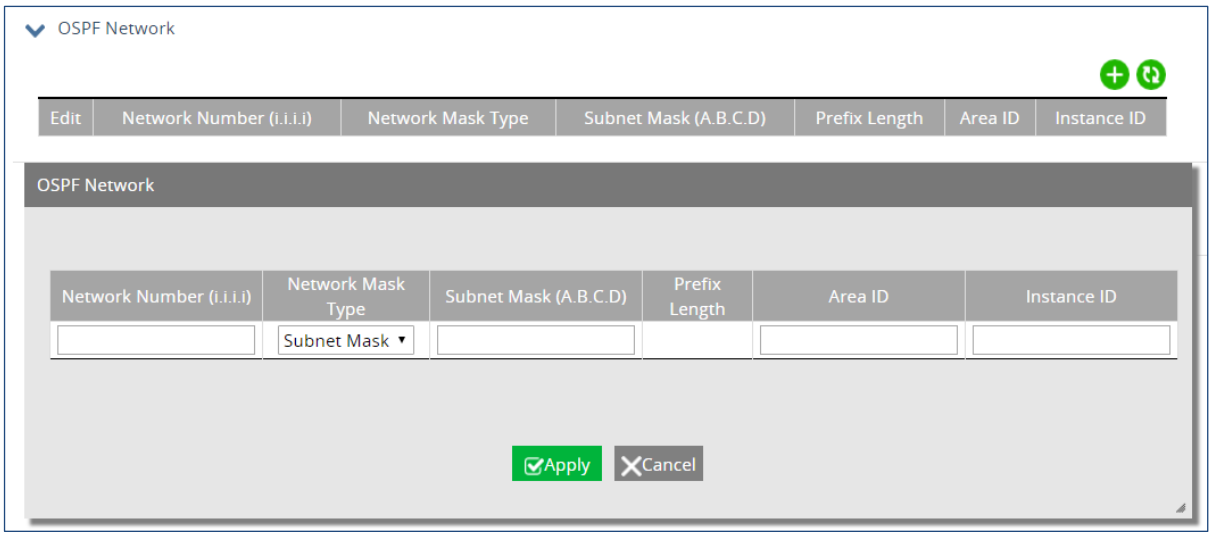
1. **Auto Cost**. **(1~4294967)** The auto-cost reference bandwidth, which controls how OSPF calculates the default metric for the interface.
2. **Opaque LSA Capability**. (enable/disable)
3. **RFC 1583 Compatibility**. (enable/disable) Setting this to enable will make the instance compatible with OSPFv2.
4. **Default Metric**. (1-16777214) A default metric facilitates redistributing routes with incompatible metrics. If the metrics do not convert, the default metric provides an alternative.

5. **OSPF Database Summary Optimization**. (enable/disable) When enabled, the database exchange process is optimized by removing the LSA from the database summary list for the neighbor, if the LSA instance in database summary list is the same as or less recent than the listed LSA in the database description packet received from the neighbor.
6. **Log Adjacency Changes**. (Log Adjacency Changes/Log Adjacency Changes-Detail)
7. **Maximum number allowed to process DD concurrently** (1~65535) Limits the number of Database Descriptors (DD) that can be processed concurrently.
8. **Maximum number of OSPF area** (Excluding Backbone Area, 1~4294967294)
9. **OSPF ABR type** (Cisco, IBM, shortcut, standard) OSPF Area Border Router (ABR) type.
10. **Flood reduction**. (enable/disable) When enabled, flood reduction reduces unnecessary refreshing and flooding of already known and unchanged information.
11. **Router-ID For The OSPF Process** (A.B.C.D)
12. **Extension to OSPF Multi Instance Support**. (enable/disable)
13. **Passive Interface (Global Control)**. (enable/disable)
14. **Shutdown OSPF Process**. (enable/disable)
15. Click “Apply” when finished.



The second panel is OSPF Network. Use this panel to enable OSPF routing with a specified area ID (and optionally an instance ID) on interfaces with IP addresses that match the specified network address.

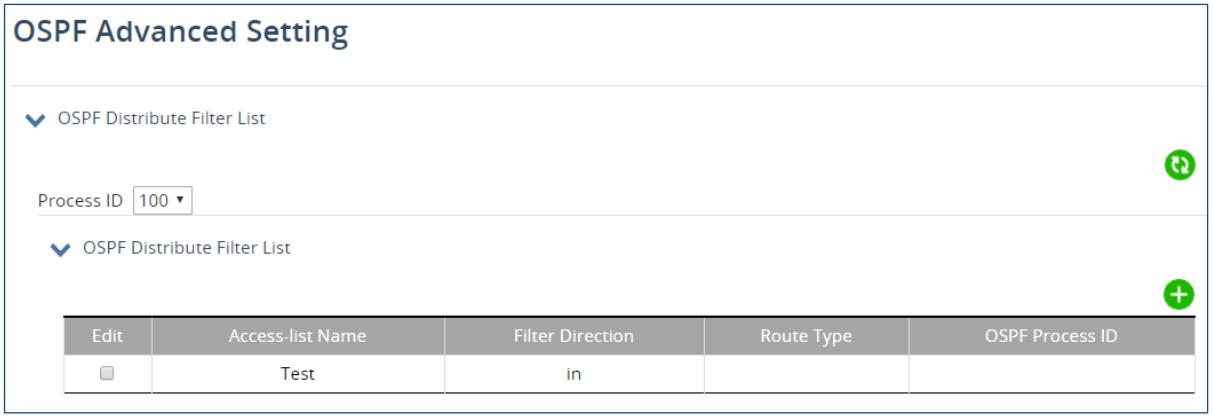
To add an OSPF network, click the add icon and enter the IPv4 network address. Select subnet mask or prefix length, and enter the value for the corresponding field that displays. Enter an **Area ID** from 0 – 4294967295, and an Instance ID from 1 – 255 (if running multiple instances of OSPF).



The final panel is for setting OSPF Timers, including Link State Advertisements (LSA), SPF Timers, and LSA Throttle Timers. Use the drop-down menu to select the timer type, and then click the edit icon in the panel displayed below.

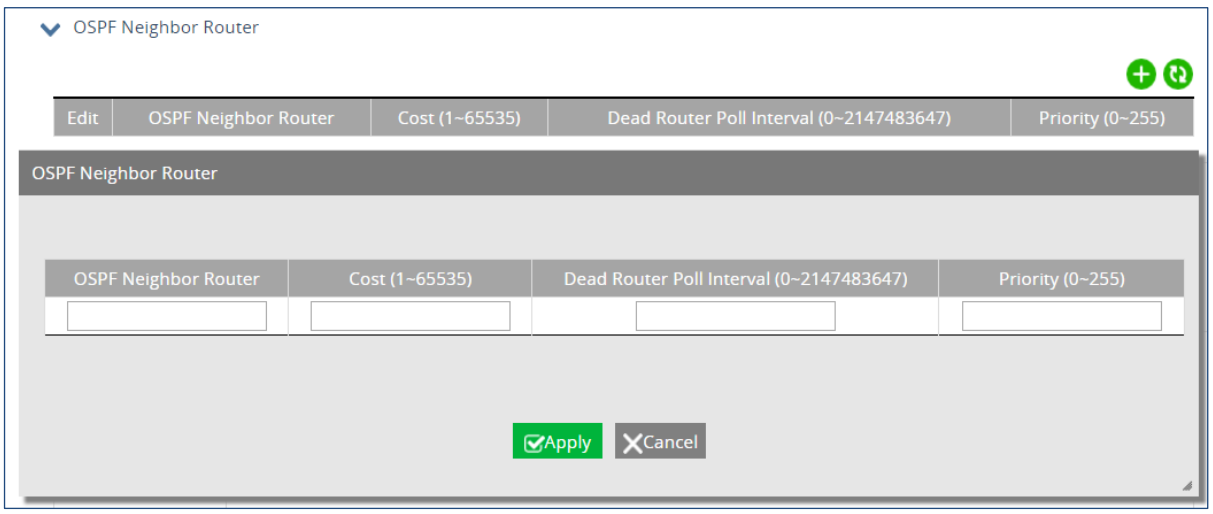
OSPF Advanced Setting

The top panel is for applying filters to networks in routing updates, redistributing other routing protocols into the OSPF routing table. Click the edit icon, and enter the name of the access list to be applied next to the filter type.

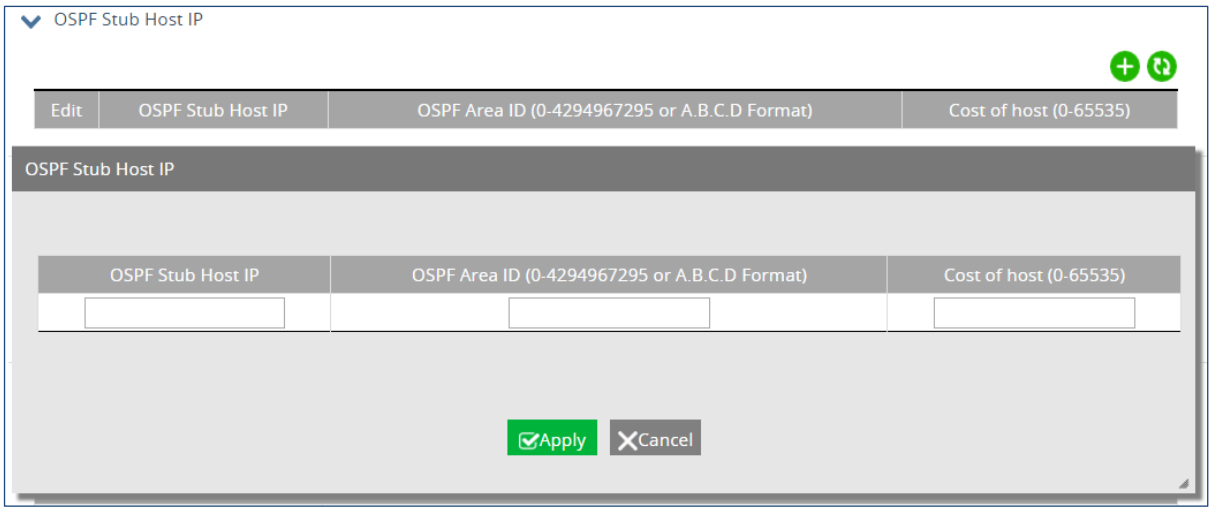


The second panel is OSPF neighbor, used to configure OSPF routers interconnecting to NBMA (Non-Broadcast Multi-Access) networks. Include one neighbor entry for each known non-broadcast network neighbor. Configure the neighbor address on the primary address of the interface.

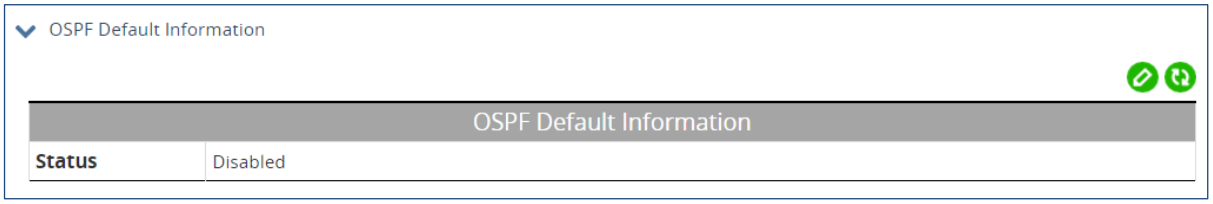
To add a neighbor router, click the add icon and enter the IP address of the neighbor in A.B.C.D format. Then enter the Cost (the Link-state metric to this neighbor), the Dead Router Poll Interval (the rate at which routers send hello packets when neighboring router is inactive, in seconds), and the priority.



