D-Link®
Building Networks for People

# Web UI Reference Guide

Product Model: DXS-3600 Series
Layer 2/3 Managed 10Gigabit Ethernet Switch
Release 2.40

September, 2015. P/N 651XS3632010G

# Table of Contents

# 1. Introduction

This manual's feature descriptions are based on the software release **2.40**, running in the **Enhanced License (EI) Mode**. The features listed here are the subset of features that are supported by the DXS-3600 Series switch.

## Audience

This reference manual is intended for network administrators and other IT networking professionals responsible for managing the switch by using the Web User Interface (Web UI). The Web UI is the secondary management interface to the DXS-3600 Series switch, which will be generally be referred to simply as the "switch" within this manual. This manual is written in a way that assumes that you already have the experience and knowledge of Ethernet and modern networking principles for Local Area Networks.

## Other Documentation

The documents below are a further source of information in regards to configuring and troubleshooting the switch. All the documents are available either from the CD, bundled with this switch, or from the D-Link website. Other documents related to this switch are:

- *DXS-3600 Series Hardware Installation Guide*
- *DXS-3600 Series CLI Reference Guide*

## Conventions

| Convention | Description |
|---|---|
| **Boldface Font** | Indicates a button, a toolbar icon, menu, or menu item. For example: Open the **File** menu and choose **Cancel**. Used for emphasis. May also indicate system messages or prompts appearing on screen. For example: **You have mail**. Bold font is also used to represent filenames, program names and commands. For example: use the **copy** command. |
| Initial capital letter | Indicates a window name. Names of keys on the keyboard have initial capitals. For example: Click Enter. |
| **Menu Name > Menu Option** | Indicates the menu structure. **Device > Port > Port Properties** means the **Port Properties** menu option under the **Port** menu option that is located under the **Device** menu. |
| `Blue Courier Font` | This convention is used to represent an example of a screen console display including example entries of CLI command input with the corresponding output. |

## Notes, Notices, and Cautions

Below are examples of the three types of indicators used in this manual. When administering your switch using the information in this document, you should pay special attention to these indicators. Each example below provides an explanatory remark regarding each type of indicator.

**NOTE:** A note indicates important information that helps you make better use of your device.

**NOTICE:** A notice indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

**CAUTION:** A caution indicates a potential for property damage, personal injury, or death.

# 2. Web-based Switch Configuration

***Management Options***
***Connecting using the Web User Interface***
***Logging onto the Web Manager***
***Web User Interface (Web UI)***

## Management Options

This switch provides multiple access platforms that can be used to configure, manage and monitor networking features available on this switch. Currently there are three management platforms available and they are described below.

**The Command Line Interface (CLI) through the Serial Port or remote Telnet**

This switch can be managed, out-of-band, by using the console port on the front panel of the switch. Alternatively, the switch can also be managed, in-band, by using a Telnet connection to any of the LAN ports on this switch. The command line interface provides complete access to all switch management features.

**SNMP-based Management**

The switch can be managed with an SNMP-compatible console program. The switch supports SNMP version 1.0, version 2.0 and version 3.0. The SNMP agent decodes the incoming SNMP messages and responds to requests with MIB objects stored in the database. The SNMP agent updates the MIB objects to generate statistics and counters.

**Web-based Management Interface**

After successfully installing the switch, the user can configure the switch, monitor the LED panel, and display statistics graphically using a Web browser, such as Microsoft® Internet Explorer (version 6 and later), Mozilla Firefox (version 3 and later), Safari (version 5 and later), Google Chrome (version 5 and later), Opera (version 12 and later), or Netscape (version 8 and later).

## Connecting using the Web User Interface

Most software functions of the DXS-3600 Series switches can be managed, configured and monitored via the embedded web-based (HTML) interface. Manage the switch from remote stations anywhere on the network through a standard web browser. The web browser acts as a universal access tool and can communicate directly with the switch using the HTTP or HTTPS protocol.

**NOTE:** The Command Line Interface (CLI) provides the functionality of managing, configuring, and monitoring **all** of the software features that are available on this switch.

## Logging onto the Web Manager

To access the Web User Interface, simply open a standard web browser on the management PC and enter the switch's default IP address into the address bar of the browser and press the **Enter** key.

**NOTE:** The default IP address of this switch is **10.90.90.90**, with a subnet mask of **255.0.0.0**.

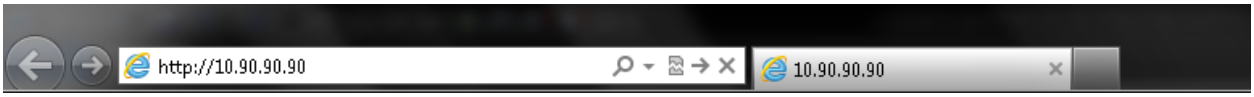



**Figure 2-1 Displays entering the IP address in Internet Explorer**

This will open the user authentication window, as seen below.


**Figure 2-2 User Authentication Window**

By default, there is no username or password configured on this switch. When connecting to the Web UI for the first time simply leave the **User Name** and **Password** fields blank and click the **Login** button.

# Web User Interface (Web UI)

The user interface provides access to various switch configuration and management windows, to view performance statistics, and permits you to graphically monitor the system status.

## Areas of the User Interface

The figure below shows the user interface. Three distinct areas that divide the user interface, as described in the table.

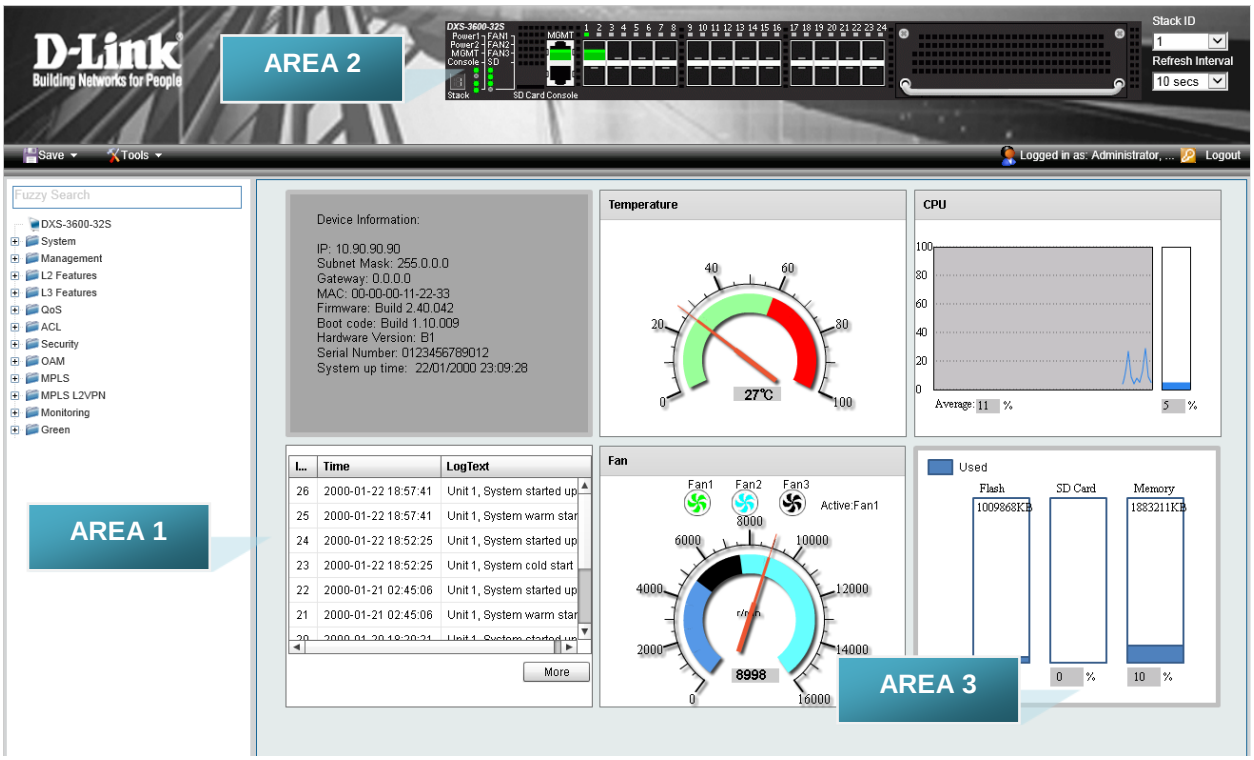



**Figure 2-3 Main Web UI Window**

| Area Number | Description |
|---|---|
| **AREA 1** | In this area, a folder tree layout is displayed of functions that can be configured using the Web UI. Open folders and click the hyperlinked menu buttons to access each individual page for configuration. The **DXS-3600-32S** link is the default page that will display basic monitoring settings for this switch. |
| **AREA 2** | In this area, a graphical near real-time image of the front panel of the switch is displayed. Some management functions, like **Save** and **Tools** are accessible here. |
| **AREA 3** | In this area, the switch's configuration page can be found, based on the selection made in **AREA 1**. |

# 3. System

***Device Information***
***System Information Settings***
***Peripheral Settings***
***Port Configuration***
***System Log***
***Time and SNTP***
***Time Range***

## Device Information

On this page, the Device Information, Temperature status, CPU, Usage status, System Log, Fan status, and Memory usage status are displayed. It appears automatically when you log on to the switch. To return to the Device Information window after viewing other windows, click the **DXS-3600-32S** link.

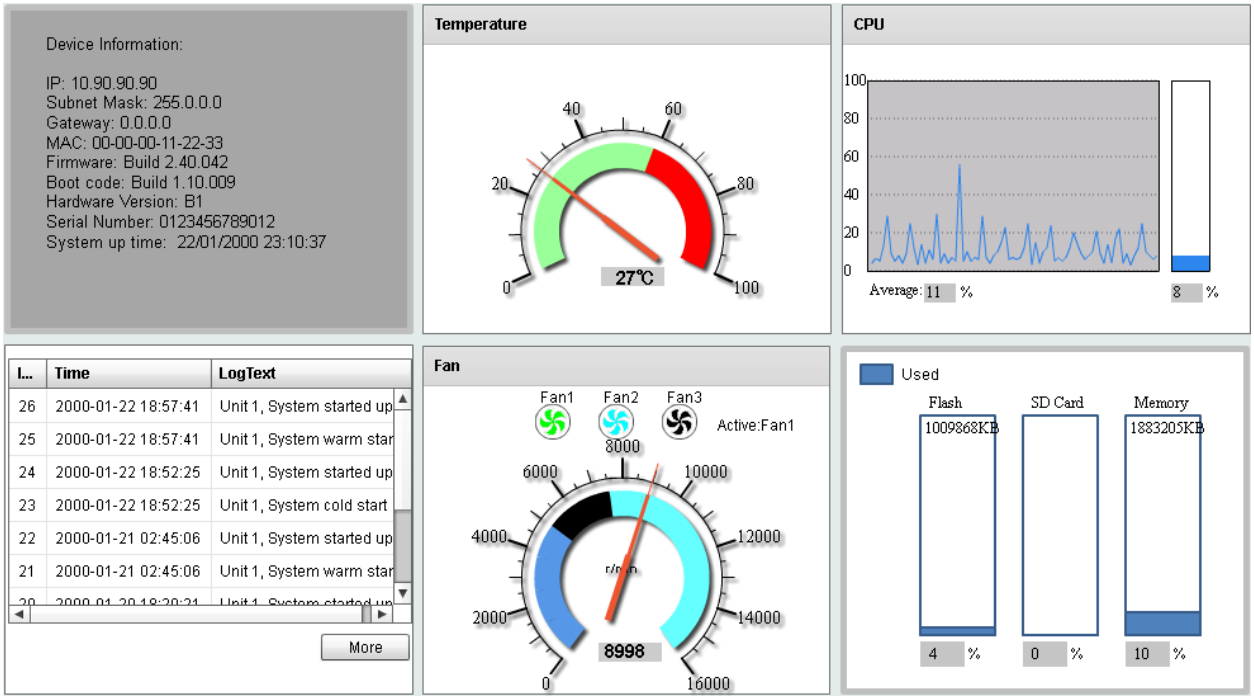



**Figure 3-1 Device Information Window**

## Device Information

In the Device Information section, the user can view a list of basic information regarding the switch.

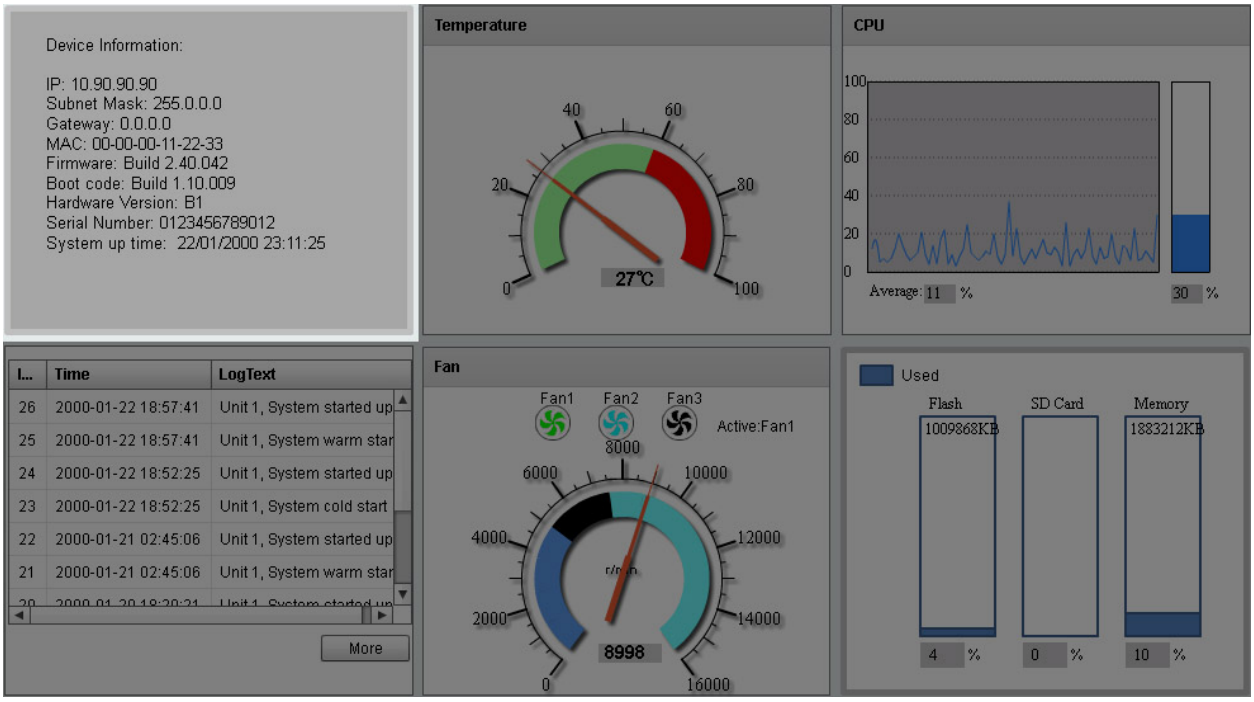



**Figure 3-2 Device Information (Highlight) Window**

In the **Device Information** section, the following display parameters are available:

| Parameter | Description |
|---|---|
| **IP Address** | Here the IP address of the switch's main interface is displayed. |
| **Subnet Mask** | Here the Subnet Mask of the switch's main interface is displayed. |
| **Gateway** | Here the Gateway IP address of the switch's main interface is displayed. |
| **MAC Address** | Here the MAC address of the switch is displayed. |
| **Firmware Version** | Here the Firmware version of the switch is displayed. |
| **Boot Code Version** | Here the Boot Code of the switch is displayed. |
| **Hardware Version** | Here the Hardware version of the switch is displayed. |
| **Serial Number** | Here the Serial number of the switch is displayed. |
| **System Up Time** | Here the System's up time is displayed. |

# Temperature Status

In the **Temperature** section, the user can view a real-time display of the switch's internal temperature. The temperature of the switch is mainly influenced by two factors: (1) the environment, and (2) the internal air-flow of the switch. In the *DXS-3600 Series Hardware Installation Guide*, there are some guidelines that can assist the user with the installation of this switch in a temperature friendly environment. The fan modules, installed in this switch, have temperature sensors built-in that automatically controls the air-flow inside the switch.

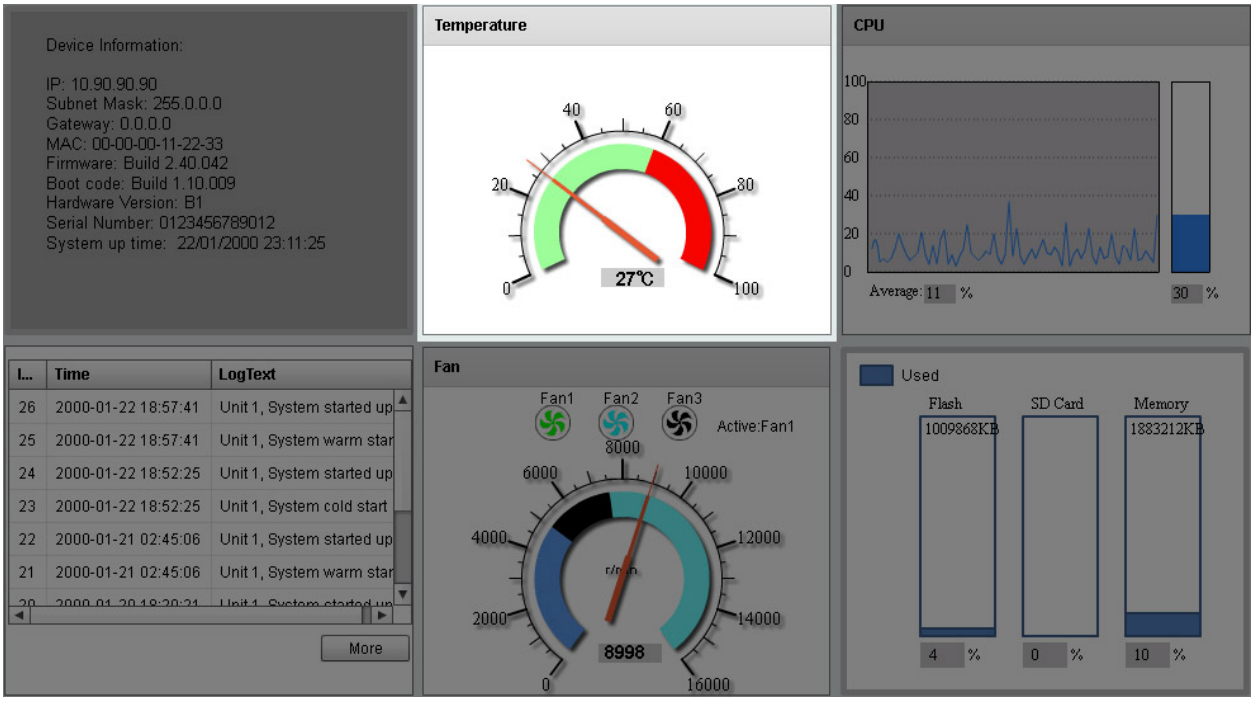



**Figure 3-3 Temperature Status Window**

In the **Temperature** section, the following display parameters are available:

| Parameter | Description |
|---|---|
| **Percentage Display** | In this graphic, the reading is divided into percentage sections. The **green area** is known as the 'safe' area. This area ranges from 0% to 60%. This is the optimum temperature range recommended for this switch. |
| **Temperature** | Below the percentage gauge needle, the accurate temperature reading, for this switch, is displayed in degrees Celsius. |
| **Warning Section** | In this graphic, the reading is divided into percentage sections. The **red area** is known as the 'warning' area. This area ranges from 60% to 100%. It is recommended not to allow the switch to run this hot, to avoid component damage. |

# CPU Status

In the CPU section, the user can view a real-time display of the switch's CPU usage. There are a number of factors that can influence a depleted CPU usage. One of those factors is network broadcasts. In the *DXS-3600 Series CLI Reference Guide* there is an abundance of features that can be enabled to prevent this problem from occurring.

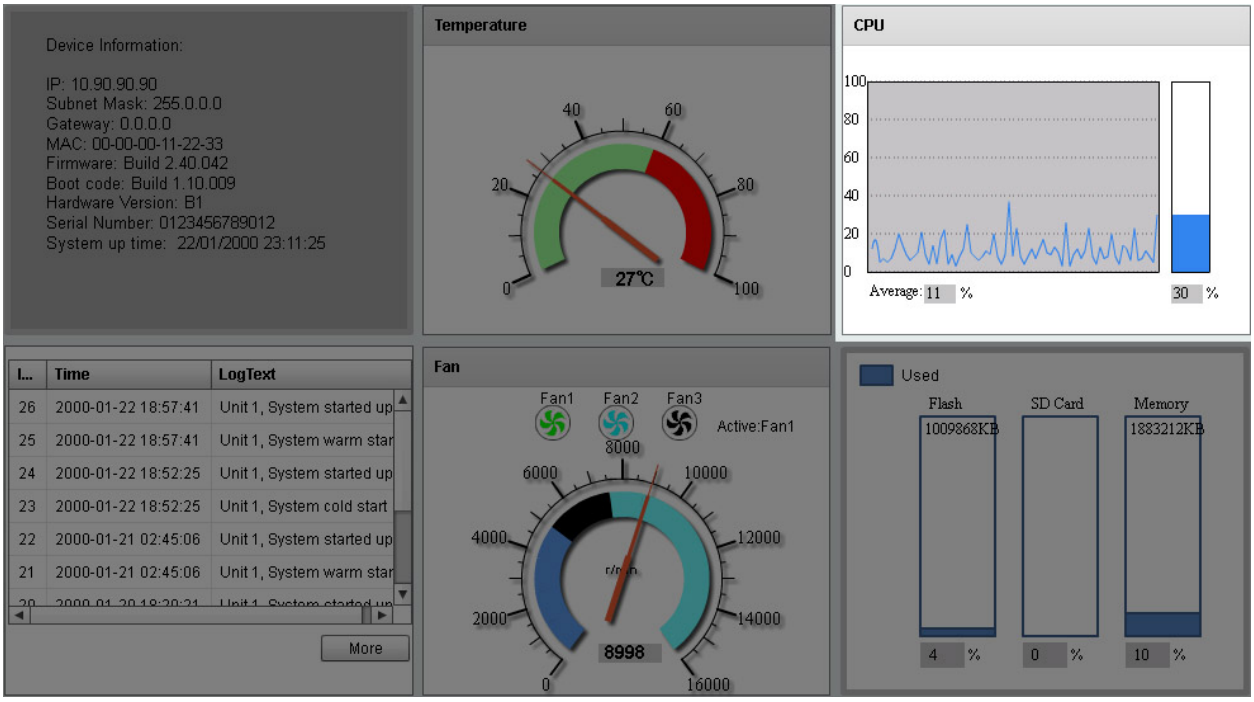



**Figure 3-4 CPU Status Window**

In the **CPU** section, the following display parameters are available:

| Parameter | Description |
|---|---|
| **Percentage Display** | In this graphic, the reading is divided into percentage sections. This area ranges from 0% to 100%. |
| **Average** | Below the CPU percentage line chart, we find an accurate display of the average CPU usage percentage. |
| **Percentage Bar** | In this graphic, an accurate reading of the real-time CPU usage percentage is displayed. |

# System Log Entries

In the System Log section, the user can view a list of System log entries, generated by the switch, when certain events have occurred.


**Figure 3-5 System Log Window**

In the **System Log** section, the following display parameters are available:

| Parameter | Description |
|---|---|
| **Entry Number** | Every log entry has a specific entry number, generated when the log entry was added to the System log entry display. Here the System log entry number is displayed in reverse order. |
| **Time** | Here the specific date and time of the log entry is displayed. |
| **Log Text** | Here the log entry description is displayed. |

Click the **More** button to view a larger display of the complete System Log section.

After clicking the **More** button, the following window will appear:

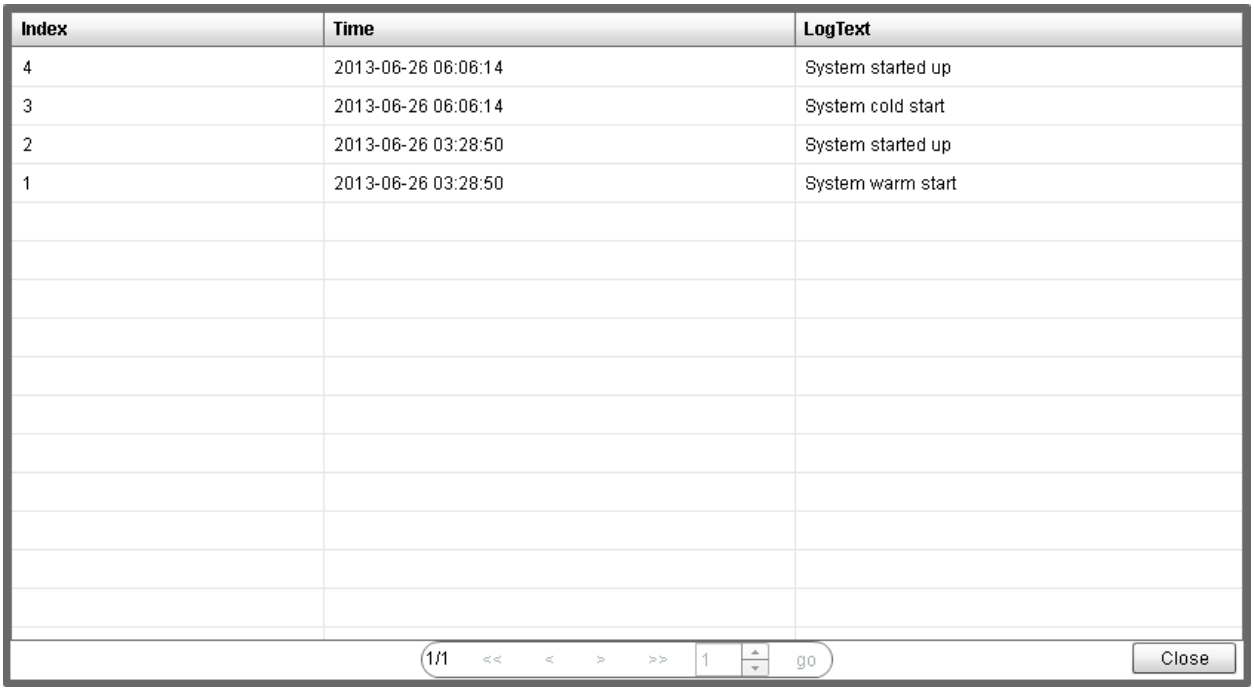



**Figure 3-6 System Log (More) Window**

Click the **Close** button to exit the larger display.

# Fan Status

In the **Fan** section, the user can view a real-time display of the switch's fan(s) status. A maximum of 3 fans can be installed in this switch. In this real-time graphic, we observe the status and speed of the three fans installed.


**Figure 3-7 Fan Status Window**

In the **Fan** section, the following display parameters are available:

| Parameter | Description |
|---|---|
| **Fan Number** | At the top of this graphic, the list of installed fans is displayed. After clicking on any specific fan icon, the real-time RPM gauge of that fan will be displayed. Also after clicking on a fan icon, the **Active Fan** display parameter will change accordingly. |
| **RPM Graph** | In this graph (gauge display), we observe the RPM speed at which the selected fan is working at. |
| **RPM Reading** | At the bottom of the graphics, we observe the accurate real-time display of the RPM value for a specific fan. |

# Flash, SD Card, and Memory Status

In this section, the user can view a real-time graphic that represents the memory usage for the **Flash**, **SD Card**, and **RAM Memory**.

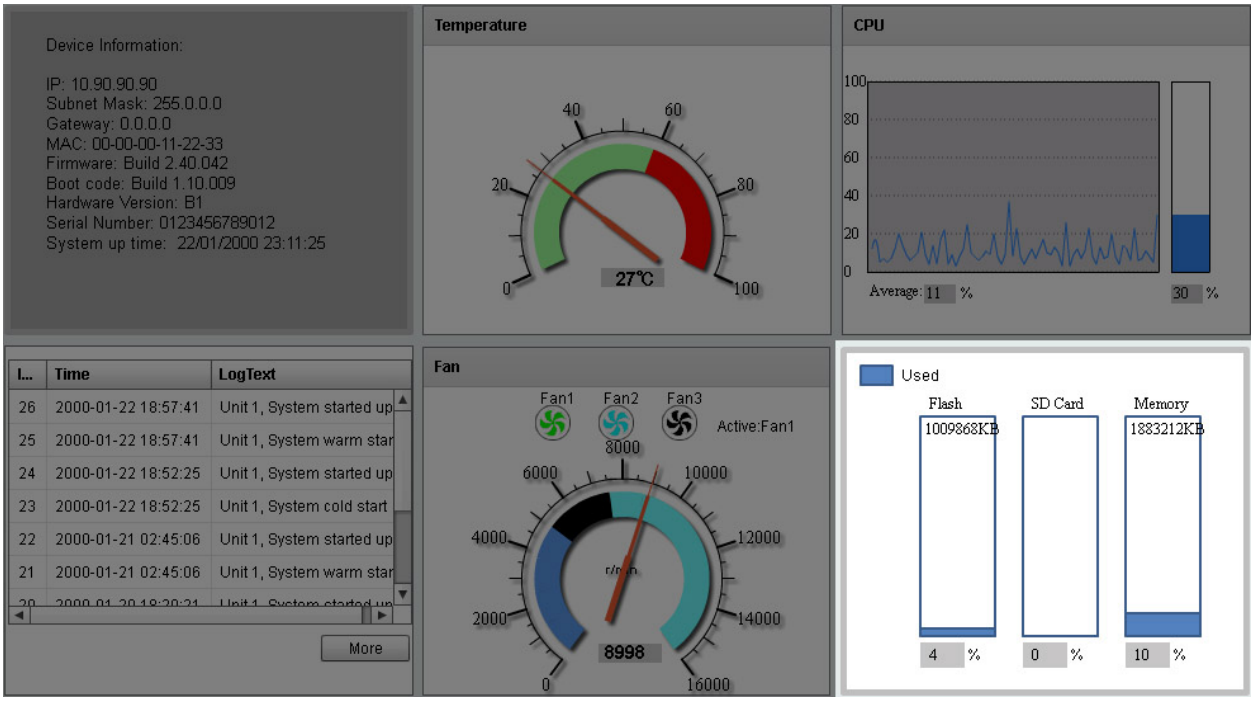



**Figure 3-8 Flash, SD Card, and Memory Status Window**

In this section, the following display parameters are available:

| Parameter | Description |
|---|---|
| **Used** | This displays the color that represents the used memory allocation. |
| **Flash** | This displays the used and unused space of the Flash. The more accurate percentage display can be found below the graphic. |
| **SD Card** | This displays the used and unused space of the SD Card. The more accurate percentage display can be found below the graphic. |
| **Memory** | This displays the used and unused space of the Memory. The more accurate percentage display can be found below the graphic. |

# System Information Settings

This window is used to view and configure the system information settings and management interface configuration settings.

To view the following window, click **System > System Information Settings**, as shown below:

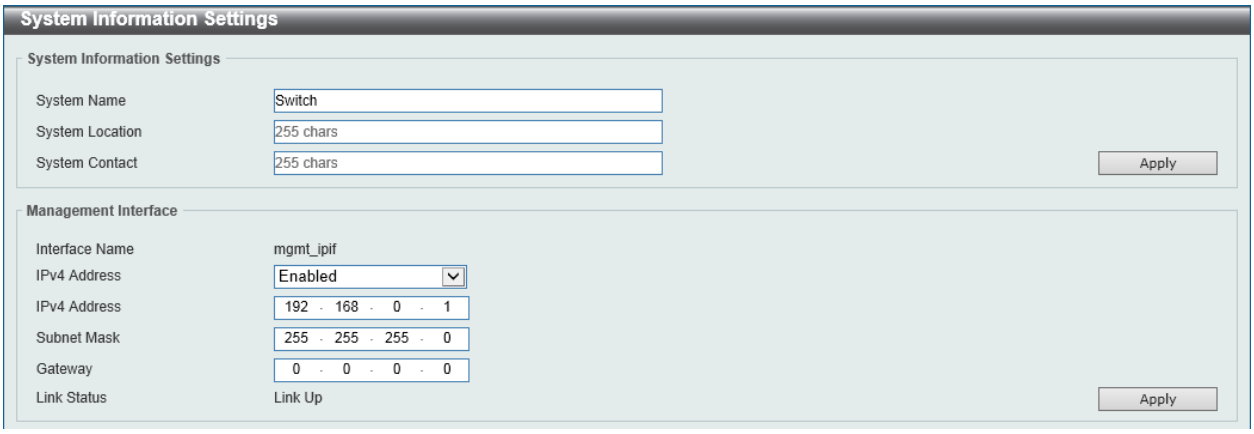



**Figure 3-9 System Information Settings Window**

The fields that can be configured in **System Information Settings** are described below:

| Parameter | Description |
|---|---|
| **System Name** | Enter a system name for the Switch, if so desired. This name will identify it in the Switch network. |
| **System Location** | Enter the location of the Switch, if so desired. |
| **System Contact** | Enter a contact name for the Switch, if so desired. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Management Interface** are described below:

| Parameter | Description |
|---|---|
| **IPv4 Address** | Select to enable or disable this interface here. When enabled, enter the IPv4 address for this interface here. |
| **Subnet Mask** | Enter the IPv4 subnet mask for this interface here. |
| **Gateway** | Enter the gateway IPv4 address for this interface here. |

Click the **Apply** button to accept the changes made.

# Peripheral Settings

This window is used to view and configure the environment trap settings and environment temperature threshold settings.

To view the following window, click **System > Peripheral Settings**, as shown below:

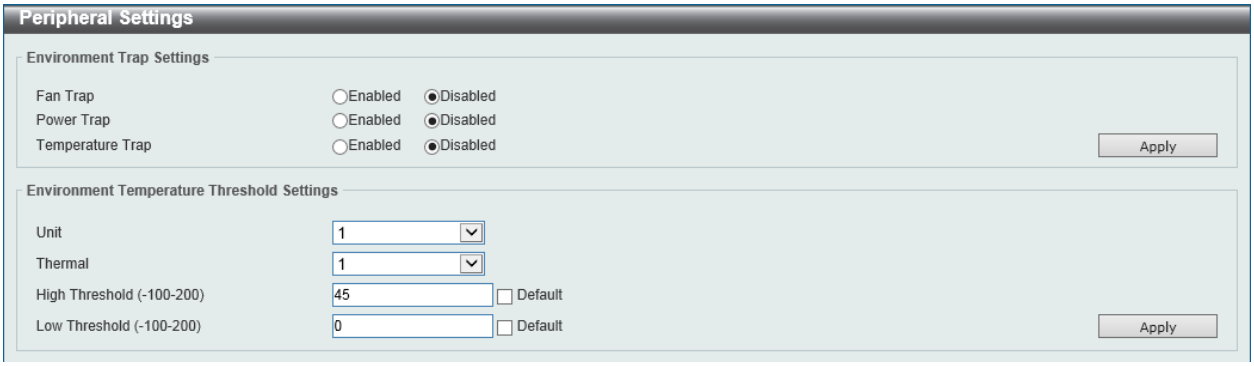



**Figure 3-10 Peripheral Settings Window**

The fields that can be configured in **Environment Trap Settings** are described below:

| Parameter | Description |
|---|---|
| **Fan Trap** | Click to enable or disable the fan trap state for waning fan event (fan failed or fan recover). |
| **Power Trap** | Click to enable or disable the power trap state for waning power event (power failed or power recover). |
| **Temperature Trap** | Click to enable or disable the temperature trap state for warning temperature event (temperature exceeds the thresholds or temperature recover). |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Environment Temperature Threshold Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Thermal** | Select the thermal sensor ID. |
| **High Threshold** | Enter the high threshold value of the warning temperature setting. The range is from -100 to 200 Celsius degree. Tick the **Default** check box to return to the default value. |
| **Low Threshold** | Enter the low threshold value of the warning temperature setting. The range is from -100 to 200 Celsius degree. Tick the **Default** check box to return to the default value. |

Click the **Apply** button to accept the changes made.

# Port Configuration

## Port Settings

This window is used to view and configure the switch's port settings.

**NOTE:** The **10M** and **100M** speed options are only applicable when connecting to the **Management Port** (Mgmt 0) or when the **DXS-3600-EM-8T** expansion module is used.

To view the following window, click **System > Port Configuration > Port Settings**, as shown below:

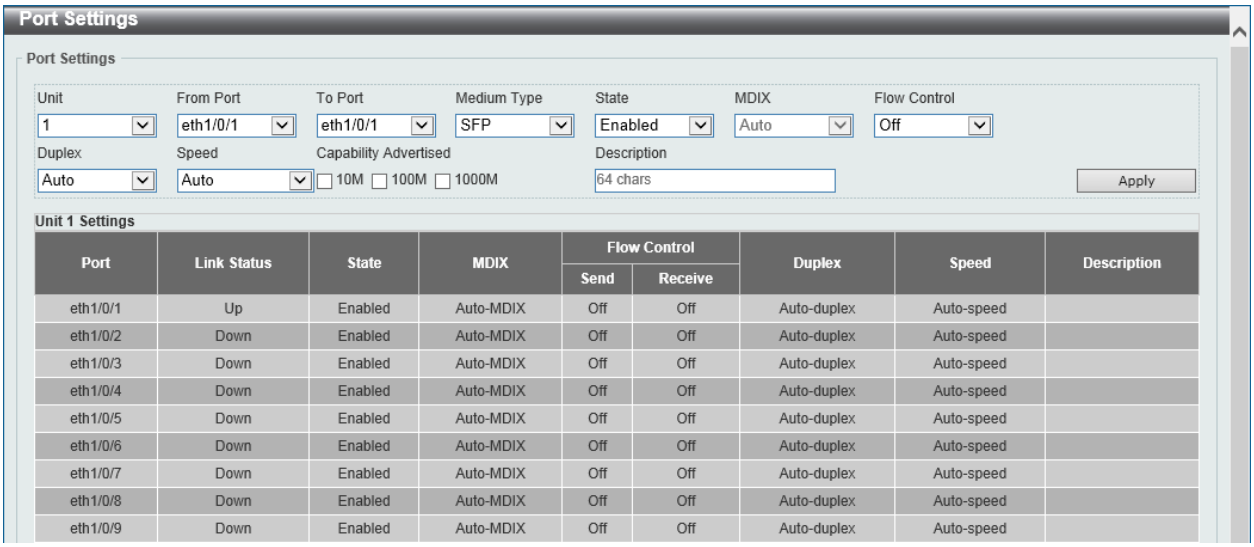



**Figure 3-11 Port Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the stacking unit ID of the switch that will be configured here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Medium Type** | Select the port medium type here. Options to choose from are **RJ45** and **SFP**.<br>**Note:** Selecting the SFP option, includes the use of SFP+ transceivers for 10G connectivity. |
| **State** | Select this option to enable or disabled the physical port here. |
| **MDIX** | Select the Medium Dependent Interface Crossover (MDIX) option here. Options to choose from are Auto, Normal, and Cross.<br>• **Auto** - Select this option for auto-sensing of the optimal type of cabling.<br>• **Normal** - Select this option for normal cabling. If this option is selected, the port is in the MDIX mode and can be connected to a PC's NIC using a straight-through cable or a port (in the MDI mode) on another switch through a cross-over cable.<br>• **Cross** - Select this option for cross cabling. If this option is selected, the port is in the MDI mode and can be connected to a port (in the MDIX mode) on another switch through a straight cable. |
| **Flow Control** | Select to either turn flow control **On** or **Off** here. Ports configured for full-duplex use 802.3x flow control, half-duplex ports use back-pressure flow control, and Auto ports use an automatic selection of the two. |
| **Duplex** | Select the duplex mode used here. Options to choose from are **Auto**, **Half**, and **Full**. |
| **Speed** | Select the port speed option here. This option will manually force the connection speed on the selected port to only connect at the speed specified here. |

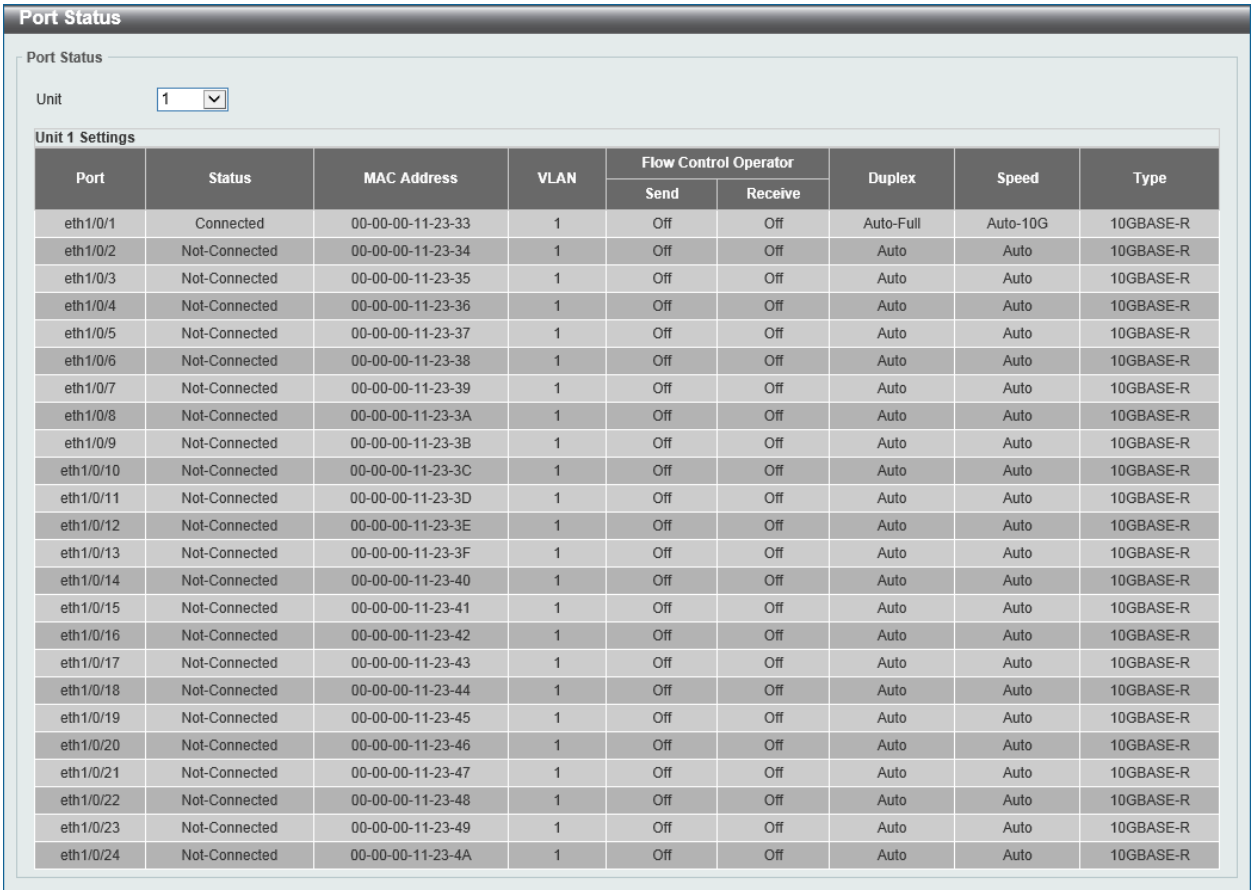
| Parameter | Description |
|---|---|
| | Options to choose from are **Auto**, **10M**, **100M**, **1000M**, **1000M Master**, **1000M Slave**, **10G**, **10G Master**, **10G Slave**, and **40G**.<br>The **Master** setting will allow the port to advertise capabilities related to duplex, speed and physical layer type. The master setting will also determine the master and slave relationship between the two connected physical layers. This relationship is necessary for establishing the timing control between the two physical layers. The timing control is set on a master physical layer by a local source.<br>The **Slave** setting uses loop timing, where the timing comes from a data stream received from the master. If one connection is set for master, the other side of the connection must be set for slave. Any other configuration will result in a link down status for both ports.<br>• **Auto:** Specifies that for copper ports, auto-negotiation will start to negotiate the speed and flow control with its link partner. For fiber ports, auto-negotiation will start to negotiate the clock and flow control with its link partner.<br>• **10M:** Specifies to force the port speed to 10Mbps. This option is only available for 10Mbps copper connections.<br>• **100M:** Specifies to force the port speed to 100Mbps. This option is only available for 100Mbps copper connections.<br>• **1000M:** Specifies to force the port speed to 1Gbps. This option is only available for 1Gbps fiber connections.<br>• **1000M Master:** Specifies to force the port speed to 1Gbps and operates as the master, to facilitate the timing of transmit and receive operations. This option is only available for 1Gbps copper connections.<br>• **1000M Slave:** Specifies to force the port speed to 1Gbps and operates as the slave, to facilitate the timing of transmit and receive operations. This option is only available for 1Gbps copper connections.<br>• **10G:** Specifies to force the port speed to 10Gbps. This option is only available for 10Gbps fiber connections.<br>• **10G Master:** Specifies to force the port speed to 10Gbps and operates as the master, to facilitate the timing of transmit and receive operations. This option is only available for 10Gbps copper connections.<br>• **10G Slave:** Specifies to force the port speed to 10Gbps and operates as the slave, to facilitate the timing of transmit and receive operations. This option is only available for 10Gbps copper connections.<br>• **40G:** Specifies to force the port speed to 40Gbps. This option is only available for 40Gbps fiber connections. |
| **Capability Advertised** | When the **Speed** is set to **Auto**, these capabilities are advertised during auto-negotiation. |
| **Description** | Enter a 64 characters description for the corresponding port here. |

Click the **Apply** button to accept the changes made.