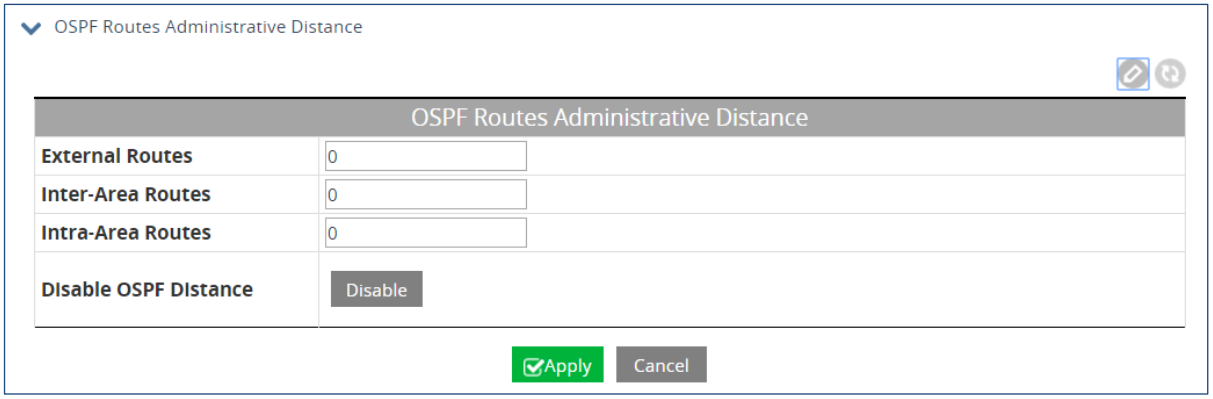
The third panel is OSPF Stub Host IP. Click the add icon, then enter the Stub Host IP address, the OSPF Area ID (0-4294967295 or A.B.C.D Format), and the Cost of host (0-65535). Click “Apply” when finished.



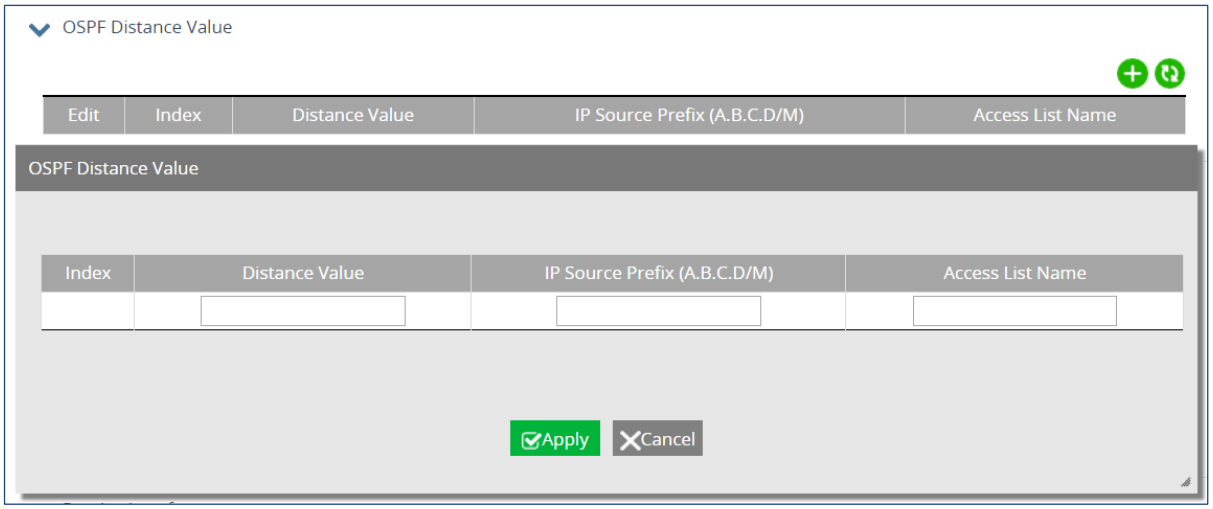
The fourth panel is OSPF Default Information. Use (enable) it to create a default external route into an OSPF routing domain.



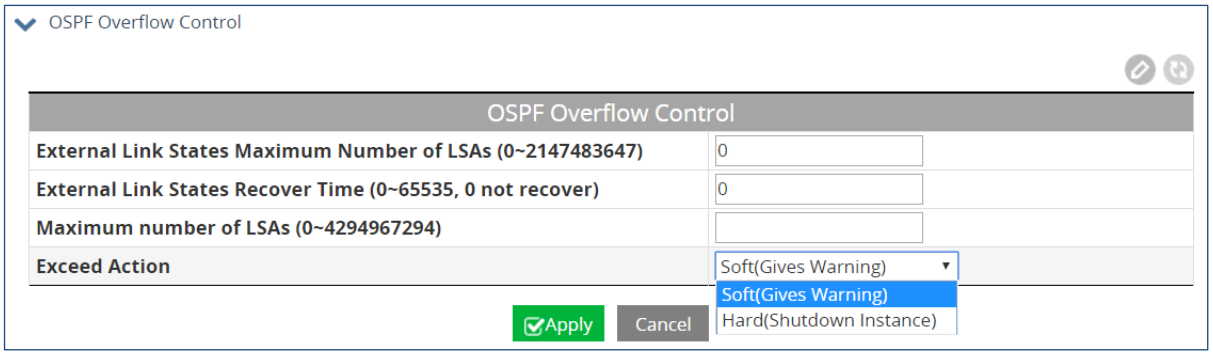
The fifth panel is used to set OSPF Routes Administrative Distance. The administrative distance rates the trustworthiness of a routing information source. A higher distance value means a lower trust rating.



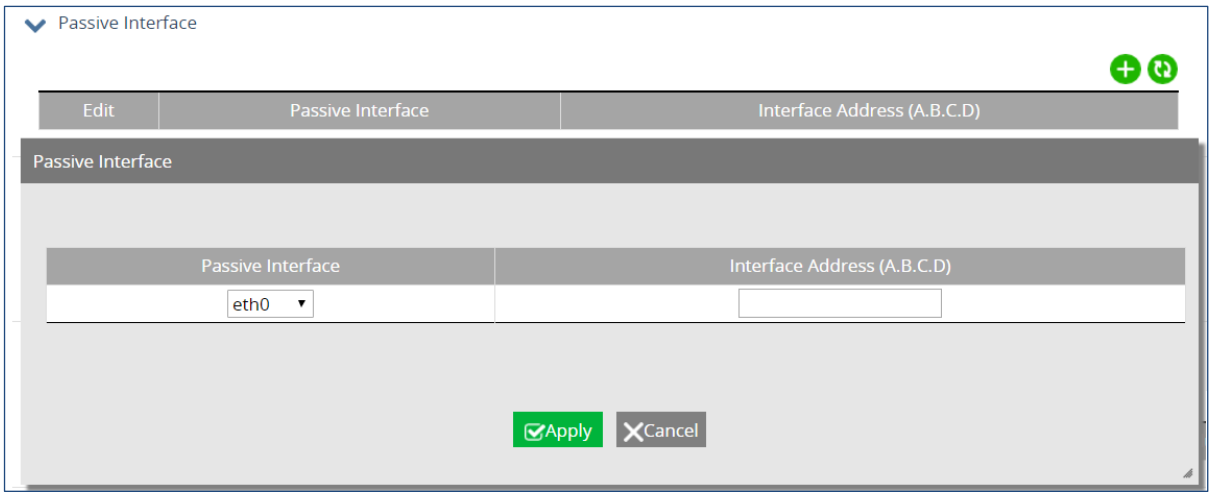
In the OSPF Distance panel, set administrative distances for access lists or next hop IP addresses. Click the add icon, and enter the distance value, the IP source prefix, and the access list name. Then click “Apply.”



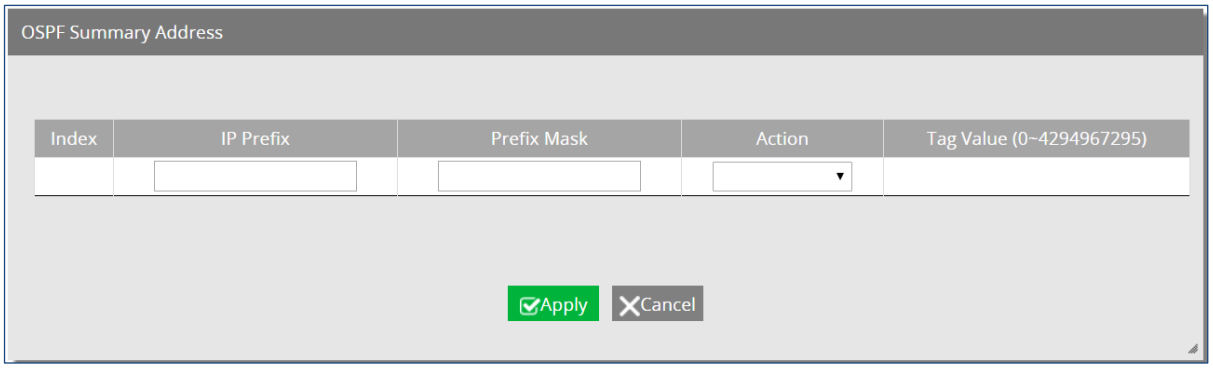
The OSPF Overflow Control Panel contains the settings for the maximum number of LSAs that can be supported by the OSPF instance.



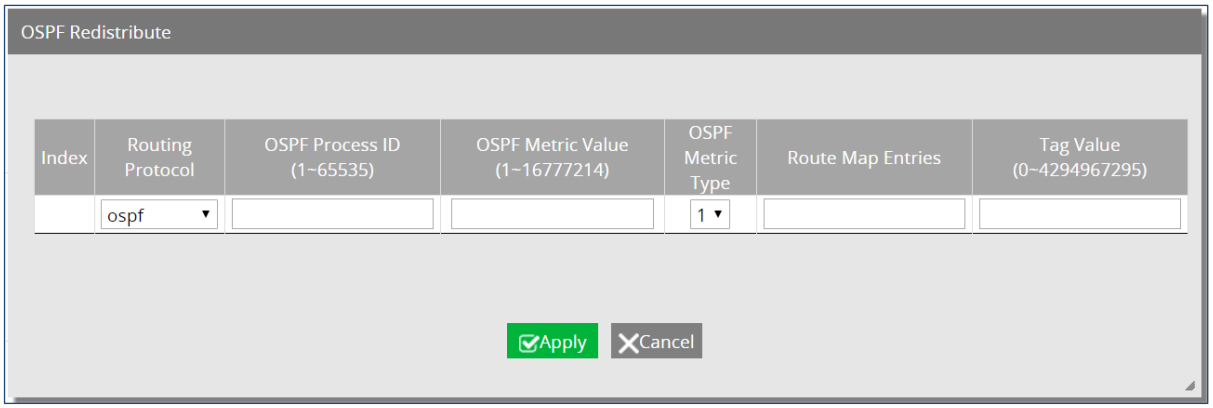
The seventh panel, OSPF Passive interface is used to suppress sending Hello packets on an interface. Click the add icon, and then enter the interface and the interface IP address. Then click “Apply.”



The OSPF Summary Address panel is used to summarize or suppress external routes with the specified address range. An address range is a pairing of a starting address and a mask that is almost the same as IP network number. Click the add icon, and enter the IP prefix, the Prefix Mask, the action (**not advertise** or **tag**), and the tag value. Then click “Apply.”



The final panel is OSPF Redistribute, for redistributing routes from a routing protocol, static route, and kernel route into an OSPF routing table. Click the add icon, and select the routing protocol (OSPFv3, connected, kernel, RIP, static route). Enter the OSPFv3 Process ID, Metric Value, and Metric Type. Finally, specify the route map reference and the tag value. Click “Apply when finished.



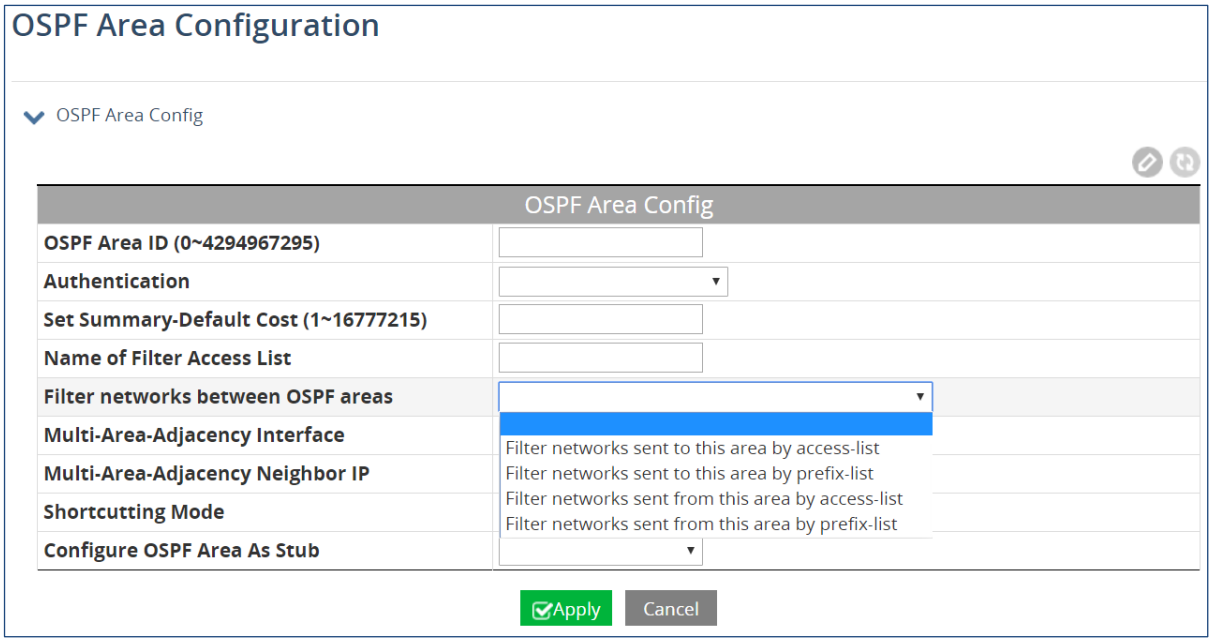
OSPF Area Configuration

The OSPF Area Configuration screen is comprised of five panels, the first of which is OSPF Area Config, used for defining areas and authentication. To add an area, click the edit icon and enter values for the following fields:

1. OSPF Area ID
2. Authentication
3. Set Summary-Default Cost
4. Name of Filter Access List
5. Filter networks between OSPF areas
6. Multi-Area-Adjacency Interface

7. Multi-Area-Adjacency Neighbor IP
8. Shortcutting Mode
9. Configure OSPF Area As Stub

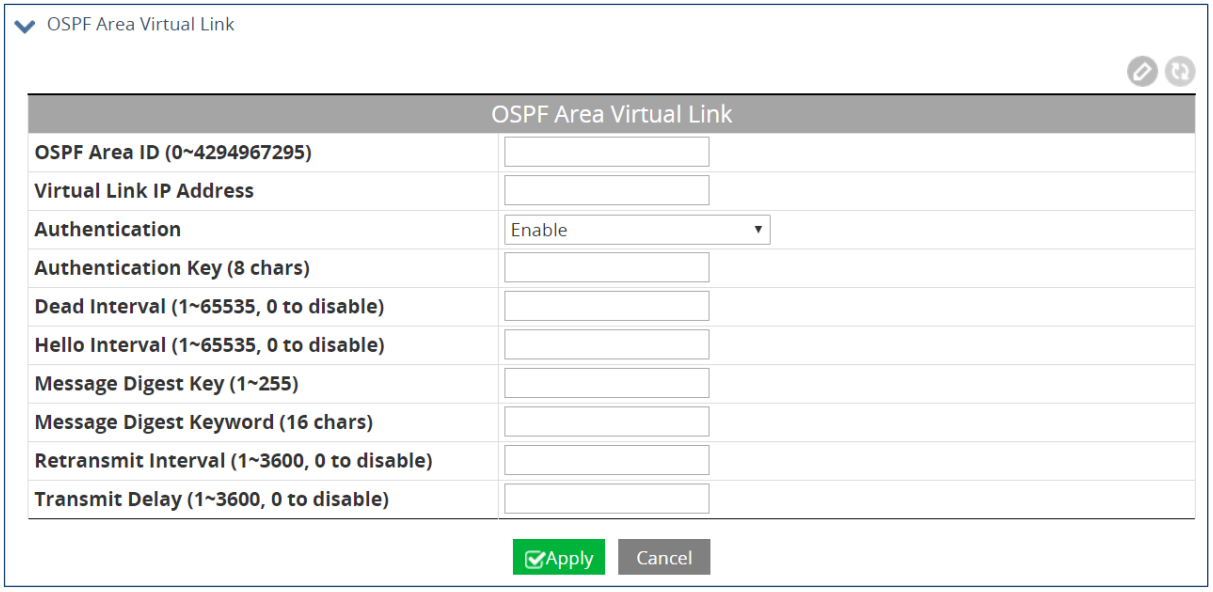
Click “Apply” when finished.



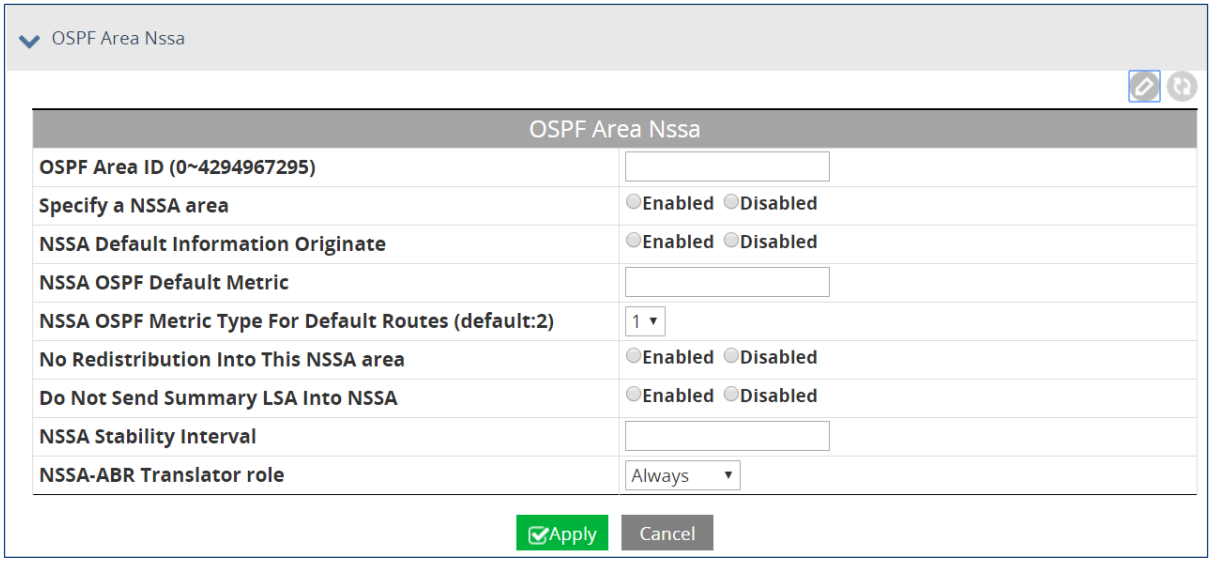
All OSPF areas must be connected to the backbone area 0. If this is not physically possible, a Virtual Link can be used. A virtual link connects through another area that is connected to area 0. To create an OSPF Area Virtual Link, click the add icon in the second panel and enter values for the following fields:

1. OSPF Area ID
2. Virtual Link IP Address
3. Authentication
4. Authentication Key (8 chars)
5. Dead Interval
6. Hello Interval
7. Message Digest Key
8. Message Digest Keyword
9. Retransmit Interval
10. Transmit Delay

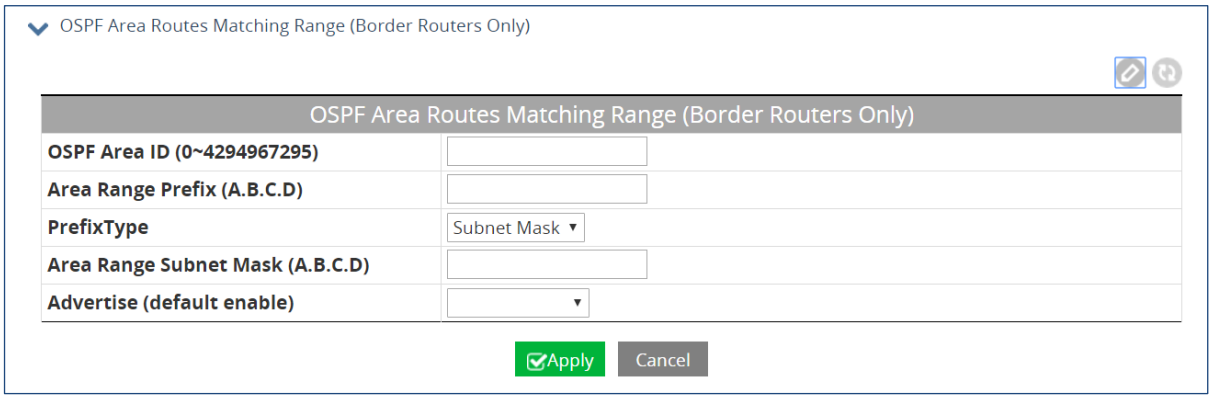
Click “Apply” when finished.



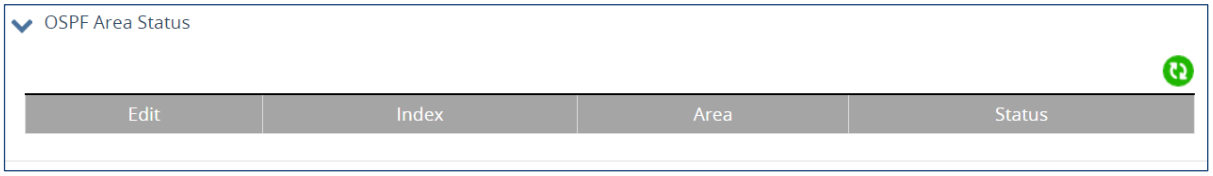
The third panel is for creating OSPF NSSA Areas. An NSSA (Not So Stubby Area) (NSSA) is an OSPF stub area that can also import external route information. External routes from other areas are not flooded into an NSSA, but route information from the NSSA is translated and flooded into other areas (like the backbone).