# Port Status

This window is used to view the switch's physical port status and settings.

To view the following window, click **System > Port Configuration > Port Status**, as shown below:



Port Status

Port Status

Unit 1

Unit 1 Settings

| Port | Status | MAC Address | VLAN | Flow Control Operator | | Duplex | Speed | Type |
|---|---|---|---|---|---|---|---|---|
| | | | | Send | Receive | | | |
| eth1/0/1 | Connected | 00-00-00-11-23-33 | 1 | Off | Off | Auto-Full | Auto-10G | 10GBASE-R |
| eth1/0/2 | Not-Connected | 00-00-00-11-23-34 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/3 | Not-Connected | 00-00-00-11-23-35 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/4 | Not-Connected | 00-00-00-11-23-36 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/5 | Not-Connected | 00-00-00-11-23-37 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/6 | Not-Connected | 00-00-00-11-23-38 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/7 | Not-Connected | 00-00-00-11-23-39 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/8 | Not-Connected | 00-00-00-11-23-3A | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/9 | Not-Connected | 00-00-00-11-23-3B | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/10 | Not-Connected | 00-00-00-11-23-3C | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/11 | Not-Connected | 00-00-00-11-23-3D | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/12 | Not-Connected | 00-00-00-11-23-3E | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/13 | Not-Connected | 00-00-00-11-23-3F | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/14 | Not-Connected | 00-00-00-11-23-40 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/15 | Not-Connected | 00-00-00-11-23-41 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/16 | Not-Connected | 00-00-00-11-23-42 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/17 | Not-Connected | 00-00-00-11-23-43 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/18 | Not-Connected | 00-00-00-11-23-44 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/19 | Not-Connected | 00-00-00-11-23-45 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/20 | Not-Connected | 00-00-00-11-23-46 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/21 | Not-Connected | 00-00-00-11-23-47 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/22 | Not-Connected | 00-00-00-11-23-48 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/23 | Not-Connected | 00-00-00-11-23-49 | 1 | Off | Off | Auto | Auto | 10GBASE-R |
| eth1/0/24 | Not-Connected | 00-00-00-11-23-4A | 1 | Off | Off | Auto | Auto | 10GBASE-R |

**Figure 3-12 Port Status Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the stacking unit ID of the switch that will be displayed here. |

# Port GBIC

This window is used to view active GBIC information found on each applicable physical port of this switch.

To view the following window, click **System > Port Configuration > Port GBIC**, as shown below:

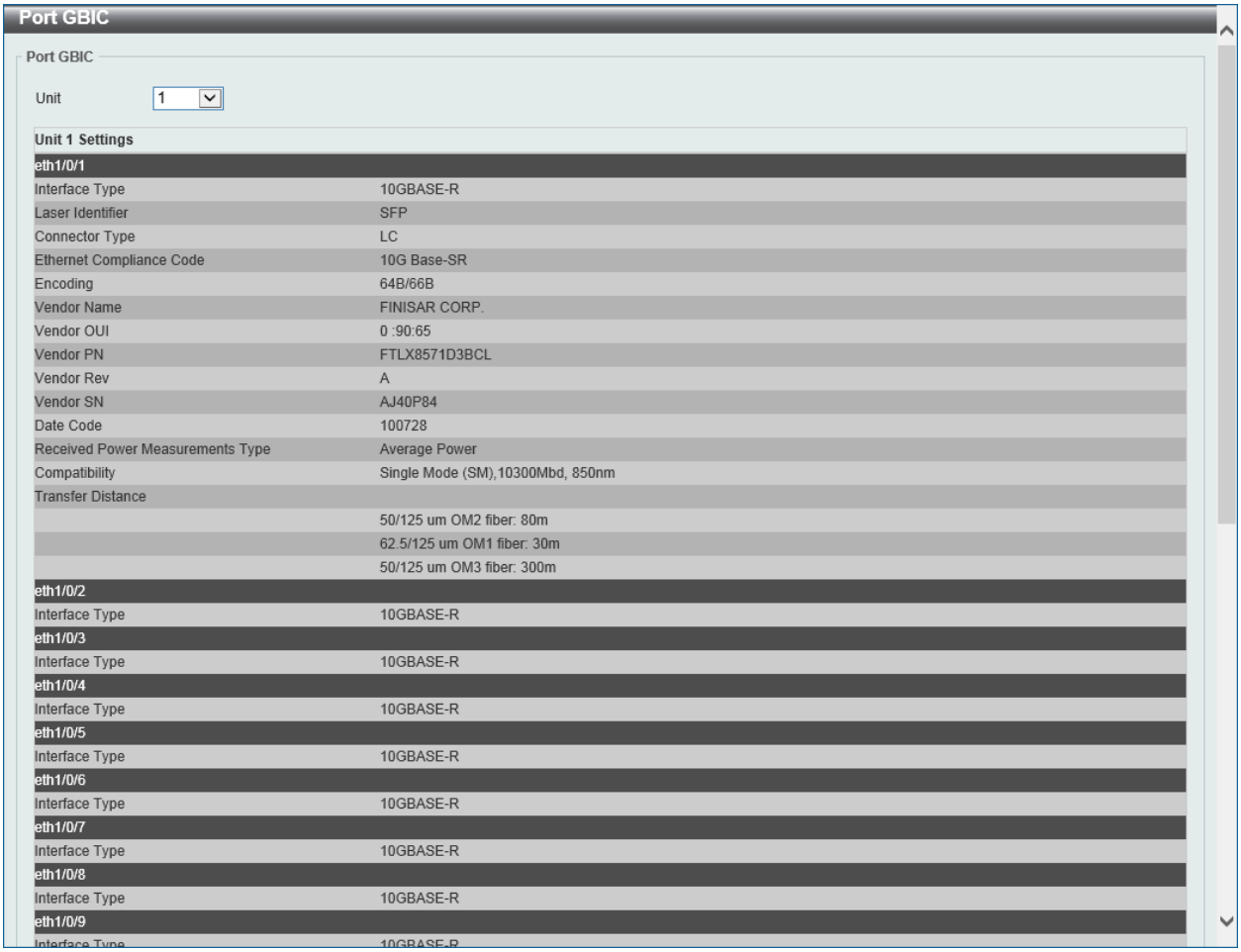



**Figure 3-13 Port GBIC Window**

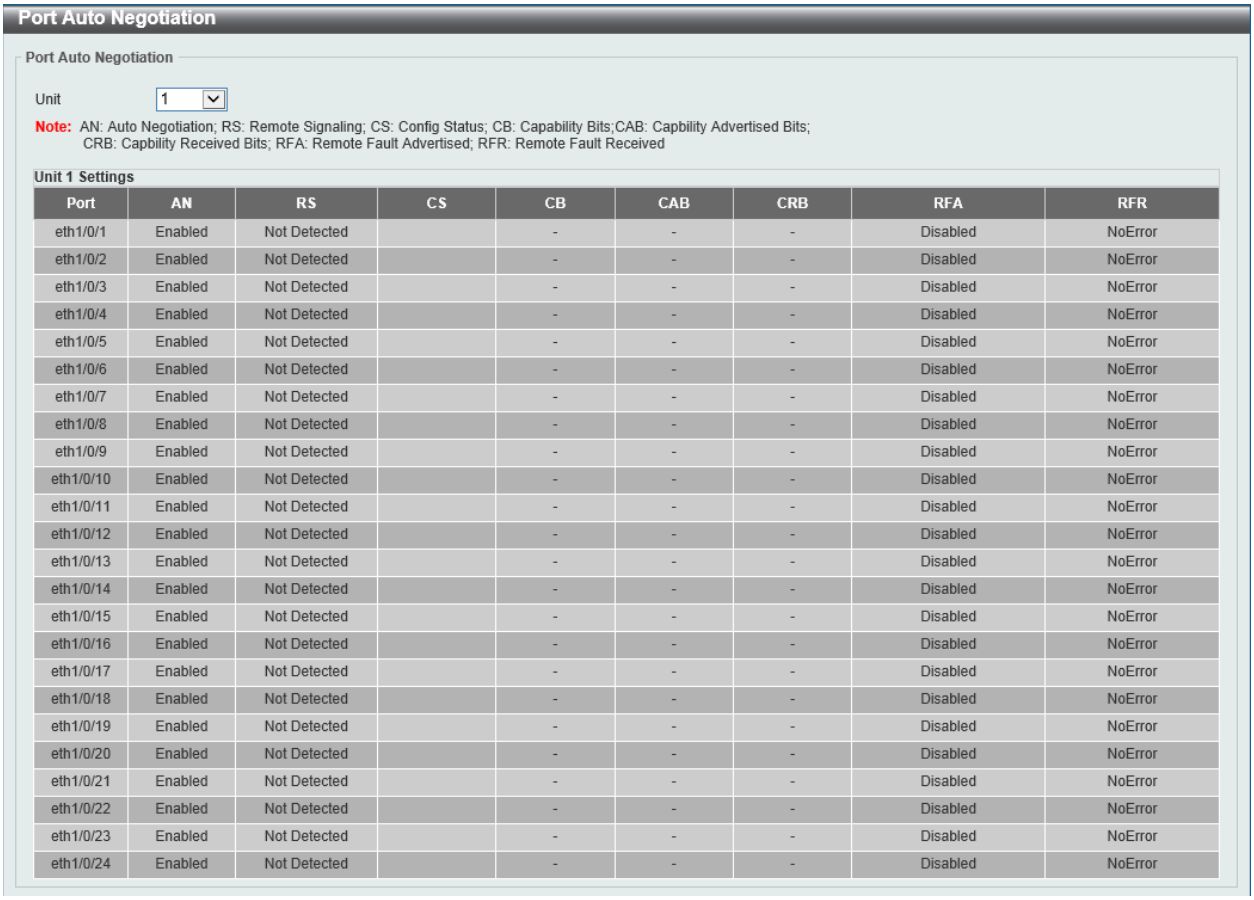
The fields that can be configured in **Port GBIC** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this display here. |

# Port Auto Negotiation

This window is used to view detailed port auto-negotiation information.

To view the following window, click **System > Port Configuration > Port Auto Negotiation**, as shown below:




| Port | AN | RS | CS | CB | CAB | CRB | RFA | RFR |
|---|---|---|---|---|---|---|---|---|
| eth1/0/1 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/2 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/3 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/4 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/5 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/6 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/7 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/8 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/9 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/10 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/11 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/12 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/13 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/14 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/15 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/16 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/17 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/18 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/19 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/20 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/21 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/22 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/23 | Enabled | Not Detected | | - | - | - | Disabled | NoError |
| eth1/0/24 | Enabled | Not Detected | | - | - | - | Disabled | NoError |

**Figure 3-14 Port Auto Negotiation Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the stacking unit ID of the switch that will be displayed here. |

# Error Disable Settings

This window is used to view and configure the error recovery for causes and to configure the recovery interval.

To view the following window, click **System > Port Configuration > Error Disable Settings**, as shown below:

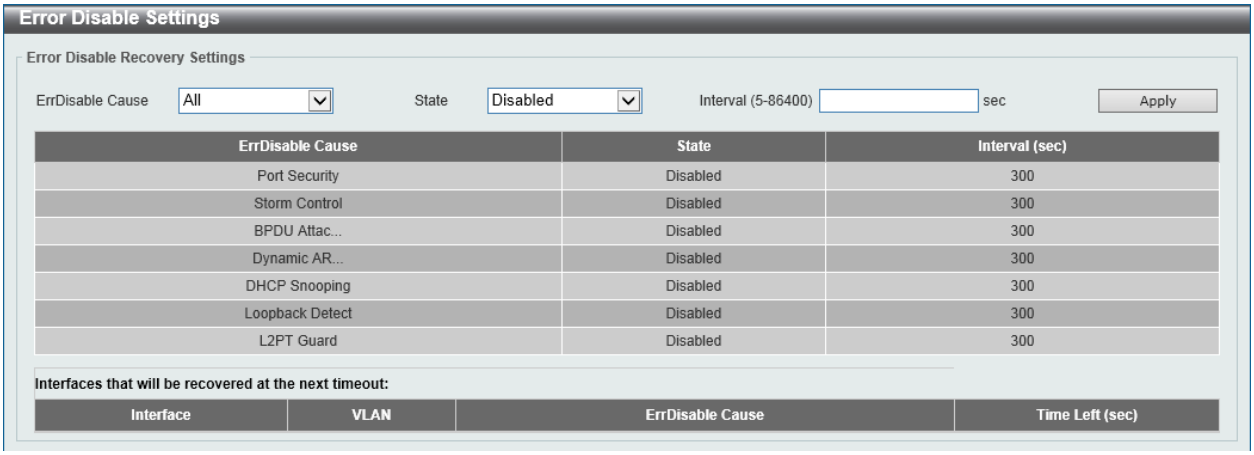



**Figure 3-15 Error Disable Settings Window**

The fields that can be configured in **Error Disable Recovery Settings** are described below:

| Parameter | Description |
|---|---|
| **ErrDisable Cause** | Select the error disabled cause here. Options to choose from are **Port Security**, **Storm Control**, **BPDU Attack Protection**, **Dynamic ARP Inspection**, **DHCP Snooping**, and **Loopback Detect**. |
| **State** | Select the enable or disable the error disabled recovery feature here. |
| **Interval** | Enter the time, in seconds, to recover the port from the error state caused by the specified module. The range is from 5 to 86400. |

Click the **Apply** button to accept the changes made.

# Jumbo Frame

This window is used to view and configure the Jumbo Frame size and settings. The switch supports jumbo frames. Jumbo frames are Ethernet frames with more than 1,518 bytes of payload. The switch supports jumbo frames with a maximum frame size of up to 12288 bytes.

To view the following window, click **System > Port Configuration > Jumbo Frame**, as shown below:


**Figure 3-16 Jumbo Frame Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the stacking unit ID of the switch that will be configured here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Maximum Receive Frame Size** | Enter the maximum receive frame size value here. This value must be between 64 and 12288 bytes. By default, this value is 1536 bytes. |

Click the **Apply** button to accept the changes made.

# System Log

## System Log Settings

This window is used to view and configure the system's log settings.

To view the following window, click **System > System Log > System Log Settings**, as shown below:

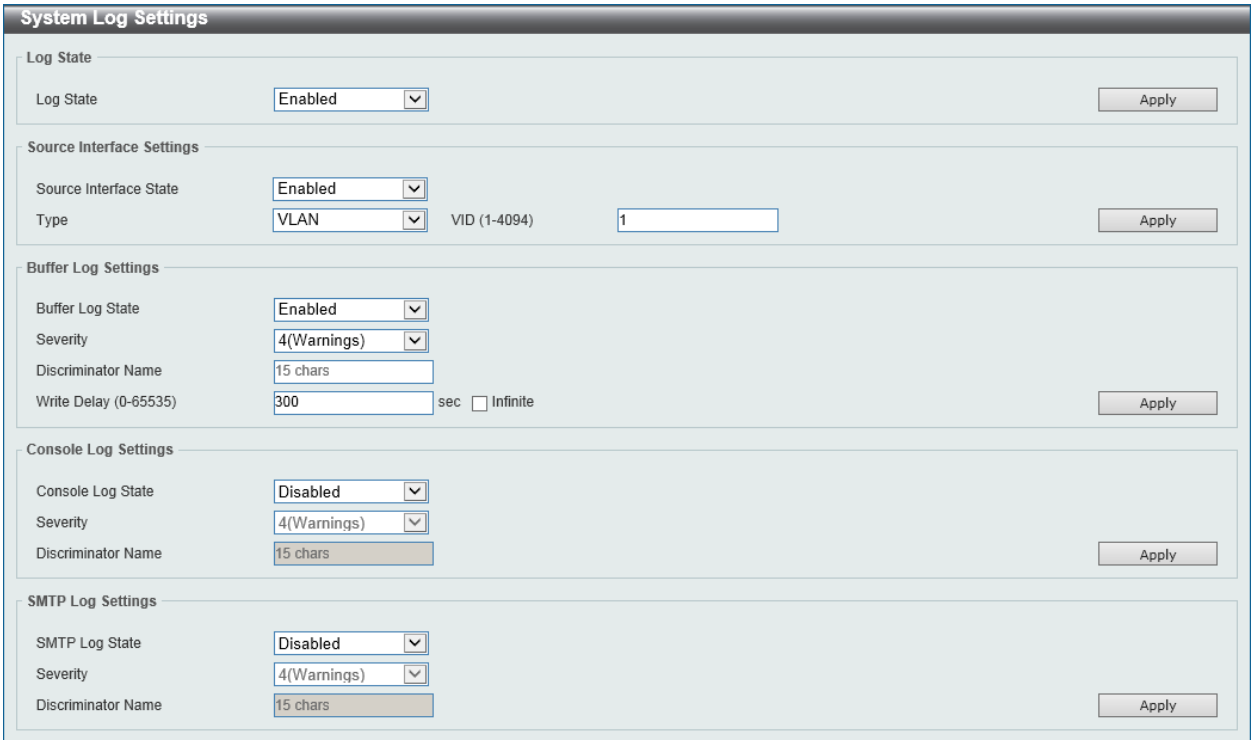



**Figure 3-17 System Log Settings Window**

The fields that can be configured for **Log State** are described below:

| Parameter | Description |
|---|---|
| **Log State** | Select the enable or disable the system log feature's global state here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Source Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Source Interface State** | Select this option to enable or disable the source interface's global state. |
| **Type** | Select the type of interface that will be used. Options to choose from are **Loopback**, **Mgmt**, and **VLAN**. |
| **VID** | Enter the interface's VID used here. For loopback interfaces this ID can be from 1 to 8. For the management (Mgmt) interface this value is always 0. For VLAN interfaces this value is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Buffer Log Settings** are described below:

| Parameter | Description |
|---|---|
| **Buffer Log State** | Select whether the enable or disable the buffer log's global state here. Options to choose from are **Enable**, **Disabled**, and **Default**. When selecting the **Default** option, the buffer log's global state will follow the default behavior. |
| **Severity** | Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, |

| Parameter | Description |
|---|---|
| | **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**. |
| **Discriminator Name** | Enter the discriminator name used here. This name can be up to 15 characters long. |
| **Write Delay** | Enter the log's write delay value here. This value must be between 0 and 65535 seconds. By default, this value is 300 seconds. Tick the **Infinite** option, to disable the write delay feature. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Console Log Settings** are described below:

| Parameter | Description |
|---|---|
| **Console Log State** | Select whether the enable or disable the console log's global state here. |
| **Severity** | Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**. |
| **Discriminator Name** | Enter the discriminator name used here. This name can be up to 15 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **SMTP Log Settings** are described below:

| Parameter | Description |
|---|---|
| **SMTP Log State** | Select whether the enable or disable the SMTP log's global state here. |
| **Severity** | Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**. |
| **Discriminator Name** | Enter the discriminator name used here. This name can be up to 15 characters long. |

Click the **Apply** button to accept the changes made.

# System Log Discriminator Settings

This window is used to view and configure the system log's discriminator settings.

To view the following window, click **System > System Log > System Log Discriminator Settings**, as shown below:

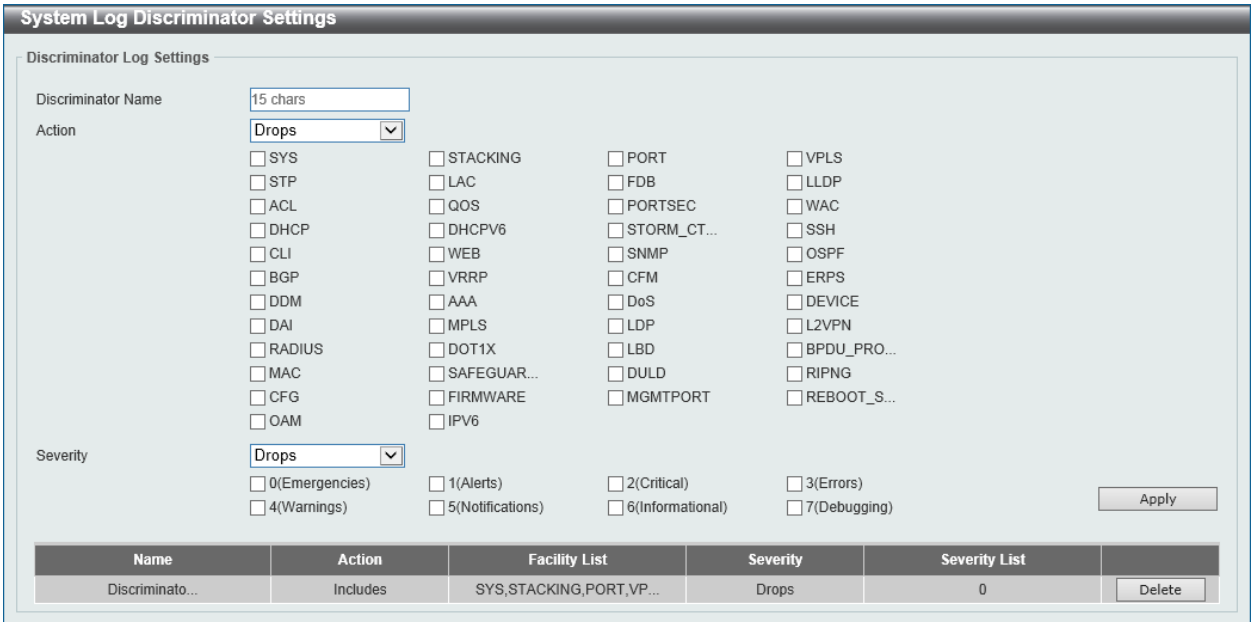



**Figure 3-18 System Log Discriminator Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Discriminator Name** | Enter the discriminator name here. This name can be up to 15 characters long. |
| **Action** | Select the facility's behavior option and the type of facility that will be associated with the selected behavior here. Behavior options to choose from are **Drops** and **Includes**. |
| **Severity** | Select the severity behavior option and the value of the type of information that will be logged. Behavior options to choose from are **Drops** and **Includes**. Severity value options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

# System Log Server Settings

This window is used to view and configure system log's server settings.

To view the following window, click **System > System Log > System Log Server Settings**, as shown below:

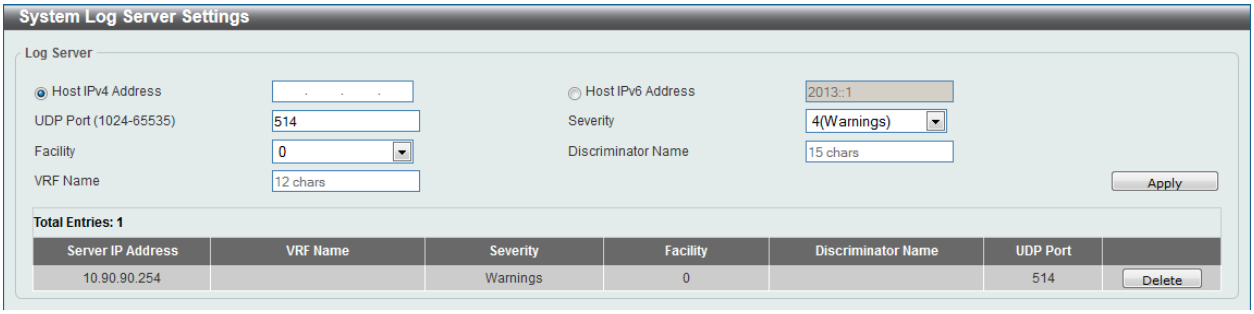



**Figure 3-19 System Log Server Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Host IPv4 Address** | Enter the system log server's IPv4 address here. |
| **Host IPv6 Address** | Enter the system log server's IPv6 address here. |
| **UDP Port** | Enter the system log server's UDP port number here. This value must be between 1024 and 65535. By default, this value is 514. |
| **Severity** | Select the severity value of the type of information that will be logged. Options to choose from are **0 (Emergencies)**, **1 (Alerts)**, **2 (Critical)**, **3 (Errors)**, **4 (Warnings)**, **5 (Notifications)**, **6 (Informational)**, and **7 (Debugging)**. |
| **Facility** | Select the facility value here. Options to choose from are 0 to 23. |
| **Discriminator Name** | Enter the discriminator name here. This name can be up to 15 characters long. |
| **VRF Name** | Enter the VRF name that will be associated with this configuration here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

# System Log

This window is used to view and clear the system log.

To view the following window, click **System > System Log > System Log**, as shown below:

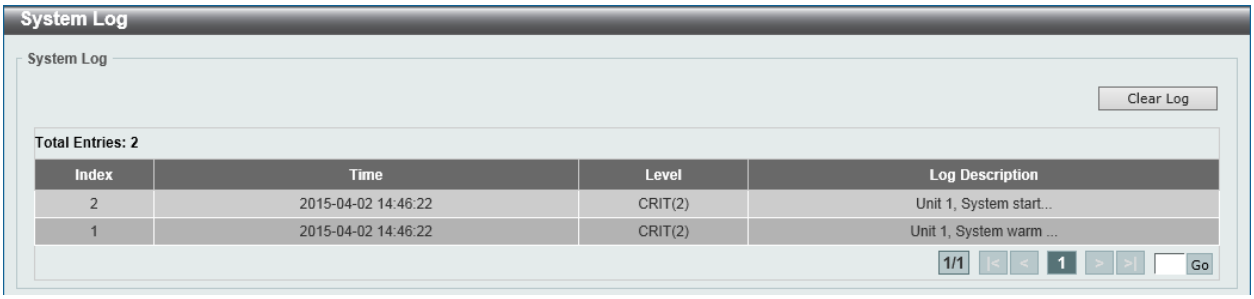



**Figure 3-20 System Log Window**

Click the **Clear Log** button to clear the system log entries displayed in the table.

## System Attack Log

This window is used to view and clear the system attack log.

To view the following window, click **System > System Log > System Attack Log**, as shown below:


**Figure 3-21 System Attack Log Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the stacking unit ID of the switch that will be displayed here. |

Click the **Clear Attack Log** button to clear the system attack log entries displayed in the table.

# Time and SNTP

## Clock Settings

This window is used to view and configure the time settings for the Switch.

To view the following window, click **System > Time and SNTP > Clock Settings**, as shown below:

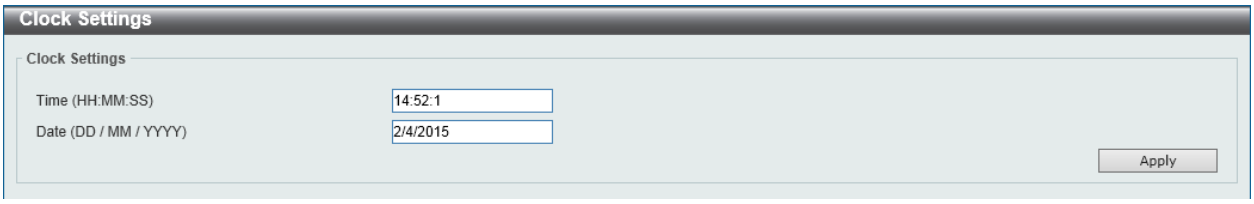



**Figure 3-22 Clock Settings Window**

The fields that can be configured in **Clock Settings** are described below:

| Parameter | Description |
|---|---|
| **Time** | Enter the current time in hours (HH), minutes (MM), and seconds (SS) here. For example, 18:30:30. |
| **Date** | Enter the current day (DD), month (MM), and year (YY) here. For example, 30/04/2015. |

Click the **Apply** button to accept the changes made.

## Time Zone Settings

This window is used to view and configure time zones and Daylight Savings Time settings for SNTP.

To view the following window, click **System > Time and SNTP > Time Zone Settings**, as shown below:

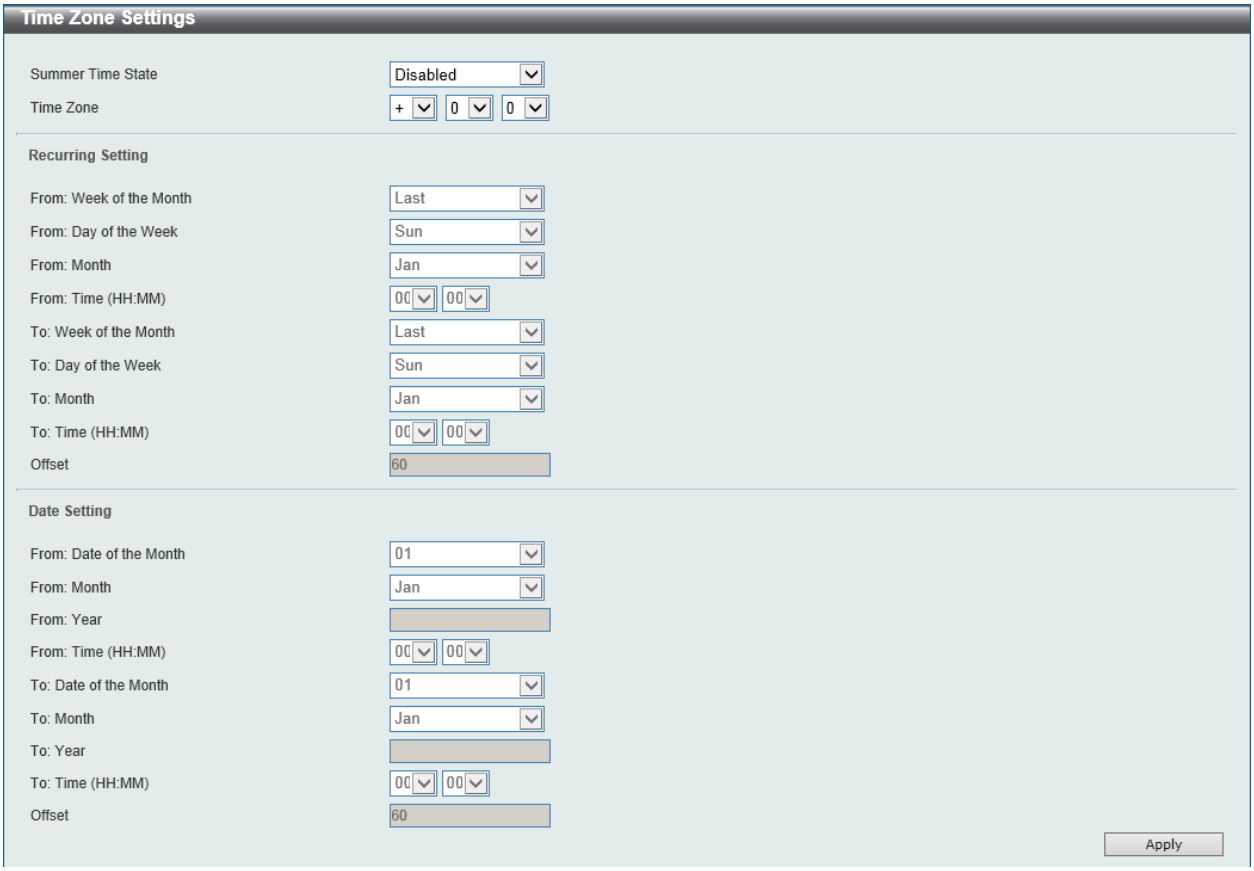



**Figure 3-23 Time Zone Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Summer Time State** | Select the summer time setting. Options to choose from are **Disabled**, **Recurring Setting**, and **Date Setting**.<br>• **Disabled** - Select to disable the summer time setting.<br>• **Recurring Setting** - Select to configure the summer time that should start and end on the specified week day of the specified month.<br>• **Date Setting** - Select to configure the summer time that should start and end on the specified date of the specified month. |
| **Time Zone** | Select to specify your local time zone's offset from Coordinated Universal Time (UTC). |

The fields that can be configured in **Recurring Settings** are described below:

| Parameter | Description |
|---|---|
| **From: Week of the Month** | Select week of the month that summer time will start. |
| **From: Day of the Week** | Select the day of the week that summer time will start. |
| **From: Month** | Select the month that summer time will start. |
| **From: Time** | Select the time of the day that summer time will start. |
| **To: Week of the Month** | Select week of the month that summer time will end. |

| Parameter | Description |
|---|---|
| **To: Day of the Week** | Select the day of the week that summer time will end. |
| **To: Month** | Select the month that summer time will end. |
| **To: Time** | Select the time of the day that summer time will end. |
| **Offset** | Enter the number of minutes to add during summer time. The default value is 60. The range of this offset is 30, 60, 90 and 120. |

The fields that can be configured in **Date Settings** are described below:

| Parameter | Description |
|---|---|
| **From: Date of the Month** | Select date of the month that summer time will start. |
| **From: Month** | Select the month that summer time will start. |
| **From: Year** | Enter the year that the summer time will start. |
| **From: Time** | Select the time of the day that summer time will start. |
| **To: Date of the Month** | Select date of the month that summer time will end. |
| **To: Month** | Select the month that summer time will end. |
| **To: Year** | Enter the year that the summer time will end. |
| **To: Time** | Select the time of the day that summer time will end. |
| **Offset** | Enter the number of minutes to add during summer time. The default value is 60. The range of this offset is 30, 60, 90 and 120. |

Click the **Apply** button to accept the changes made.

# SNTP Settings

This window is used to view configure the SNTP settings for the switch.

To view the following window, click **System > Time and SNTP > SNTP Settings**, as shown below:

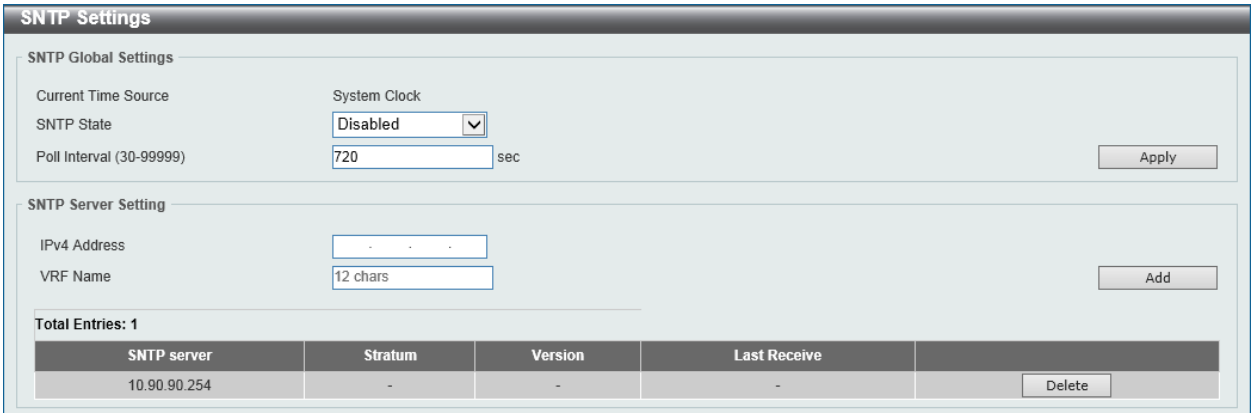



**Figure 3-24 SNTP Settings Window**

The fields that can be configured in **SNTP Global Settings** are described below:

| Parameter | Description |
|---|---|
| **SNTP State** | Select this option to enable or disable SNTP. |
| **Poll Interval** | Enter the synchronizing interval in seconds. The value is from 30 to |

| Parameter | Description |
|---|---|
| | 99999 seconds. The default interval is 720 seconds. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SNTP Server Settings** are described below:

| Parameter | Description |
|---|---|
| **IPv4 Address** | Enter the IP address of the SNTP server which provides the clock synchronization. |
| **VRF Name** | Enter the name of the VRF instance which the SNTP server belongs to. |

Click the **Add** button to add the SNTP server.

Click the **Delete** button to remove the specified entry.

# Time Range

This window is used to view and configure the time profile settings.

To view the following window, click **System > Time Range**, as shown below:

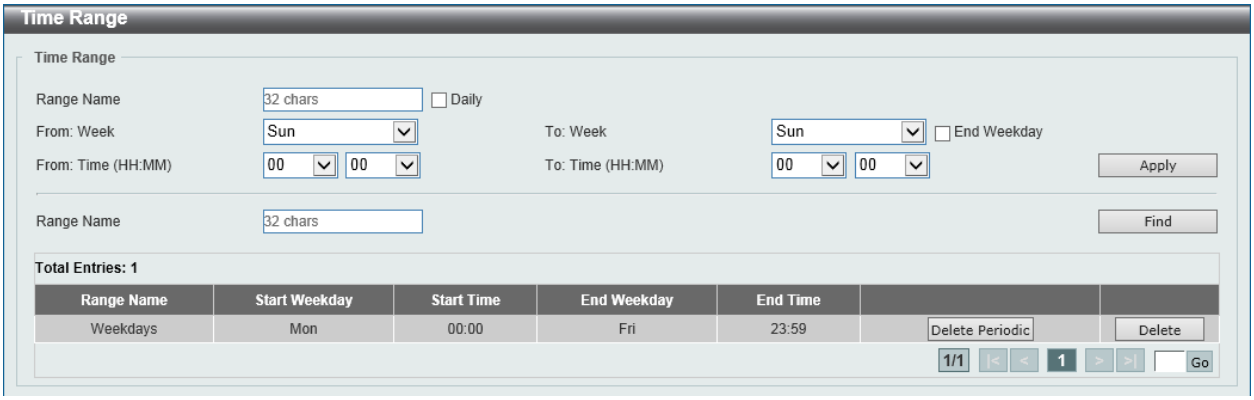



**Figure 3-25 Time Range Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Range Name** | Enter the time profile's range name here. This name can be up to 32 characters long. |
| **From Week ~ To Week** | Select the starting and ending days of the week that will be used for this time profile. Tick the **Daily** option to use this time profile for every day of the week. Tick the **End Week Day** option to use this time profile from the starting day of the week until the end of the week, which is Sunday. |
| **From Time ~ To Time** | Select the starting and ending time of the day that will be used for this time profile. The first drop-down menu selects the hour and the second drop-down menu selects the minute. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete Periodic** button to delete the periodic entry.