The OSPF Area Routes Matching Range panel allows OSPF routes to be summarized at an area boundary. A single summary route is then advertised to other areas by the Area Border Routers (ABRs). Routing information is condensed at area boundaries and outside the area.



The final panel is OSPF Area Status. It is read only, and displays the current Index, Area and Status of created OSPF areas.



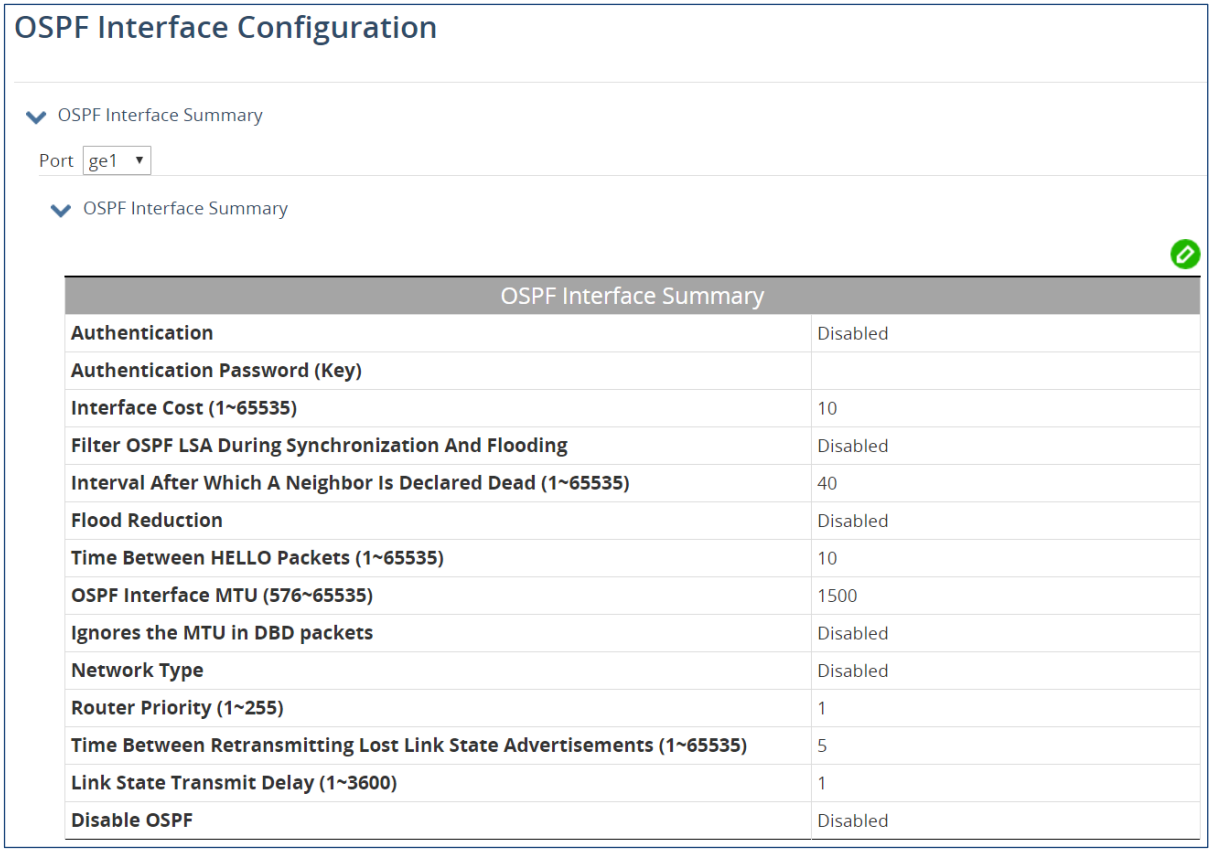
OSPF Interface Configuration

OSPF must be enabled on at least one interface in order to be activated on a network. Select the port from the drop-down menu in the upper left and then click the edit icon. Enter values for the following fields in the OSPF Interface Summary panel.

1. Authentication
2. Authentication Password (Key)
3. Interface Cost
4. Filter OSPF LSA During Synchronization And Flooding
5. Interval After Which A Neighbor Is Declared Dead
6. Flood Reduction

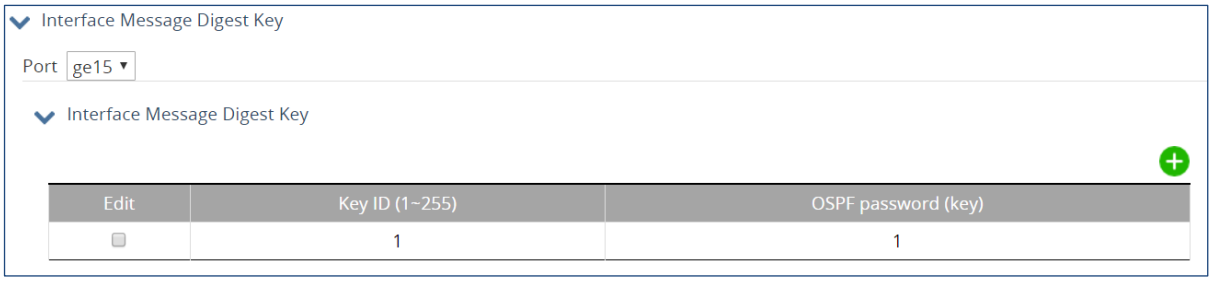
7. Time Between HELLO Packets
8. OSPF Interface MTU
9. Ignores the MTU in DBD packets
10. Network Type
11. Router Priority
12. Time Between Retransmitting Lost Link State Advertisements
13. Link State Transmit Delay
14. Disable OSPF

Click “Apply” when finished.



OSPF Interface Summary	
Authentication	Disabled
Authentication Password (Key)	
Interface Cost (1~65535)	10
Filter OSPF LSA During Synchronization And Flooding	Disabled
Interval After Which A Neighbor Is Declared Dead (1~65535)	40
Flood Reduction	Disabled
Time Between HELLO Packets (1~65535)	10
OSPF Interface MTU (576~65535)	1500
Ignores the MTU in DBD packets	Disabled
Network Type	Disabled
Router Priority (1~255)	1
Time Between Retransmitting Lost Link State Advertisements (1~65535)	5
Link State Transmit Delay (1~3600)	1
Disable OSPF	Disabled

The second panel on this screen is for configuring the Interface Message Digest Key, which allows for uninterrupted transitions between passwords. This is helpful for administrators who want to change the OSPF password without disrupting communication. Click the add icon and enter the key and the OSPF password. Click “Apply” when done.

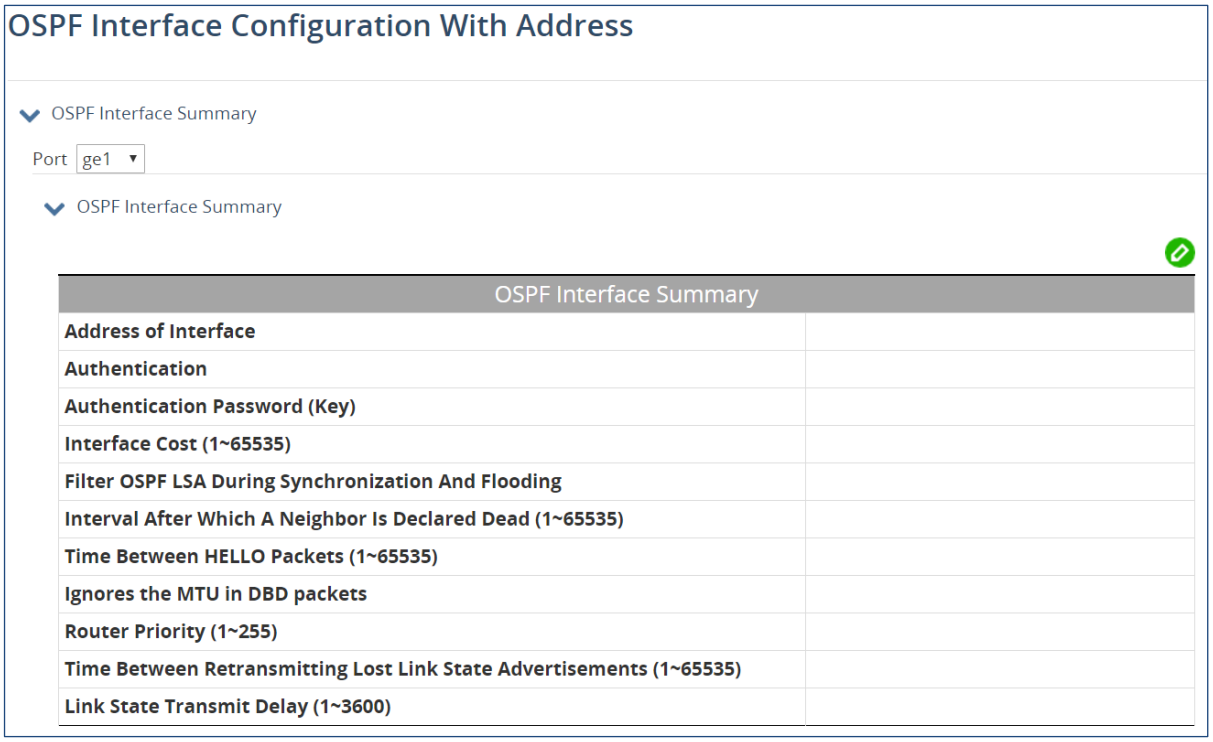


OSPF Interface Configuration with Address

The OSPF Interface Summary panel on this screen is similar to the one in the OSPF Interface Configuration screen, except that the OSPF area is restricted to an IP address. Select the port from the drop-down menu in the upper left and then click the edit icon. Enter values for the following fields:

1. Address of Interface
2. Authentication
3. Authentication Password (Key)
4. Interface Cost
5. Filter OSPF LSA During Synchronization and Flooding
6. Interval After Which A Neighbor Is Declared Dead
7. Time Between HELLO Packets
8. Ignores the MTU in DBD packets
9. Router Priority
10. Time Between Retransmitting Lost Link State Advertisements
11. Link State Transmit Delay

Click “Apply” when finished.

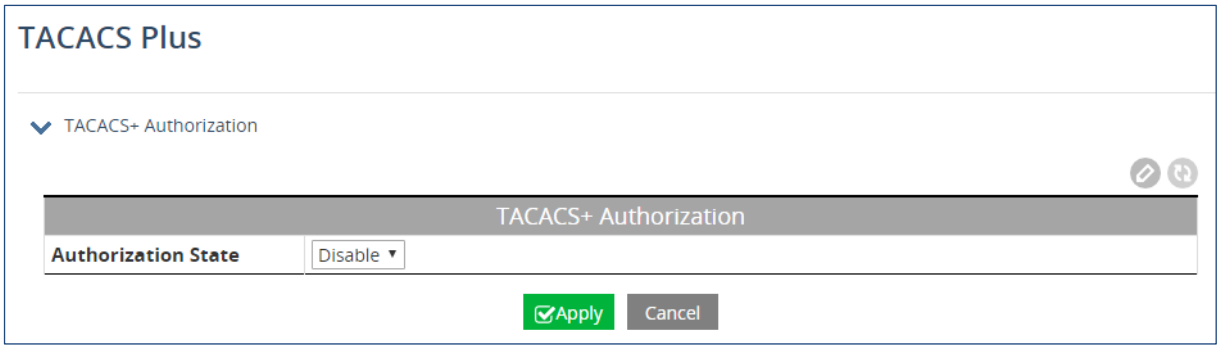


The Interface OSPF Statistics panel is a read-only panel that shows the index, interface address, and statistics for the selected port.