Click the **Delete** button to delete the specified entry.

# 4. Management

***User Account Settings***
***Password Encryption***
***Login Method***
***SNMP***
***RMON***
***Telnet/Web***
***Session Timeout***
***DHCP***
***DHCP Auto Configuration***
***DNS***
***IP Source Interface***
***File System***
***Physical Stacking***
***Virtual Stacking (SIM)***
***SMTP Settings***
***NLB FDB Settings***

## User Account Settings

On this page, user accounts can be created and configured. Also on this page active user account sessions can be viewed.

There are several configuration options available in the Web User Interface (Web UI). The set of configuration options available to the user depends on the account's **Privilege Level**.

**NOTE:** By default, there is no user account created on this switch.

To view the following window, click **Management > User Account Settings**, as shown below:

After selecting the **User Management Settings** tab, the following page will appear.

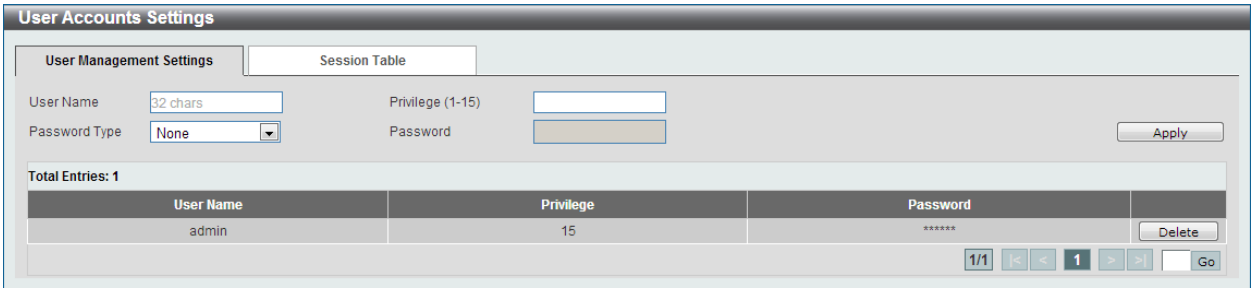



**Figure 4-1 User Management Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **User Name** | Enter the user account name here. This name can be up to 32 characters long. |
| **Privilege** | Enter the privilege level for this account here. This value must be |

| Parameter | Description |
|---|---|
| | between 1 and 15. |
| **Password Type** | Select the password type for this user account here. Options to choose from are **None**, **Plain Text**, and **Encrypted**. |
| **Password** | After selecting either **Plain Text** or **Encrypted** as the password type, enter the password for this user account here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified user account entry.

After selecting the **Session Table** tab, the following page will appear.


**Figure 4-2 Session Table Window**

On this page, a list of active user account session will be displayed.

# Password Encryption

This window is used to view and configure whether to save the encryption of the password in the configuration file.

To view the following window, click **Management > Password Encryption**, as shown below:


**Figure 4-3 Password Encryption Window**

The fields that can be configured in **Password Encryption Settings** are described below:

| Parameter | Description |
|---|---|
| **Password Encryption State** | Select this option to enable or disable the encryption of the password before stored in the configuration file. |

Click the **Apply** button to accept the changes made.

# Login Method

This window is used to view and configure the login method for each management interface that this Switch supports.

To view the following window, click **Management > Login Method**, as shown below:

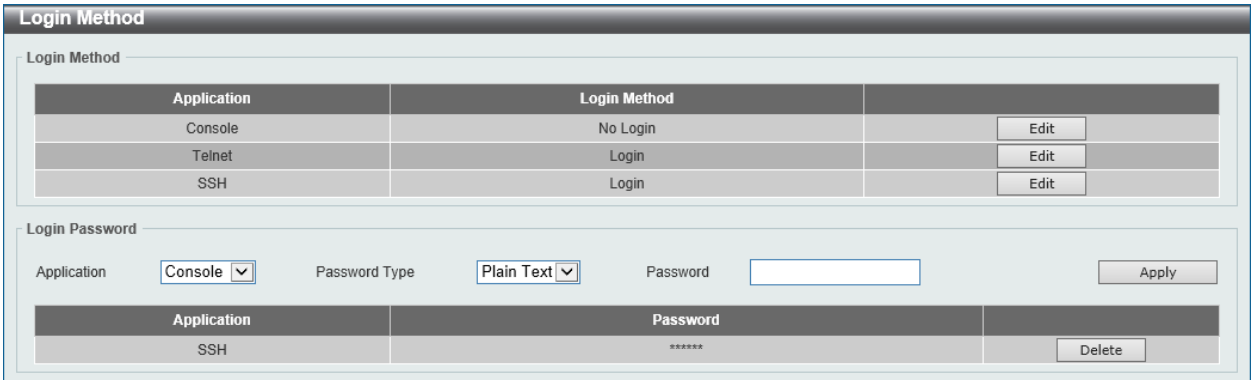



**Figure 4-4 Login Method Window**

The **Login Method** section will only be available when Authentication, Authorization, and Accounting (AAA) feature is disabled. The fields that can be configured in **Login Method** are described below:

| Parameter | Description |
|---|---|
| **Login Method** | After clicking the **Edit** button this parameter can be configured. Select the login method for the specified application here. Options to choose from are **No Login**, **Login** and **Login Local**. **No Login**, as the name implies, requires no login authentication to access the specified application. **Login** will require the user to at least enter a password when trying to access the application specified. **Login Local** requires the user to enter a username and a password to access the specified application. |

The fields that can be configured in **Login Password** are described below:

| Parameter | Description |
|---|---|
| **Application** | Select the application that will be configured here. Options to choose from are **Console**, **Telnet** and **SSH**. |
| **Password Type** | Select the password encryption type that will be used here. Options to choose from are **Plain Text** and **Encrypted**. |
| **Password** | Enter the password for the selected application here. This password will be used when the **Login Method** for the specified application is set as **Login**. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the password from the specified application.

# SNMP

Simple Network Management Protocol (SNMP) is an OSI Layer 7 (Application Layer) designed specifically for managing and monitoring network devices. SNMP enables network management stations to read and modify the settings of gateways, routers, switches, and other network devices. Use SNMP to configure system features for proper operation, monitor performance and detect potential problems in the Switch, switch group or network.

Managed devices that support SNMP include software (referred to as an agent), which runs locally on the device. A defined set of variables (managed objects) is maintained by the SNMP agent and used to manage the device. These objects are defined in a Management Information Base (MIB), which provides

a standard presentation of the information controlled by the on-board SNMP agent. SNMP defines both the format of the MIB specifications and the protocol used to access this information over the network.

The Switch supports the SNMP versions 1, 2c, and 3. The three versions of SNMP vary in the level of security provided between the management station and the network device.

In SNMP v.1 and v.2, user authentication is accomplished using 'community strings', which function like passwords. The remote user SNMP application and the Switch SNMP must use the same community string. SNMP packets from any station that has not been authenticated are ignored (dropped).

The default community strings for the Switch used for SNMP v.1 and v.2 management access are:

- **public** - Allows authorized management stations to retrieve MIB objects.
- **private** - Allows authorized management stations to retrieve and modify MIB objects.

SNMPv3 uses a more sophisticated authentication process that is separated into two parts. The first part is to maintain a list of users and their attributes that are allowed to act as SNMP managers. The second part describes what each user on that list can do as an SNMP manager.

The Switch allows groups of users to be listed and configured with a shared set of privileges. The SNMP version may also be set for a listed group of SNMP managers. Thus, you may create a group of SNMP managers that are allowed to view read-only information or receive traps using SNMPv1 while assigning a higher level of security to another group, granting read/write privileges using SNMPv3.

Using SNMPv3 individual users or groups of SNMP managers can be allowed to perform or be restricted from performing specific SNMP management functions. The functions allowed or restricted are defined using the Object Identifier (OID) associated with a specific MIB. An additional layer of security is available for SNMPv3 in that SNMP messages may be encrypted. To read more about how to configure SNMPv3 settings for the Switch read the next section.

**Traps**

Traps are messages that alert network personnel of events that occur on the Switch. The events can be as serious as a reboot (someone accidentally turned OFF the Switch), or less serious like a port status change. The Switch generates traps and sends them to the trap recipient (or network manager). Typical traps include trap messages for Authentication Failure, Topology Change and Broadcast\Multicast Storm.

**MIBs**

The Switch in the Management Information Base (MIB) stores management and counter information. The Switch uses the standard MIB-II Management Information Base module. Consequently, values for MIB objects can be retrieved from any SNMP-based network management software. In addition to the standard MIB-II, the Switch also supports its own proprietary enterprise MIB as an extended Management Information Base. Specifying the MIB Object Identifier may also retrieve the proprietary MIB. MIB values can be either read-only or read-write.

The Switch incorporates a flexible SNMP management for the switching environment. SNMP management can be customized to suit the needs of the networks and the preferences of the network administrator. Use the SNMP V3 menus to select the SNMP version used for specific tasks.

The Switch supports the Simple Network Management Protocol (SNMP) versions 1, 2c, and 3. The administrator can specify the SNMP version used to monitor and control the Switch. The three versions of SNMP vary in the level of security provided between the management station and the network device.

SNMP settings are configured using the menus located on the SNMP V3 folder of the Web manager. Workstations on the network that are allowed SNMP privileged access to the Switch can be restricted with the Management Station IP Address menu.

# SNMP Global Settings

This window is used to view and configure the SNMP global settings and trap settings.

To view the following window, click **Management > SNMP > SNMP Global Settings**, as shown below:

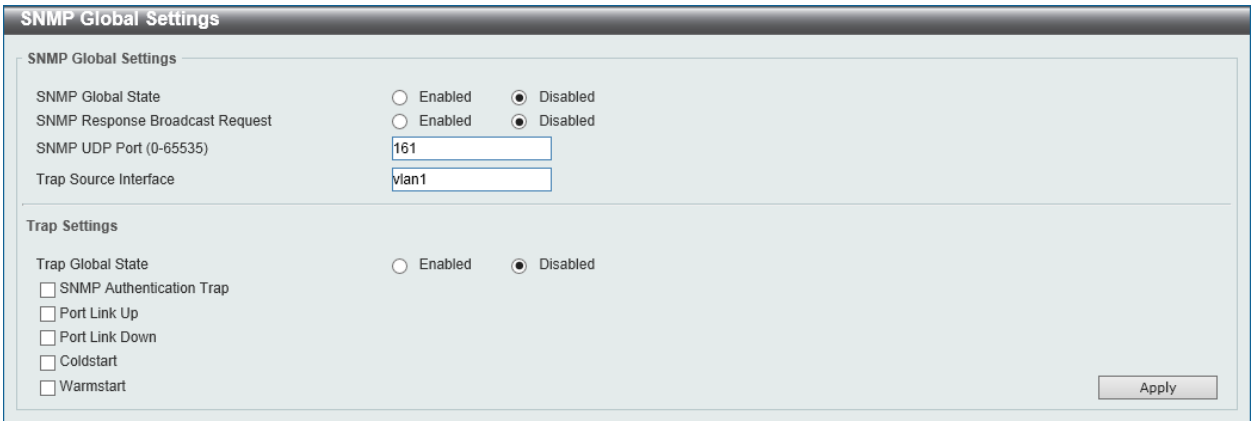



**Figure 4-5 SNMP Global Settings Window**

The fields that can be configured in **SNMP Global Settings** are described below:

| Parameter | Description |
|---|---|
| **SNMP Global State** | Select this option to enable or disable the SNMP feature. |
| **SNMP Response Broadcast Request** | Select this option to enable or disable the server to response to broadcast SNMP GetRequest packets. |
| **SNMP UDP Port** | Enter the SNMP UDP port number. |
| **Trap Source Interface** | Enter the interface whose IP address will be used as the source address for sending the SNMP trap packet. |

The fields that can be configured in **Trap Settings** are described below:

| Parameter | Description |
|---|---|
| **Trap Global State** | Select this option to enable or disable the sending of all or specific SNMP notifications. |
| **SNMP Authentication Trap** | Tick this option to control the sending of SNMP authentication failure notifications. An authenticationFailuretrap is generated when the device receives an SNMP message that is not properly authenticated. The authentication method depends on the version of SNMP being used. For SNMPv1 or SNMPv2c, authentication failure occurs if packets are formed with an incorrect community string. For SNMPv3, authentication failure occurs if packets are formed with an incorrect SHA/MD5 authentication key. |
| **Port Link Up** | Tick this option to control the sending of port link up notifications. A linkup trap is generated when the device recognizes that one of the communication links has come up. |

| Parameter | Description |
|---|---|
| **Port Link Down** | Tick this option to control the sending of port link down notifications. A linkDown trap is generated when the device recognizes a failure in one of the communication links. |
| **Coldstart** | Tick this option to control the sending of SNMP coldStart notifications. |
| **Warmstart** | Tick this option to control the sending of SNMP warmStart notifications. |

Click the **Apply** button to accept the changes made.

# SNMP Linkchange Trap Settings

This window is used to view and configure the SNMP link change trap settings.

To view the following window, click **Management > SNMP > SNMP Linkchange Trap Settings**, as shown below:

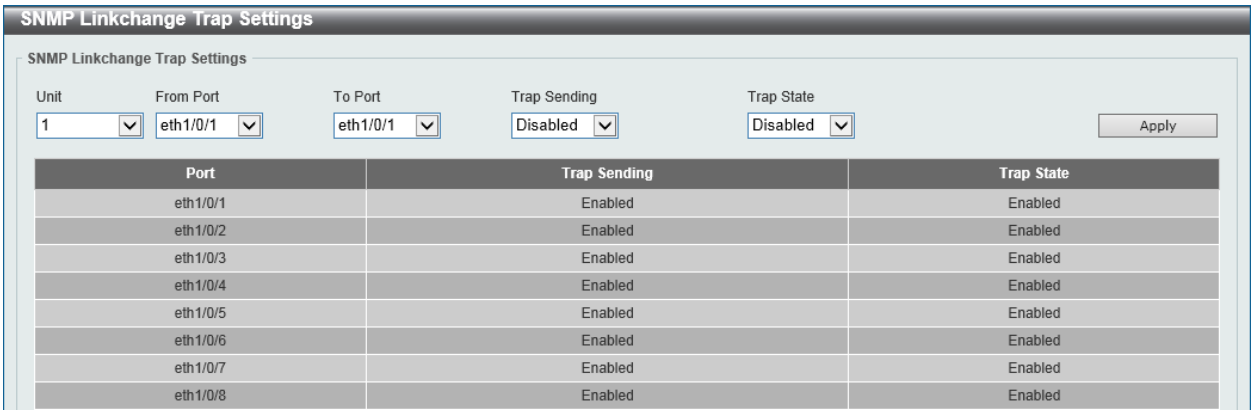



**Figure 4-6 SNMP Linkchange Trap Settings Window**

The fields that can be configured in **SNMP Linkchange Trap Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Trap Sending** | Select this option to enable or disable the sending of the SNMP notification traps that is generated by the system. |
| **Trap State** | Select this option to enable or disable the SNMP link change trap. |

Click the **Apply** button to accept the changes made.

# SNMP View Table Settings

This window is used to assign views to community strings that define which MIB objects can be accessed by a remote SNMP manager. The SNMP Group created with this table maps SNMP users (identified in the SNMP User Table) to the views created in the previous window.

To view the following window, click **Management > SNMP > SNMP View Table Settings**, as shown below:

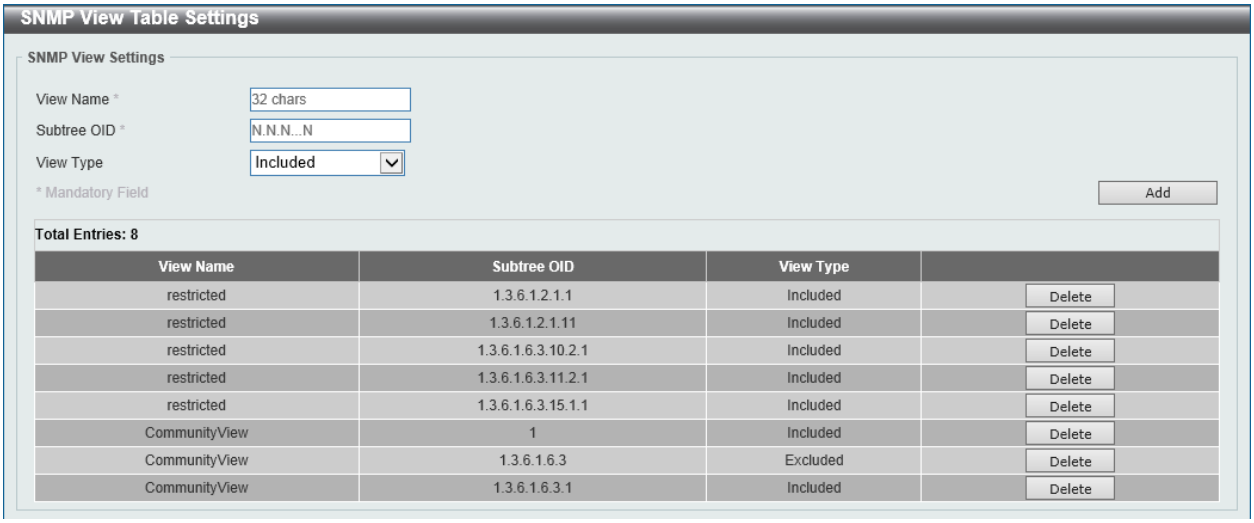



**Figure 4-7 SNMP View Table Settings Window**

The fields that can be configured in **SNMP View Settings** are described below:

| Parameter | Description |
|---|---|
| **View Name** | Type an alphanumeric string of up to 32 characters. This is used to identify the new SNMP view being created. |
| **Subtree OID** | Type the Object Identifier (OID) sub-tree for the view. The OID identifies an object tree (MIB tree) that will be included or excluded from access by an SNMP manager. |
| **View Type** | Select the view type here. Options to choose from are **Included**, and **Excluded**.<br>• **Included** - Select to include this object in the list of objects that an SNMP manager can access.<br>• **Excluded** - Select to exclude this object from the list of objects that an SNMP manager can access. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

# SNMP Community Table Settings

This window is used to create an SNMP community string to define the relationship between the SNMP manager and an agent. The community string acts like a password to permit access to the agent on the Switch. One or more of the following characteristics can be associated with the community string:

- An Access List of IP addresses of SNMP managers that are permitted to use the community string to gain access to the Switch's SNMP agent.
- Any MIB view that defines the subset of all MIB objects will be accessible to the SNMP community.
- Read/write or read-only level permission for the MIB objects accessible to the SNMP community.

To view the following window, click **Management > SNMP > SNMP Community Table Settings**, as shown below:


**Figure 4-8 SNMP Community Table Settings Window**

The fields that can be configured in **SNMP Community Settings** are described below:

| Parameter | Description |
|---|---|
| **Key Type** | Select the key type for the SNMP community. Options to choose from are **Plain Text**, and **Encrypted**. |
| **Community Name** | Enter an alphanumeric string of up to 32 characters that is used to identify members of an SNMP community. This string is used like a password to give remote SNMP managers access to MIB objects in the Switch's SNMP agent. |
| **View Name** | Enter an alphanumeric string of up to 32 characters that is used to identify the group of MIB objects that a remote SNMP manager is allowed to access on the Switch. The view name must exist in the SNMP View Table. |
| **Access Right** | Select the access right here. Options to choose from are **Read Only**, and **Read Write**.<br>• **Read Only** - SNMP community members using the community string created can only read the contents of the MIBs on the Switch.<br>• **Read Write** - SNMP community members using the community string created can read from, and write to the contents of the MIBs on the Switch. |
| **IP Access-List Name** | Enter the name of the standard access list to control the user to use this community string to access to the SNMP agent. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

# SNMP Group Table Settings

An SNMP Group created with this table maps SNMP users (identified in the SNMP User Table) to the views created in the previous window.

To view the following window, click **Management > SNMP > SNMP Group Table Settings**, as shown below:

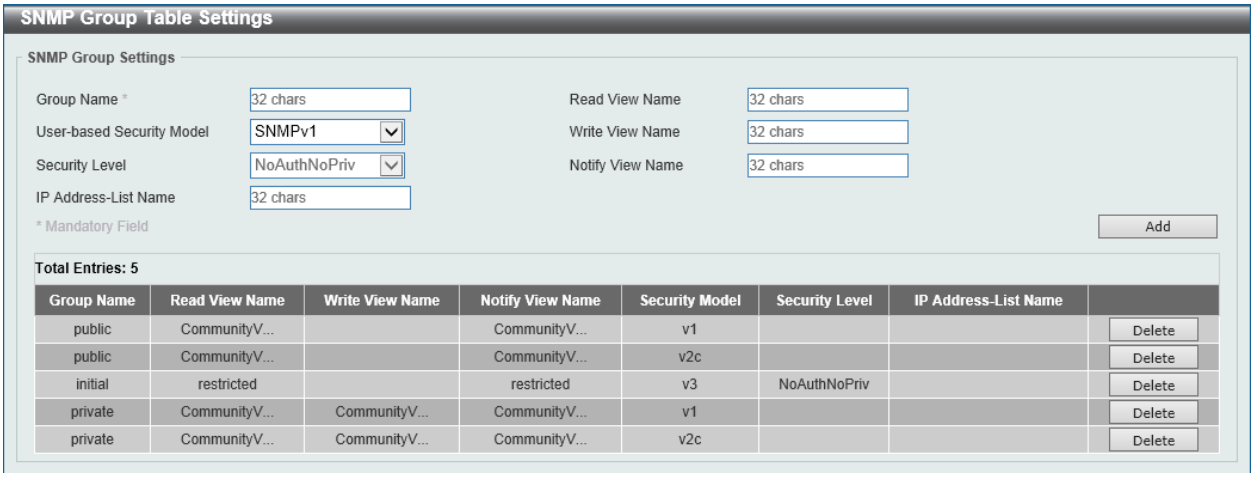



**Figure 4-9 SNMP Group Table Settings Window**

The fields that can be configured in **SNMP Group Settings** are described below:

| Parameter | Description |
|---|---|
| **Group Name** | Enter the group name of a maximum of 32 characters. The syntax is general string that does not allow space. |
| **Read View Name** | Enter the read view name that the group user can access. |
| **User-based Security Model** | Select the security model here. Options to choose from are **SNMPv1**, **SNMPv2c**, and **SNMPv3**.<br>• **SNMPv1** - Select to allow the group user to use the SNMPv1 security model.<br>• **SNMPv2c** - Select to allow the group user to use the SNMPv2c security model.<br>• **SNMPv3** - Select to allow the group user to use the SNMPv3 security model. |
| **Write View Name** | Enter the write view name that the group user can access. |
| **Security Level** | When selecting **SNMPv3** in the **User-based Security Model** drop-down list, this option is available.<br>• **NoAuthNoPriv** - Specify that there will be no authorization and no encryption of packets sent between the Switch and a remote SNMP manager.<br>• **AuthNoPriv** - Specify that authorization will be required, but there will be no encryption of packets sent between the Switch and a remote SNMP manager.<br>• **AuthPriv** - Specify that authorization will be required, and that packets sent between the Switch and a remote SNMP manger will be encrypted. |
| **Notify View Name** | Enter a write view name that the group user can access. The notify view describes the object that can be reported its status via trap packets to the group user. |
| **IP Address-List Name** | Enter the standard IP access control list (ACL) to associate with the group. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

# SNMP Engine ID Local Settings

The Engine ID is a unique identifier used for SNMP V3 implementations on the Switch.

To view the following window, click **Management > SNMP > SNMP Engine ID Local Settings**, as shown below:

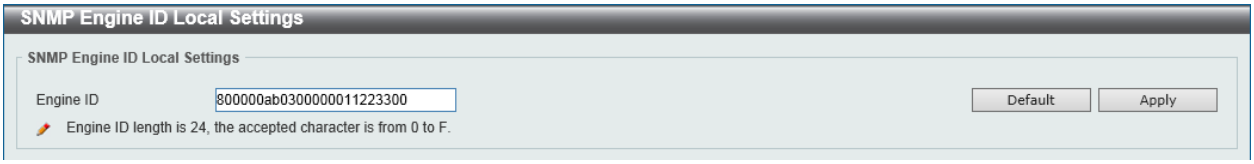



**Figure 4-10 SNMP Engine ID Local Settings Window**

The fields that can be configured in **SNMP Engine ID Local Settings** are described below:

| Parameter | Description |
|---|---|
| **Engine ID** | Enter the engine ID string with the maximum of 24 characters. |

Click the **Default** button to revert the engine ID to the default.

Click the **Apply** button to accept the changes made.

# SNMP User Table Settings

This window is used to configure and display the SNMP users that are currently configured on the Switch.

To view the following window, click **Management > SNMP > SNMP User Table Settings**, as shown below:

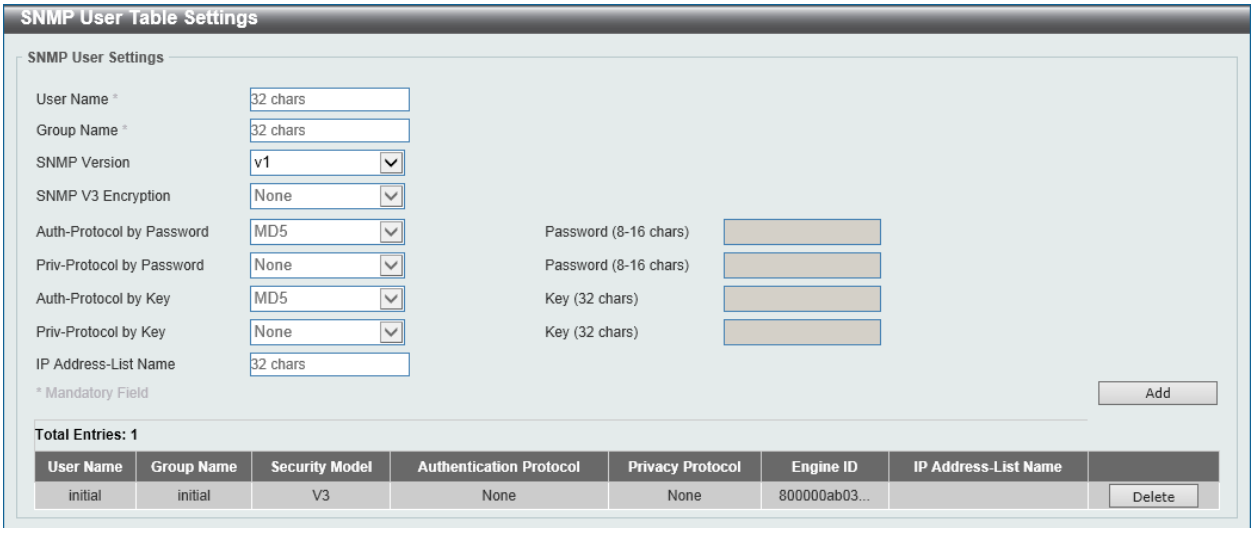



**Figure 4-11 SNMP User Table Settings Window**

The fields that can be configured in **SNMP User Settings** are described below:

| Parameter | Description |
|---|---|
| **User Name** | Enter an alphanumeric string of up to 32 characters. This is used to identify the SNMP users. |
| **Group Name** | Enter the SNMP group name to which the user belongs. The syntax is general string that does not allow spaces. |

| Parameter | Description |
|---|---|
| **SNMP Version** | Select the SNMP version. Options to choose from are **v1**, **v2c**, and **v3**. |
| **SNMP V3 Encryption** | When selecting **v3** in the **SNMP Version** drop-down list, this option is available. Options to choose from are **None**, **Password**, and **Key**. |
| **Auth-Protocol by Password** | When selecting **v3** in the **SNMP Version** drop-down list, and selecting **Password** in the SNMP V3 Encryption drop-down list, this option is available. Select the authentication level. Options to choose from are the following:<br>• **MD5** - Select to use the HMAC-MD5-96 authentication level. This field will require the user to enter a password or a key.<br>• **SHA** - Specify that the HMAC-SHA authentication protocol will be used. This field will require the user to enter a password or a key. |
| **Password** | Enter the authentication protocol password here. For **MD5** this password must be between 8 and 16 characters long. For **SHA** this password must be between 8 and 20 characters long. |
| **Priv-Protocol by Password** | When selecting **v3** in the **SNMP Version** drop-down list, and selecting **Password** in the SNMP V3 Encryption drop-down list, this option is available. Select the private protocol. Options to choose from are the following:<br>• **None** - Specify that no authorization protocol is in use.<br>• **DES56** - Specify that DES 56-bit encryption is in use, based on the CBC-DES (DES-56) standard. This field will require the user to enter a password or a key. |
| **Password** | Enter the private protocol password here. For **none**, this field will be disabled. For **DES56** this password must be between 8 and 16 characters long. |
| **Auth-Protocol by Key** | When selecting **v3** in the **SNMP Version** drop-down list, and selecting **Key** in the SNMP V3 Encryption drop-down list, this option is available. Select the authentication level. Options to choose from are the following:<br>• **MD5** - Select to use the HMAC-MD5-96 authentication level. This field will require the user to enter a password or a key.<br>• **SHA** - Specify that the HMAC-SHA authentication protocol will be used. This field will require the user to enter a password or a key. |
| **Key** | Enter the authentication protocol key here. For **MD5** this key must be 32 characters long. For **SHA** this key must be 40 characters long. |
| **Priv-Protocol by Key** | When selecting **v3** in the **SNMP Version** drop-down list, and selecting **Key** in the SNMP V3 Encryption drop-down list, this option is available. Select the private protocol. Options to choose from are the following:<br>• **None** - Specify that no authorization protocol is in use.<br>• **DES56** - Specify that DES 56-bit encryption is in use, based on the CBC-DES (DES-56) standard. This field will require the user to enter a password or a key. |
| **Key** | Enter the private protocol key here. For **none**, this field will be disabled. For **DES56** this key must be 32 characters long. |
| **IP Address-List Name** | Enter the standard IP access control list (ACL) to associate with the user. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

# SNMP Host Table Settings

This window is used to view and configure the recipient of the SNMP notification.

To view the following window, click **Management > SNMP > SNMP Host Table Settings**, as shown below:

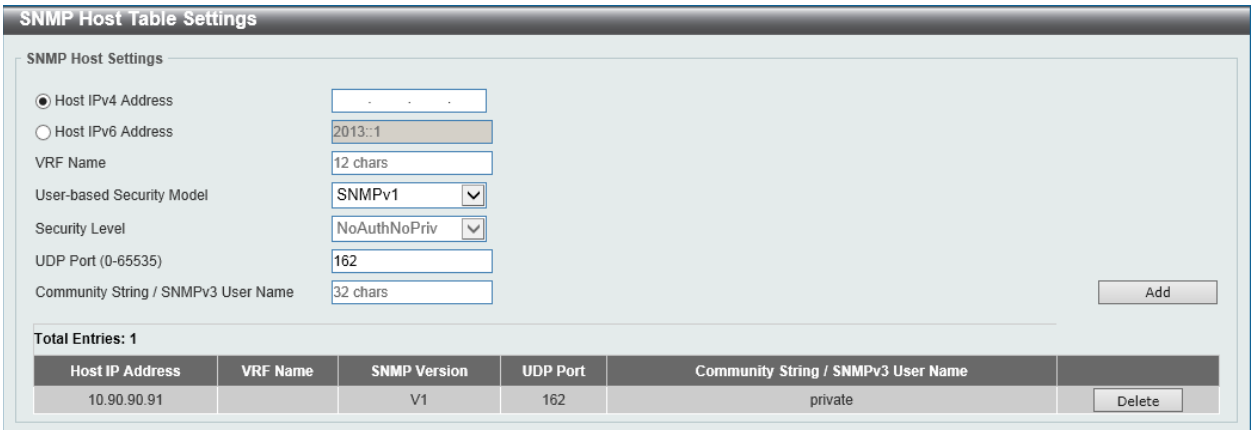



**Figure 4-12 SNMP Host Table Settings Window**

The fields that can be configured in **SNMP Host Settings** are described below:

| Parameter | Description |
|---|---|
| **Host IPv6 Address** | Enter the IPv4 address of the SNMP notification host. |
| **Host IPv6 Address** | Enter the IPv6 address of the SNMP notification host. |
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration here. This name can be up to 12 characters long. |
| **User-based Security Model** | Select the security model here. Options to choose from are **SNMPv1**, **SNMPv2c**, and **SNMPv3**.<br>• **SNMPv1** - Select to allow the group user to use the SNMPv1 security model.<br>• **SNMPv2c** - Select to allow the group user to use the SNMPv2c security model.<br>• **SNMPv3** - Select to allow the group user to use the SNMPv3 security model. |
| **Security Level** | When selecting **SNMPv3** in the **User-based Security Model** drop-down list, this option is available.<br>• **NoAuthNoPriv** - Specify that there will be no authorization and no encryption of packets sent between the Switch and a remote SNMP manager.<br>• **AuthNoPriv** - Specify that authorization will be required, but there will be no encryption of packets sent between the Switch and a remote SNMP manager.<br>• **AuthPriv** - Specify that authorization will be required, and that packets sent between the Switch and a remote SNMP manger will be encrypted. |
| **UDP Port** | Enter the UDP port number. The default trap UDP port number is 162. The range of UDP port numbers is from 0 to 65535. Some port numbers may conflict with other protocols. |
| **Community String / SNMPv3 User Name** | Enter the community string to be sent with the notification packet. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

# RMON

## RMON Global Settings

This window is used to enable or disable remote monitoring (RMON) for the rising and falling alarm trap feature for the SNMP function on the Switch.

To view the following window, click **Management > RMON > RMON Global Settings**, as shown below:

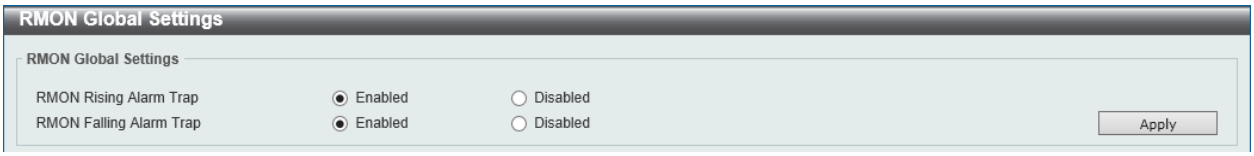



**Figure 4-13 RMON Global Settings Window**

The fields that can be configured in **RMON Global Settings** are described below:

| Parameter | Description |
|---|---|
| **RMON Rising Alarm Trap** | Select this option to enable or disable the RMON Rising Alarm Trap Feature. |
| **RMON Falling Alarm Trap** | Select this option to enable or disable the RMON Falling Alarm Trap Feature. |

Click the **Apply** button to accept the changes made.

## RMON Statistics Settings

This window is used to configure and display the RMON statistics on the specified port.

To view the following window, click **Management > RMON > RMON Statistics Settings**, as shown below:

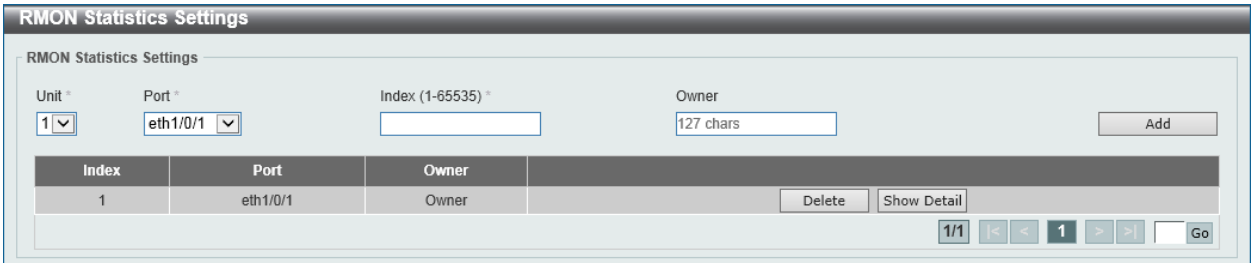



**Figure 4-14 RMON Statistics Settings Window**

The fields that can be configured in **RMON Statistics Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select to choose the port. |
| **Index** | Enter the RMON table index. The value is from 1 to 65535 |
| **Owner** | Enter the owner string. The string can be up to 127 characters. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Click the **Show Detail** button to see the detail information of the specific port.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.

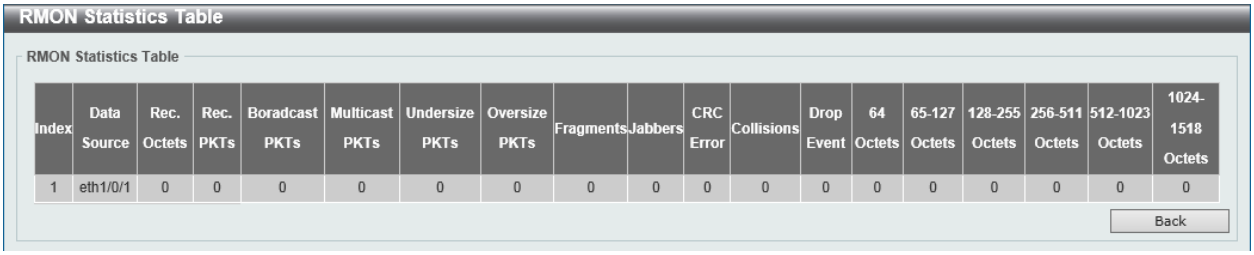



**Figure 4-15 RMON Statistics Settings (Show Detail) Window**

Click the **Back** button to return to the previous window.

# RMON History Settings

This window is used to view and configure RMON MIB history statistics gathered on the specified port.

To view the following window, click **Management > RMON > RMON History Settings**, as shown below:

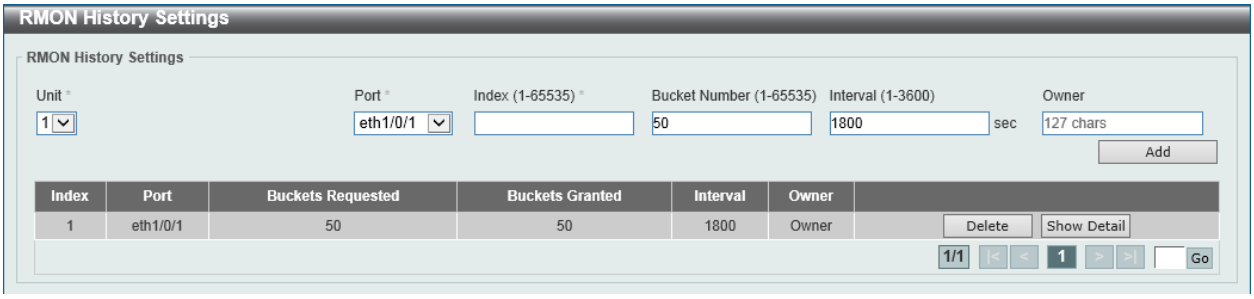



**Figure 4-16 RMON History Settings Window**

The fields that can be configured in **RMON History Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select the port that will be used here. |
| **Index** | Enter the history group table index. The value is from 1 to 65535 |
| **Bucket Number** | Enter Specifies the number of buckets specified for the RMON collection history group of statistics. The range is from 1 to 65535. The default value is 50. |
| **Interval** | Enter the time in seconds in each polling cycle. The range is from 1 to 3600. |
| **Owner** | Enter the owner string. The string can be up to 127 characters. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Click the **Show Detail** button to see the detail information of the specific port.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.

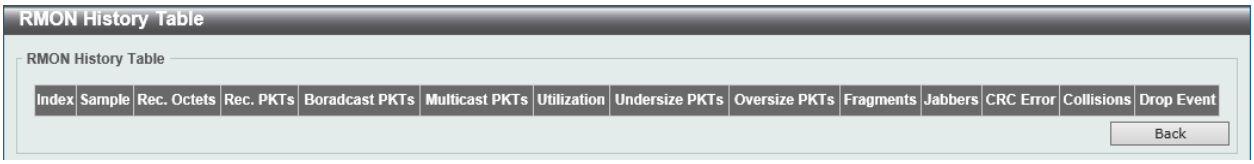



**Figure 4-17 RMON History Settings (Show Detail) Window**

Click the **Back** button to return to the previous window.

# RMON Alarm Settings

This window is used to view and configure alarm entries to monitor an interface.