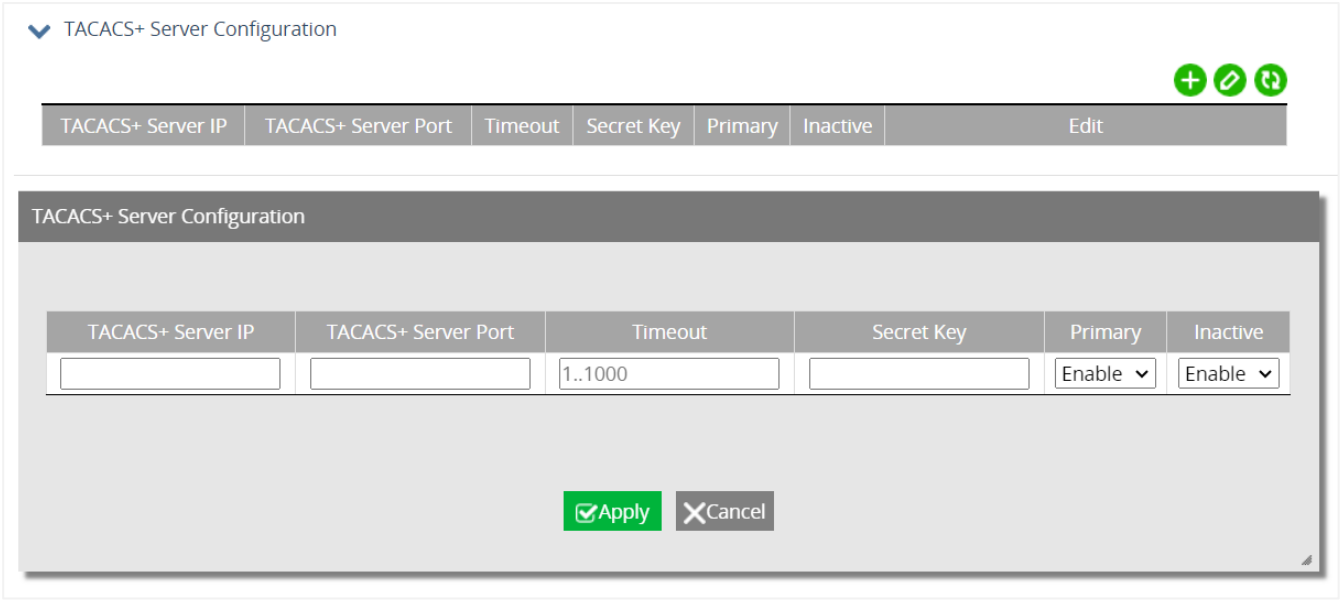
20 AAA (Authentication, Authorization, and Accounting)

TACACS Plus

This switch supporst the Tacacs+ protocol IEEE 802.1X protocol to provide port based security against unauthorized access. Enable Tacacs+ by clicking the edit button in the top panel and setting the Authorization State to Enable. Then click Apply.



The next panel allows for the configuration of the switch to connect to a TACACS+ server. Setting a TACACS+ server to “primary” means that it will be the first server contacted when the switch tries to create a TACACS+ session. Only one server can be set to primary. Setting a TACACS+ server to “inactive” will disable it. A maximum of 3 servers can be added to a switch.



21 ERPS (Ethernet Ring Protection Switching)

ERPS (Ethernet ring protection switching) is a protocol defined by the International Telecommunication Union (ITU) in its G.8032 recommendation. This document describes how ERPS can offer rapid detection and recovery if a link or node fails and also instructs the user on how to configure it. ERPS prevents loops on a per-VLAN basis with networks that are wired in a simple ring topology. ERPS (G.8032) Version 2 provides enhancements in support of multiple ring and ladder topologies, and EtherWAN is compliant with G.8032 Version 2, February 2012 edition.

Acronyms

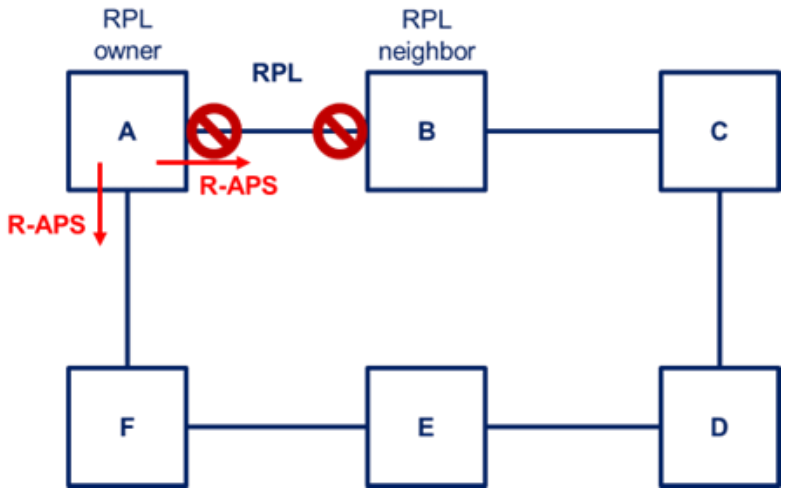
The following acronyms are used in the discussion about Ethernet ring protection switching (ERPS):

1. **Node**: The L2 switch equipment added to the ERPS ring is called a node. Each node cannot be added to more than two ports in the same ERPS ring. The nodes are divided into RPL Owner, Neighbor, and Ring Node.

2. **Ring Protection Link (RPL)**: which is the link designated by mechanism that is blocked during idle state to prevent loop on an ERPS ring. In ERPS, port roles include RPL Owner, Neighbor, and Ring ports. The RPL Owner Node and the RPL Neighbor Node are responsible for blocking traffic over the RPL in normal conditions.

3. **RPL Owner Node**: RPL is controlled by the RPL Owner, which is one of the terminating nodes of this link. Usually, the RPL is blocked, and traffic cannot pass through it. Therefore, no loop will be formed within the ring. When a failure in a ring is detected, the RPL will become unblocked, and traffic can then pass through it. By this way, a single-point failure in the ring can be overcame and traffic can keep being forwarded in the ring.

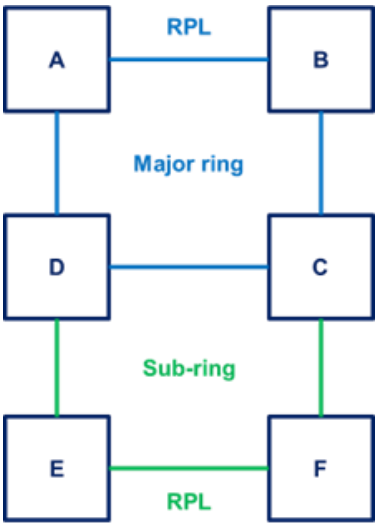
4. **RPL Neighbor Node**: An ERPS ring has only one RPL Neighbor port configured by the user, and it must be a port connected to the RPL Owner port. If the network is normal, it will block together with the RPL Owner port to prevent loops in the ERPS ring. The node with the RPL neighbor port becomes the RPL neighbor node.



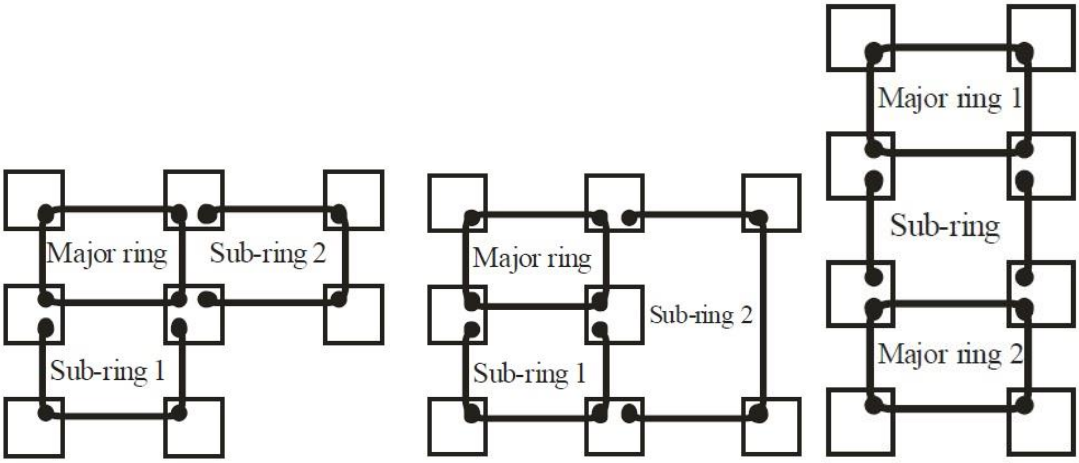
5. **Ring Node**: The common port The ports except RPL owner and neighbor port are ring node ports. If the node has only the common port, it will become the ring node.

6. **ERP Instance** (or **ERPS Instance**): ERP Instance (or ERPS Instance): An EPR instance is formed by the same instance ID, control VLAN, and interconnected switches.

7. **Major-Ring**: The topology of an ERPS network consists of one or several rings. Its ring members can be categorized into two types: the major ring and the sub-ring. An ERPS topology must include at least one major ring. The major ring is a closed circle formed by nodes. Each of the nodes has exactly two links that connect it to its neighbor node. One of the links in the closed circle should be configured as the RPL. Normally the RPL is blocked to prevent the traffic in the ring from looping.



8. **Sub-Ring**: A sub-ring is not a closed circle but a list of nodes with two terminating nodes. These two terminating nodes connect to either the major ring or another sub-ring. There is also a RPL, which is the sub-ring, and normally it is blocked to avoid traffic looping.

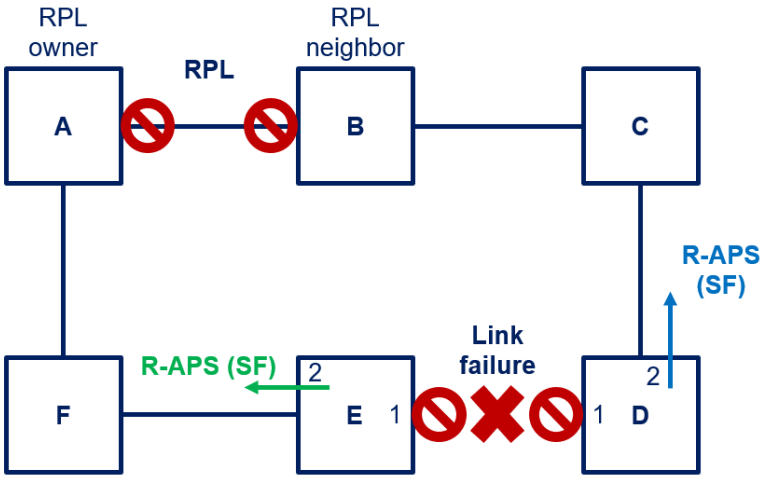


(Different forms of Main-Ring and Sub-Ring)

9. **Interconnected Node**: There could be many nodes that connect to different rings. Each node cannot be added to more than two ports in the same ERPS ring. These nodes are divided into three categories: RPL Owner, Neighbor, and Ring Node. The nodes across different rings are called "interconnected nodes.