To view the following window, click **Management > RMON > RMON Alarm Settings**, as shown below:

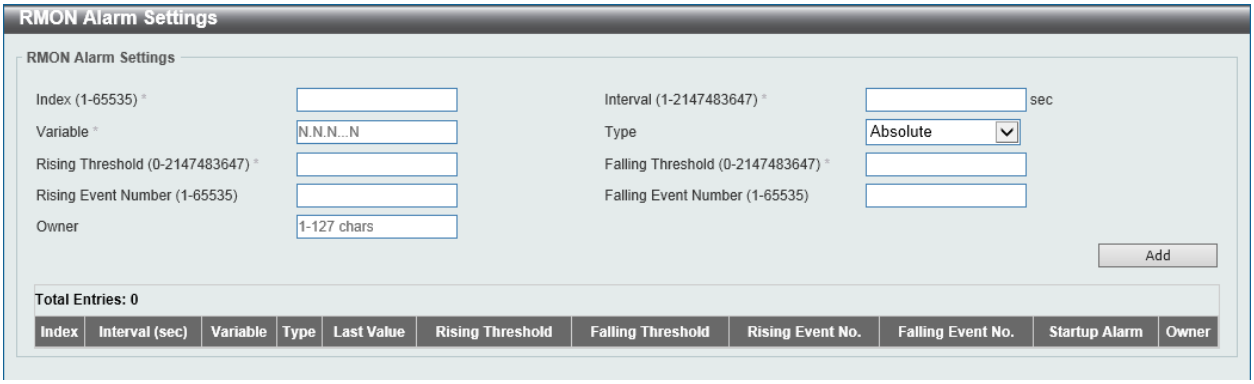



**Figure 4-18 RMON Alarm Settings Window**

The fields that can be configured in **RMON Alarm Settings** are described below:

| Parameter | Description |
|---|---|
| **Index** | Enter the alarm index. The range is from 1 to 65535. |
| **Interval** | Enter the interval in seconds for the sampling of the variable and checking against the threshold. The valid range is from 1 to 2147483648 seconds. |
| **Variable** | Enter the object identifier of the variable to be sampled. |
| **Type** | Select the monitoring type. Options to choose from are **Absolute** and **Delta**. |
| **Rising Threshold** | Enter the rising threshold value between 0 and 2147483647. |
| **Falling Threshold** | Enter the falling threshold value between 0 and 2147483647. |
| **Rising Event Number** | Enter the index of the event entry that is used to notify the rising threshold crossing event. The valid range is from 1 to 65535. If not specified, no action is taken while crossing the ringing threshold. |
| **Falling Event Number** | Enter the index of the event entry that is used to notify the falling threshold crossing event. The valid range is from 1 to 65535. If not specified, no action is taken while crossing the falling threshold. |
| **Owner** | Enter the owner string up to 127 characters. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# RMON Event Settings

This window is used to view and configure event entries.

To view the following window, click **Management > RMON > RMON Event Settings**, as shown below:

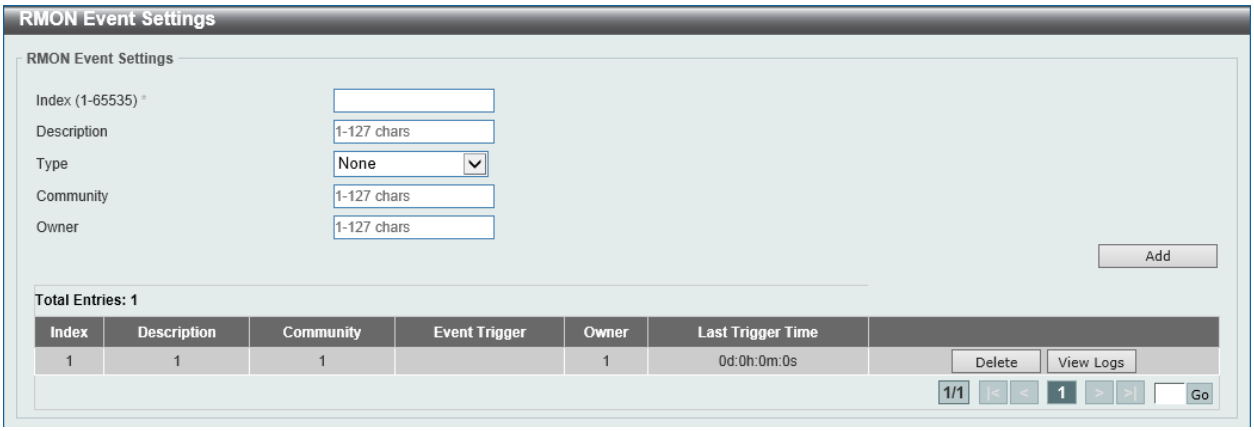



**Figure 4-19 RMON Event Settings Window**

The fields that can be configured in **RMON Event Settings** are described below:

| Parameter | Description |
|---|---|
| **Index** | Enter the index of the alarm entry between 1 and 65535. |
| **Description** | Enter a description for the RMON event entry. The string is up to 127 characters long. |
| **Type** | Select the RMON event entry type. Options to choose from are **None**, **Log**, **Trap**, and **Log and Trap**. |
| **Community** | Enter the community string. The string can be up to 127 characters. |
| **Owner** | Enter the owner string. The string can be up to 127 characters. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Click the **View Logs** button to see the detail information of the specific port.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **View Logs** button, the following window will appear.

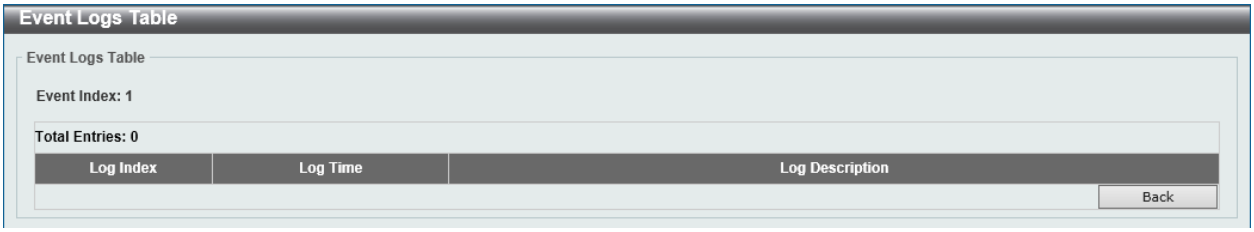



**Figure 4-20 RMON Event Settings (View Logs) Window**

Click the **Back** button to return to the previous window.

# Telnet/Web

This window is used to view and configure Telnet and Web settings on the switch.

To view the following window, click **Management > Telnet/Web**, as shown below:

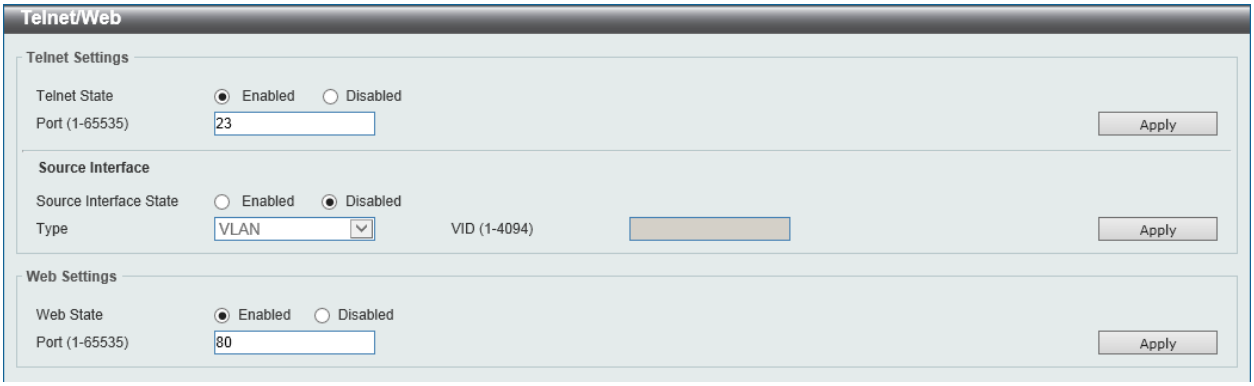



**Figure 4-21 Telnet/Web Window**

The fields that can be configured in **Telnet Settings** are described below:

| Parameter | Description |
|---|---|
| **Telnet State** | Select this option to enable or disable the configuration through Telnet. |
| **Port** | Enter the TCP port number used for Telnet management of the Switch. The “well-known” TCP port for the Telnet protocol is 23. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Source Interface** are described below:

| Parameter | Description |
|---|---|
| **Source Interface State** | Select to enable or disable the source interface’s state here. |
| **Type** | Select the type of source interface that will be used here. Options to choose from are **Loopback**, **Mgmt**, and **VLAN**. |
| **VID** | Enter the interface’s ID here. For loopback interfaces the range is from 1 to 8. For the management (Mgmt) interface this value can only be 0. For VLAN interfaces the range is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Web Settings** are described below:

| Parameter | Description |
|---|---|
| **Web State** | Select this option to enable or disable the configuration through the web. |
| **Port** | Enter the TCP port number used for Telnet management of the Switch. The “well-known” TCP port for the Telnet protocol is 80. |

Click the **Apply** button to accept the changes made.

# Session Timeout

This window is used to view and configure the session timeout settings.

To view the following window, click **Management > Session Timeout**, as shown below:

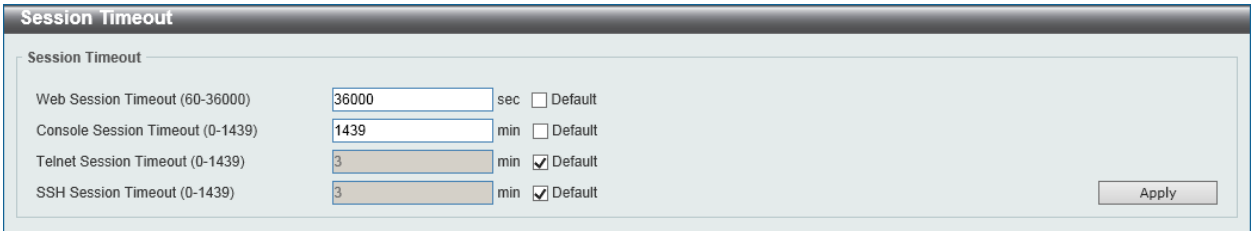



**Figure 4-22 Session Timeout Window**

The fields that can be configured in **Session Timeout** are described below:

| Parameter | Description |
|---|---|
| **Web Session Timeout** | Enter the time in seconds of the web session timeout. Tick the **Default** check box to return to the default setting. The value is from 60 to 36000 seconds. The default value is 180 seconds. |
| **Console Session Timeout** | Enter the time in minutes of the web session timeout. Tick the **Default** check box to return to the default setting. The value is from 0 to 1439 minutes. 0 means never timeout. The default value is 3 minutes. |
| **Telnet Session Timeout** | Enter the time in minutes of the Telnet session timeout. Tick the **Default** check box to return to the default setting. The value is from 0 to 1439 minutes. 0 means never timeout. The default value is 3 minutes. |
| **SSH Session Timeout** | Enter the time in minutes of the SSH session timeout. Tick the **Default** check box to return to the default setting. The value is from 0 to 1439 minutes. 0 means never timeout. The default value is 3 minutes. |

Click the **Apply** button to accept the changes made.

# DHCP

## Service DHCP

This window is used to view and configure the DHCP relay service on the switch.

To view the following window, click **Management > DHCP > Service DHCP**, as shown below:


**Figure 4-23 Service DHCP Window**

The fields that can be configured in **Service DHCP** are described below:

| Parameter | Description |
|---|---|
| **Service DHCP State** | Select this option to enable or disable the DHCP relay service. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Service IPv6 DHCP** are described below:

| Parameter | Description |
|---|---|
| **Service IPv6 DHCP State** | Select this option to enable or disable the IPv6 DHCP relay service. |

Click the **Apply** button to accept the changes made.

# DHCP Class Settings

This window is used to view and configure the DHCP class and the DHCP option matching pattern for the DCHP class.

To view the following window, click **Management > DHCP > DHCP Class Settings**, as shown below:

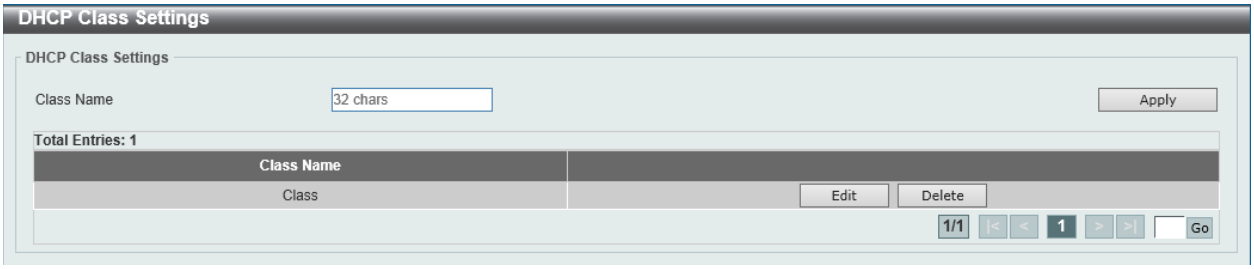



**Figure 4-24 DHCP Class Settings Window**

The fields that can be configured in **DHCP Class Settings** are described below:

| Parameter | Description |
|---|---|
| **Class Name** | Enter the DHCP class name with a maximum of 32 characters. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the DHCP option matching pattern for the corresponding DCHP class.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following window will appear.

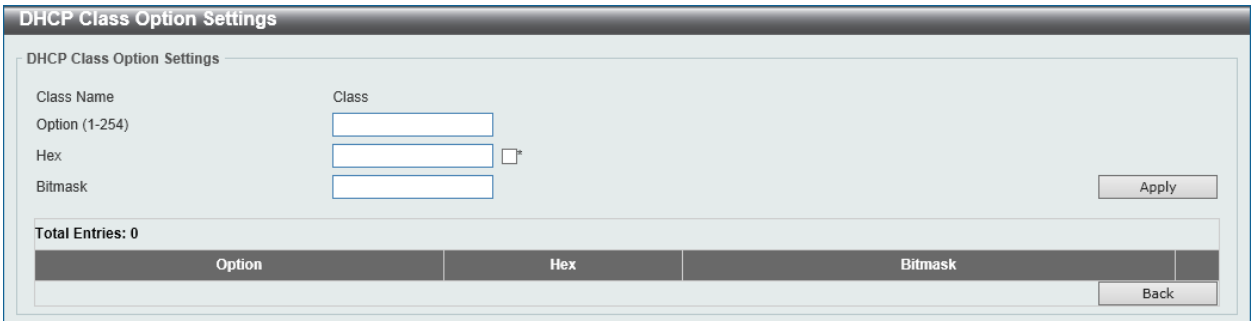



**Figure 4-25 DHCP Class Settings (Edit) Window**

The fields that can be configured in **DHCP Class Option Settings** are described below:

| Parameter | Description |
|---|---|
| **Option** | Enter the DHCP option number. The range is from 1 to 255. |
| **Hex** | Enter the hex pattern of the specified DHCP option. Tick the ***** check box not to match the remaining bits of the option. |
| **Bitmask** | Enter the hex bit mask for masking of the pattern. The masked pattern bits will be matched. If not specified, all bits entered in **Hex** will be checked. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Back** button to return to the previous window.

# DHCP Server

DHCP, or Dynamic Host Configuration Protocol, allows the switch to delegate IP addresses, subnet masks, default gateways and other IP parameters to devices that request this information. This occurs when a DHCP enabled device is booted on or attached to the locally attached network. This device is known as the DHCP client and when enabled, it will emit query messages on the network before any IP parameters are set. When the DHCP server receives this request, it returns a response to the client, containing the previously mentioned IP information that the DHCP client then utilizes and sets on its local configurations.

The user can configure many DHCP related parameters that it will utilize on its locally attached network, to control and limit the IP settings of clients desiring an automatic IP configuration, such as the lease time of the allotted IP address, the range of IP addresses that will be allowed in its DHCP pool, the ability to exclude various IP addresses within the pool so as not to make identical entries on its network, or to assign the IP address of an important device (such as a DNS server or the IP address of the default route) to another device on the network.

Users also have the ability to bind IP addresses within the DHCP pool to specific MAC addresses in order to keep consistent the IP addresses of devices that may be important to the upkeep of the network that require a static IP address.

## DHCP Server Global Settings

This window is used to view and configure the DHCP server global parameters.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Global Settings**, as shown below:

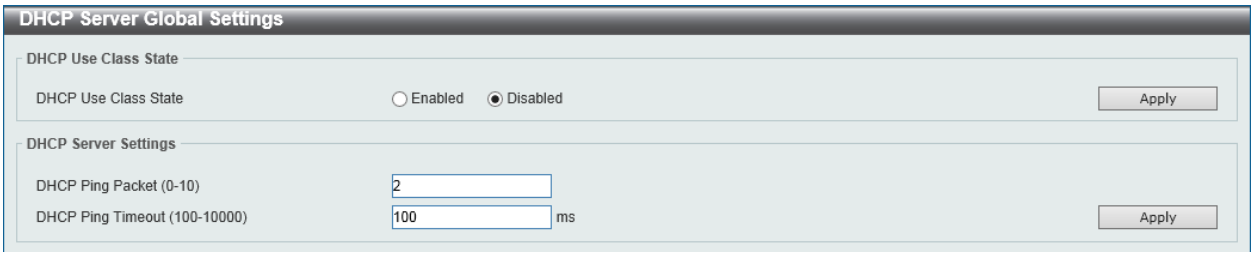



**Figure 4-26 DHCP Server Global Settings Window**

The fields that can be configured in **DHCP Use Class State** are described below:

| Parameter | Description |
|---|---|
| **DHCP Use Class State** | Select to enable or disable the feature where the DHCP server uses a class. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DHCP Server Settings** are described below:

| Parameter | Description |
|---|---|
| **DHCP Ping Packet** | Enter the number of ping packets that the switch will send out on the network containing the IP address to be allotted. If the ping request is not returned, the IP address is considered unique to the local network and then allotted to the requesting client. 0 means there is no ping test. The range is from 0 to 10. The default value is 2. |
| **DHCP Ping Timeout** | Enter the amount of time the DHCP server must waits before timing out a ping packet. The range is from 100 to 10000 milliseconds. The default value is 100 milliseconds. |

Click the **Apply** button to accept the changes made.

## DHCP Server Pool Settings

This window is used to view and configure the DHCP server pool settings.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Pool Settings**, as shown below:


**Figure 4-27 DHCP Server Pool Settings Window**

The fields that can be configured in **DHCP Server Pool** are described below:

| Parameter | Description |
|---|---|
| **Pool Name** | Enter the DHCP server's pool name here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Edit Class** button to configure the DHCP class.

Click the **Edit Option** button to configure the DHCP server pool's option settings.

Click the **Configure** button to configure the DHCP server pool's settings.

Click the **Delete** button to remove the specified entry.

After clicking the **Edit Class** button, the following page will appear.

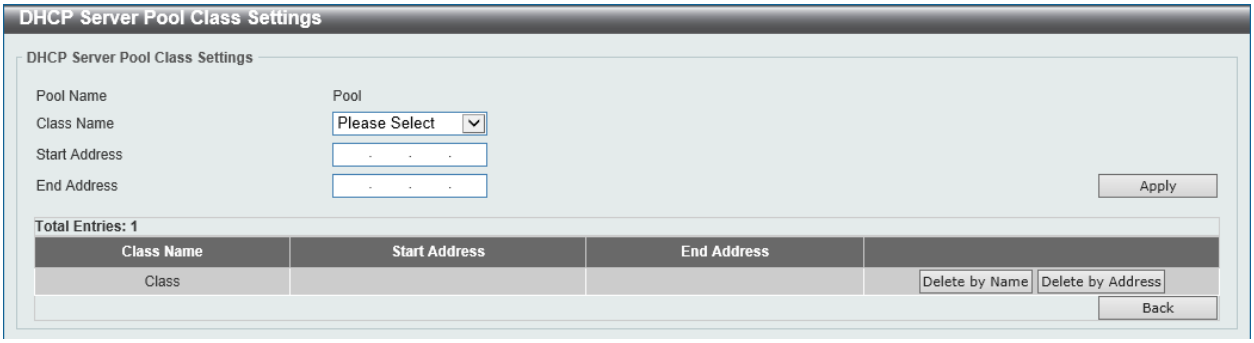



**Figure 4-28 DHCP Server Pool Settings (Edit Class) Window**

The fields that can be configured in **DHCP Server Pool Class Settings** are described below:

| Parameter | Description |
|---|---|
| **Class Name** | Select an existing DHCP class' name here that will be associated with this DHCP pool. |
| **Start Address** | Enter the starting IPv4 address that will be associated with the DHCP class in the DHCP pool here. |
| **End Address** | Enter the ending IPv4 address that will be associated with the DHCP class in the DHCP pool here. |

Click the **Apply** button to accept the changes made.

Click the **Delete by Name** button to remove the DHCP class association by name.

Click the **Delete by Address** button to remove the DHCP class association by address.

After clicking the **Edit Option** button, the following page will appear.

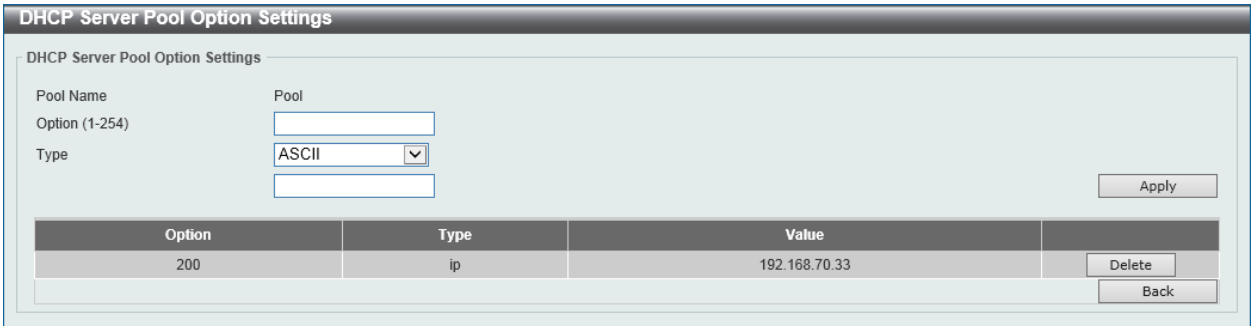



**Figure 4-29 DHCP Server Pool Settings (Edit Option) Window**

The fields that can be configured in **DHCP Server Pool Option Settings** are described below:

| Parameter | Description |
|---|---|
| **Option** | Enter the DHCP option number here. The range is from 1 to 254. |
| **Type** | Select the DHCP option type here. Options to choose from are **ASCII**, **HEX**, and **IP**. After selecting ASCII, enter the **ASCII** string in the space provided. This string can be up to 255 characters long. After selecting **HEX**, enter the hexadecimal string in the space provided. This string can be up to 254 characters long. Select the **None** option to specify to use a zero-length hexadecimal string. After selecting **IP**, enter the IPv4 address(es) in the space(s) provided. Up to 8 IPv4 address can be entered. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Back** button to return to the previous window.

After clicking the **Configure** button, the following page will appear.

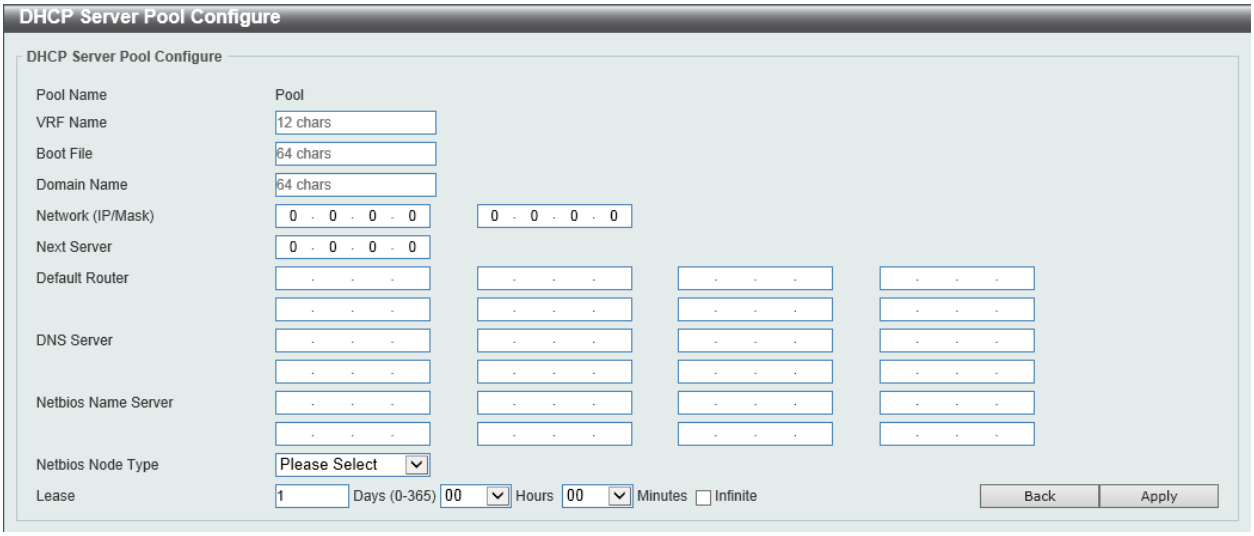



**Figure 4-30 DHCP Server Pool Settings (Configure) Window**

The fields that can be configured in **DHCP Server Pool Configure** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration here. This name can be up to 12 characters long. |
| **Boot File** | Enter the boot file's name here. This name can be up to 64 characters long. |
| **Domain Name** | Enter the domain name for the DHCP client here. This name can be up to 64 characters long. |
| **Network (IP/Mask)** | Enter the network IPv4 address and subnet mask for the DHCP client here. |
| **Next Server** | Enter the next server's IPv4 address here. This parameter is used to specify the server IP address for the client to boot the image. The server is typically a TFTP server. Only one boot server can be specified. |
| **Default Router** | Enter the IPv4 address of the default router for the DHCP client here. Up to 8 IPv4 address can be entered here. The IP address of the router should be on the same subnet as the client's subnet. Routers are listed in the order of preference. If default routers are already configured, the default routers configured later will be added to the default interface list. |
| **DNS Server** | Enter the IPv4 address to be used by the DHCP client as the DNS server here. Up to 8 IPv4 address can be entered here. Servers are listed in the order of preference. If DNS servers are already configured, the DNS servers configured later will be added to the DNS server list. |
| **Netbios Name Server** | Enter the WINS name server's IPv4 address for the DHCP client here. Up to 8 IPv4 address can be entered here. Servers are listed in the order of preference. If name servers are already configured, the name |

| Parameter | Description |
|---|---|
| | server configured later will be added to the default interface list. |
| **Netbios Node Type** | Select the NetBIOS node type for Microsoft DHCP clients here. Options to choose from are **Broadcast**, **Peer To Peer**, **Mixed**, and **Hybrid**. The node type of the h-node (Hybrid) is recommended. The node type determines the method NetBIOS use to register and resolve names. The broadcast system uses broadcasts. A p-node system uses only point-to-point name queries to a name server (WINS). An m-node system broadcasts first, and then queries the name server. A hybrid system queries the name server first, and then broadcasts. |
| **Lease** | Enter and select the lease time for an IPv4 address that is assigned from the address pool here. Enter the **Days** in the range from 0 to 365. Select the **Hours** and **Minutes** from the drop-down menus. Alternatively, the **Infinite** option can be selected to specify that the lease time is unlimited. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

## DHCP Server Exclude Address

This window is used to view and exclude a range of IPv4 addresses from being allocated to the DHCP client. The DHCP server automatically allocates addresses in DHCP address pools to DHCP clients. All the addresses except the interface's IP address on the router and the excluded address(es) specified here are available for allocation. Multiple ranges of addresses can be excluded. To remove a range of excluded addresses, administrators must specify the exact range of addresses previously configured.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Exclude Address**, as shown below:

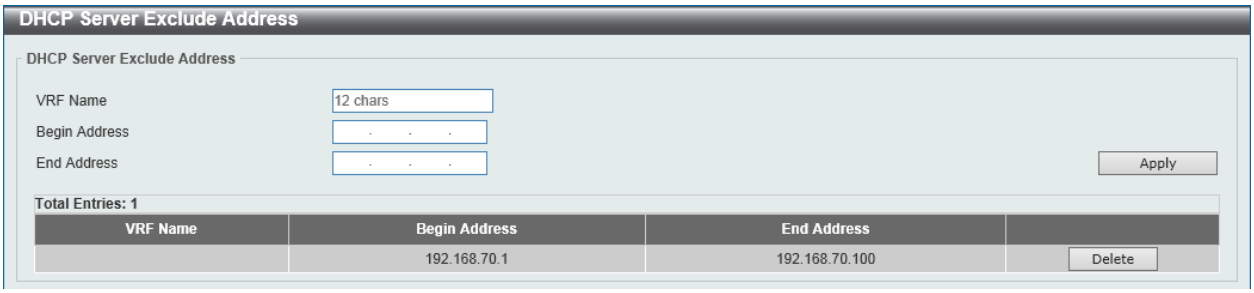



**Figure 4-31 DHCP Server Exclude Address Window**

The fields that can be configured in **DHCP Server Exclude Address** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration here. This name can be up to 12 characters long. |
| **Begin Address** | Enter the first IPv4 address of a range of addresses to be excluded here. |
| **End Address** | Enter the last IPv4 address of a range of addresses to be excluded here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# DHCP Server Manual Binding

This window is used to view and configure the DHCP server feature's manual binding settings. With a manual binding entry, the IP address can be either be bound with a client-identifier or bound with the hardware address of the host.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Manual Binding**, as shown below:

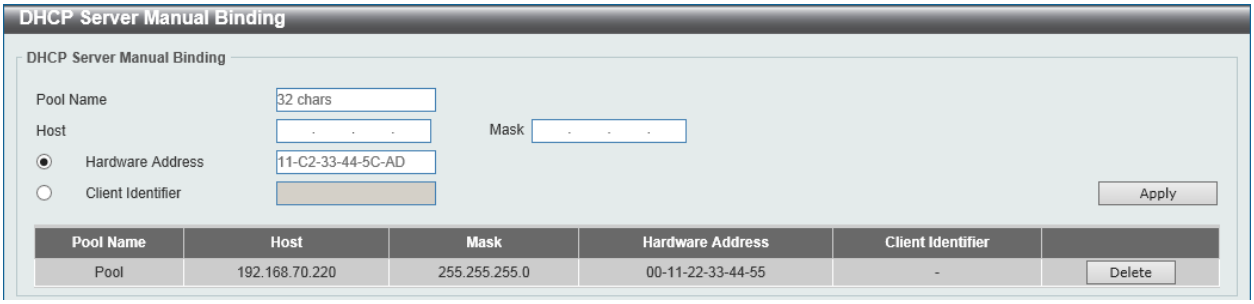



**Figure 4-32 DHCP Server Manual Binding Window**

The fields that can be configured in **DHCP Server Manual Binding** are described below:

| Parameter | Description |
|---|---|
| **Pool Name** | Enter the DHCP server's pool name here. This name can be up to 32 characters long. |
| **Host** | Enter the DHCP host's IPv4 address here. |
| **Mask** | Enter the DHCP host's network subnet mask here. |
| **Hardware Address** | Enter the DHCP host's MAC address here. |
| **Client Identifier** | Enter the DHCP host's identifier in hexadecimal notation here. The client identifier is formatted by the media type and the MAC address. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# DHCP Server Dynamic Binding

This window is used to view and clear the DHCP server's dynamic binding entries.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Dynamic Binding**, as shown below:

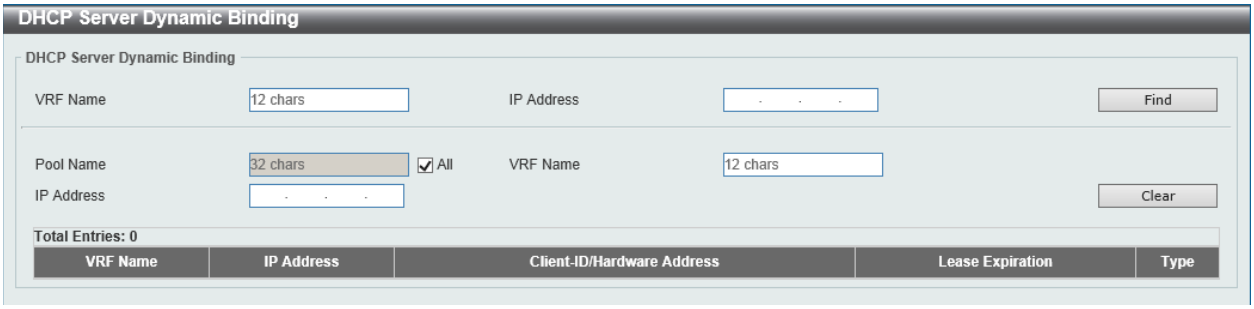



**Figure 4-33 DHCP Server Dynamic Binding Window**

The fields that can be configured in **DHCP Server Dynamic Binding** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. |
| **IP Address** | Enter the binding entry's IPv4 address here. |
| **Pool Name** | Enter the DHCP server's pool name here. This name can be up to 32 characters long. Select the **All** option to clear the binding entries for all pools. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

## DHCP Server IP Conflict

This window is used to view and clear the DHCP conflict entries from the DHCP server database.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server IP Conflict**, as shown below:

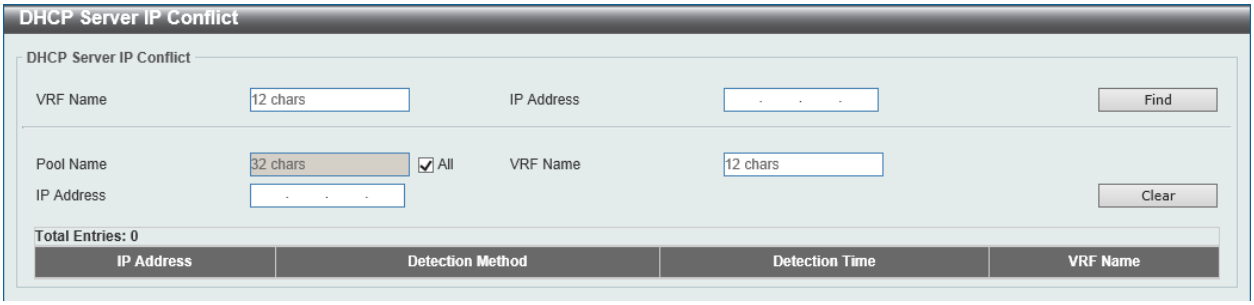



**Figure 4-34 DHCP Server IP Conflict Window**

The fields that can be configured in **DHCP Server IP Conflict** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. |
| **IP Address** | Enter the IPv4 address of the conflict entry to be located or cleared. |
| **Pool Name** | Enter the DHCP server's pool name here. This name can be up to 32 characters long. Select the **All** option to clear the conflict entries for all pools. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

## DHCP Server Statistic

This window is used to display DHCP server statistics.

To view the following window, click **Management > DHCP > DHCP Server > DHCP Server Statistic**, as shown below:

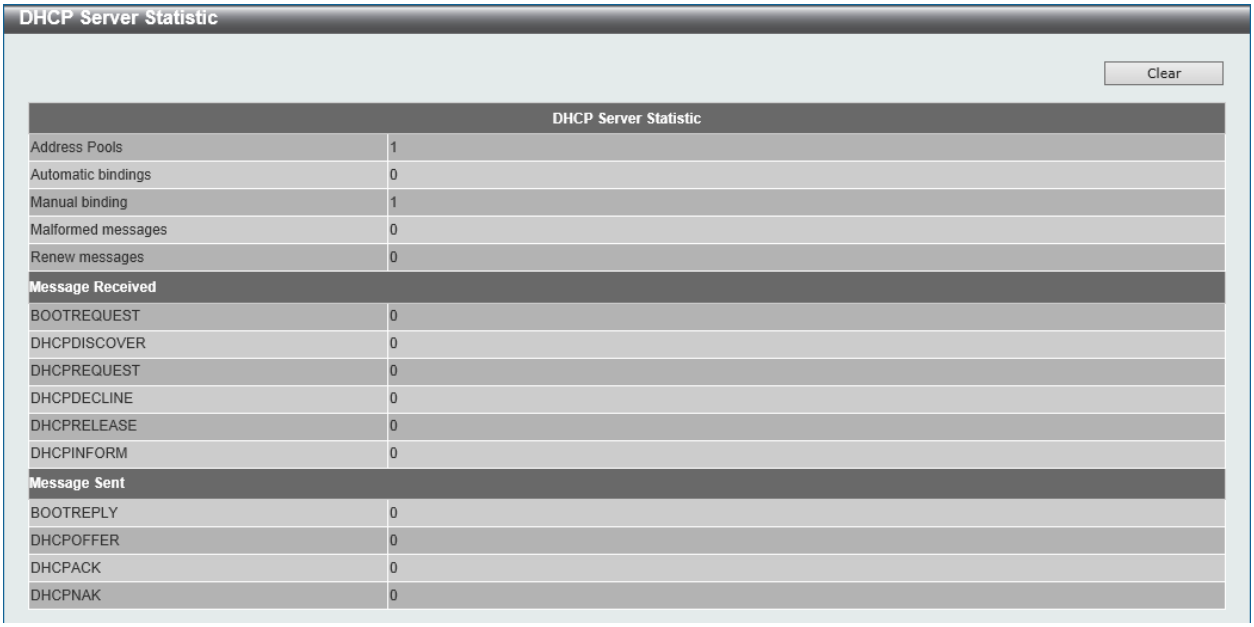



**Figure 4-35 DHCP Server Statistic Window**

Click the **Clear** button to clear the statistics information displayed here.

# DHCPv6 Server

## DHCPv6 Server Pool Settings

This window is used to view and configure the DHCPv6 server pool settings.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Pool Settings**, as shown below:

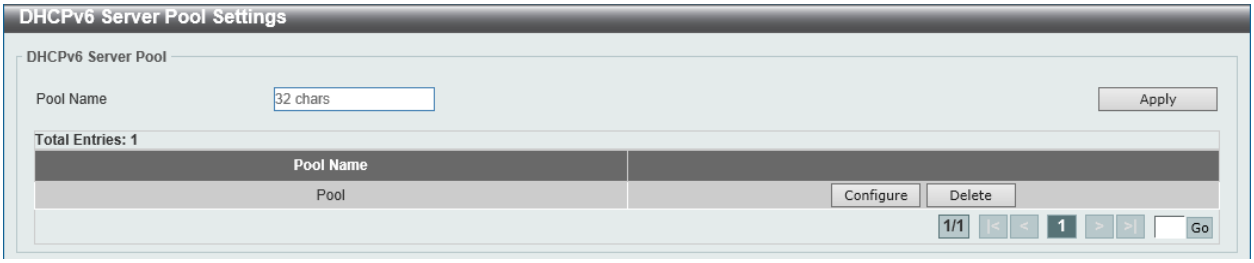



**Figure 4-36 DHCPv6 Server Pool Settings Window**

The fields that can be configured in **DHCPv6 Server Pool** are described below:

| Parameter | Description |
|---|---|
| **Pool Name** | Enter the DHCPv6 server's pool name here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Configure** button to configure the DHCPv6 server pool's settings.

Click the **Delete** button to remove the specified entry.

After clicking the **Configure** button, the following page will appear.

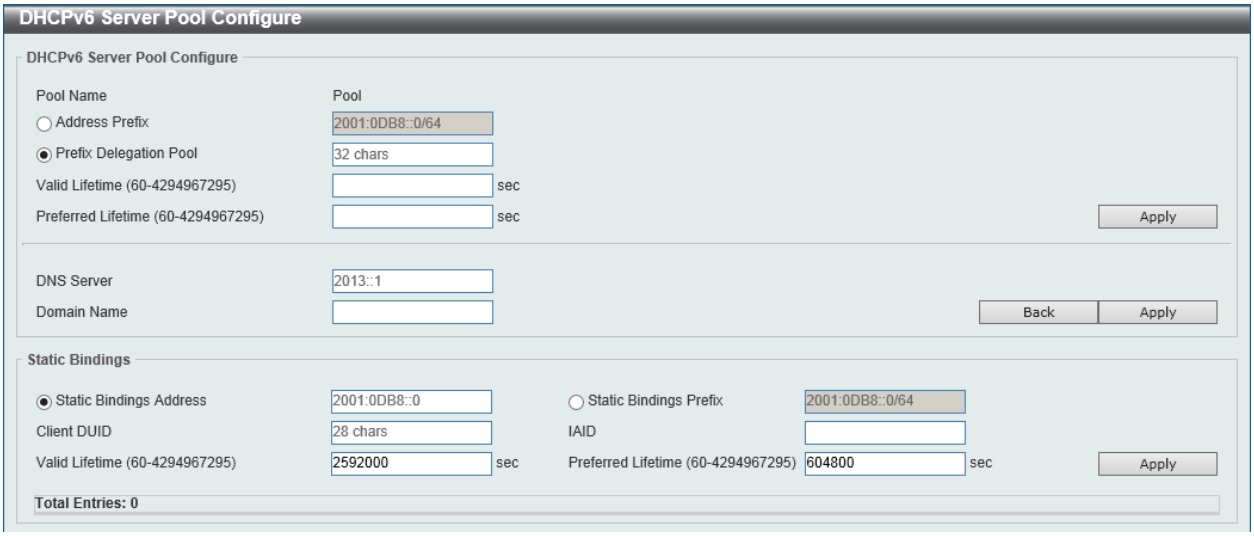



**Figure 4-37 DHCPv6 Server Pool Settings (Configure) Window**

The fields that can be configured in **DHCPv6 Server Pool Configure** are described below:

| Parameter | Description |
|---|---|
| **Address Prefix** | Select and enter the DHCPv6 server pool's IPv6 network address and prefix length here. For example, 2015::0/64. |
| **Prefix Delegation Pool** | Select and enter the DHCPv6 server pool's prefix delegation name here. This name can be up to 32 characters long. |
| **Valid Lifetime** | Enter the valid lifetime value here. The range is from 60 to 4294967295 seconds. The valid lifetime should be greater than preferred lifetime. If this value is not specified, then the default valid lifetime will be 2592000 seconds (30 days). |
| **Preferred Lifetime** | Enter the preferred lifetime value here. The range is from 60 to 4294967295 seconds. If this value is not specified, then the default preferred lifetime will be 604800 seconds (7 days). |
| **DNS Server** | Enter the DNS server's IPv6 address to be assigned to requesting DHCPv6 clients here. |
| **Domain Name** | Enter the domain name to be assigned to requesting DHCPv6 clients here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

The fields that can be configured in **Static Bindings** are described below:

| Parameter | Description |
|---|---|
| **Static Bindings Address** | Enter the static binding IPv6 address assign to the specific client here. |
| **Static Bindings Prefix** | Enter the static binding IPv6 network address and prefix length here. |
| **Client DUID** | Enter the client DHCP Unique Identifier (DUID) here. This string can be up to 28 characters long. |
| **IAID** | Enter the Identity Association Identifier (IAID) here. The IAID here uniquely identifies a collection of non-temporary addresses (IANA) assigned on the client. |
| **Valid Lifetime** | Enter the valid lifetime value here. The valid lifetime should be greater |

| Parameter | Description |
|---|---|
| | than the preferred lifetime. The range is from 60 to 4294967295 seconds. By default, this value is 2592000 seconds (30 days). |
| **Preferred Lifetime** | Enter the preferred lifetime value here. The range is from 60 to 4294967295 seconds. By default, this value is 604800 seconds (7 days). |

Click the **Apply** button to accept the changes made.

## DHCPv6 Server Local Pool Settings

This window is used to view and configure the DHCPv6 server's local pool settings.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Local Pool Settings**, as shown below:

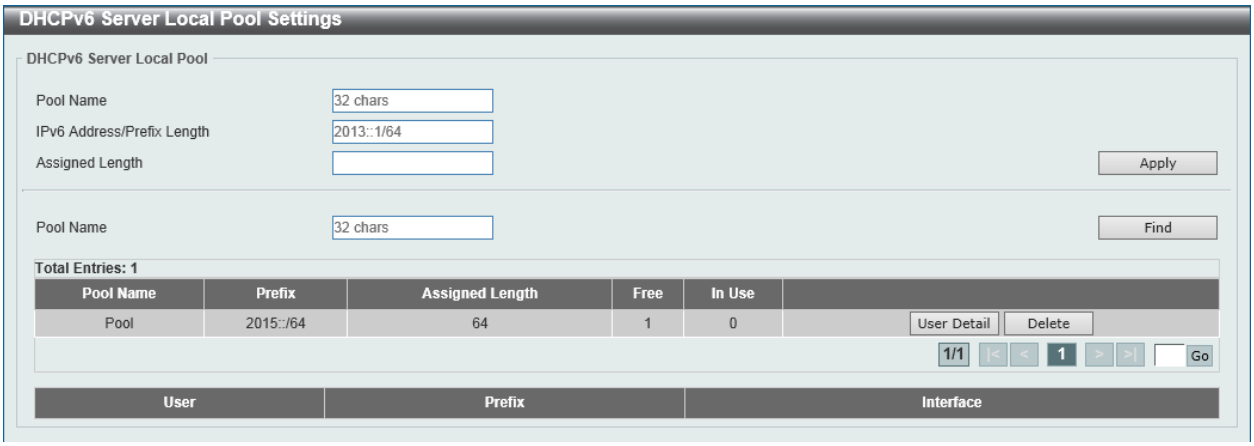



**Figure 4-38 DHCPv6 Server Local Pool Settings Window**

The fields that can be configured in **DHCPv6 Server Local Pool** are described below:

| Parameter | Description |
|---|---|
| **Pool Name** | Enter the DHCPv6 server's pool name here. This name can be up to 32 characters long. |
| **IPv6 Address / Prefix Length** | Enter the IPv6 prefix address and prefix length of the local pool here. |
| **Assigned Length** | Enter the prefix length to be delegated to the user from the pool here. The value of the assigned length cannot be less than the value of the prefix length. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **User Detail** button to view the user information displayed in the lower table.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## DHCPv6 Server Exclude Address

This window is used to specify IPv6 addresses that a DHCPv6 server should not assign to DHCPv6 clients. The DHCPv6 server assumes that all addresses (excluding the switch's IPv6 address) can be

assigned to clients. Use this window to exclude a single IPv6 address or a range of IPv6 addresses. The excluded addresses are only applied to the pool(s) for address assignment.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Exclude Address**, as shown below:


**Figure 4-39 DHCPv6 Server Exclude Address Window**

The fields that can be configured in **DHCPv6 Server Exclude Address** are described below:

| Parameter | Description |
|---|---|
| **Low IPv6 Address** | Enter the excluded IPv6 address or first IPv6 address in an excluded address range here. |
| **High IPv6 Address** | Optionally, enter the last IPv6 address in the excluded address range. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

## DHCPv6 Server Binding

This window is used to view and clear the DHCPv6 server's binding entries.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Binding**, as shown below:


**Figure 4-40 DHCPv6 Server Binding Window**

The fields that can be configured in **DHCPv6 Server Binding** are described below:

| Parameter | Description |
|---|---|
| **IPv6 Address** | Enter the binding entry's IPv6 address to be displayed or cleared here. Select the **All** option to display or clear all DHCPv6 client prefix bindings in or from the binding table. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

## DHCPv6 Server Interface Settings

This window is used to view and configure the DHCPv6 server's interface settings.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Interface Settings**, as shown below:

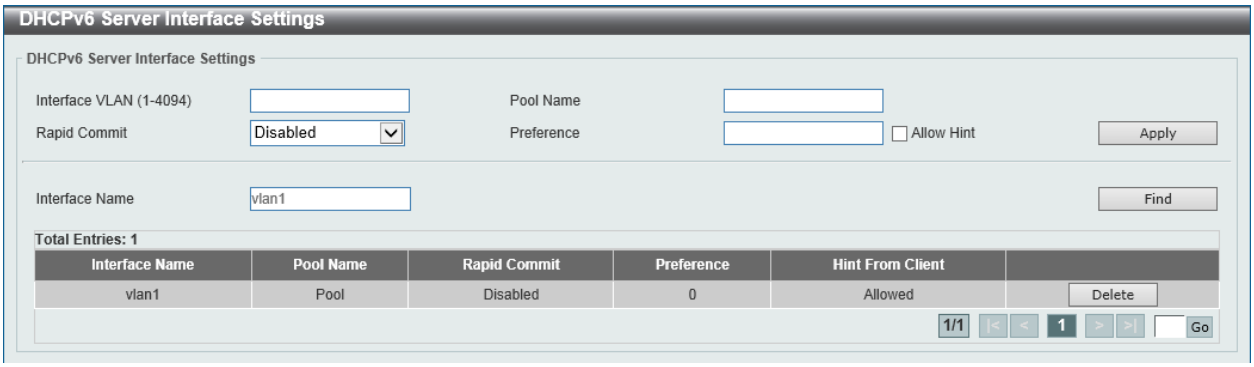



**Figure 4-41 DHCPv6 Server Interface Settings Window**

The fields that can be configured in **DHCPv6 Server Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the interface's VLAN ID here. The range is from 1 to 4094. |
| **Pool Name** | Enter the DHCPv6 server's pool name here. This name can be up to 32 characters long. |
| **Rapid Commit** | Select to allow the proceeding of two-message exchanges or not by enabling or disabling this option. By default, two-message exchange is not allowed. |
| **Preference** | Enter the preference value here. Select the **Allow Hint** option to allow hints. |
| **Interface Name** | Enter the interface's name here. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

## DHCPv6 Server Operational Information

This window is used to display the DHCPv6 server's operational information.

To view the following window, click **Management > DHCP > DHCPv6 Server > DHCPv6 Server Operational Information**, as shown below:

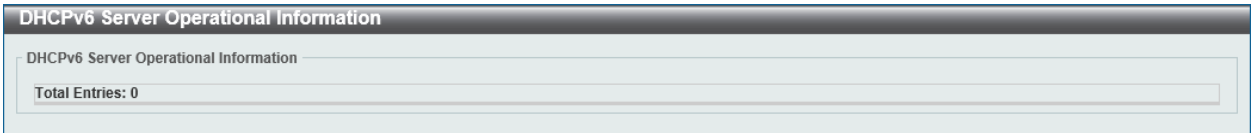



**Figure 4-42 DHCPv6 Server Operational Information Window**

# DHCP Relay

## DHCP Relay Pool Settings

This window is used to view and configure the DHCP relay pool on a DHCP relay agent.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Relay Pool Settings**, as shown below:

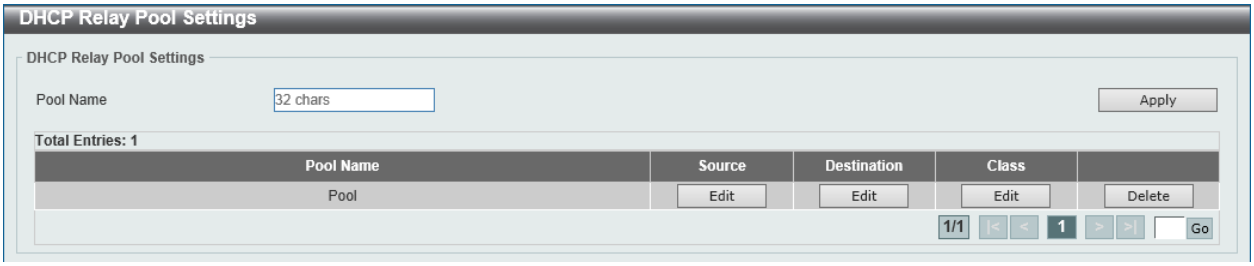



**Figure 4-43 DHCP Relay Pool Settings Window**

The fields that can be configured in **DHCP Relay Pool Settings** are described below:

| Parameter | Description |
|---|---|
| **Pool Name** | Enter the address pool name with a maximum of 32 characters. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the corresponding information of the specific DHCP pool.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button under **Source**, the following window will appear.

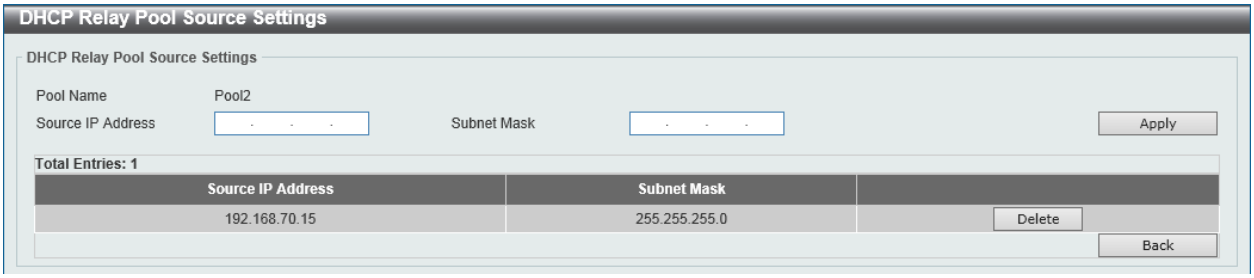



**Figure 4-44 DHCP Relay Pool Settings (Source Edit) Window**

The fields that can be configured in **DHCP Relay Pool Source Settings** are described below:

| Parameter | Description |
|---|---|
| **Source IP Address** | Enter the source subnet of client packets. |
| **Subnet Mask** | Enter the network mask of the source subnet. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Back** button to return to the previous window.

After clicking the **Edit** button under **Destination**, the following window will appear.

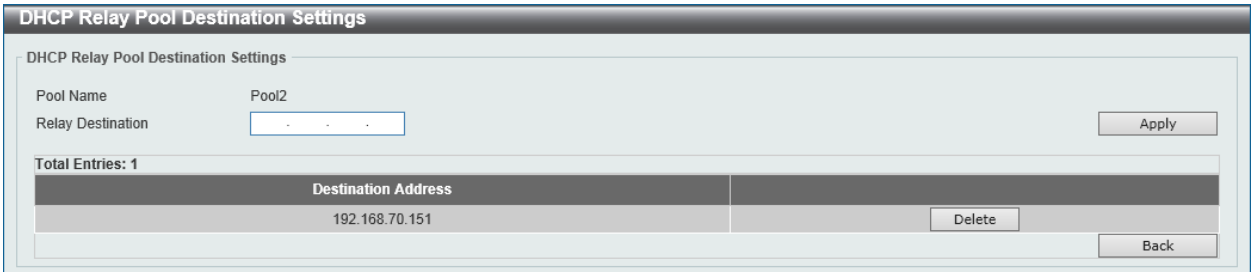



**Figure 4-45 DHCP Relay Pool Settings (Destination Edit) Window**

The fields that can be configured in **DHCP Relay Pool Destination Settings** are described below:

| Parameter | Description |
|---|---|
| **Relay Destination** | Enter the relay destination DHCP server IP address. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Back** button to return to the previous window.

After clicking the **Edit** button under **Class**, the following window will appear.

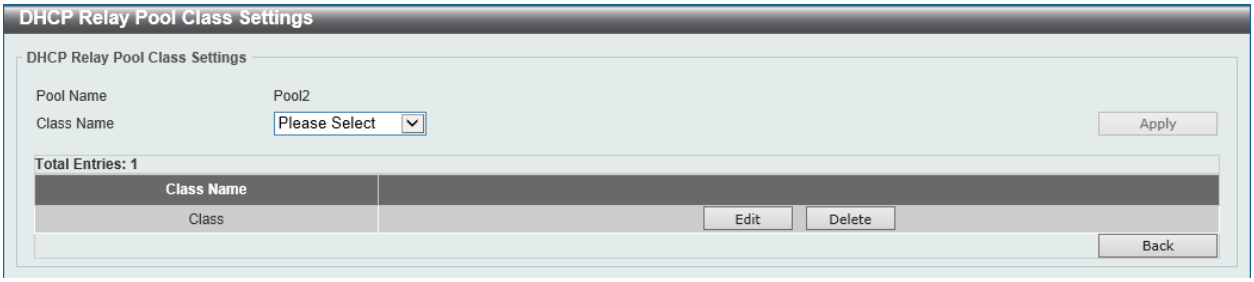



**Figure 4-46 DHCP Relay Pool Settings (Class Edit) Window**

The fields that can be configured in **DHCP Relay Pool Class Settings** are described below:

| Parameter | Description |
|---|---|
| **Class Name** | Select the DHCP class name. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to edit more information.

Click the **Delete** button to remove the specified entry.

Click the **Back** button to return to the previous window.

After clicking the **Edit** button, the following window will appear.


**Figure 4-47 DHCP Relay Pool Settings (Class Edit, Edit) Window**

The fields that can be configured in **DHCP Relay Pool Class Edit Settings** are described below:

| Parameter | Description |
|---|---|
| **Relay Target** | Enter the DHCP relay target for relaying packets that matches the value pattern of the option defined in the DHCP class. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Back** button to return to the previous window.

## DHCP Relay Information Settings

This window is used to view and configure the DHCP relay information.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Relay Information Settings**, as shown below:

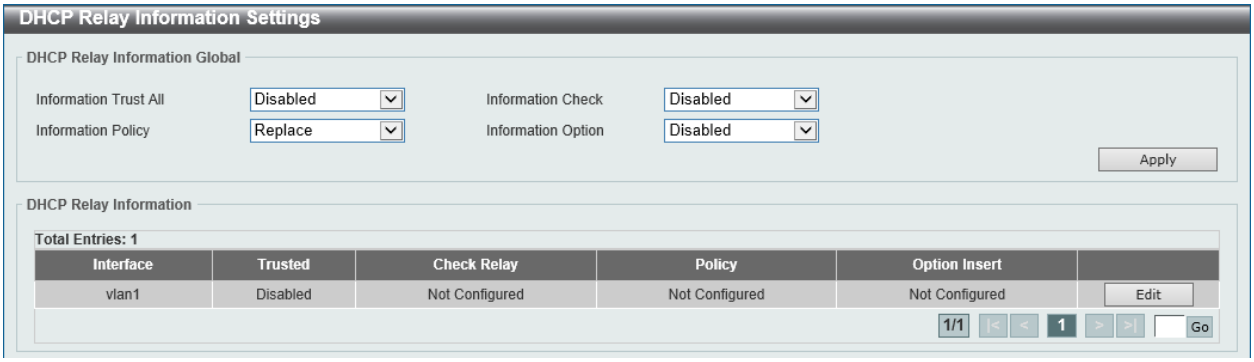



**Figure 4-48 DHCP Relay Information Settings Window**

The fields that can be configured in **DHCP Relay Information Global** are described below:

| Parameter | Description |
|---|---|
| **Information Trust All** | Select this option to enable or disable the DHCP relay agent to trust the IP DHCP relay information for all interfaces. |
| **information Check** | Select this option to enable or disable the DHCP relay agent to validate and remove the relay agent information option in the received DHCP reply packet. |
| **Information Policy** | Select the Option 82 re-forwarding policy for the DHCP relay agent. Options to choose from are **Keep**, **Drop**, and **Replace**.<br>• **Keep** - Select to discard the packet that already has the relay option.<br>• **Drop** - Select that the DHCP request packet that already has the |

| Parameter | Description |
|---|---|
| | relay option is left unchanged and directly relayed to the DHCP server.<br>• **Replace** - Select that the DHCP request packet that already has the relay option will be replaced by a new option. |
| **Information Option** | Select this option to enable or disable the insertion of relay agent information (Option 82) during the relay of DHCP request packets. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the corresponding interface.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## DHCP Relay Information Option Format Settings

This window is used to view and configure the DHCP information format.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Relay Information Option Format Settings**, as shown below:

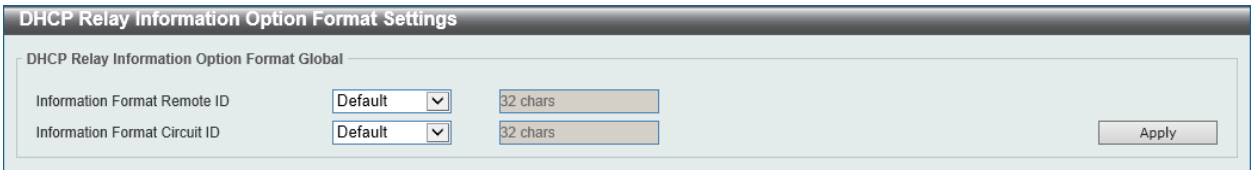



**Figure 4-49 DHCP Relay Information Option Format Settings Window**

The fields that can be configured in **DHCP Relay Information Option Format Global** are described below:

| Parameter | Description |
|---|---|
| **Information Format Remote ID** | Select the DHCP information remote ID sub-option. Options to choose from are **Default**, **User Define**, and **Vendor2**.<br>• **Default** - Select to use the Switch's system MAC address as the remote ID.<br>• **User Define** - Select to use a user-defined remote ID. Enter the user-defined string with the maximum of 32 characters in the text box.<br>• **Vendor2** - Select to use vender 2 as the remote ID. |
| **Information Format Circuit ID** | Select the DHCP information circuit ID sub-option. Options to choose from are **Default**, **User Define**, and **Vendor1**.<br>• **Default** - Select to use the default circuit ID sub-option.<br>• **User Define** - Select to use a user-defined circuit ID. Enter the user-defined string with the maximum of 32 characters in the text box.<br>• **Vendor1** - Select to use vender 1 as the circuit ID. |

Click the **Apply** button to accept the changes made.

## DHCP Local Relay VLAN

This window is used to view and configure local relay on a VLAN or a group of VLANs.

To view the following window, click **Management > DHCP > DHCP Relay > DHCP Local Relay VLAN**, as shown below:

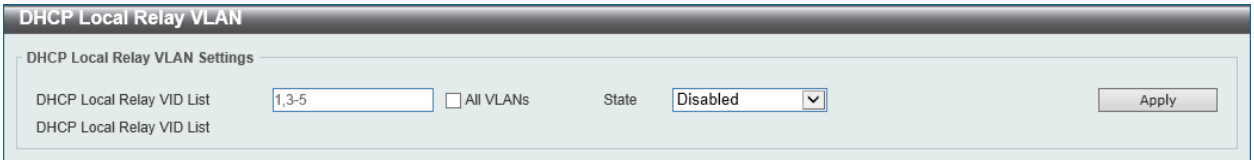



**Figure 4-50 DHCP Local Relay VLAN Window**

The fields that can be configured in **DHCP Local Relay VLAN Settings** are described below:

| Parameter | Description |
|---|---|
| **DHCP Local Relay VID List** | Enter the VLAN ID for DHCP local relay. Tick the **All VLANs** check box to select all VLANs. |
| **State** | Select this option to enable or disable the DHCP local relay on the specific VLAN(s). |

Click the **Apply** button to accept the changes made.

# DHCPv6 Relay

## DHCPv6 Relay Global Settings

This window is used to view and configure the DHCPv6 relay remote ID settings.

To view the following window, click **Management > DHCP > DHCPv6 Relay > DHCPv6 Relay Global Settings**, as shown below:

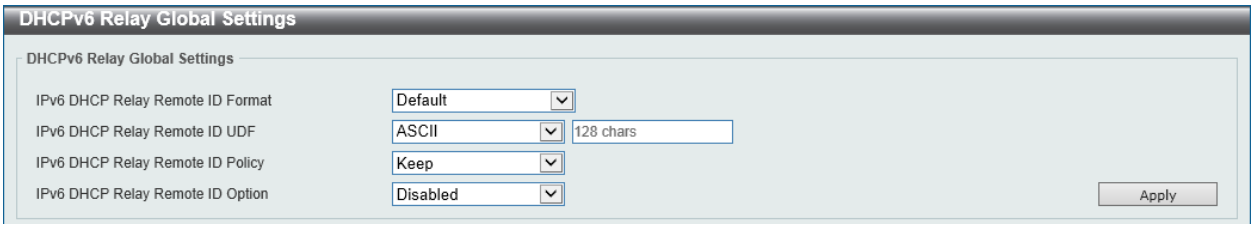



**Figure 4-51 DHCPv6 Relay Global Settings Window**

The fields that can be configured in **DHCPv6 Relay Global Settings** are described below:

| Parameter | Description |
|---|---|
| **IPv6 DHCP Relay Remote ID Format** | Select to choose the sub-type of the remote ID. Options to choose from are **Default**, **CID with User Define**, and **User Define**. |
| **IPv6 DHCP Relay Remote ID UDF** | Select to choose the User Define Field (UDF) for remote ID. Options to choose from are **ASCII**, and **Hex**.<br>• **ASCII** - Select to enter the ASCII string with a maximum of 128 characters in the text box.<br>• **HEX** - Select to enter the hexadecimal string with a maximum of 256 characters in the text box. |
| **IPv6 DHCP Relay Remote ID Policy** | Select to choose Option 37 forwarding policy for the DHCPv6 relay agent. Options to choose from are **Keep**, and **Drop**.<br>• **Keep** - Select to discard the packet that already has the relay agent Remote-ID Option 37.<br>• **Drop** - Select that the DHCPv6 request packet that already has the relay agent Remote-ID option is left unchanged and directly relayed to the DHCPv6 server. |
| **IPv6 DHCP Relay Remote ID** | Select this option to enable or disable the insertion of the relay agent |

| Parameter | Description |
|---|---|
| **Option** | remote ID Option 37 during the relay of DHCP for IPv6 request packets. |

Click the **Apply** button to accept the changes made.

## DHCPv6 Relay Interface Settings

This window is used to view and configure the DHCPv6 relay interface settings.

To view the following window, click **Management > DHCP > DHCPv6 Relay > DHCPv6 Relay Interface Settings**, as shown below:


**Figure 4-52 DHCPv6 Relay Interface Settings Window**

The fields that can be configured in **DHCPv6 Relay Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the interface's VLAN ID used in the DHCPv6 relay here. The range is from 1 to 4094. |
| **Destination IPv6 Address** | Enter the DHCPv6 relay destination address. |
| **Output Interface VLAN** | Enter the output interface's VLAN ID for the relay destination here. The range is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# DHCP Auto Configuration

This window is used to view and configure the DHCP auto-configuration function.

To view the following window, click **Management > DHCP Auto Configuration**, as shown below:

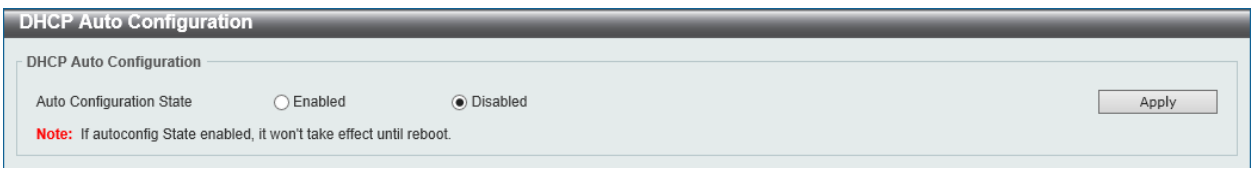



**Figure 4-53 DHCP Auto Configuration Window**

The fields that can be configured in **DHCP Auto Configuration** are described below:

| Parameter | Description |
|---|---|
| **Auto Configuration State** | Select this option to enable or disable the auto-configuration function. |

Click the **Apply** button to accept the changes made.

# DNS

Computer users usually prefer to use text names for computers for which they may want to open a connection. Computers themselves, require 32 bit IP addresses. Somewhere, a database of network devices' text names and their corresponding IP addresses must be maintained.

The Domain Name System (DNS) is used to map names to IP addresses throughout the Internet and has been adapted for use within intranets. For two DNS servers to communicate across different subnets, the DNS Relay of the Switch must be used. The DNS servers are identified by IP addresses.

**Mapping Domain Names to Addresses**

Name-to-address translation is performed by a program called a Name server. The client program is called a Name resolver. A Name resolver may need to contact several Name servers to translate a name to an address.

The Domain Name System (DNS) servers are organized in a somewhat hierarchical fashion. A single server often holds names for a single network, which is connected to a root DNS server - usually maintained by an ISP.

**Domain Name Resolution**

The domain name system can be used by contacting the name servers one at a time, or by asking the domain name system to do the complete name translation. The client makes a query containing the name, the type of answer required, and a code specifying whether the domain name system should do the entire name translation, or simply return the address of the next DNS server if the server receiving the query cannot resolve the name.

When a DNS server receives a query, it checks to see if the name is in its sub domain. If it is, the server translates the name and appends the answer to the query, and sends it back to the client. If the DNS server cannot translate the name, it determines what type of name resolution the client requested. A complete translation is called recursive resolution and requires the server to contact other DNS servers until the name is resolved. Iterative resolution specifies that if the DNS server cannot supply an answer, it returns the address of the next DNS server the client should contact.

Each client must be able to contact at least one DNS server, and each DNS server must be able to contact at least one root server.

The address of the machine that supplies domain name service is often supplied by a DHCP or BOOTP server, or can be entered manually and configured into the operating system at startup.

## DNS Global Settings

This window is used to view and configure the DNS global settings.

To view the following window, click **Management > DNS > DNS Global Settings**, as shown below:

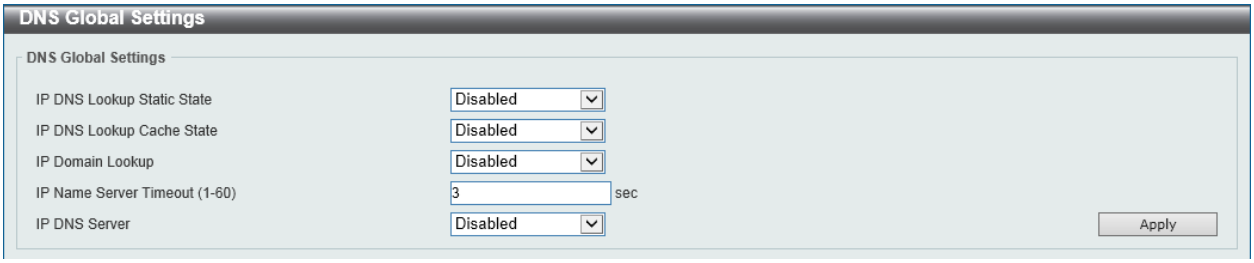



**Figure 4-54 DNS Global Settings Window**

The fields that can be configured in **DNS Global Settings** are described below:

| Parameter | Description |
|---|---|
| **IP DNS Lookup Static State** | Select to enable or disable the IP DNS lookup static state here. |
| **IP DNS Lookup Cache State** | Select to enable or disable the IP DNS lookup cache state here. |
| **IP Domain Lookup** | Select to enable or disable the IP domain lookup state here. |
| **IP Name Server Timeout** | Enter the maximum time to wait for a response from a specified name server. This value is between 1 and 60 seconds. |
| **IP DNS Server** | Select the globally enable or disable the DNS server feature here. |

Click the **Apply** button to accept the changes made.

# DNS Name Server Settings

This window is used to view and configure the IP address of a domain name server.

To view the following window, click **Management > DNS > DNS Name Server Settings**, as shown below:

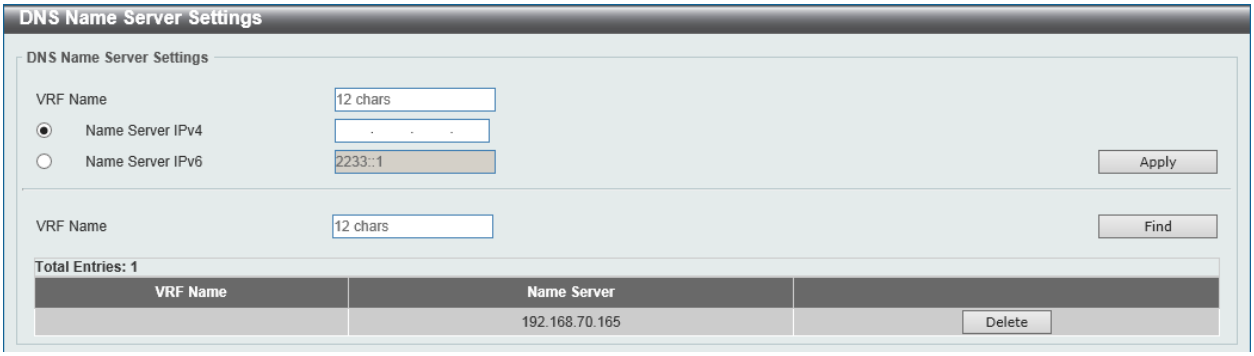



**Figure 4-55 DNS Name Server Settings Window**

The fields that can be configured in **DNS Name Server Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration or search here. This name can be up to 12 characters long. |
| **Name Server IPv4** | Select and enter the IPv4 address of the DNS server. |
| **Name Server IPv6** | Select and enter the IPv6 address of the DNS server. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

# DNS Host Settings

This window is used to view and configure the static mapping entry for the host name and the IP address in the host table.

To view the following window, click **Management > DNS > DNS Host Settings**, as shown below:

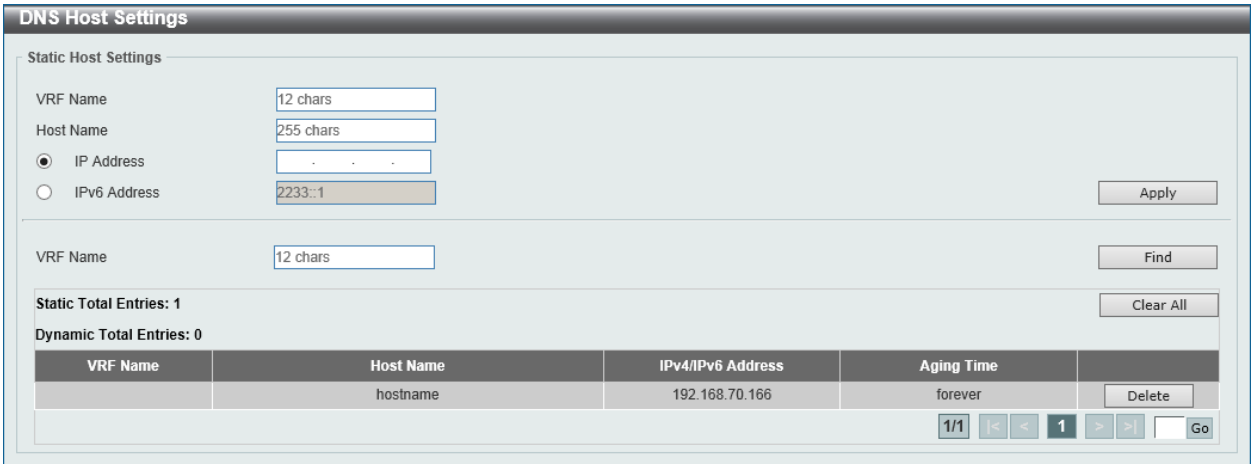



**Figure 4-56 DNS Host Settings Window**

The fields that can be configured in **Static Host Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration or search here. This name can be up to 12 characters long. |
| **Host Name** | Enter the host name of the equipment. |
| **IP Address** | Select and enter the IPv4 address of the equipment. |
| **IPv6 Address** | Select and enter the IPv6 address of the equipment. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear All** button to clear the information entered in all the fields on this page.

Click the **Delete** button to remove the specified entry.

# IP Source Interface

This window is used to view and configure the IP source interface settings.

To view the following window, click **Management > IP Source Interface**, as shown below:

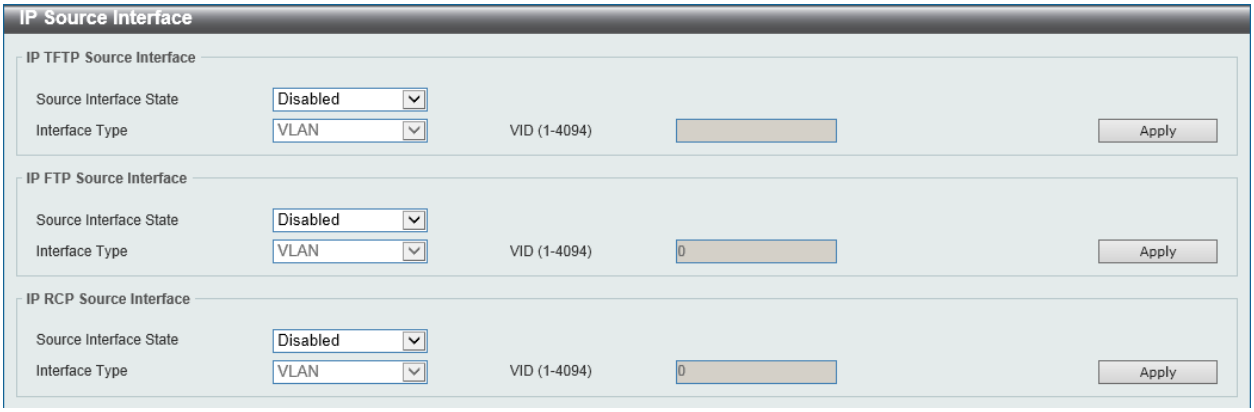



**Figure 4-57 IP Source Interface Window**

The fields that can be configured in **IP TFTP Source Interface** are described below:

| Parameter | Description |
|---|---|
| **Source Interface State** | Select to enable or disable the IP TFTP source interface's state here. |
| **Interface Type** | After enabling the **Source Interface State** option, select the interface type here. Options to choose from are **Loopback**, **Mgmt**, and **VLAN**. |
| **VID** | Enter the interface's ID here. For loopback interfaces this value is from 1 to 8. For the management interface (Mgmt) this value can only be 0. For VLAN interfaces this value is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP FTP Source Interface** are described below:

| Parameter | Description |
|---|---|
| **Source Interface State** | Select to enable or disable the IP FTP source interface's state here. |
| **Interface Type** | After enabling the **Source Interface State** option, select the interface type here. Options to choose from are **Loopback**, **Mgmt**, and **VLAN**. |
| **VID** | Enter the interface's ID here. For loopback interfaces this value is from 1 to 8. For the management interface (Mgmt) this value can only be 0. For VLAN interfaces this value is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP RCP Source Interface** are described below:

| Parameter | Description |
|---|---|
| **Source Interface State** | Select to enable or disable the IP RCP source interface's state here. |
| **Interface Type** | After enabling the **Source Interface State** option, select the interface type here. Options to choose from are **Loopback**, **Mgmt**, and **VLAN**. |
| **VID** | Enter the interface's ID here. For loopback interfaces this value is from 1 to 8. For the management interface (Mgmt) this value can only be 0. For VLAN interfaces this value is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

# File System

This window is used to view, manage and configure the switch's file system.

To view the following window, click **Management > File System**, as shown below:

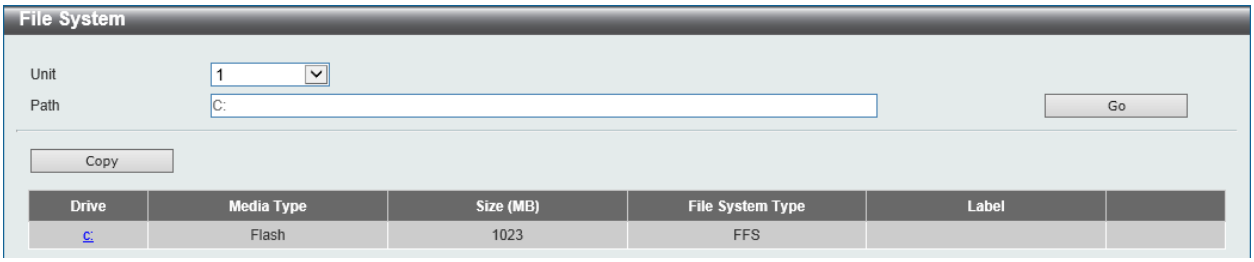



**Figure 4-58 File System Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Path** | Enter the path string |

Click the **Go** button to navigate to the path entered.

Click the **c:** hyperlink to navigate the C: drive

After clicking the **c:** hyperlink, the following window will appear:

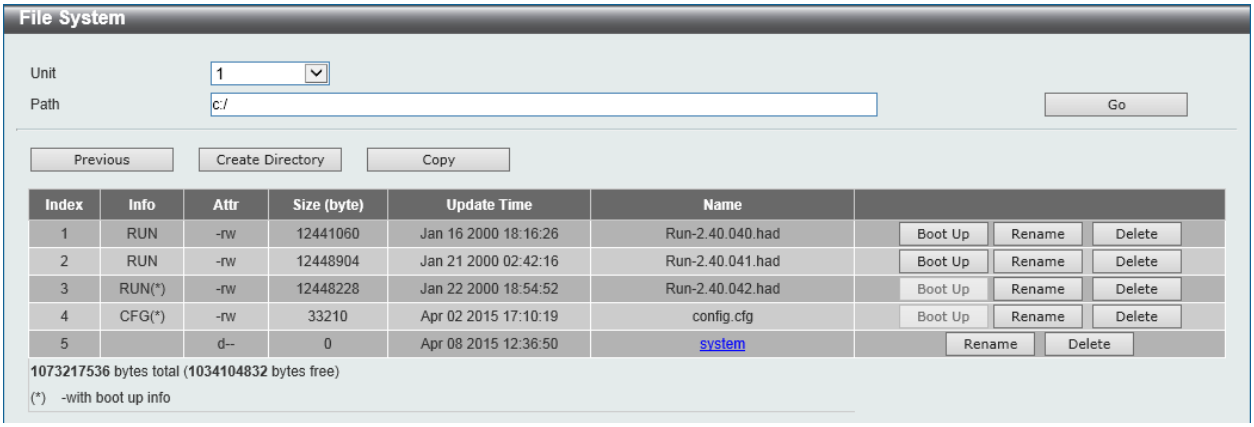



**Figure 4-59 File System (Drive) Window**

Click the **Previous** button to return to the previous window.

Click the **Create Directory** to create a new directory within the file system of the Switch.

Click the **Copy** button to copy a specific file to the Switch.

Click the **Boot Up** button to set a specific runtime image as the boot up image.

Click the **Rename** button to rename a specific file's name.

Click the **Delete** button to remove a specific file from the file system.

**NOTE:** If the boot configuration file is damaged, the Switch will automatically revert back to the default configuration.

**NOTE:** If the boot image file is damaged, the Switch will automatically use the backup image file in the next boot up.

Click the **Copy** button to see the following window.

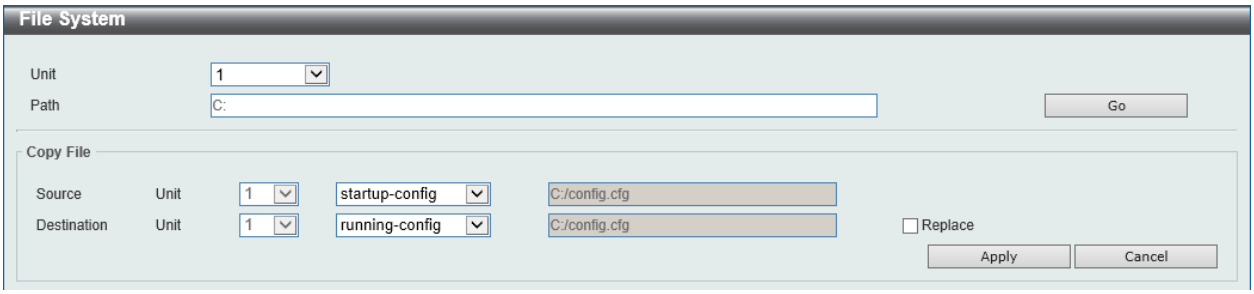



**Figure 4-60 File System (Copy) Window**

The fields that can be configured in **Copy File** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select the source file's switch **Unit** ID. Select the type of source file that will be copied next. Options to choose from are **startup-config** and **Source File**. Only after selecting the **Source File** option can the source file's path and filename be entered in the space provided. |
| **Destination** | Select the destination file's switch **Unit** ID. Select the type of destination file that will be copied next. Options to choose from are **startup-config**, **running-config**, and **Destination File**. Only after selecting the **Destination File** option can the destination file's path and filename be entered in the space provided. Tick the **Replace** check box to replace the current running configuration with the indicated configuration file. |

Click the **Apply** button to initiate the copy.