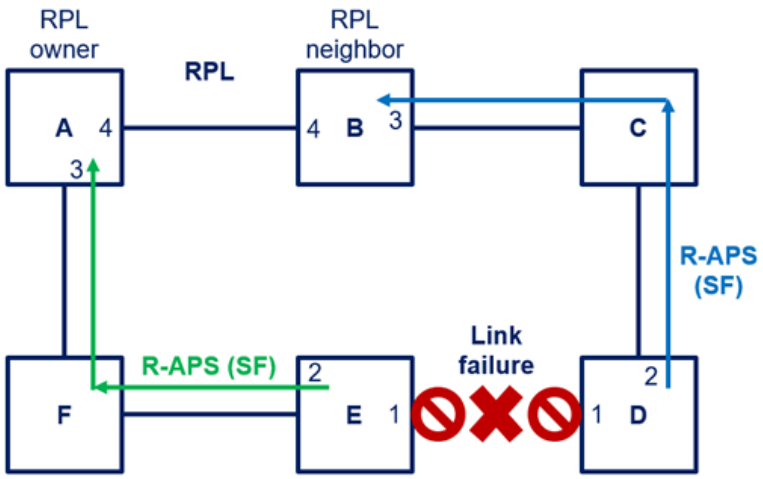
10. **Ring Automatic Protection Switching (R-APS)** protocol message: The protocol uses R-APS messages to communicate and coordinate the behavior among all ring nodes.

11. **Link Failure**:



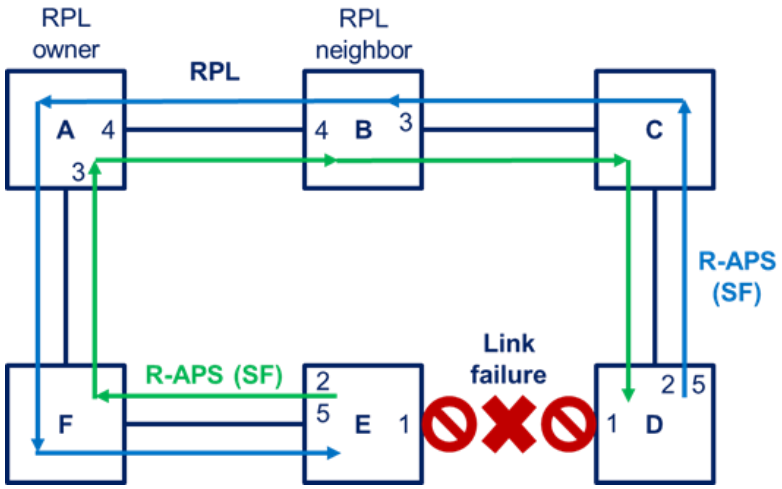
11.1. The ring nodes adjacent to the failed link block the ring ports on the failed link.

11.2. The ring nodes adjacent to the failed link send R-APS (SF) message (SF: Signal Fail)



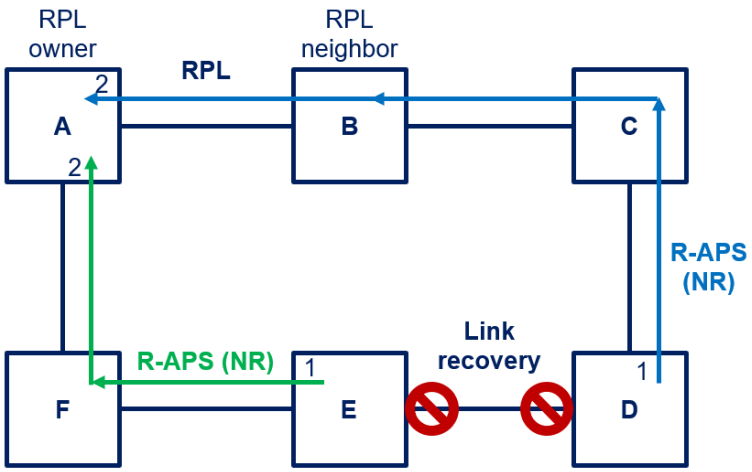
11.3. The R-APS (SF) messages are forwarded along the logical topology to the RPL owner and the RPL neighbor.

11.4. The RPL owner and the RPL neighbor unblock the RPL ports.



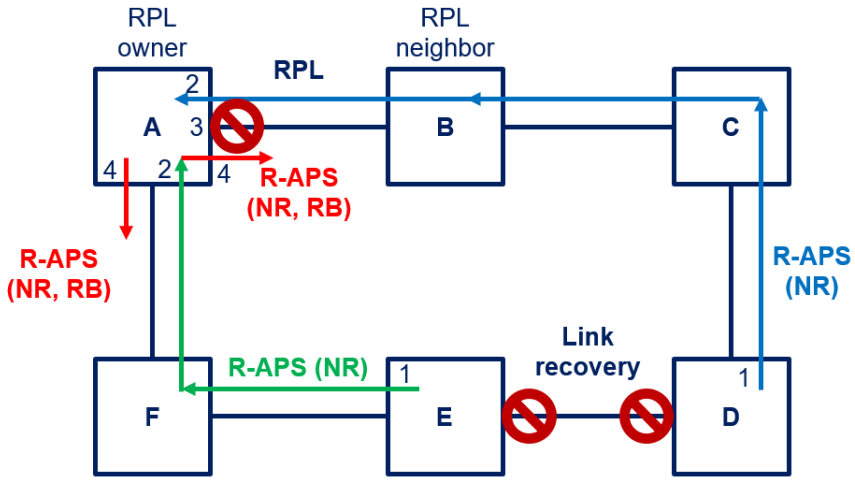
11.5. The ring nodes adjacent to the failed link continue sending R-APS (SF) messages periodically.

12. **Link Recovery**:



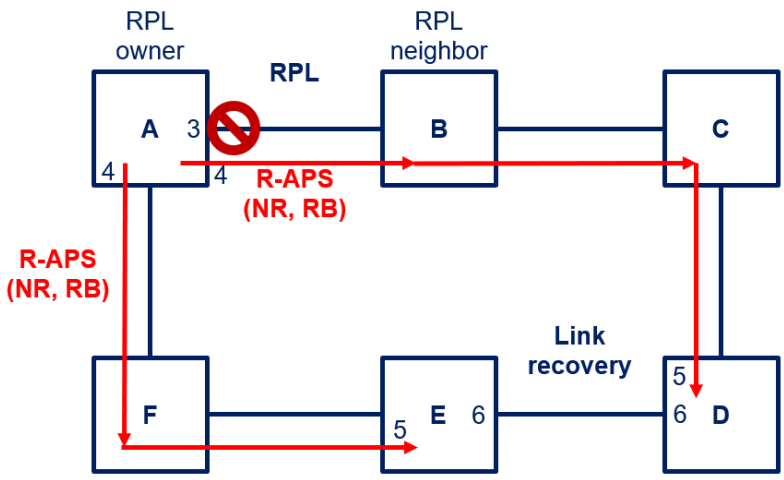
12.1. The ring nodes adjacent to the recovered link send an R-APS (NR) message (NR: No Request).

12.2. The R-APS (NR) messages are forwarded along the logical topology to the RPL owner.



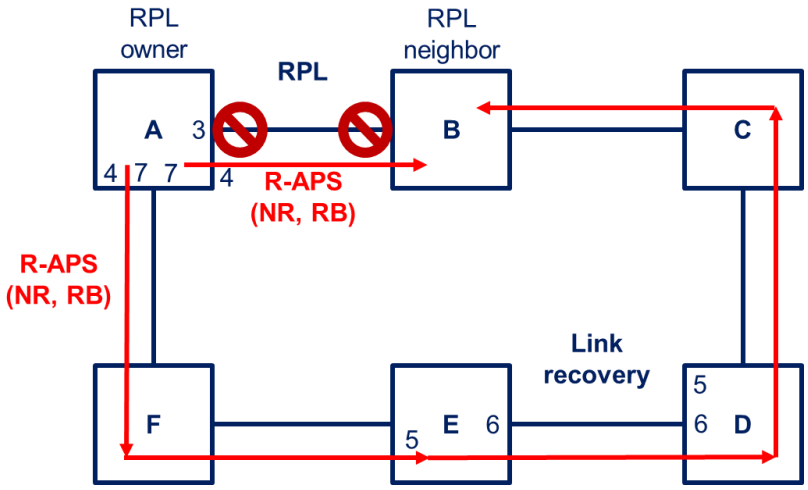
12.3. The RPL owner blocks its PRL port.

12.4. The RPL owner sends an R-APS (NR, RB) message (NR: No Request, RB: RPL Blocked).



12.5. The R-APS (NR, RB) messages are forwarded along the logical topology to the ring nodes adjacent to the recovered link.

12.6. The ring nodes adjacent to the recovered link unblock the ports on the recovered link and stop sending R-APS (NR) messages.



12.7. The RPL owner continues to send R-APS (NR, RB) messages periodically.

13. **Control Channel**: The control channel is the transmission VLAN of the ERPS protocol, and the protocol packet will carry a corresponding VLAN tag.

14. **Virtual Channel**: A sub-ring can either have or not have a virtual channel on the interconnected node. In a sub-ring, there are two modes for transmitting the sub-ring's R-APS packets: the virtual-channel mode and the non-virtual-channel mode. R-APS packets cannot pass through the RPL of the sub-ring because the RPL is blocked. To transmit the R-APS from one side of the RPL to another, a tunnel in the major ring will be adopted. When R-APS packets arrive at the sub-ring's terminating node, they will be passed into this tunnel. By this way, R-APS packets can travel in the main ring and then arrive at another terminating node in the same sub-ring. Such a tunnel is called the Virtual Channel. In non-virtual-channel mode, there is no tunnel for the sub-ring. In this case, the G.8032 protocol will allow the R-APS packets belonging to the sub-ring to pass through the sub-ring's RPL to reach nodes on the other side of this RPL. Hence, every node in the sub-ring can receive the R-APS packets. Note that only the R-APS packets are allowed to pass through the sub-ring's RPL. Traffic other than the R-APS packets are still forbidden to pass through sub-ring's RPL.

15. **Revertive Mode**: When the link fails, the RPL link is in the release protection state, and the RPL link is re-protected after the faulty link is restored to prevent loops.

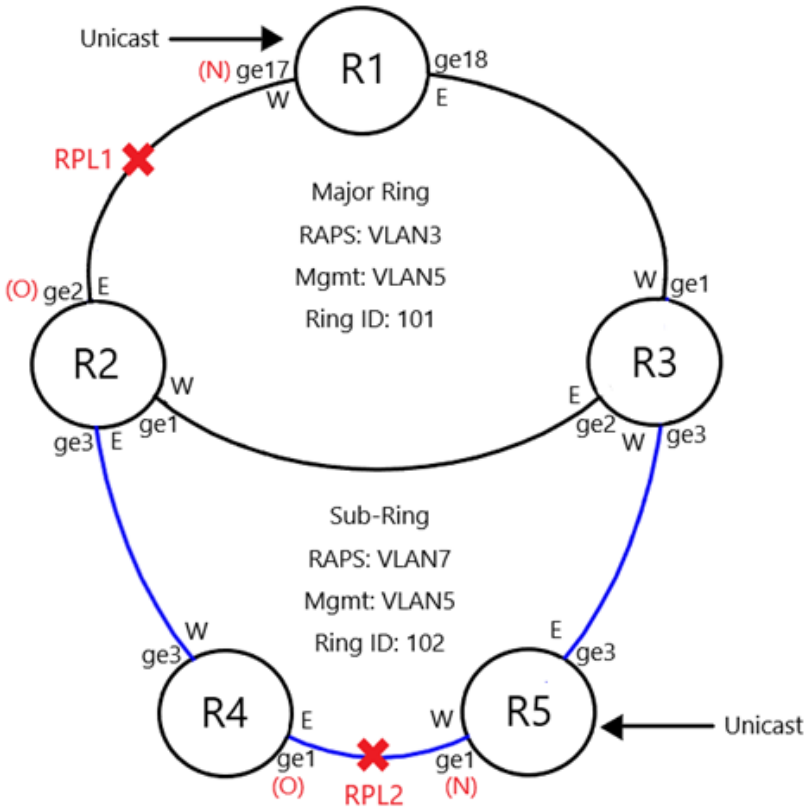
16. **Non-revertive Mode**: After the fault is rectified, the faulty node remains faulty (without entering forwarding) and the RPL link remains in the release protection state.