Click the **Cancel** button the discard the process.

# Physical Stacking

The switch supports stacking 4 switches together while being managed by one IP address through Telnet, the Web User Interface, the RJ45 console port or through SNMP. This cost effective switch provides an affordable solution for administrators to upgrade their networks using either the **DXS-3600-EM-Stack** or the **DXS-3600-EM-4QXS** modules to scale and stack the switches. This increases overall reliability, serviceability, and availability.

- **Duplex Chain** - The duplex chain topology stacks switches together in a chain-link format. Using this method, data transfer is only possible in one direction and if there is a break in the chain, then data transfer will obviously be affected.

- **Duplex Ring** - The duplex ring stacks switches in a ring or circle format where data can be transferred in two directions. This topology is very resilient due to the fact that if there is a break in the ring, data can still be transferred through the stacking cables between switches in the stack.

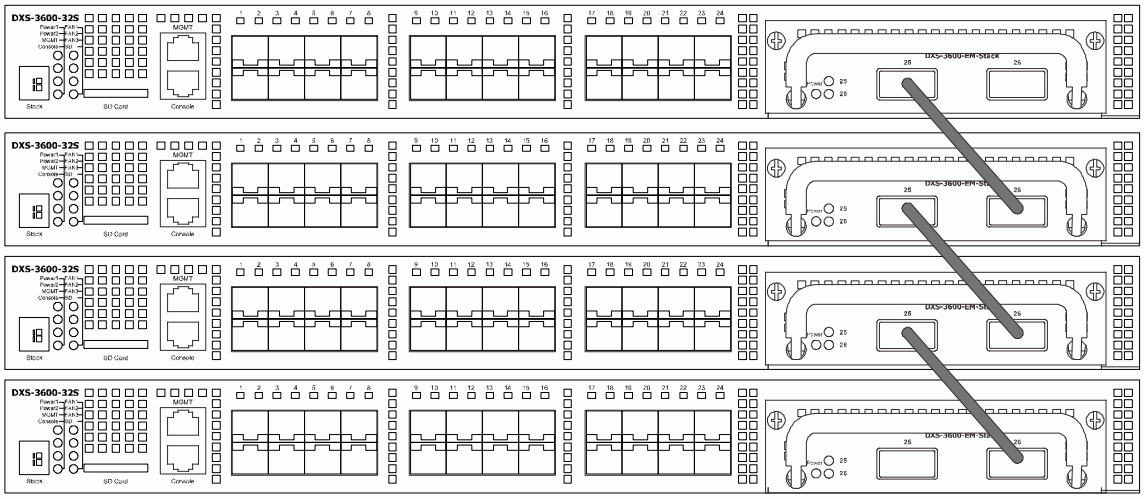


**Figure 4-61 Switches stacked in a Duplex Chain**

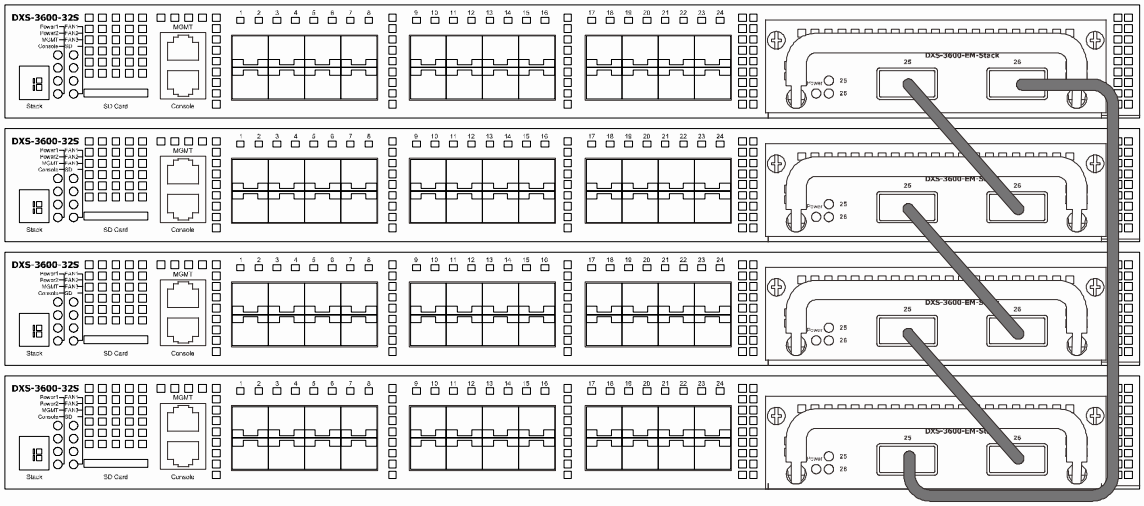


**Figure 4-62 Switches stacked in a Duplex Ring**

Within each of these topologies, each switch plays a role in the Switch stack. These roles can be set by the user per individual Switch, or if desired, can be automatically determined by the Switch stack. Three possible roles exist when stacking with the Switch.

**Primary Master** - The Primary Master is the leader of the stack. It will maintain normal operations, monitor operations and the running topology of the Stack. This switch will also assign Stack Unit IDs, synchronize configurations and transmit commands to remaining switches in the switch stack. The Primary Master can be manually set by assigning this Switch the highest priority (a lower number denotes a higher priority) before physically assembling the stack, or it can be determined automatically by the stack through an election process which determines the lowest MAC address and then will assign that switch as the Primary Master, if all priorities are the same. The Primary master are physically displayed by the seven segment LED to the far right on the front panel of the switch where this LED will flash between its given Box ID and 'H'.

**Backup Master** - The Backup Master is the backup to the Primary Master, and will take over the functions of the Primary Master if the Primary Master fails or is removed from the Stack. It also monitors the status of neighboring switches in the stack, will perform commands assigned to it by the Primary Master and will monitor the running status of the Primary Master. The Backup Master can be set by the user by assigning this Switch the second highest priority before physically assembling the stack, or it can be determined automatically by the stack through an election process which determines the second lowest MAC address and then will assign that switch as the Backup Master, if all priorities are the same. The Backup master are physically displayed by the seven segment LED to the far right on the front panel of the switch where this LED will flash between its given Box ID and 'h'.

**Slave** - Slave switches constitute the rest of the switch stack and although not Primary or Backup Masters, they can be placed into these roles when these other two roles fail or are removed from the stack. Slave switches perform operations requested by the master, monitor the status of neighbor switches in the stack and the stack topology and adhere to the Backup Master's commands once it becomes a Primary Master. Slave switches will do a self-check to determine if it is to become the Backup Master if the Backup Master is promoted to the Primary Master, or if the Backup Master fails or is removed from the switch stack. If both Primary and Backup masters fail, or are removed from the Switch stack, it will determine if it is to become the Primary Master. These roles will be determined, first by priority and if the priority is the same, the lowest MAC address.

Once switches have been assembled in the topology desired by the user and powered on, the stack will undergo three processes until it reaches a functioning state.

- **Initialization State** - This is the first state of the stack, where the runtime codes are set and initialized and the system conducts a peripheral diagnosis to determine each individual switch is functioning properly.
- **Master Election State** - Once the codes are loaded and initialized, the stack will undergo the Master Election State where it will discover the type of topology used, elect a Primary Master and then a Backup Master.
- **Synchronization State** - Once the Primary Master and the Backup Master have been established, the Primary Master will assign Stacking Unit IDs to switches in the stack, synchronize configurations for all switches and then transmit commands to the rest of the switches based on the users configurations of the Primary Master.

Once these steps have been completed, the switch stack will enter a normal operating mode.

**Stack Switch Swapping**

The stacking feature of the Switch supports "hot swapping" of switches in and out of the running stack. Users may remove or add switches to the stack without powering down or largely affecting the transfer of data between switches in the stack, with a few minor provisions.

When switches are "hot inserted" into the running stack, the new switch may take on the Primary Master, Backup Master or Slave role, depending on configurations set on the newly added switch, such as configured priority or MAC address. Yet, if adding two stacks together that have both previously undergone the election process, and therefore both have a Primary Master and a Backup master, a new Primary Master will be elected from one of the already existing Primary Masters, based on priority or MAC address. This Primary Master will take over all of the Primary Master's roles for all new switches that were hot inserted. This process is done using discovery packets that circulate through the switch stack every 1.5 seconds until the discovery process has been completed.

The "hot remove" action means removing a device from the stack while the stack is still running. The hot removal is detected by the stack when it fails to receive heartbeat packets during its specified interval from a device, or when one of the stacking ports links is down. Once the device has been removed, the remaining switches will update their stacking topology database to reflect the change. Any one of the three roles, Primary Master, Backup Master or Slave, may be removed from the stack, yet different processes occur for each specific device removal.

If a Slave device has been removed, the Primary Master will inform other switches of the hot remove of this device through the use of unit leave messages. Switches in the stack will clear the configurations of the unit removed, and dynamically learned databases, such as ARP, will be cleared as well.

If the Backup Master has been hot removed, a new Backup Master will be chosen through the election process previously described. Switches in the stack will clear the configurations of the unit removed, and dynamically learned databases, such as ARP, will be cleared as well. Then the Backup Master will begin backing up the Primary Master when the database synchronization has been completed by the stack.

If the Primary Master is removed, the Backup Master will assume the Primary Master's role and a new Backup Master will be chosen using the election process. Switches in the stack will clear the configurations of the unit removed, and dynamically learned databases, such as ARP, will be cleared as well. The new Primary Master will inherit the MAC and IP address of the previous Primary Master to avoid conflict within the stack and the network itself.

If both the Primary Master and the Backup Master are removed, the election process is immediately processed, and a new Primary Master and Backup Master are determined. Switches in the stack will clear the configurations of the units removed, and dynamically learned databases, such as ARP, will be cleared as well. Static switch configurations still remain in the database of the remaining switches in the stack and those functions will not be affected.

**NOTE:** If there is a Box ID conflict when the stack is in the discovery phase, the device will enter a special standalone topology mode. Users can only get device information, configure Box IDs, save and reboot. All stacking ports will be disabled and an error message will be produced on the local console port of each device in the stack. Users must reconfigure Box IDs and reboot the stack.

To view the following window, click **Management > Physical Stacking**, as shown below:

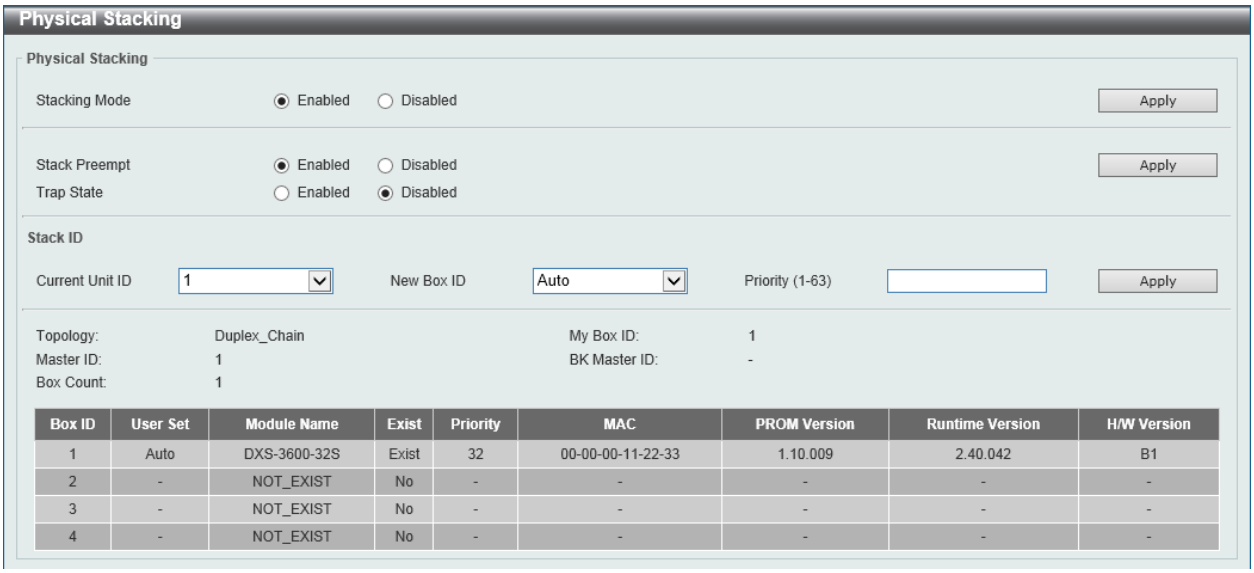



**Figure 4-63 Physical Stacking Window**

The fields that can be configured in **Physical Stacking** are described below:

| Parameter | Description |
|---|---|
| **Stacking Mode** | Select this option to enable or disable the stacking mode. |
| **Stack Preempt** | Select this option to enable or disable preemption of the master role to come into play when a unit with a better priority is added to the Switch later. |
| **Trap State** | Select this option to enable or disable sending of stacking related traps. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Stack ID** are described below:

| Parameter | Description |
|---|---|
| **Current Unit ID** | Select the unit ID of the switch in the stack. |
| **New Box ID** | Select the new box ID for the switch that is selected in the **Current Unit ID**. The user may choose any number between 1 and 4 to identify the switch in the switch stack. **Auto** will automatically assign a box number to the switch in the switch stack. |
| **Priority** | Enter the priority of the switch stacking unit. The range is from 1 to 63. |

Click the **Apply** button to accept the changes made.

# Virtual Stacking (SIM)

D-Link Single IP Management (SIM) is a concept that will stack switches together over Ethernet instead of using stacking ports or modules. There are some advantages in implementing the Single IP Management feature:

- SIM can simplify management of small workgroups or wiring closets while scaling the network to handle increased bandwidth demand.
- SIM can reduce the number of IP address needed in your network.
- SIM can eliminate any specialized cables for stacking connectivity and remove the distance barriers that typically limit your topology options when using other stacking technology.

Switches using D-Link Single IP Management (labeled here as SIM) must conform to the following rules:

- SIM is an optional feature on the Switch and can easily be enabled or disabled through the Command Line Interface or Web Interface. SIM grouping has no effect on the normal operation of the Switch in the user's network.
- There are three classifications for switches using SIM. The **Commander Switch (CS)**, which is the master switch of the group, **Member Switch (MS)**, which is a switch that is recognized by the CS a member of a SIM group, and a **Candidate Switch (CaS)**, which is a Switch that has a physical link to the SIM group but has not been recognized by the CS as a member of the SIM group.
- A SIM group can only have one Commander Switch (CS).
- A SIM group accepts up to 32 switches (numbered 1-32), not including the Commander Switch (numbered 0).
- Members of a SIM group cannot cross a router.
- There is no limit to the number of SIM groups in the same IP subnet (broadcast domain); however a single switch can only belong to one group.
- If multiple VLANs are configured, the SIM group will only utilize the management VLAN on any switch.
- SIM allows intermediate devices that do not support SIM. This enables the user to manage switches that are more than one hop away from the CS.

The SIM group is a group of switches that are managed as a single entity. The Switch may take on three different roles:

1. **Commander Switch (CS)** - This is a switch that has been manually configured as the controlling device for a group, and takes on the following characteristics:
   - It has an IP Address.
   - It is not a command switch or member switch of another Single IP group.
   - It is connected to the member switches through its management VLAN.
2. **Member Switch (MS)** - This is a switch that has joined a single IP group and is accessible from the CS, and it takes on the following characteristics:
   - It is not a CS or MS of another IP group.

   - It is connected to the CS through the CS management VLAN.
3. **Candidate Switch (CaS)** - This is a switch that is ready to join a SIM group but is not yet a member of the SIM group. The Candidate Switch may join the SIM group of the Switch by manually configuring it to be a MS of a SIM group. A switch configured as a CaS is not a member of a SIM group and will take on the following characteristics:
   - It is not a CS or MS of another Single IP group.
   - It is connected to the CS through the CS management VLAN

The following rules also apply to the above roles:

- Each device begins in a Candidate state.
- A CS must change its role to CaS and then to MS, to become a MS of a SIM group. Thus, the CS cannot directly be converted to a MS.
- The user can manually configure a CS to become a CaS.
- A MS can become a CaS by:
  - Being configured as a CaS through the CS.
  - If report packets from the CS to the MS time out.
- The user can manually configure a CaS to become a CS
- The CaS can be configured through the CS to become a MS.

After configuring one switch to operate as the CS of a SIM group, additional DXS-3600 Series switches may join the group by manually configuring the Switch to be a MS. The CS will then serve as the in band entry point for access to the MS. The CS's IP address will become the path to all MS's of the group and the CS's Administrator's password, and/or authentication will control access to all MS's of the SIM group.

With SIM enabled, the applications in the CS will redirect the packet instead of executing the packets. The applications will decode the packet from the administrator, modify some data, and then send it to the MS. After execution, the CS may receive a response packet from the MS, which it will encode and send it back to the administrator.

When a CaS becomes a MS, it automatically becomes a member of the first SNMP community (includes read/write and read only) to which the CS belongs. However, if a MS has its own IP address, it can belong to SNMP communities to which other switches in the group, including the CS, do not belong.

**Upgrade to v1.61**

To better improve SIM management, the DXS-3600 Series switches have been upgraded to version 1.61 in this release. Many improvements have been made, including the Commander Switch (CS) now has the capability to automatically rediscover member switches that have left the SIM group, either through a reboot or web malfunction. This feature is accomplished through the use of Discover packets and Maintenance packets that previously set SIM members will emit after a reboot. Once a MS has had its MAC address and password saved to the CS's database, if a reboot occurs in the MS, the CS will keep this MS information in its database and when a MS has been rediscovered, it will add the MS back into the SIM tree automatically. No configuration will be necessary to rediscover these switches.

There are some instances where pre-saved MS switches cannot be rediscovered. For example, if the Switch is still powered down, if it has become the member of another group, or if it has been configured to be a Commander Switch, the rediscovery process cannot occur.

The topology map now includes new features for connections that are a member of a port trunking group. It will display the speed and number of Ethernet connections creating this port trunk group, as shown in the adjacent picture.

This version will support switch upload and downloads for firmware, configuration files and log files, as follows:

- **Firmware** - The switch now supports MS firmware downloads from a TFTP server.
- **Configuration Files** - This switch now supports downloading and uploading of configuration files both to (for configuration restoration) and from (for configuration backup) MS's, using a TFTP server.
- **Log** - The Switch now supports uploading MS log files to a TFTP server.

The user may zoom in and zoom out when utilizing the topology window to get a better, more defined view of the configurations.

# Single IP Settings

This window is used to view and configure the SIM settings. The switch is set as a Candidate (CaS) as the factory default configuration and Single IP Management is disabled.

To view the following window, click **Management > Virtual Stacking (SIM) > Single IP Settings**, as shown below:

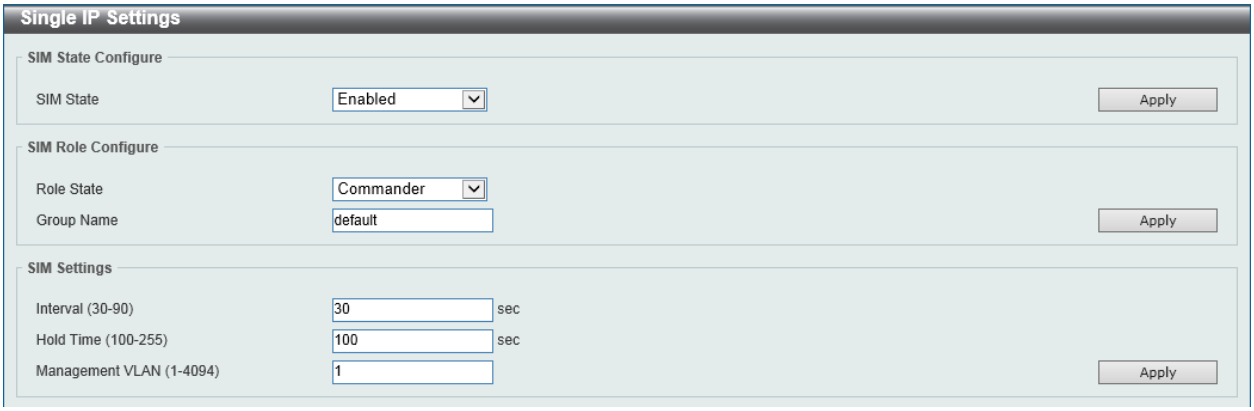



**Figure 4-64 Single IP Settings Window**

The fields that can be configured in **SIM State Configure** are described below:

| Parameter | Description |
|---|---|
| **SIM State** | Select this option to enable or disable the SIM state on the Switch. Select **Disabled** to render all SIM functions on the Switch inoperable. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SIM Role Configure** are described below:

| Parameter | Description |
|---|---|
| **Role State** | Select to change the SIM role of the Switch. Options to choose from are **Candidate**, and **Commander**.<br>• **Candidate** - A Candidate Switch (CaS) is not the member of a SIM group but is connected to a Commander Switch. This is the default setting for the SIM role of the Switch.<br>• **Commander** - Select to make the Switch a Commander Switch (CS). The user may join other switches to this Switch, over Ethernet, to be part of its SIM group. Choosing this option will also enable the Switch to be configured for SIM. |
| **Group Name** | Enter a group name. This is optional. This name is used to segment switches into different SIM groups. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SIM Settings** are described below:

| Parameter | Description |
|---|---|
| **Interval** | Enter the interval in seconds. The range is from 30 to 90. |

| Parameter | Description |
|---|---|
| **Hold Time** | Enter the hold-time in seconds. The range is from 100 to255. |
| **Management VLAN** | Enter the single IP management message VLAN ID. |

Click the **Apply** button to accept the changes made.

After enabling the Switch to be a Commander Switch (CS), the **Single IP Management** folder will then contain four added links to aid the user in configuring SIM through the web, including **Topology**, **Firmware Upgrade**, **Configuration Backup/Restore** and **Upload Log File**.

# Topology

This window is used to view, manage and configure the switch within the SIM group and requires Java script to function properly on your computer.

To view the following window, click **Management > Virtual Stacking (SIM) > Topology**, as shown below:

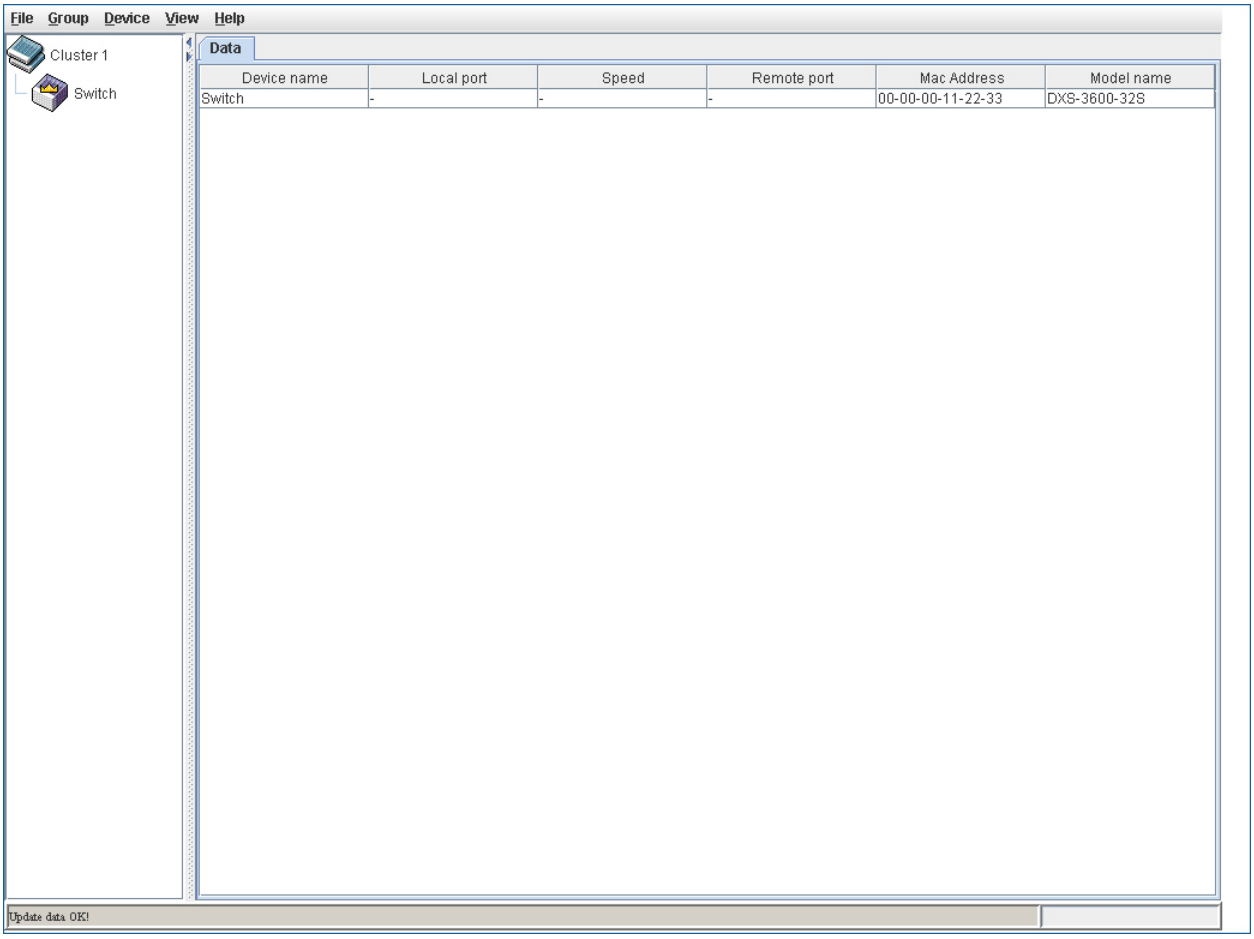



**Figure 4-65 Topology Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Device Name** | Display the Device Name of the switches in the SIM group configured by the user. If no device is configured by the name, it will be given the name default and tagged with the last six digits of the MAC Address to identify it. |

| Parameter | Description |
|---|---|
| **Local Port** | Display the number of the physical port on the CS that the MS or CaS is connected to. The CS will have no entry in this field. |
| **Speed** | Display the connection speed between the CS and the MS or CaS. |
| **Remote Port** | Display the number of the physical port on the MS or CaS to which the CS is connected. The CS will have no entry in this field. |
| **MAC Address** | Display the MAC Address of the corresponding Switch. |
| **Model Name** | Display the full Model Name of the corresponding Switch. |

To view the Topology View window, open the **View** drop-down menu in the toolbar and then click **Topology**, which will open the following Topology Map. This window will refresh itself periodically (20 seconds by default).

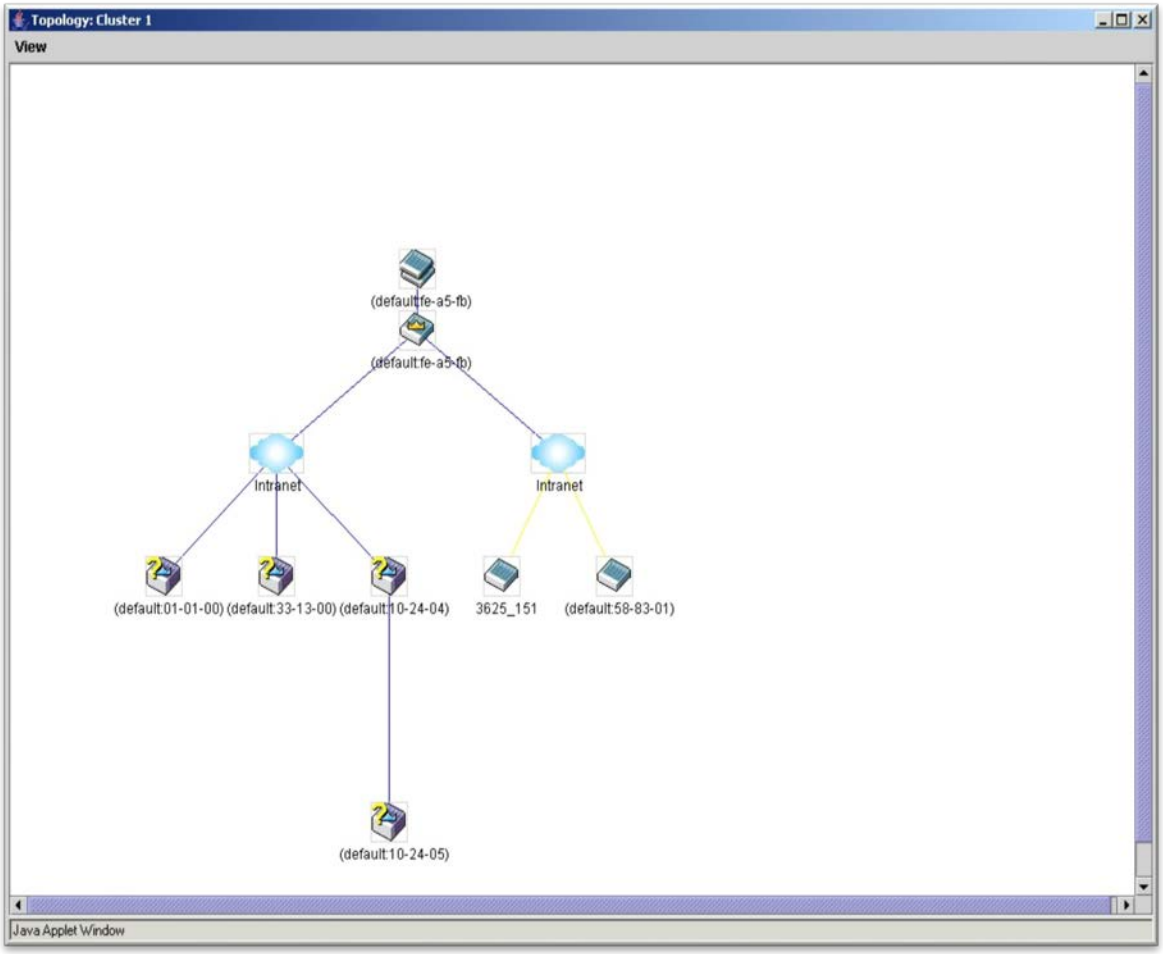



**Figure 4-66 Topology View**

This window will display how the devices within the Single IP Management Group connect to other groups and devices. Possible icons on this window are as follows:

| Icon | Description | Icon | Description |
|---|---|---|---|
|  | Group |  | Layer 3 member switch |

| Icon | Description | Icon | Description |
|---|---|---|---|
|  | Layer 2 commander switch |  | Member switch of other group |
|  | Layer 3 commander switch |  | Layer 2 candidate switch |
|  | Commander switch of other group |  | Layer 3 candidate switch |
|  | Layer 2 member switch |  | Unknown device |
|  | Non-SIM devices | | |

**Tool Tips**

In the Topology view window, the mouse plays an important role in configuration and in viewing device information. Setting the mouse cursor over a specific device in the topology window (tool tip) will display the same information about a specific device as the Tree view does. See the window below for an example.


**Figure 4-67 Device Information Utilizing the Tool Tip**

Setting the mouse cursor over a line between two devices will display the connection speed between the two devices, as shown below.

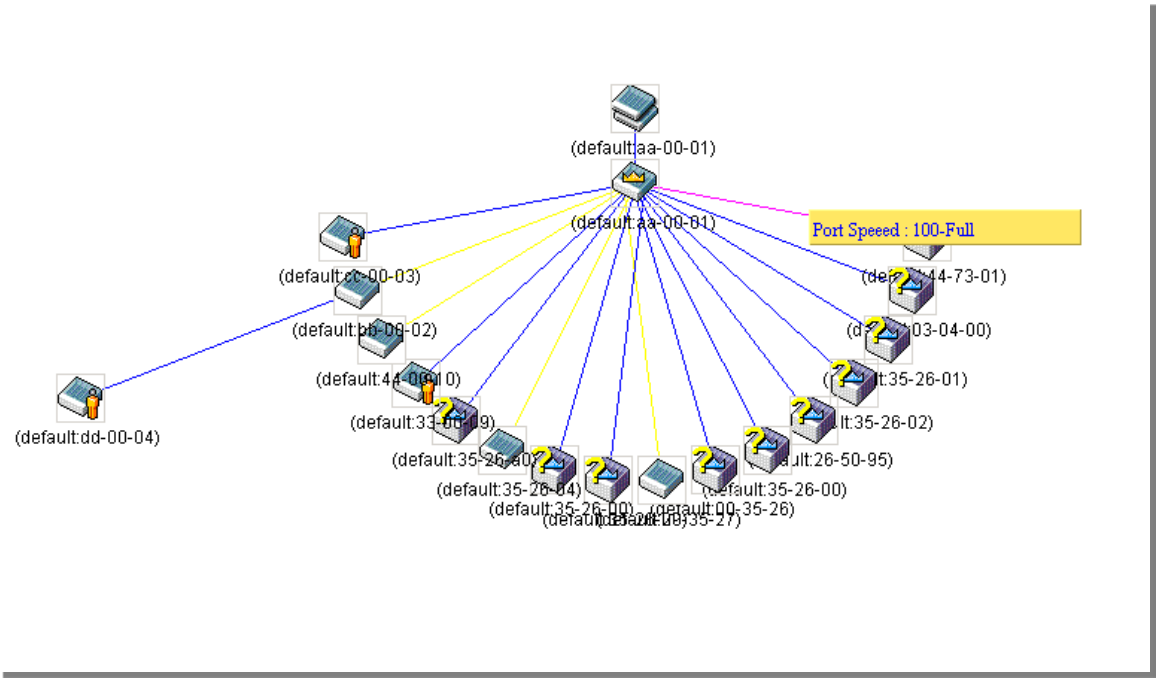



**Figure 4-68 Port Speed Utilizing the Tool Tip**

## Right-Click

Right-clicking on a device will allow the user to perform various functions, depending on the role of the Switch in the SIM group and the icon associated with it.

## Group Icon

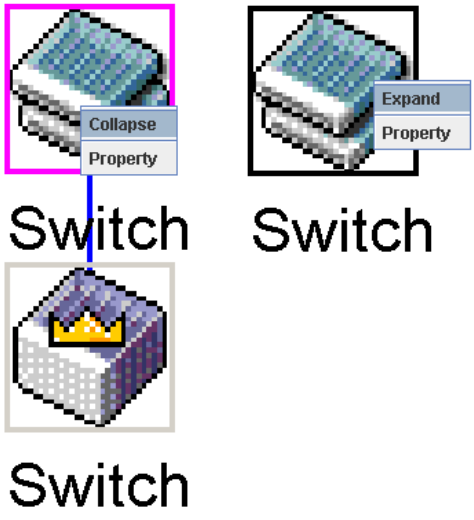



**Figure 4-69 Right-Clicking a Group Icon**

The following options may appear for the user to configure:

- **Collapse** - To collapse the group that will be represented by a single icon.
- **Expand** - To expand the SIM group, in detail.
- **Property** - To pop up a window to display the group information.

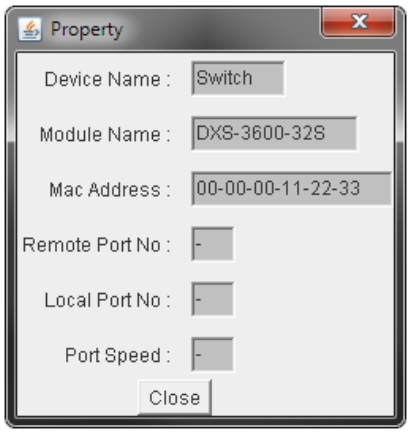



**Figure 4-70 Property Window**

The fields that can be displayed are described below:

| Parameter | Description |
|---|---|
| **Device Name** | Display the Device Name of the switches in the SIM group configured by the user. If no Device Name is configured by the name, it will be given the name default and tagged with the last six digits of the MAC Address to identify it. |
| **Module Name** | Display the full module name of the switch that was right-clicked. |
| **MAC Address** | Display the MAC Address of the corresponding Switch. |
| **Remote Port No** | Display the number of the physical port on the MS or CaS that the CS is connected to. The CS will have no entry in this field. |
| **Local Port No** | Display the number of the physical port on the CS that the MS or CaS is connected to. The CS will have no entry in this field. |
| **Port Speed** | Display the connection speed between the CS and the MS or CaS. |

Click the **Close** button to close the property window.

**Commander Switch Icon**

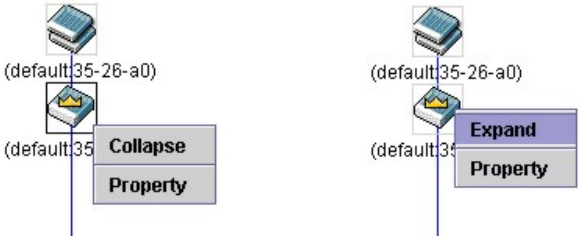



**Figure 4-71 Right-clicking a Commander Icon**

The following options may appear for the user to configure:

- **Collapse** - To collapse the group that will be represented by a single icon.
- **Expand** - To expand the SIM group, in detail.
- **Property** - To pop up a window to display the group information.

**Member Switch Icon**

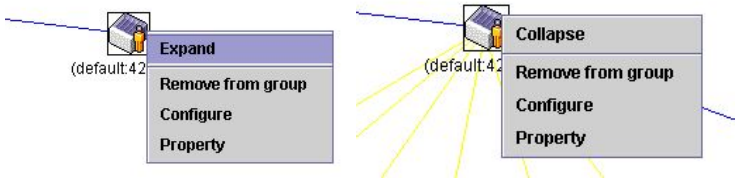



**Figure 4-72 Right-clicking a Member icon**

The following options may appear for the user to configure:

- **Collapse** - To collapse the group that will be represented by a single icon.
- **Expand** - To expand the SIM group, in detail.
- **Remove from group** - Remove a member from a group.
- **Configure** - Launch the web management to configure the Switch.
- **Property** - To pop up a window to display the device information.

## Candidate Switch Icon

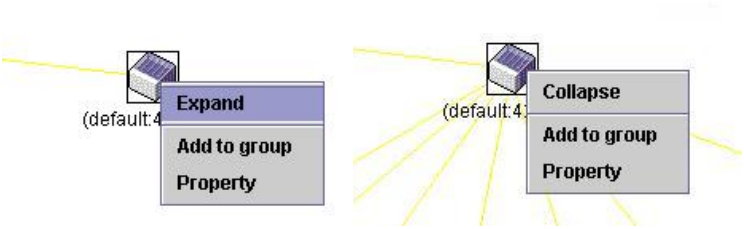



**Figure 4-73 Right-clicking a Candidate icon**

The following options may appear for the user to configure:

- **Collapse** - To collapse the group that will be represented by a single icon.
- **Expand** - To expand the SIM group, in detail.
- **Add to group** - Add a candidate to a group. Clicking this option will reveal the following dialog box for the user to enter a password for authentication from the Candidate Switch before being added to the SIM group. Click **OK** to enter the password or **Cancel** to exit the dialog box.

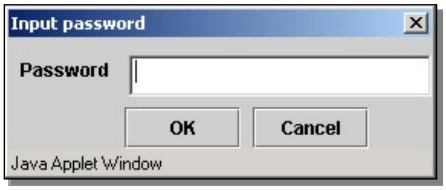



**Figure 4-74 Input password Window**

- **Property** - To pop up a window to display the device information.

## Menu Bar

The Single IP Management window contains a menu bar for device configurations, as seen below.


**Figure 4-75 Menu Bar of the Topology View**

**File**

- **Print Setup** - Will view the image to be printed.
- **Print Topology** - Will print the topology map.
- **Preference** - Will set display properties, such as polling interval, and the views to open at SIM startup.

**Group**

- **Add to group** - Add a candidate to a group. Clicking this option will reveal the following dialog box for the user to enter a password for authentication from the Candidate Switch before being added to the SIM group. Click **OK** to enter the password or **Cancel** to exit the dialog box.


**Figure 4-76 Input password Window**

- **Remove from group** - Remove an MS from the group.

**Device**

- **Configure** - Will open the Web manager for the specific device.

**View**

- **Refresh** - Update the views with the latest status.
- **Topology** - Display the Topology view.

**Help**

- **About** - Will display the SIM information, including the current SIM version.


**Figure 4-77 About Window**

# Firmware Upgrade

This window is used to view and upgrade firmware from the Commander Switch to the Member Switch. Member Switches will be listed in the table

To view the following window, click **Management > Virtual Stacking (SIM) > Firmware Upgrade**, as shown below:

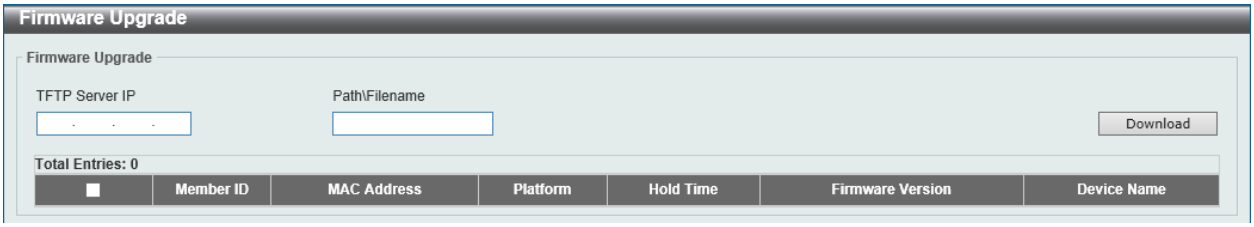



**Figure 4-78 Firmware Upgrade Window**

The fields that can be configured in **Firmware Upgrade** are described below:

| Parameter | Description |
|---|---|
| **TFTP Server IP** | Enter the TFTP server IP address. |
| **Path \ Filename** | Enter the path and file name. |

Click the **Download** button to update the firmware.

To specify a certain switch for firmware download, tick its corresponding check box.

# Configuration File Backup/Restore

This window is used to view and upgrade configuration files from the Commander Switch to the Member Switch using a TFTP server. Member Switches will be listed in the table.

To view the following window, click **Management > Virtual Stacking (SIM) > Configuration File Backup/Restore**, as shown below:

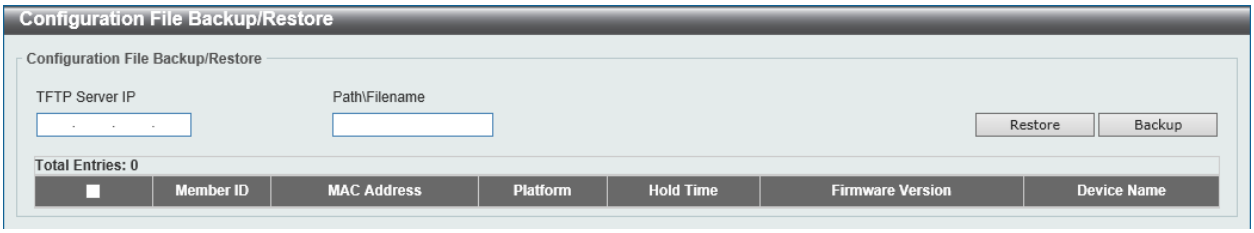



**Figure 4-79 Configuration File Backup/Restore Window**

The fields that can be configured in **Configuration File Backup/Restore** are described below:

| Parameter | Description |
|---|---|
| **TFTP Server IP** | Enter the TFTP server IP address. |
| **Path \ Filename** | Enter the path and file name. |

Click the **Restore** button to update the configuration from a TFTP server to the member switch.

Click the **Backup** button to back up the configuration file to a TFTP server.

# Upload Log File

This window is used to view and upload log files from SIM member switches to a specified PC.

To view the following window, click **Management > Virtual Stacking (SIM) > Upload Log File**, as shown below:

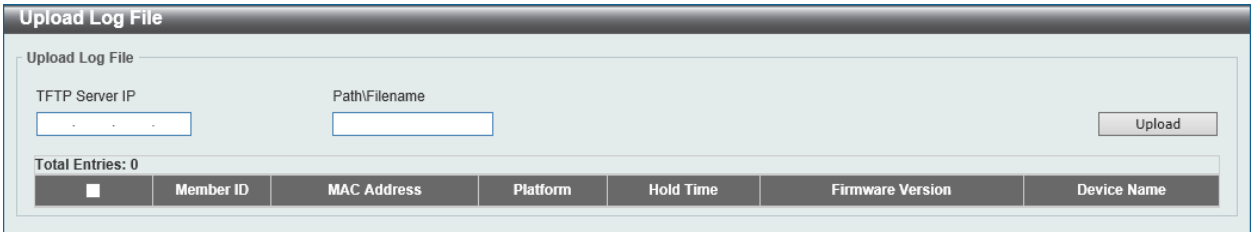



**Figure 4-80 Upload Log File Window**

The fields that can be configured in **Upload Log File** are described below:

| Parameter | Description |
|---|---|
| **TFTP Server IP** | Enter the TFTP server IP address. |
| **Path \ Filename** | Enter the path and file name. |

Click the **Upload** button to initiate the file transfer.

# SMTP Settings

This window is used to view and configure the Simple Mail Transfer Protocol (SMTP) settings.

To view the following window, click **Management > SMTP Settings**, as shown below:

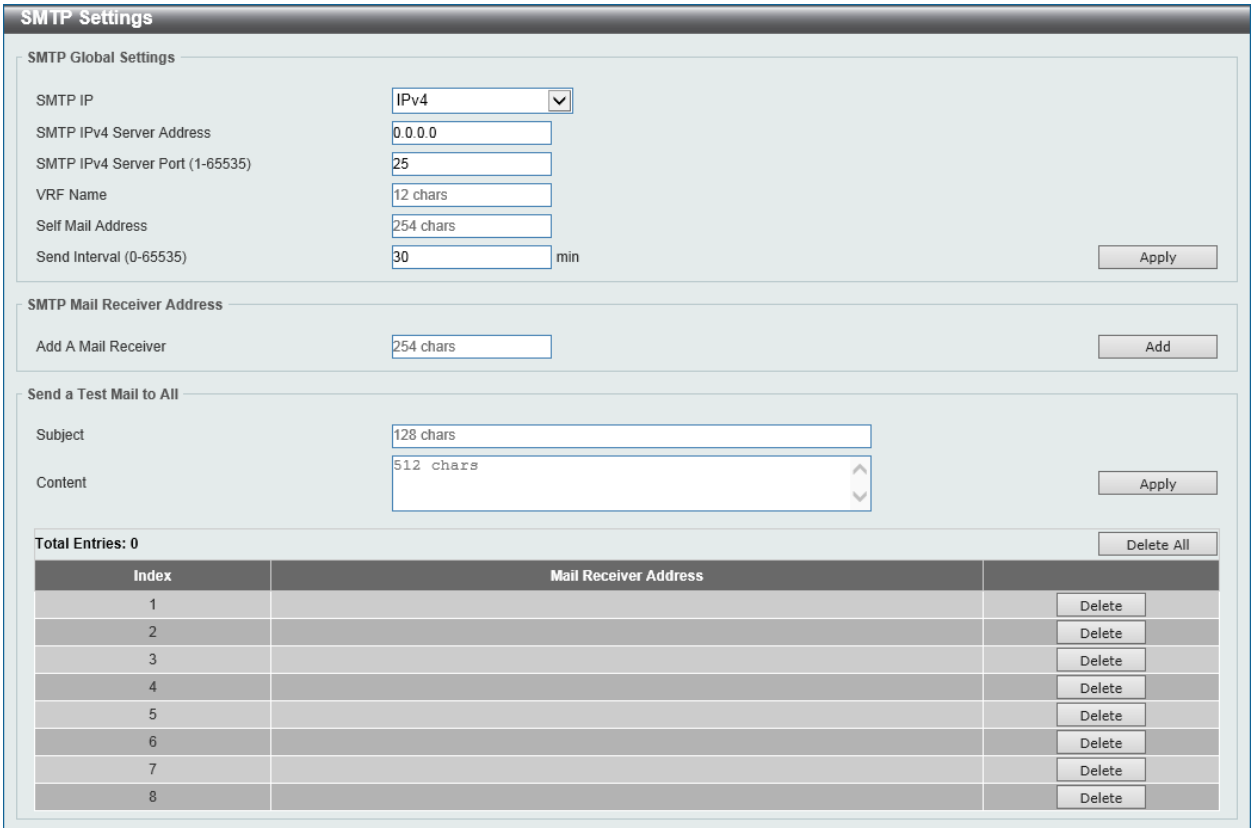



**Figure 4-81 SMTP Settings Window**

The fields that can be configured in **SMTP Global Settings** are described below:

| Parameter | Description |
|---|---|
| **SMTP IP** | Select the SMTP server's IP address type here. Options to choose from are **IPv4** and **IPv6**. |
| **SMTP IPv4 Server Address** | After selecting **IPv4** as the SMTP IP type enter the SMTP server's IPv4 address here. |
| **SMTP IPv6 Server Address** | After selecting **IPv6** as the SMTP IP type enter the SMTP server's IPv6 address here. |
| **SMTP IPv4 Server Port** | After selecting **IPv4** as the SMTP IP type enter the SMTP server's port number here. The range is from 1 to 65535. By default, this value is 25. |
| **SMTP IPv6 Server Port** | After selecting **IPv6** as the SMTP IP type enter the SMTP server's port number here. The range is from 1 to 65535. By default, this value is 25. |
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. This option is only available when **IPv4** was selected as the SMTP IP type. |
| **Self Mail Address** | Enter the email address that represents the switch here. This string can be up to 254 characters long. |
| **Send Interval** | Enter the sending interval value here. The range is from 0 to 65535 minutes. By default, this value is 30 minutes. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **SMTP Mail Receiver Address** are described below:

| Parameter | Description |
|---|---|
| **Add A Mail Receiver** | Enter the email address of the receiver here. This string can be up to 254 characters long. |

Click the **Add** button to add a new SMTP email recipient.

The fields that can be configured in **Send a Test Mail to All** are described below:

| Parameter | Description |
|---|---|
| **Subject** | Enter the subject of the email here. This string can be up to 128 characters long. |
| **Content** | Enter the content of the email here. This string can be up to 512 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to delete all the entries found in the display table.

Click the **Delete** button to delete the specified entry.

# NLB FDB Settings

This window is used to view and configure the Network Load Balancing (NLB) FDB settings.

The Network Load Balancing (NLB) function is used to support the Microsoft server load balancing application where multiple servers can share the same IP address and MAC address. The requests from

clients will be forwarded to all the servers, but will only be processed by one of them. The server can work in two different modes:

- **Unicast mode:** The client uses a unicast MAC address as the destination MAC address to reach the server.
- **Multicast mode:** The client uses a multicast MAC address as the destination MAC address to reach the server.

This destination MAC address is called the shared MAC address. However, the server uses its own MAC address (rather than the shared MAC address) as the source MAC address in the reply packet. In other words, a NLB unicast address usually is not the source MAC address of a packet.

When the received packet contains the destination MAC address matches the configured unicast MAC address, it will be forwarded to those configured ports, regardless of the VLAN membership configuration.

Administrators cannot configure a static address of the MAC address table as a NLB address. However, if a MAC address is created as a NLB MAC address entry, the same MAC address can be still dynamically learnt in the Layer 2 MAC address table. In this situation, the NLB has higher priority; the dynamically learnt FDB entry won't take effect.

To view the following window, click **Management > NLB FDB Settings**, as shown below:

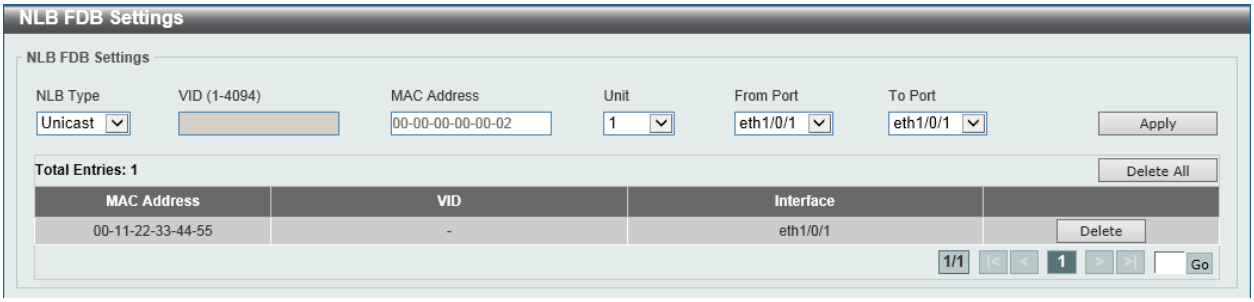



**Figure 4-82 NLB FDB Settings Window**

The fields that can be configured in **NLB FDB Settings** are described below:

| Parameter | Description |
|---|---|
| **NLB Type** | Select the NLB type here. Options to choose from are **Unicast** and **Multicast**. |
| **VID** | After selecting **Multicast** as the NLB type, enter the VLAN ID used in this configuration here. |
| **MAC Address** | Enter the unicast or multicast MAC address of the entry here. If a received packet contains a destination MAC address that matches the specified MAC address, it will be forwarded to the specified interface. |
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to delete all the entries found in the display table.

Click the **Delete** button to delete the specified entry.

# 5. Layer 2 Features

***FDB***
***VLAN***
***VLAN Tunnel***
***STP***
***ERPS (G.8032)***
***Loopback Detection***
***Link Aggregation***
***L2 Protocol Tunnel***
***L2 Multicast Control***
***LLDP***

## FDB

### Static FDB

#### Unicast Static FDB

This window is used to view and configure the static unicast forwarding settings on the switch.

To view the following window, click **L2 Features > FDB > Static FDB > Unicast Static FDB**, as shown below:

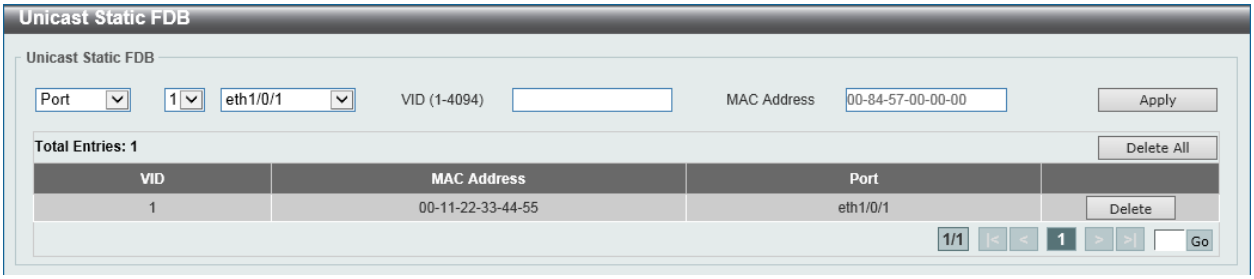



**Figure 5-1 Unicast Static FDB Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Port/Drop** | Allows the selection of the port number on which the MAC address entered resides This option could also drop the MAC address from the unicast static FDB. When selecting **Port**, select the port number. |
| **Unit** | Select the stacking unit ID of the switch that will be configured here. |
| **Port Number** | After selecting the **Port** option, select the port number used here. |
| **VID** | Enter the VLAN ID on which the associated unicast MAC address resides. |
| **MAC Address** | Enter the MAC address to which packets will be statically forwarded. This must be a unicast MAC address. |

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to delete all the entries found in the display table.

Click the **Delete** button to delete the specified entry.

## Multicast Static FDB

This window is used to view and configure the multicast static FDB settings.

To view the following window, click **L2 Features > FDB > Static FDB > Multicast Static FDB**, as shown below:

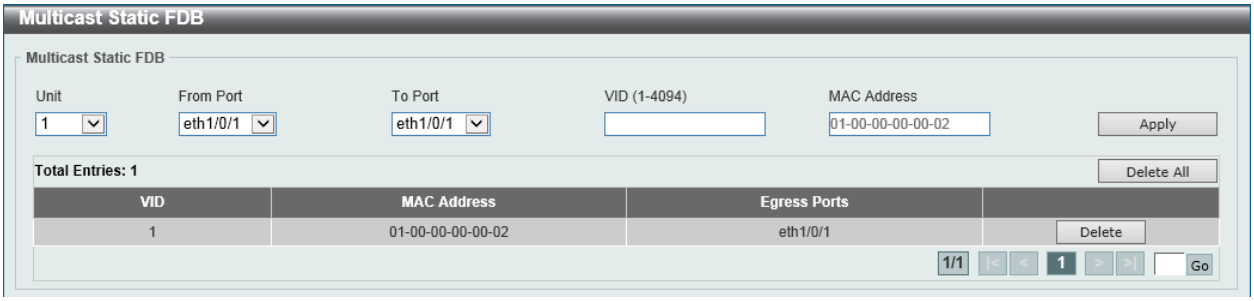



**Figure 5-2 Multicast Static FDB Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the stacking unit ID of the switch that will be configured here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **VID** | Enter the VLAN ID of the VLAN the corresponding MAC address belongs to. |
| **MAC Address** | Enter the static destination MAC address of the multicast packets. This must be a multicast MAC address. The format of the destination MAC address is 01-XX-XX-XX-XX-XX. |

Click the **Apply** button to accept the changes made.

Click the **Delete All** button to remove all the entries.

Click the **Delete** button to remove the specific entry.

# MAC Address Table Settings

This window is used to view and configure the MAC address table's global settings.

To view the following window, click **L2 Features > FDB > MAC Address Table Settings**, as shown below:

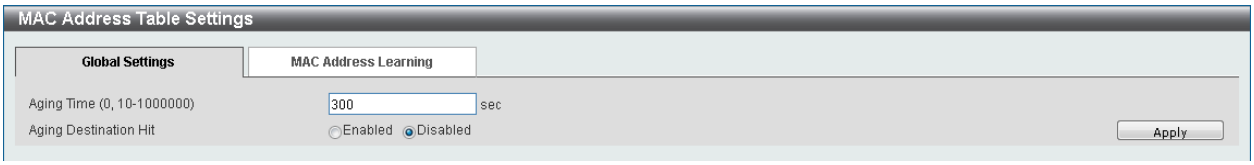



**Figure 5-3 MAC Address Table Settings (Global Settings) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Aging Time** | Enter the MAC address table's aging time value here. This value must be between 10 and 1000000 seconds. Entering 0 will disable MAC address aging. By default, this value is 300 seconds. |

| Parameter | Description |
|---|---|
| **Aging Destination Hit** | Select to enable or disable the aging destination hit function. |

Click the **Apply** button to accept the changes made.

After selecting the **MAC Address Learning** tab option, at the top of the page, the following page will be available.

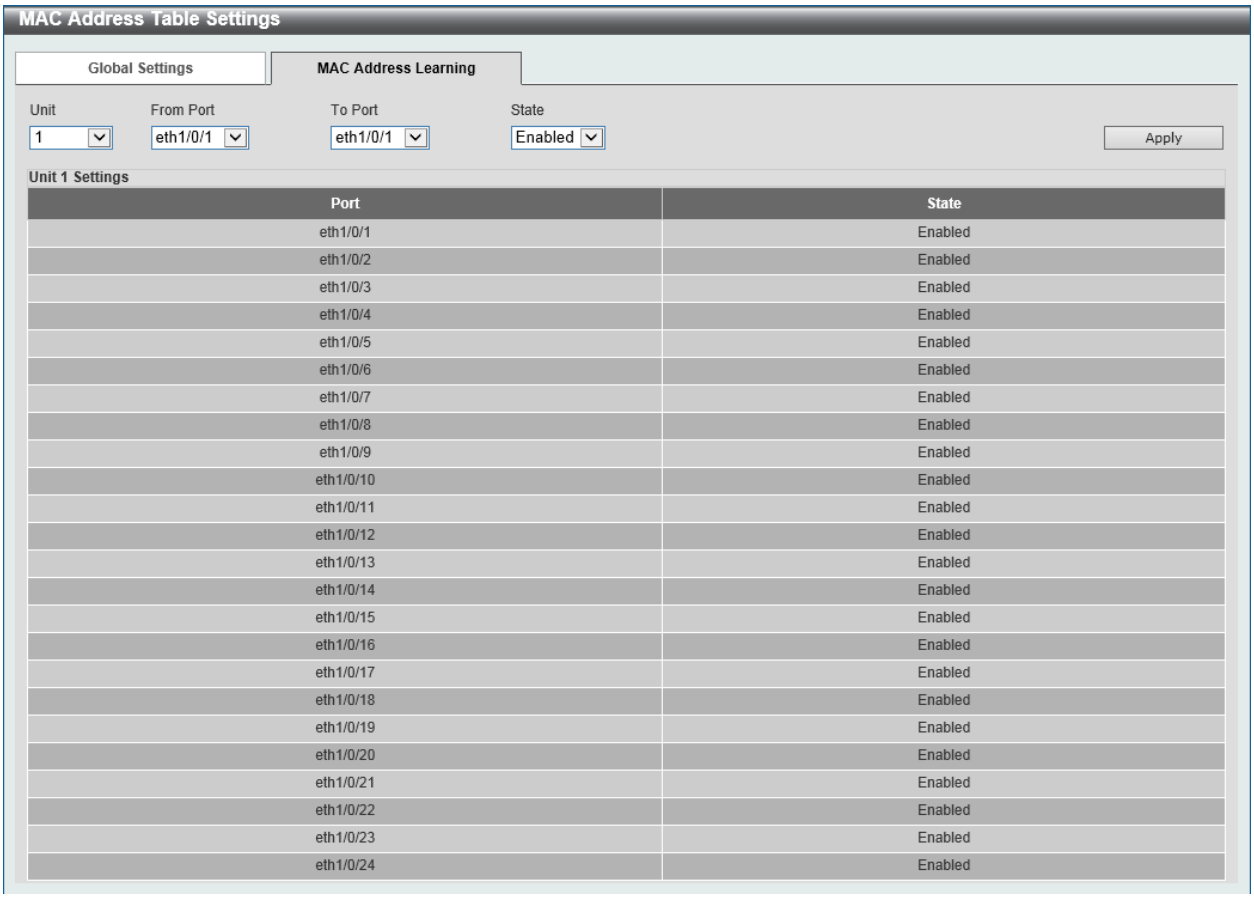



**Figure 5-4 MAC Address Table Settings (MAC Address Learning) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the stacking unit ID of the switch that will be configured here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **State** | Select to enable or disable the MAC address learning function on the ports specified here. |

Click the **Apply** button to accept the changes made.

# MAC Address Table

This window is used to view the entries listed in the MAC address table.

To view the following window, click **L2 Features > FDB > MAC Address Table**, as shown below:

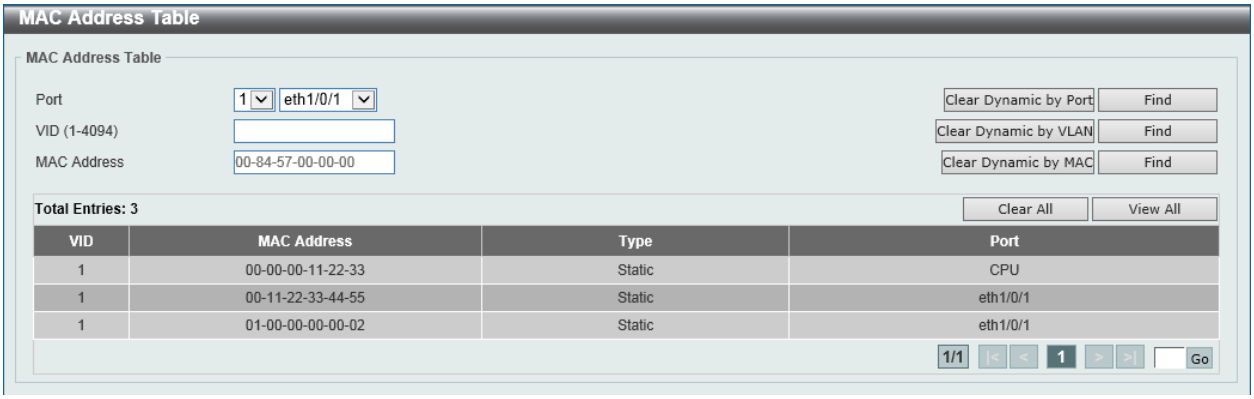



**Figure 5-5 MAC Address Table Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Port** | Select the stacking unit ID and the port number of the switch that will be configured here. |
| **VID** | Enter the VLAN ID that will be used for this configuration here. |
| **MAC Address** | Enter the MAC address that will be used for this configuration here. |

Click the **Apply** button to accept the changes made.

Click the **Clear Dynamic by Port** button to clear the dynamic MAC address listed on the corresponding port.

Click the **Clear Dynamic by VLAN** button to clear the dynamic MAC address listed on the corresponding VLAN.

Click the **Clear Dynamic by MAC** button to clear the dynamic MAC address entered.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear All** button to clear all dynamic MAC addresses.

Click the **View All** button to display all the MAC addresses recorded in the MAC address table.

## MAC Notification

This window is used to view and configure MAC notification.

To view the following window, click **L2 Features > FDB > MAC Notification**, as shown below:

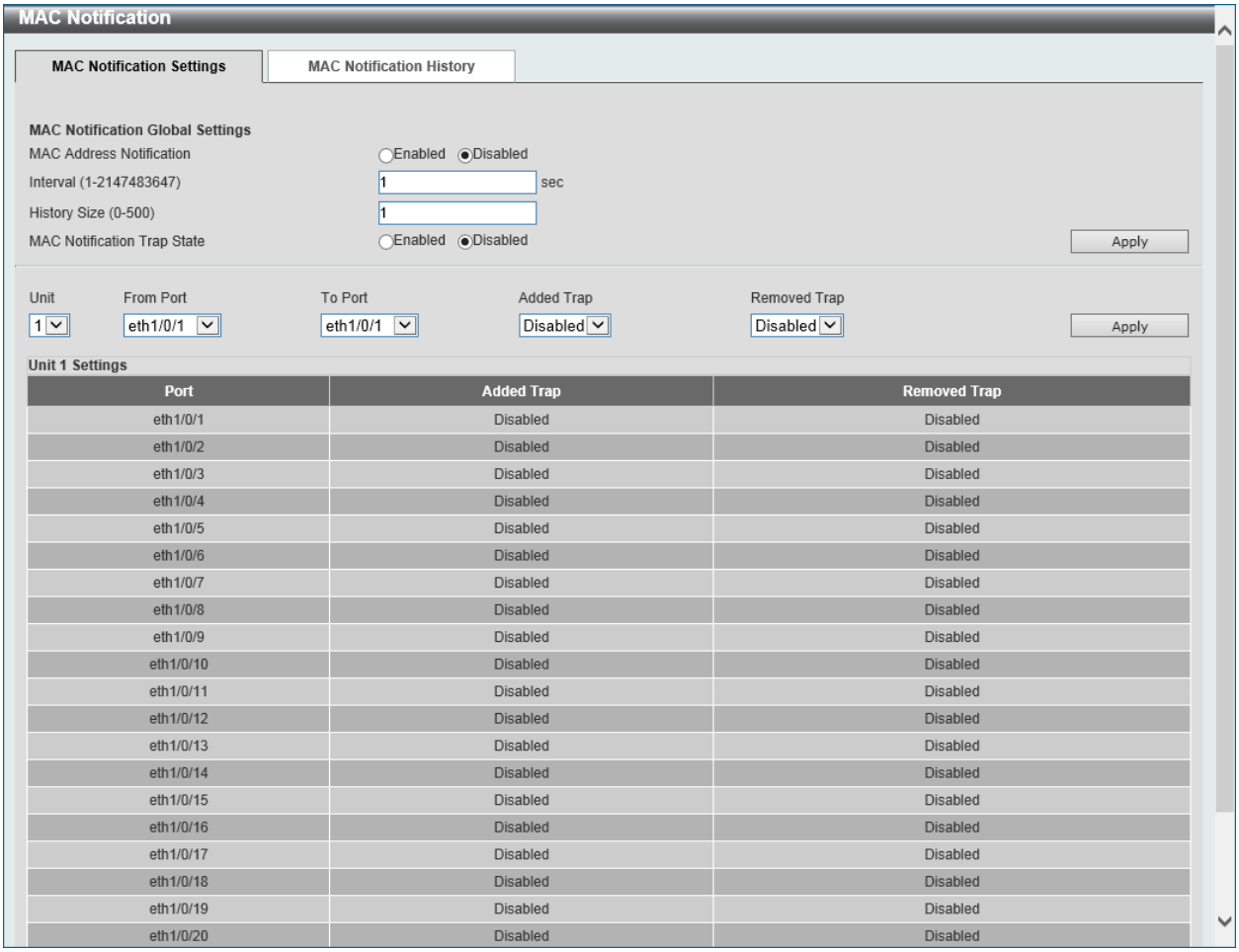



**Figure 5-6 MAC Notification (MAC Notification Settings) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **MAC Address Notification** | Select to enable or disable MAC notification globally on the switch |
| **Interval** | Enter the time value between notifications. This value must be between 1 and 2147483647 seconds. By default, this value is 1 second. |
| **History Size** | Enter the maximum number of entries listed in the history log used for notification. This value must be between 0 and 500. By default, this value is 1. |
| **MAC Notification Trap State** | Select to enable or disable the MAC notification trap state. |
| **Unit** | Select the stacking unit ID of the switch that will be configured here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Added Trap** | Select to enable or disable the added trap for the port(s) selected. |
| **Removed Trap** | Select to enable or disable the removed trap for the port(s) selected. |

Click the **Apply** button to accept the changes made for each individual section.

After selecting the **MAC Notification History** tab, at the top of the page, the following page will be available.

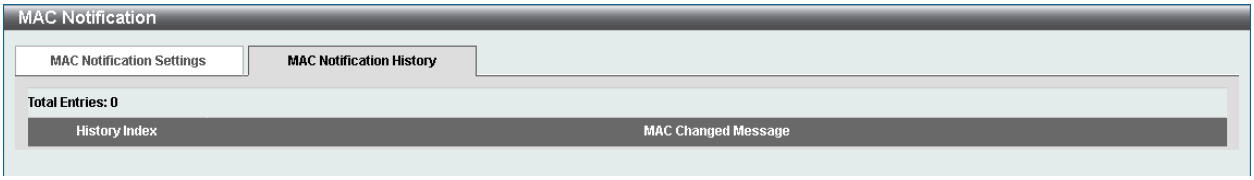



**Figure 5-7 MAC Notification (MAC Notification History) Window**

On this page, a list of MAC notification messages will be displayed.

# VLAN

## 802.1Q VLAN

This window is used to view and configure the VLAN settings on this switch.

To view the following window, click **L2 Features > VLAN > 802.1Q VLAN**, as shown below:

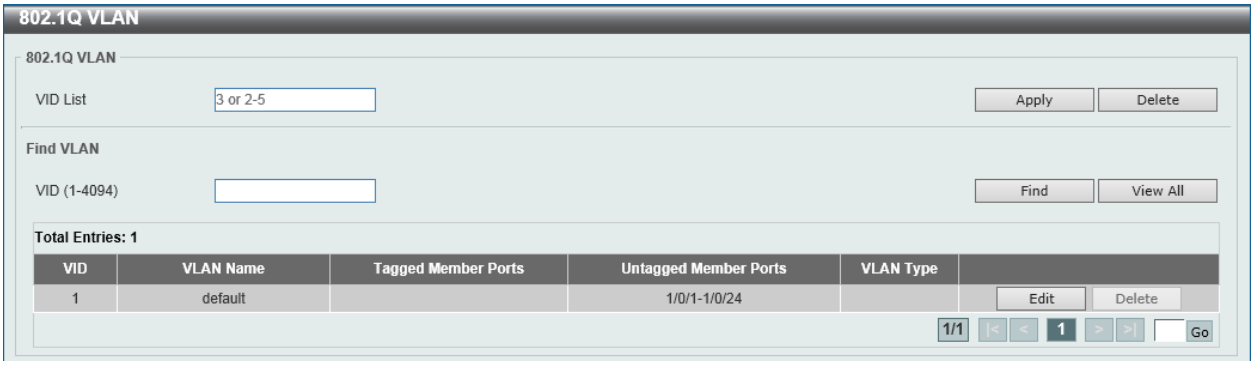



**Figure 5-8 802.1Q VLAN Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the VLAN ID list that will be created here. |
| **VID** | Enter the VLAN ID that will be displayed here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to locate all the entries.

Click the **Edit** button to re-configure the specific entry.

## 802.1v Protocol VLAN

### Protocol VLAN Profile

This window is used to view and configure 802.1v protocol VLAN profiles. The 802.1v Protocol VLAN Group Settings support multiple VLANs for each protocol and allows the user to configure the untagged ports of different protocols on the same physical port. For example, it allows the user to configure an 802.1Q and 802.1v untagged port on the same physical port.

To view the following window, click **L2 Features > VLAN > 802.1v Protocol VLAN > Protocol VLAN Profile**, as shown below:

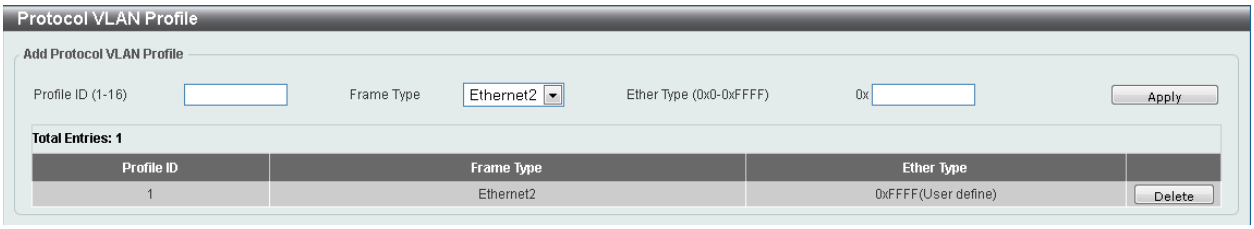



**Figure 5-9 Protocol VLAN Profile Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Profile ID** | Enter the 802.1v protocol VLAN profile ID here. This value must be between 1 and 16. |
| **Frame Type** | Select the frame type option here. This function maps packets to protocol-defined VLANs by examining the type octet within the packet header to discover the type of protocol associated with it. Options to choose from are **Ethernet 2**, **SNAP**, and **LLC**. |
| **Ether Type** | Enter the Ethernet type value for the group here. The protocol value is used to identify a protocol of the frame type specified. The form of the input is 0x0 to 0xFFFF. Depending on the frame type, the octet string will have one of the following values:<br>• For **Ethernet 2**, this is a 16-bit (2-octet) hex value. For example, IPv4 is 0800, IPv6 is 86DD, ARP is 0806, etc…<br>• For IEEE802.3 **SNAP**, this is a 16-bit (2-octet) hex value.<br>• For IEEE802.3 **LLC**, this is a 2-octet IEEE 802.2 Link Service Access Point (LSAP) pair. The first octet is for Destination Service Access Point (DSAP) and the second octet is for Source. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

## Protocol VLAN Profile Interface

This window is used to view and configure the protocol VLAN profile's interface settings.

To view the following window, click **L2 Features > VLAN > 802.1v Protocol VLAN > Protocol VLAN Profile Interface**, as shown below:

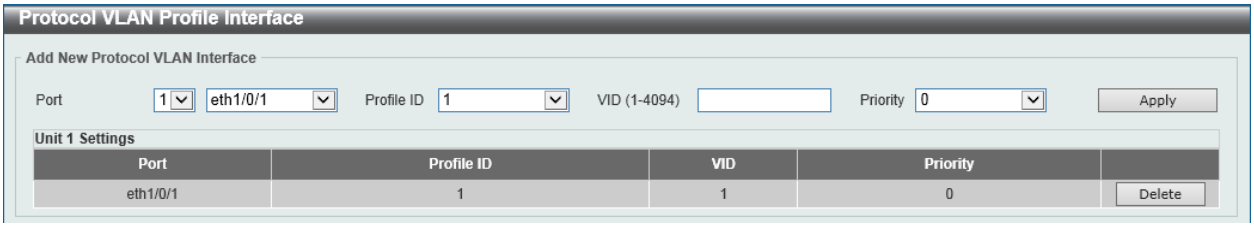



**Figure 5-10 Protocol VLAN Profile Interface Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Port** | Select the stacking unit ID and the port number of the switch that will |

| Parameter | Description |
|---|---|
| | be configured here. |
| **Profile ID** | Select the 802.1v protocol VLAN profile ID here. |
| **VID** | Enter the VLAN ID used here. |
| **Priority** | Select the priority value used here. This value is between 0 and 7. This parameter is specified to re-write the 802.1p default priority previously set in the switch, which is used to determine the CoS queue to which packets are forwarded to. Once this field is specified, packets accepted by the switch that match this priority are forwarded to the CoS queue specified previously by the user. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

# GVRP

## GVRP Global

This window is used to view and configure the GARP VLAN Registration Protocol (GVRP) global settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Global**, as shown below:

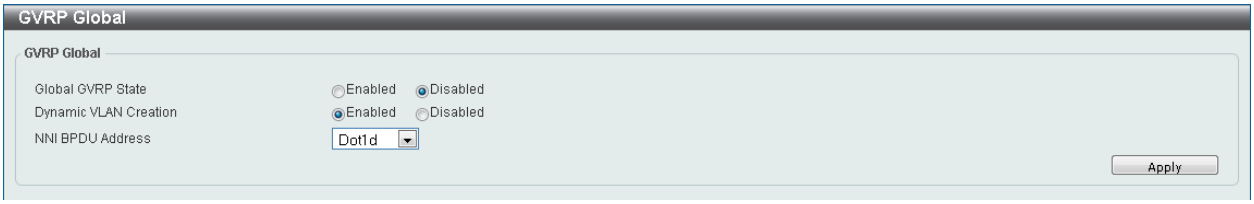



**Figure 5-11 GVRP Global Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Global GVRP State** | Select to enable or disable the global GVRP state here. |
| **Dynamic VLAN Creation** | Select to enable or disable the dynamic VLAN creation function here. |
| **NNI BPDU Address** | Select the NNI BPDU address option here. This option is used to determine the BPDU protocol address for GVRP in service provide site. It can use 802.1d GVRP address or 802.1ad service provider GVRP address. Options to choose from are **Dot1d** and **Dot1ad**. |

Click the **Apply** button to accept the changes made.

## GVRP Port

This window is used to view and configure the GVRP port settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Port**, as shown below:

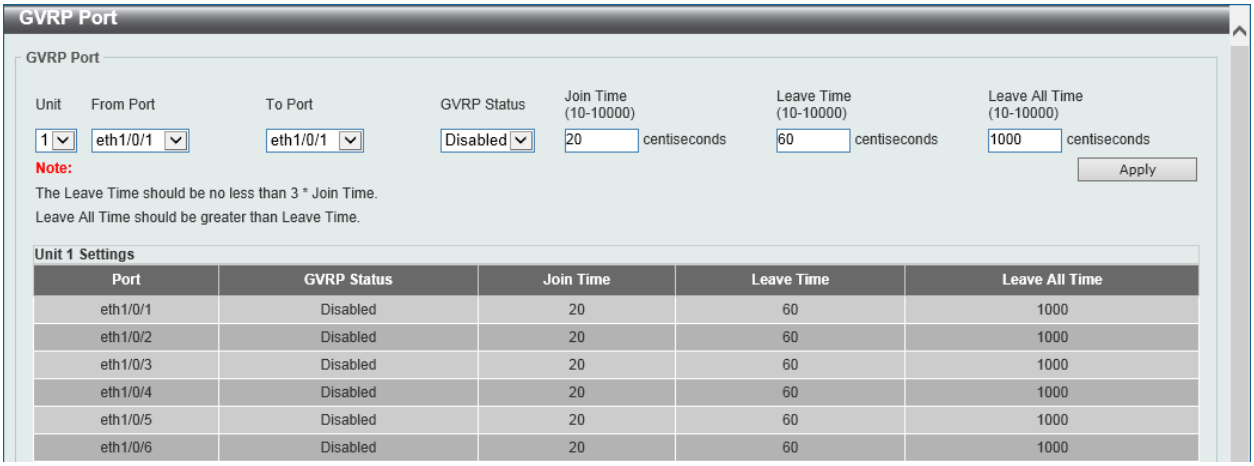



**Figure 5-12 GVRP Port Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **GVRP Status** | Select the enable or disable the GVRP port status. This enables the port to dynamically become a member of a VLAN. By default, this option is disabled. |
| **Join Time** | Enter the Join Time value in centiseconds. This value must be between 10 and 10000 centiseconds. By default, this value is 20 centiseconds. |
| **Leave Time** | Enter the Leave Time value in centiseconds. This value must be between 10 and 10000 centiseconds. By default, this value is 60 centiseconds. |
| **Leave All Time** | Enter the Leave All Time value in centiseconds. This value must be between 10 and 10000 centiseconds. By default, this value is 1000 centiseconds. |

Click the **Apply** button to accept the changes made.

## GVRP Advertise VLAN

This window is used to view and configure the GVRP advertised VLAN settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Advertise VLAN**, as shown below:

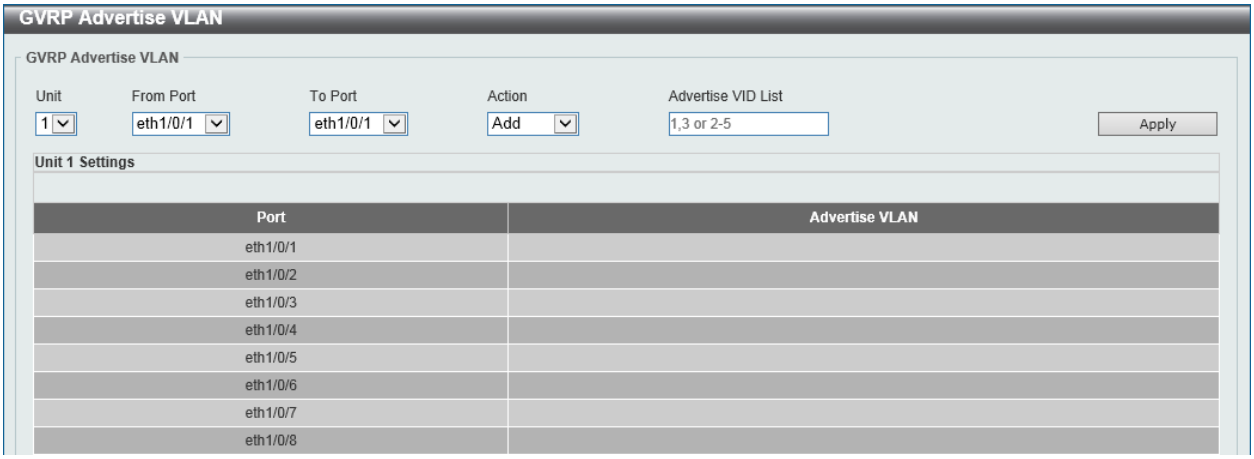



**Figure 5-13 GVRP Advertise VLAN Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Action** | Select the advertised VLAN to port mapping action that will be taken here. Options to choose from are **All**, **Add**, **Remove**, and **Replace**. When selecting **All**, all the advertised VLANs will be used. |
| **Advertise VID List** | Enter the advertised VLAN ID list here. |

Click the **Apply** button to accept the changes made.