17. **Forced Switch**: This is a management-triggered state. When an administrator needs to shut down a port that is participating in a ring, this management entity will come into action. When a Forced Switch object is issued on the port, the port goes down and the APS PDU gets propagated around the ring, indicating the status. When the clear management object is set on the port, this forced switch is revoked.

18. **Manual Switch**: Similar to the Forced Switch, the Manual Switch is also management-triggered. The difference is that it has a lower priority compared to forced switching.

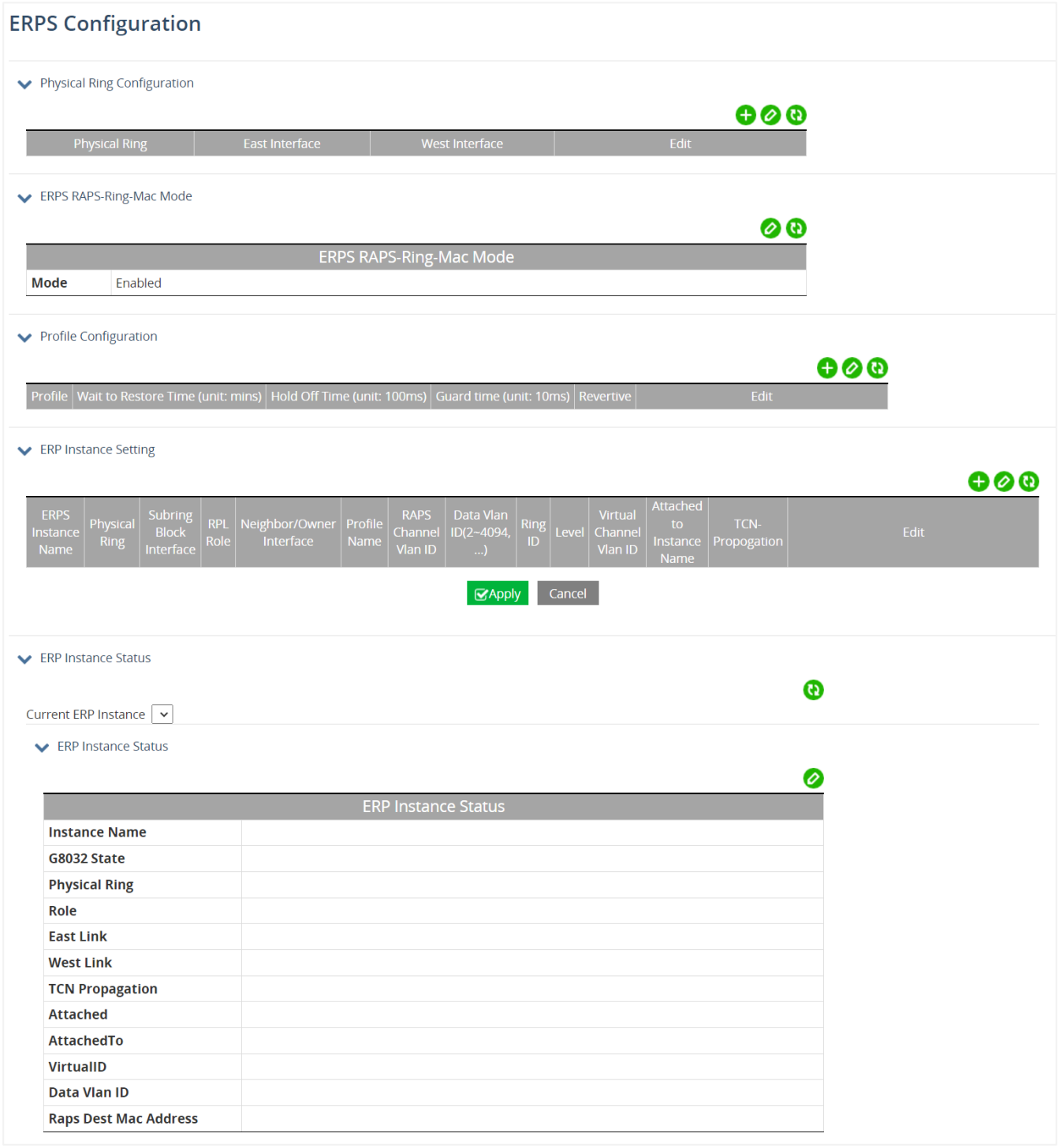
ERPS Sample Configuration – Network Topology

Five switches are connected into one Major-Ring + Sub-Ring. (Shown as below)



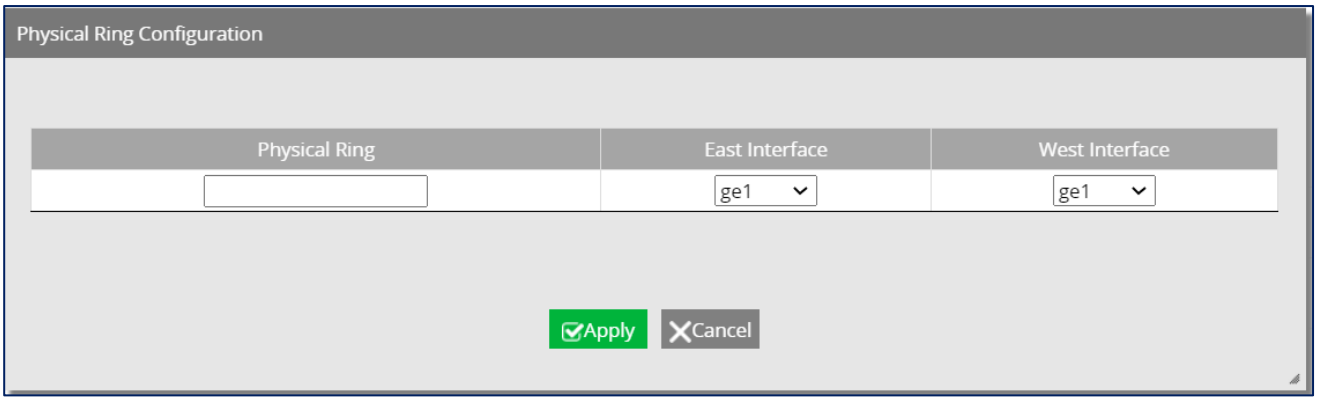
ERPS Configuration

Go to the switch Web GUI Interface, from the left items list, the user can find ERPS option and go to ERPS Setting page. In this page the user can configure the ERPS function for the switch, see the figure shown below:

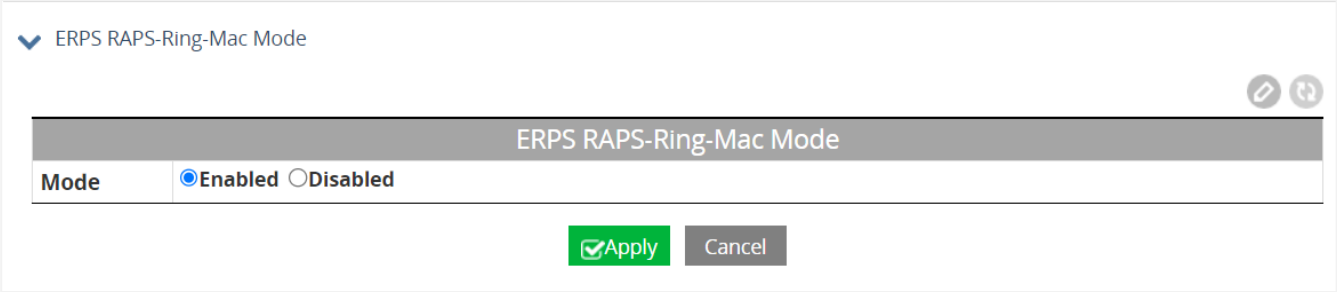


There are five selections that can be made, which are Physical Ring Configuration, ERPS RAPS-Ring-Mac Mode, Profile Configuration, ERP Instance Setting, and ERP Instance Status.

Choose Physical Ring Configuration, the user can Set Physical Ring Name, designed West Interface Port, and designed East Interface Port of the switch, see the figure below.

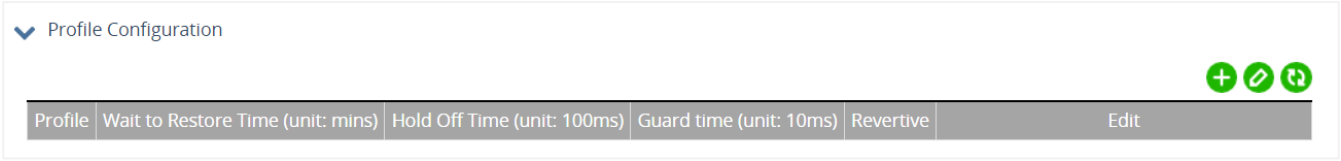


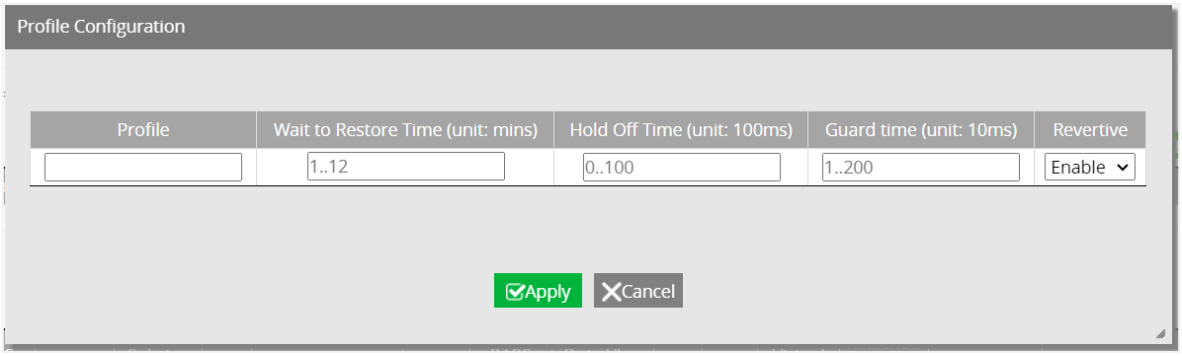
In ERPS RAPS-Ring-Mac Mode, the user can determine if RAPS Control MAC is set to "01" or the user-defined ring-id (ERPS RAPS-Ring-Mac Mode is enabled the user-defined ring-id by default); for example, If the ERPS ring is created with a user-defined ring-id, then its Control MAC address is set to 01:19:A7:00:00:ring-id (control-mac), while if the ERPS ring is created with control MAC set to "01", then its Control MAC address is always 01:19:A7:00:00:01. For detailed information, please refer to the document of ITU-T G.8032 (2010) and ITU-T G.8032 (2012).



Once the user has determined the RAPS Control MAC Mode is enabled or disabled, if the user want to modify the RAPS Control MAC Mode again, make sure the ERPS instance has to be completely removed in advance.

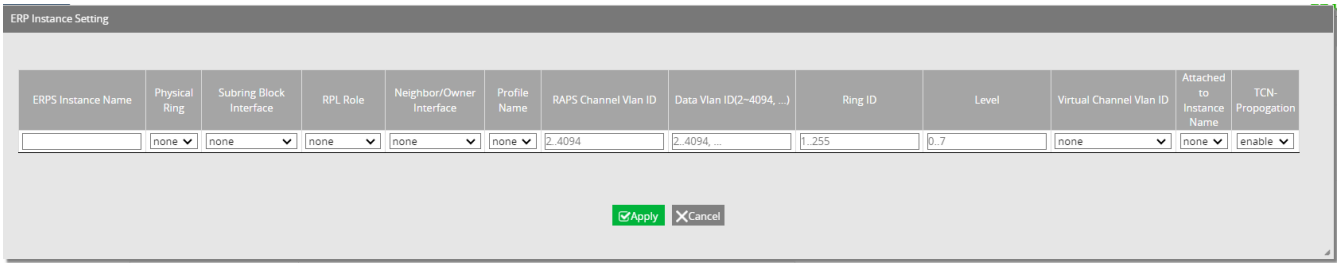
In Profile Configuration, the user can set a different profile name, wait to restore time, , Hold Off Time, and Grand Time for the designed profile. Also, setting up if the profile is worked in revertive mode or non-revertive mode, is shown in the figure below.



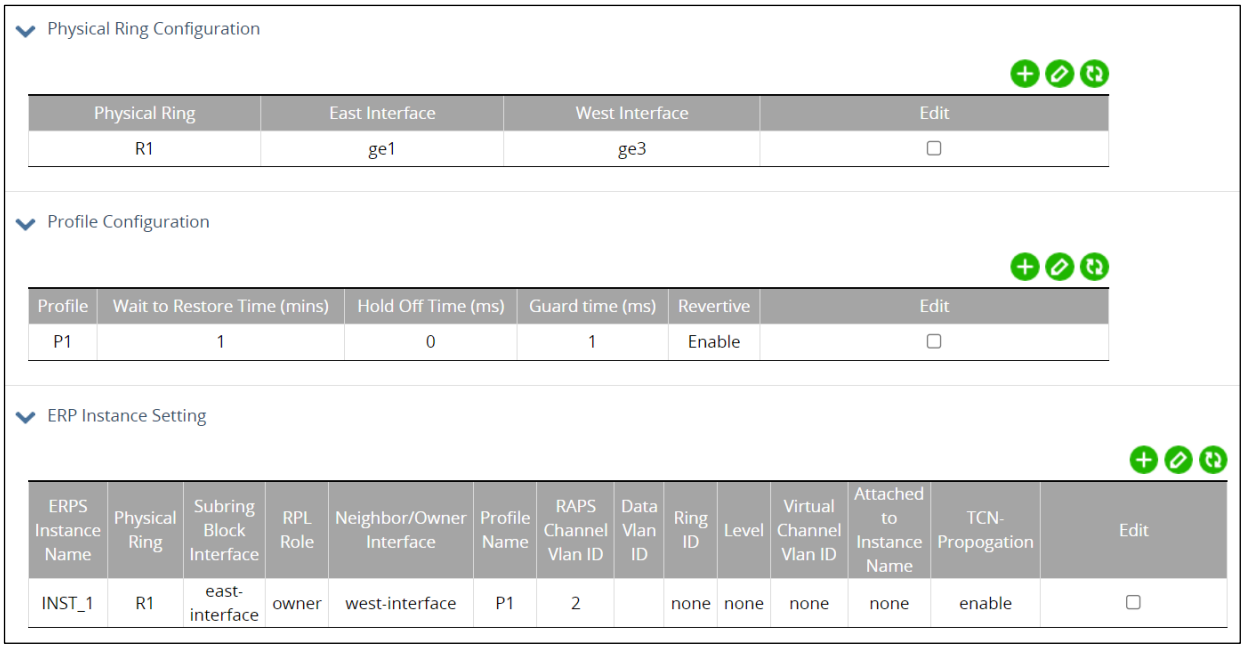


The original Physical Ring setting or Profile Configuration can also be removed once the configuration is not available to use anymore.

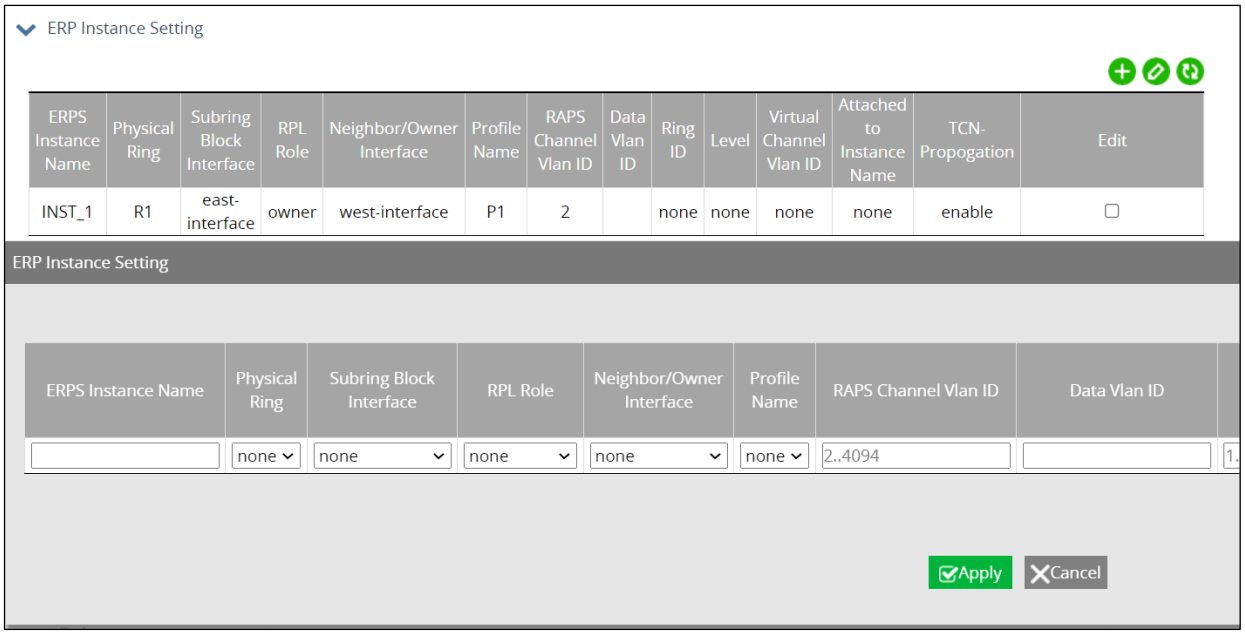
Choose ERP Instance setting, the user can set ERPS Instance ID, Physical Ring, RAPS Channel Vlan ID, Ring ID, and choose the appropriate Profile Name, RPL Role, and ERPS level for this Instance, see the figure below.



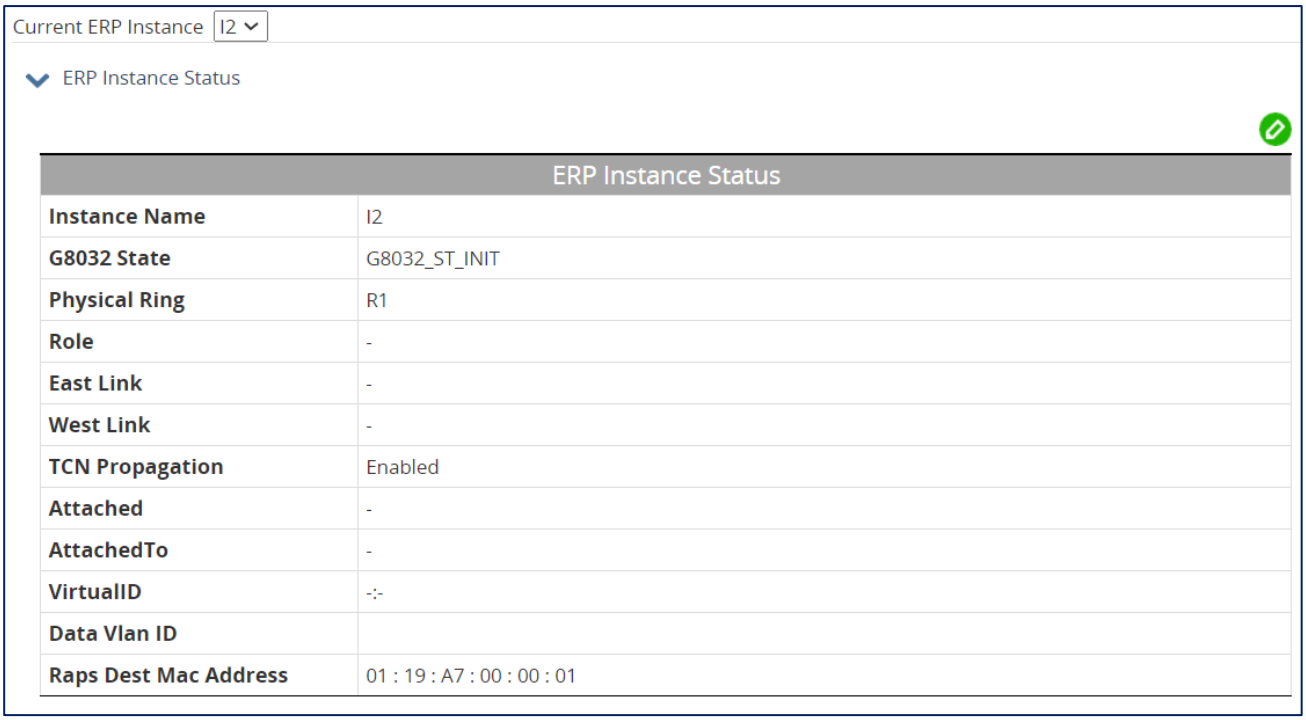
Once it applied, the ERPS Instance is shown as below:



The user can still add or delete a new ERPS Instance ID by clicking on the “+” button and setting a new ERPS Instance ID and other information related to the desired Instance setting, see the figure below.



Select a different ERPS Instance from ERPS Instance Status, and then the user can check the different ERPS Instance status, see the figure below.



ERP Instance Status	
Instance Name	I2
G8032 State	G8032_ST_INIT
Physical Ring	R1
Role	-
East Link	-
West Link	-
TCN Propagation	Enabled
Attached	-
AttachedTo	-
VirtualID	-:-
Data Vlan ID	
Raps Dest Mac Address	01 : 19 : A7 : 00 : 00 : 01

22 Contact Information

EtherWAN System, Inc.

www.etherwan.com

USA Office

5 Jenner
Irvine, CA 92618
Tel: +1-714-779-3800
Email: info@etherwan.com

Pacific Rim Office

8F., No.2, Alley 6, Lane 235, Baoqiao Rd.
Xindian District, New Taipei City 231
Taiwan
Tel: +886-2-6629-8986
Email: info@etherwan.com.tw

EX78900G Hardened Managed PoE++ Ethernet Switch
June 20, 2024