## GVRP Forbidden VLAN

This window is used to view and configure the GVRP forbidden VLAN settings.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Forbidden VLAN**, as shown below:

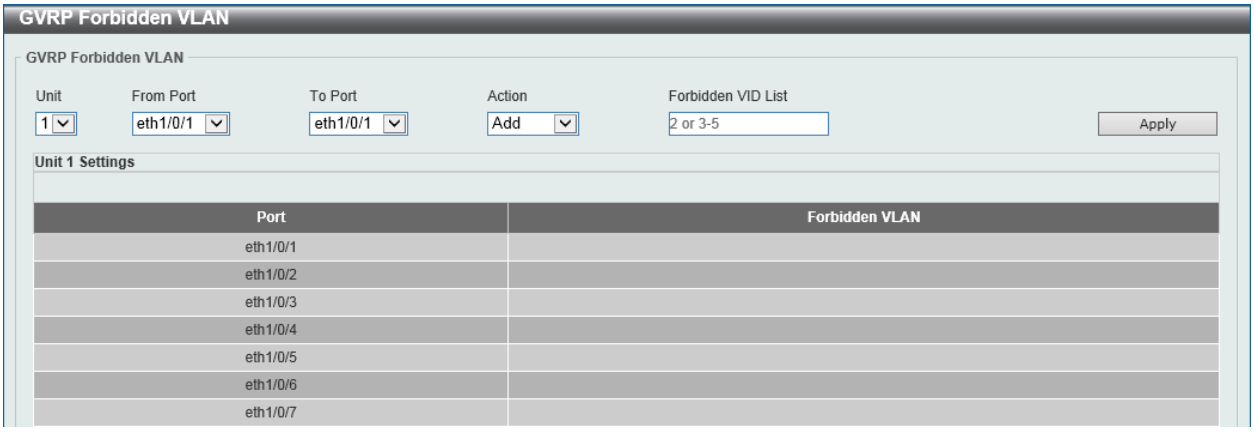



**Figure 5-14 GVRP Forbidden VLAN Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |

| Parameter | Description |
|---|---|
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Action** | Select the forbidden VLAN to port mapping action that will be taken here. Options to choose from are **All**, **Add**, and **Remove**. When selecting **All**, all the forbidden VLANs will be used. |
| **Forbidden VID List** | Enter the forbidden VLAN ID list here. |

Click the **Apply** button to accept the changes made.

## GVRP Statistics Table

This window is used to view GVRP statistics information.

To view the following window, click **L2 Features > VLAN > GVRP > GVRP Statistics Table**, as shown below:

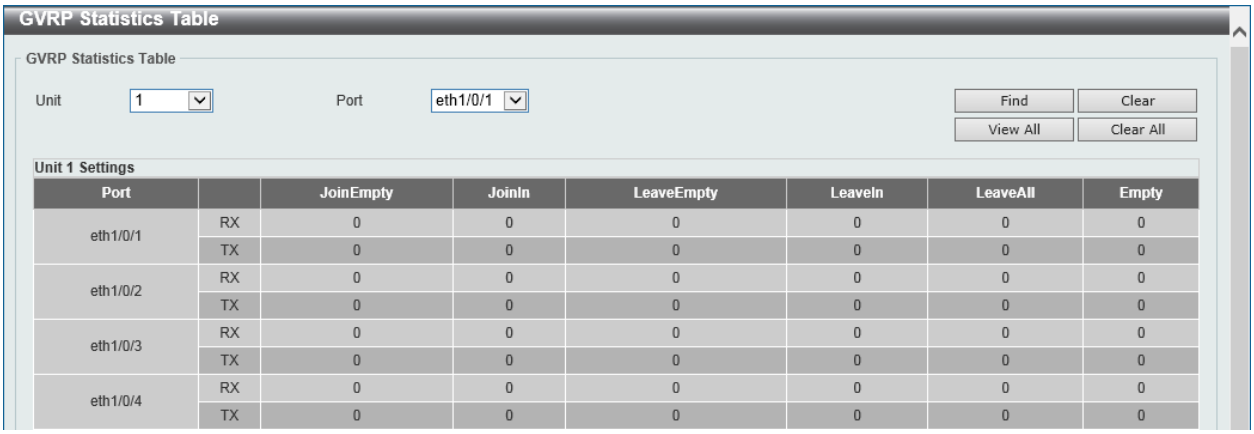



**Figure 5-15 GVRP Statistics Table Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this display here. |
| **Port** | Select the port number of which GVRP statistic information will be displayed. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear all the information for the specific port.

Click the **View All** button to view all GVRP statistic information.

Click the **Clear All** button to clear all the information in this table.

# MAC VLAN

This window is used to view and configure the MAC-based VLAN information. When a static MAC-based VLAN entry is created for a user, the traffic according to the specified VLAN operating on this port will be configured.

To view the following window, click **L2 Features > VLAN > MAC VLAN**, as shown below:

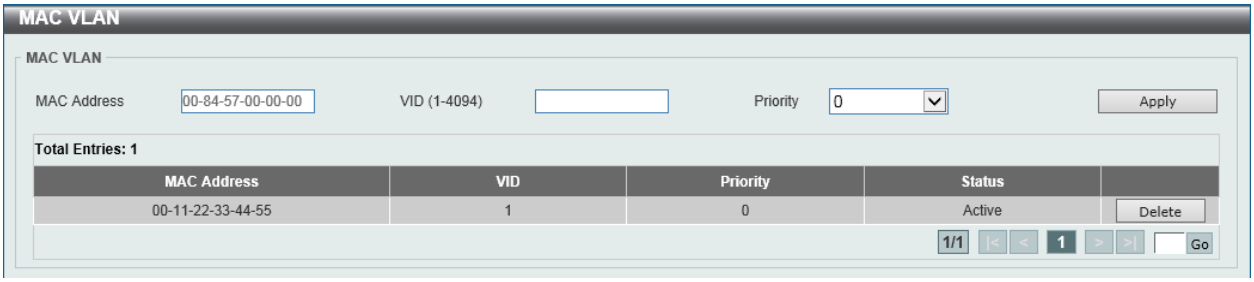



**Figure 5-16 MAC VLAN Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **MAC Address** | Enter the unicast MAC address. |
| **VID** | Enter the VLAN ID that will be used. |
| **Priority** | Select the priority that is assigned to untagged packets. This value is between 0 and 7. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

# VLAN Interface

This window is used to view and configure VLAN interface settings.

To view the following window, click **L2 Features > VLAN > VLAN Interface**, as shown below:

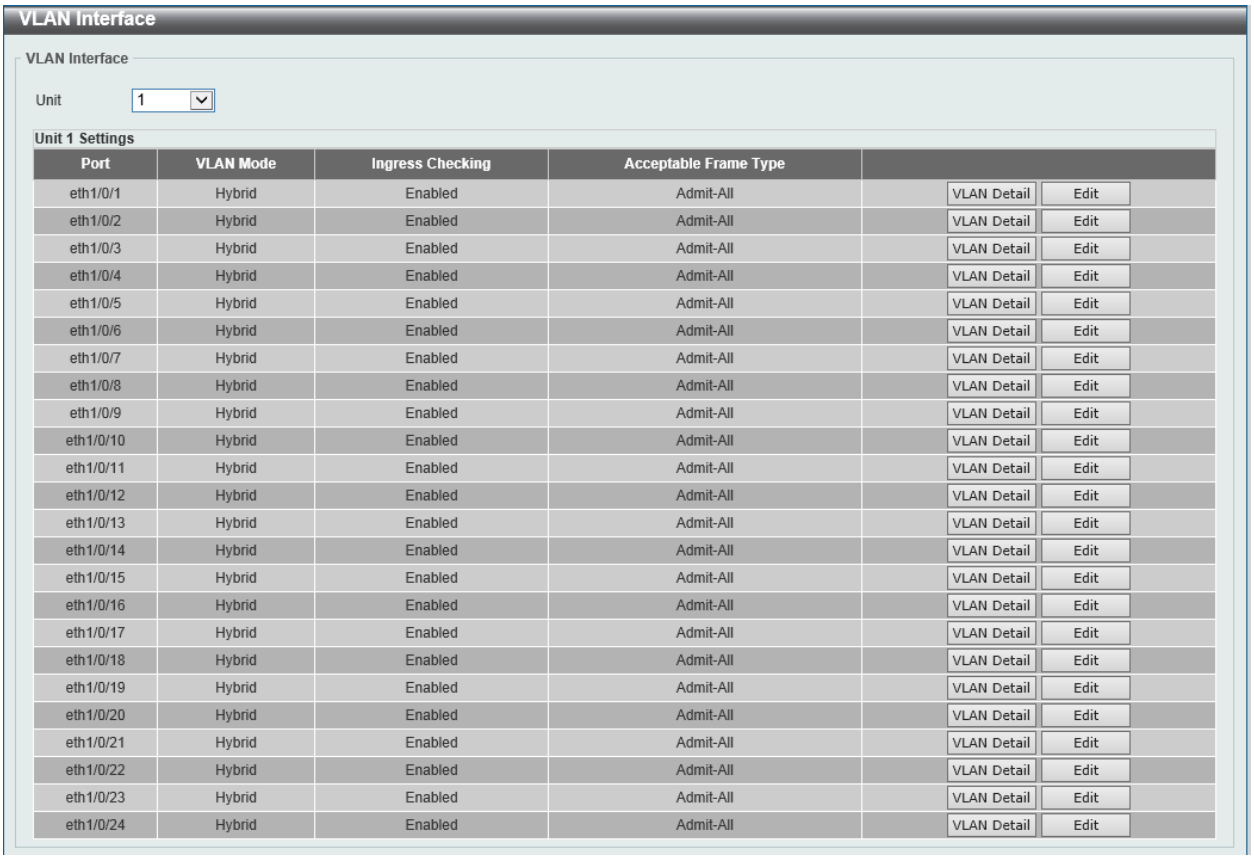



**Figure 5-17 VLAN Interface Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |

Click the **View Detail** button to view more detailed information about the VLAN on the specific interface.

Click the **Edit** button to re-configure the specific entry.

After clicking the **VLAN Detail** button, the following page will appear.

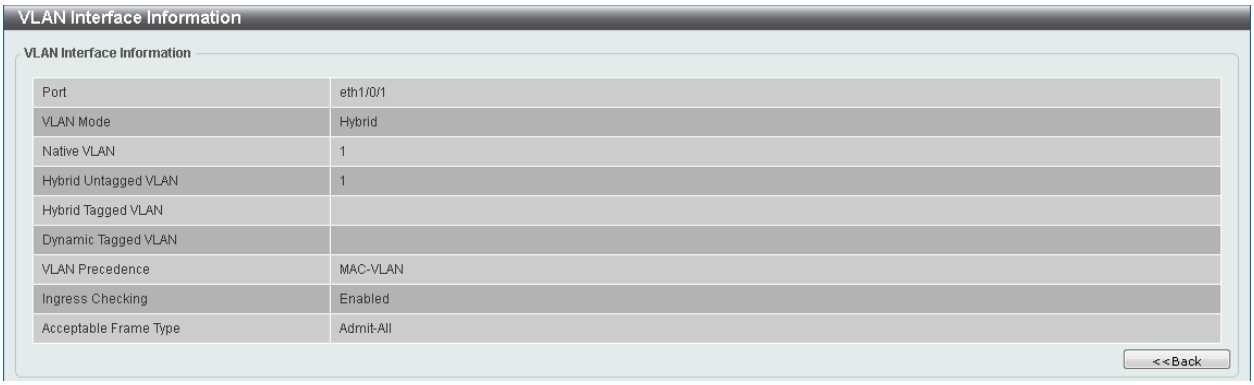



**Figure 5-18 VLAN Interface (VLAN Detail) Window**

On this page, more detailed information about the VLAN of the specific interface is displayed.

Click the **<<Back** button to return to the previous page.

After click the **Edit** button, the following page will appear. This is a dynamic page that will change when a different **VLAN Mode** was selected. When **Access** was selected as the **VLAN Mode**, the following page will appear.

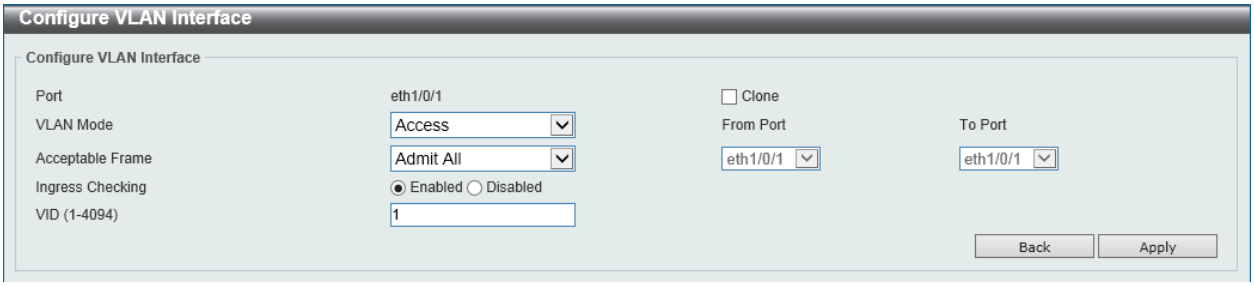



**Figure 5-19 VLAN Interface (Access) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VLAN Mode** | Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **802.1Q-Tunnel**, **Promiscuous**, **Host**, **Trunk Promiscuous**, and **Trunk Secondary**. |
| **Acceptable Frame** | Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**. |
| **Ingress Checking** | Select to enable or disable the ingress checking function. |
| **VLAN ID** | Enter the VLAN ID used for this configuration here. This value must be |

| Parameter | Description |
|---|---|
| | between 1 and 4094. |
| **Clone** | Select this option to enable the clone feature. |
| **From Port ~ To Port** | Select the range of ports that will be used in the clone feature here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

When **Hybrid** was selected as the **VLAN Mode**, the following page will appear.

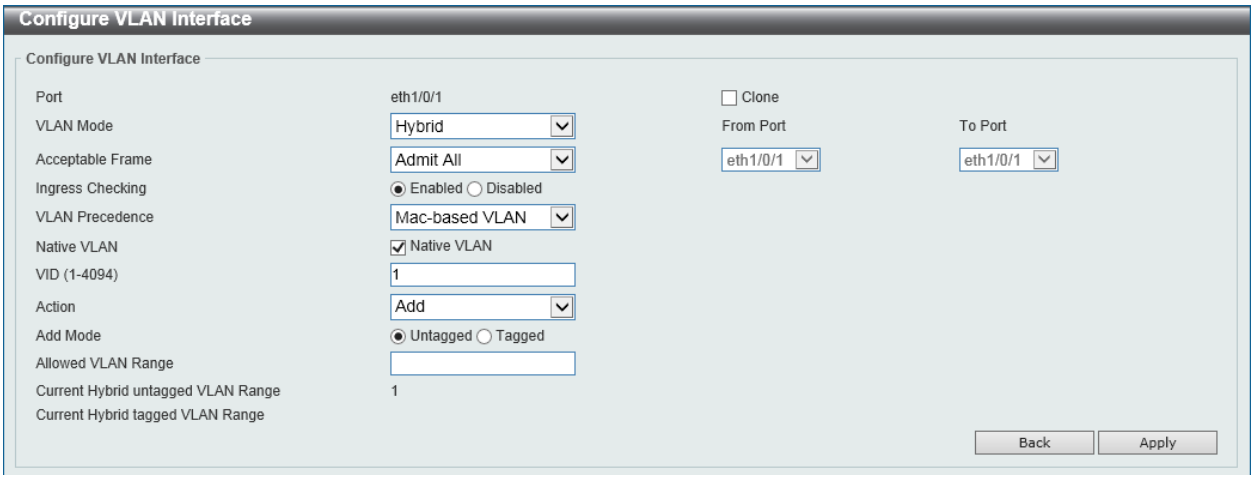



**Figure 5-20 VLAN Interface (Hybrid) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VLAN Mode** | Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **802.1Q-Tunnel**, **Promiscuous**, **Host**, **Trunk Promiscuous**, and **Trunk Secondary**. |
| **Acceptable Frame** | Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**. |
| **Ingress Checking** | Select to enable or disable the ingress checking function. |
| **VLAN Precedence** | Select the VLAN precedence option here. Options to choose from are **Mac-based VLAN** and **Subnet-based VLAN**. |
| **Native VLAN** | Tick this option to enable the native VLAN function. |
| **VID** | After ticking the **Native VLAN** option the following parameter will be available. Enter the VLAN ID used for this configuration here. This value must be between 1 and 4094. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add**, **Remove**, **Tagged**, and **Untagged**. |
| **Add Mode** | Select whether to add an **Untagged** or **Tagged** parameters. |
| **Allowed VLAN Range** | Enter the allowed VLAN range information here. |
| **Clone** | Select this option to enable the clone feature. |
| **From Port ~ To Port** | Select the range of ports that will be used in the clone feature here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

When **Trunk** was selected as the **VLAN Mode**, the following page will appear.

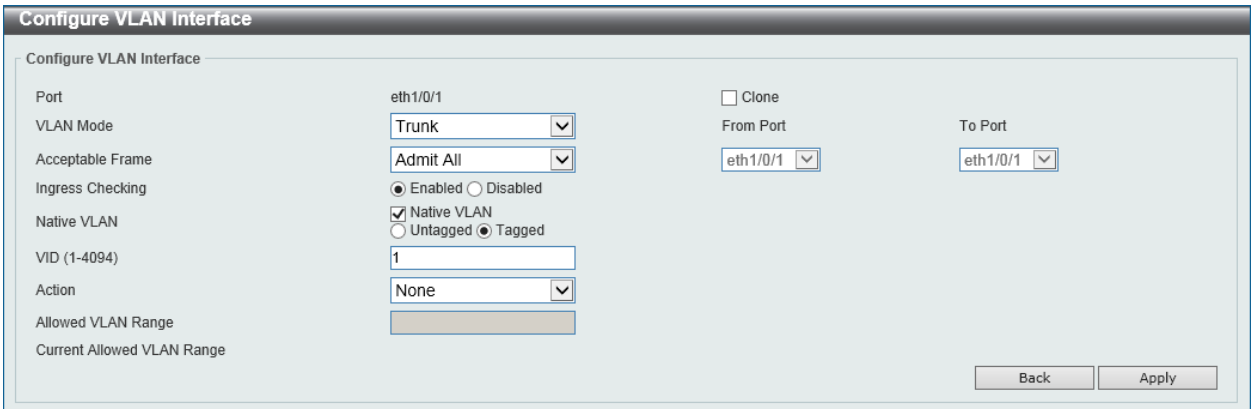



**Figure 5-21 VLAN Interface (Trunk) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VLAN Mode** | Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **802.1Q-Tunnel**, **Promiscuous**, **Host**, **Trunk Promiscuous**, and **Trunk Secondary**. |
| **Acceptable Frame** | Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**. |
| **Ingress Checking** | After selecting **Trunk** as the **VLAN Mode** the following parameter will be available. Select to enable or disable the ingress checking function. |
| **Native VLAN** | Tick this option to enable the native VLAN function. Also select if this VLAN supports **Untagged** or **Tagged** frames. |
| **VID** | After ticking the **Native VLAN** option the following parameter will be available. Enter the VLAN ID used for this configuration here. This value must be between 1 and 4094. |
| **Action** | Select the action that will be taken here. Options to choose from are **All**, **Add**, **Remove**, **Except**, and **Replace**. |
| **Allowed VLAN Range** | Enter the allowed VLAN range information here. |
| **Clone** | Select this option to enable the clone feature. |
| **From Port ~ To Port** | Select the range of ports that will be used in the clone feature here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

When **802.1Q-Tunnel** was selected as the **VLAN Mode**, the following page will appear.

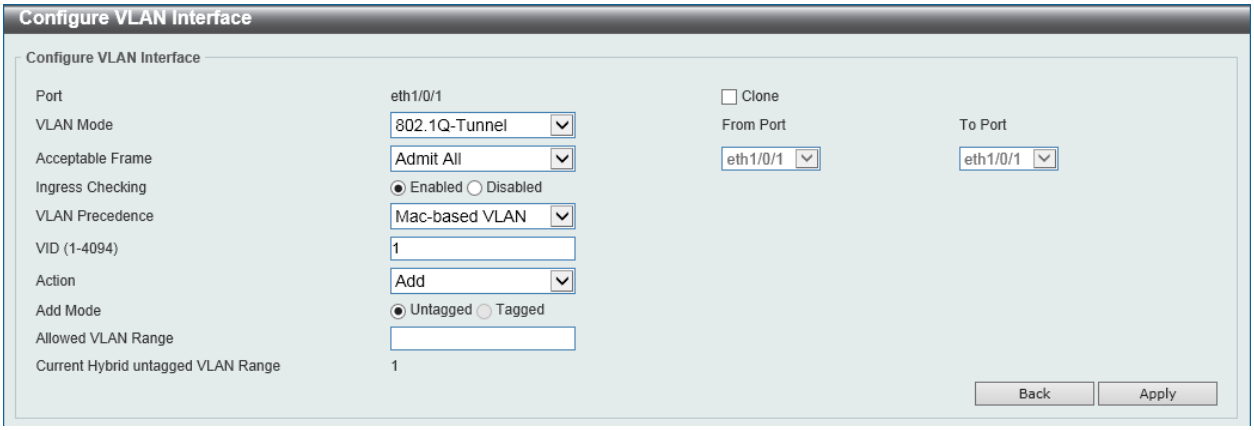



**Figure 5-22 VLAN Interface (802.1Q-Tunnel) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VLAN Mode** | Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **802.1Q-Tunnel**, **Promiscuous**, **Host**, **Trunk Promiscuous**, and **Trunk Secondary**. |
| **Acceptable Frame** | Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**. |
| **Ingress Checking** | Select to enable or disable the ingress checking function. |
| **VLAN Precedence** | Select the VLAN precedence option here. Options to choose from are **Mac-based VLAN** and **Subnet-based VLAN**. |
| **VID** | Enter the VLAN ID used for this configuration here. This value must be between 1 and 4094. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Remove** to remove an entry based in the information entered. |
| **Add Mode** | Select to add an **Untagged** parameter. |
| **Allowed VLAN Range** | Enter the allowed VLAN range information here. |
| **Clone** | Select this option to enable the clone feature. |
| **From Port ~ To Port** | Select the range of ports that will be used in the clone feature here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

When **Promiscuous** was selected as the **VLAN Mode**, the following page will appear.

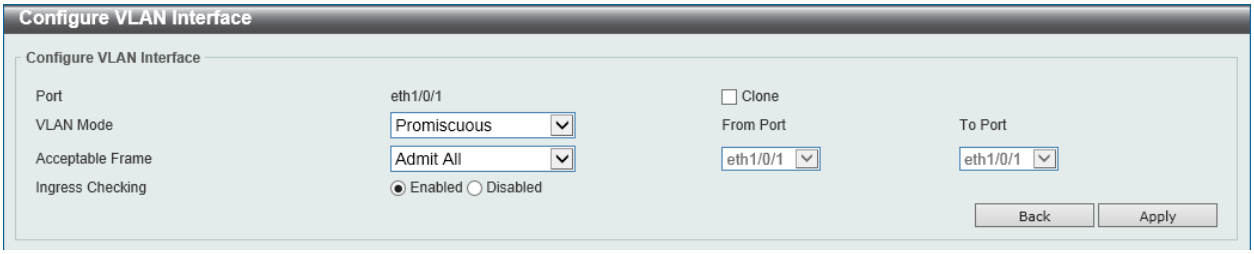



**Figure 5-23 VLAN Interface (Promiscuous) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VLAN Mode** | Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **802.1Q-Tunnel**, **Promiscuous**, **Host**, **Trunk Promiscuous**, and **Trunk Secondary**. |
| **Acceptable Frame** | Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**. |
| **Ingress Checking** | Select to enable or disable the ingress checking function. |
| **Clone** | Select this option to enable the clone feature. |
| **From Port ~ To Port** | Select the range of ports that will be used in the clone feature here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

When **Host** was selected as the **VLAN Mode**, the following page will appear.

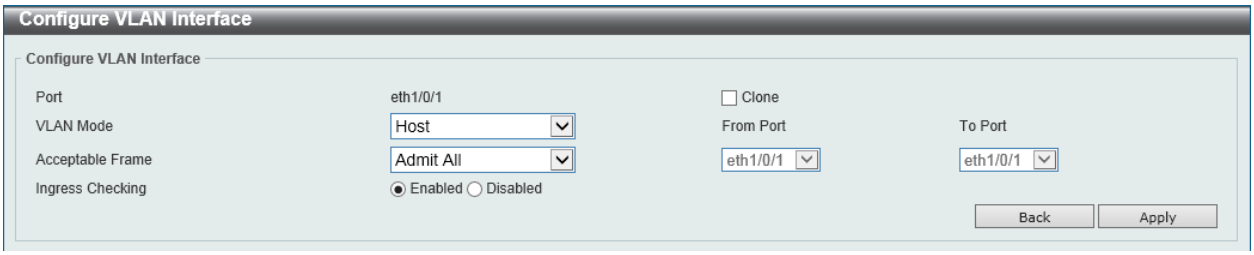



**Figure 5-24 VLAN Interface (Host) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VLAN Mode** | Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **802.1Q-Tunnel**, **Promiscuous**, **Host**, **Trunk Promiscuous**, and **Trunk Secondary**. |
| **Acceptable Frame** | Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**. |
| **Ingress Checking** | Select to enable or disable the ingress checking function. |
| **Clone** | Select this option to enable the clone feature. |
| **From Port ~ To Port** | Select the range of ports that will be used in the clone feature here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

When **Trunk Promiscuous** was selected as the **VLAN Mode**, the following page will appear.

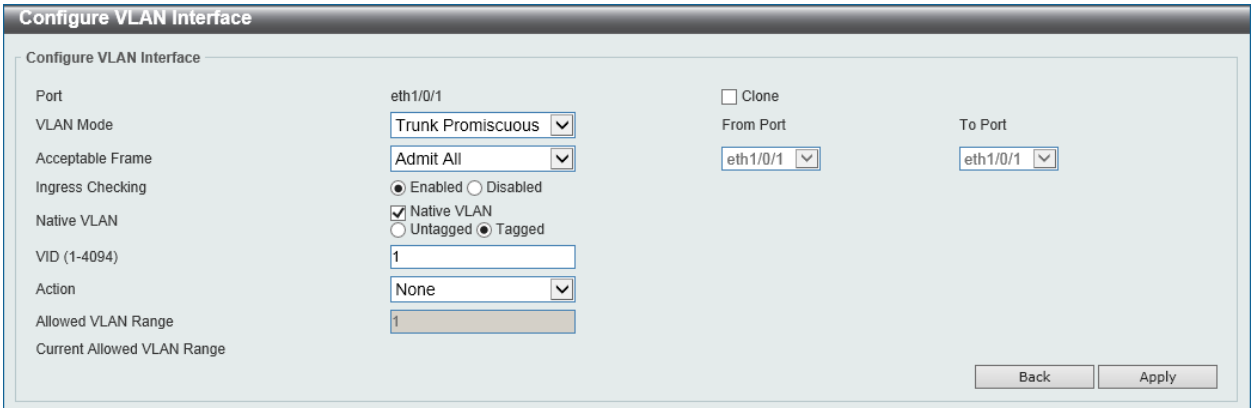



**Figure 5-25 VLAN Interface (Trunk Promiscuous) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VLAN Mode** | Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **802.1Q-Tunnel**, **Promiscuous**, **Host**, **Trunk Promiscuous**, and **Trunk Secondary**. |
| **Acceptable Frame** | Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**. |
| **Ingress Checking** | After selecting **Trunk Promiscuous** as the **VLAN Mode** the following parameter will be available. Select to enable or disable the ingress checking function. |
| **Native VLAN** | Tick this option to enable the native VLAN function. Also select if this VLAN supports **Untagged** or **Tagged** frames. |
| **VID** | After ticking the **Native VLAN** option the following parameter will be available. Enter the VLAN ID used for this configuration here. This value must be between 1 and 4094. |
| **Action** | Select the action that will be taken here. Options to choose from are **All**, **Add**, **Remove**, **Except**, and **Replace**. |
| **Allowed VLAN Range** | Enter the allowed VLAN range information here. |
| **Clone** | Select this option to enable the clone feature. |
| **From Port ~ To Port** | Select the range of ports that will be used in the clone feature here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

When **Trunk Secondary** was selected as the **VLAN Mode**, the following page will appear.

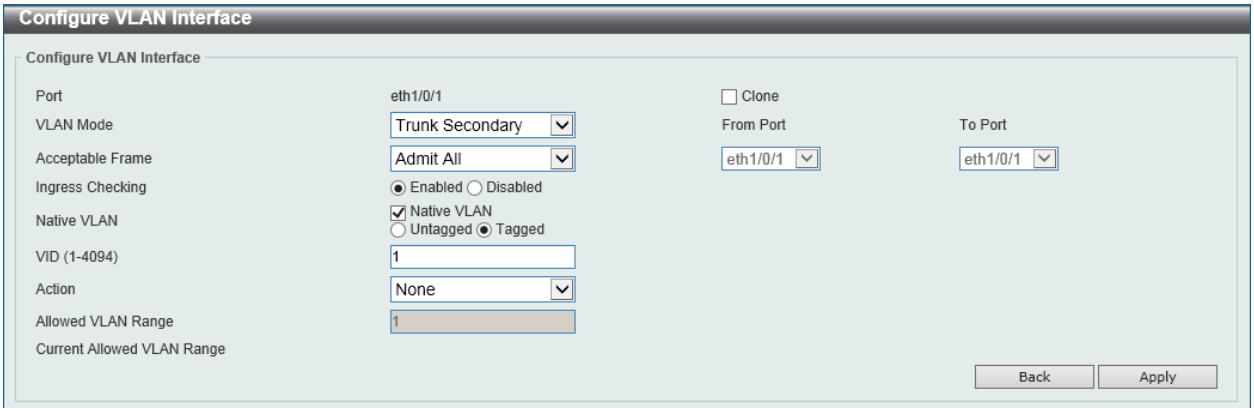



**Figure 5-26 VLAN Interface (Trunk Secondary) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VLAN Mode** | Select the VLAN mode option here. Options to choose from are **Access**, **Hybrid**, **Trunk**, **802.1Q-Tunnel**, **Promiscuous**, **Host**, **Trunk Promiscuous**, and **Trunk Secondary**. |
| **Acceptable Frame** | Select the acceptable frame behavior option here. Options to choose from are **Tagged Only**, **Untagged Only**, and **Admit All**. |
| **Ingress Checking** | After selecting **Trunk Secondary** as the **VLAN Mode** the following parameter will be available. Select to enable or disable the ingress checking function. |
| **Native VLAN** | Tick this option to enable the native VLAN function. Also select if this VLAN supports **Untagged** or **Tagged** frames. |
| **VID** | After ticking the **Native VLAN** option the following parameter will be available. Enter the VLAN ID used for this configuration here. This value must be between 1 and 4094. |
| **Action** | Select the action that will be taken here. Options to choose from are **All**, **Add**, **Remove**, **Except**, and **Replace**. |
| **Allowed VLAN Range** | Enter the allowed VLAN range information here. |
| **Clone** | Select this option to enable the clone feature. |
| **From Port ~ To Port** | Select the range of ports that will be used in the clone feature here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

# Subnet VLAN

This window is used to view and configure the subnet VLAN settings. A subnet VLAN entry is an IP subnet-based VLAN classification rule. If an untagged or priority-tagged IP packet is received on a port, its source IP address will be used to match the subnet VLAN entries. If the source IP is in the subnet of an entry, the packet will be classified to the VLAN defined for this subnet.

To view the following window, click **L2 Features > VLAN > Subnet VLAN**, as shown below:

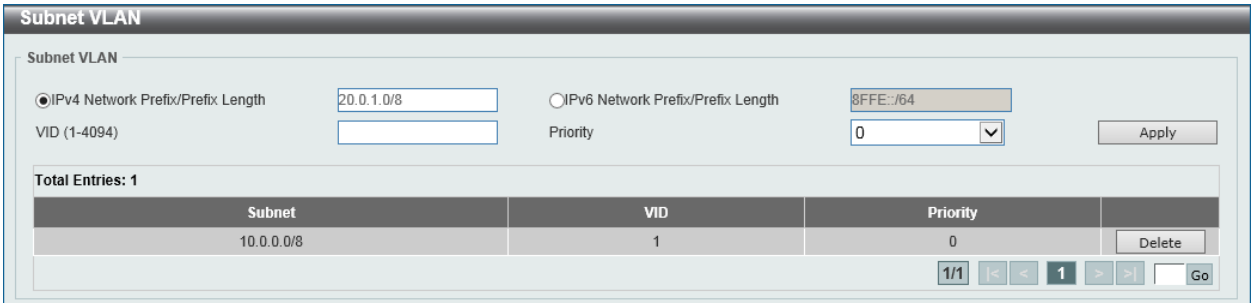



**Figure 5-27 Subnet VLAN Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **IPv4 Network Prefix / Prefix Length** | Select and enter the IPv4 address and prefix length value for the subnet VLAN here. |
| **IPv6 Network Prefix / Prefix Length** | Select and enter the IPv6 address and prefix length value for the subnet VLAN here. |
| **VID** | Enter the VLAN ID for the subnet VLAN here. |
| **Priority** | Select the priority value used here. This value is between 0 and 7. A lower value takes higher priority. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

# Super VLAN

This window is used to view and configure the super VLAN settings. Super VLANs are used to aggregate multiple sub-VLANs (Layer 2 broadcast domains) into IP subnets. A super VLAN cannot have any physical member port. A super VLAN cannot be a sub-VLAN at the same time. Once an IP interface is bound to a super VLAN, the proxy ARP will be enabled automatically on the interface for communication between its sub-VLANs. Multiple super VLANs can be configured and each super VLAN can consist of multiple sub-VLANs.

Private VLANs and super VLANs are mutually exclusive. A private VLAN cannot be configured as a super VLAN. Layer 3 routing protocols, VRRP, multicast protocols, and the IPv6 protocol cannot run on a super VLAN interface.

To view the following window, click **L2 Features > VLAN > Super VLAN**, as shown below:


**Figure 5-28 Super VLAN Window**

The fields that can be configured in **Add Super VLAN** are described below:

| Parameter | Description |
|---|---|
| **Super VID List** | Enter the VLAN ID(s) of the VLAN that will be used as a super VLAN here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Add Sub VLAN** are described below:

| Parameter | Description |
|---|---|
| **Super VID** | Enter the super VLAN's ID here. |
| **Sub VID List** | Enter the VLAN ID(s) of the VLAN that will be added as a sub-VLAN of the super VLAN here. A sub-VLAN is a Layer 2 broadcast domain. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find Super VLAN** are described below:

| Parameter | Description |
|---|---|
| **Super VID** | Enter the super VLAN's ID here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# Private VLAN

This window is used to view and configure the private VLAN settings.

To view the following window, click **L2 Features > VLAN > Private VLAN**, as shown below:

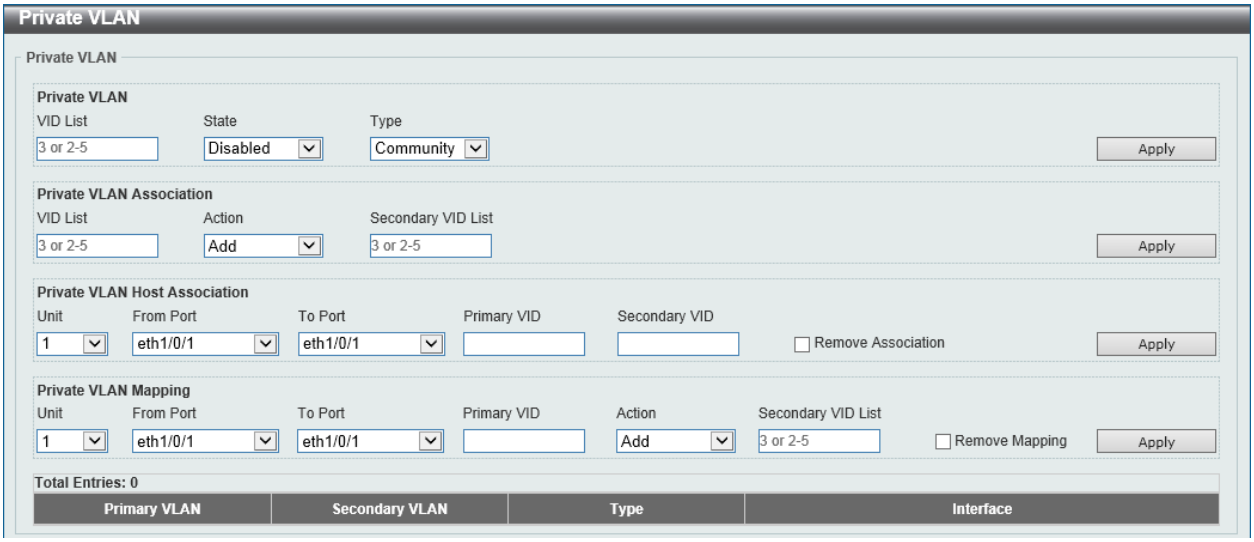



**Figure 5-29 Private VLAN Window**

The fields that can be configured for **Private VLAN** are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the private VLAN ID list here. |
| **State** | Select to enable or disable the private VLAN state here. |
| **Type** | Select the type of private VLAN that will be created here. Options to choose from are **Community**, **Isolated**, and **Primary**. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Private VLAN Association** are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the private VLAN ID list here. |
| **Action** | Select the action that will be taken for the private VLAN here. Options to choose from are **Add**, **Remove**, and **Disabled**. |
| **Secondary VID List** | Enter the secondary private VLAN ID here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Private VLAN Host Association** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Primary VID** | Enter the primary private VLAN ID here. |
| **Secondary VID** | Enter the secondary private VLAN ID here. When ticking the **Remove Association** option, specifies that this configuration will not be enabled. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Private VLAN Mapping** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Primary VID** | Enter the primary private VLAN ID here. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Remove** to remove an entry based in the information entered. |
| **Secondary VID List** | Enter the secondary private VLAN ID here. When ticking the **Remove Mapping** option, specifies that this configuration will not be enabled. |

Click the **Apply** button to accept the changes made.

# VLAN Tunnel

## Dot1q Tunnel

This window is used to view and configure the 802.1Q VLAN tunnel's settings.

An 802.1Q tunnel port behaves as an UNI port of a service VLAN. The trunk ports which are tagged members of the service VLAN behave as the NNI ports of the service VLAN.

Only configure the 802.1Q tunneling Ethernet type on ports that are connected to the provider bridge network, which receives and transmits the service VLAN tagged frames. If the tunnel Ethernet type is configured, the specified value will be the TPID in the outer VLAN tag of the transmitted frames out of this port. The specified TPID is also used to identify the service VLAN tag for the received frame on this port.

To view the following window, click **L2 Features > VLAN Tunnel > Dot1q Tunnel**, as shown below:

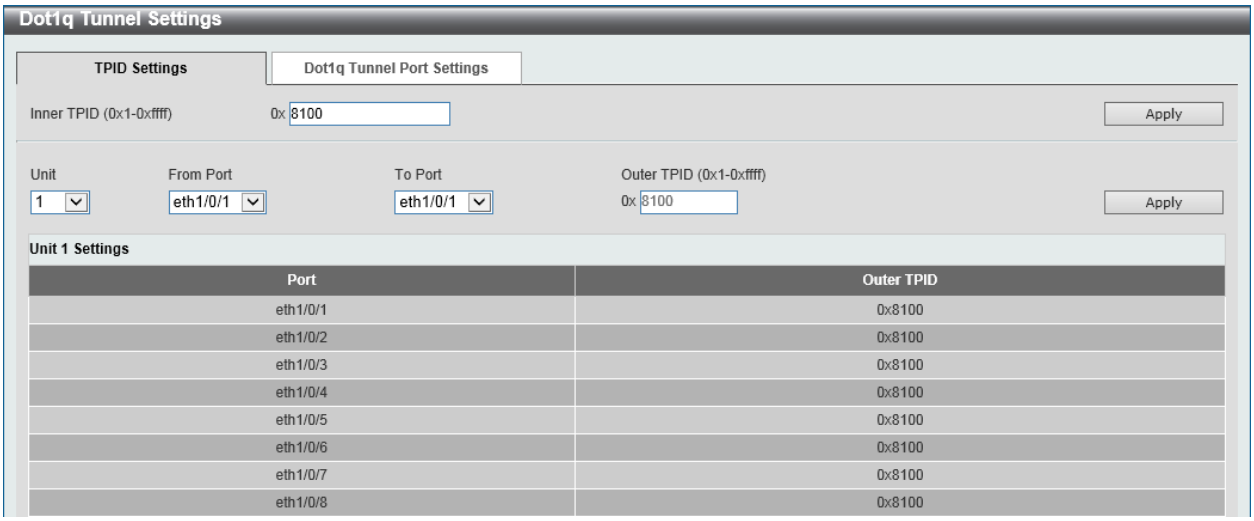



**Figure 5-30 Dot1q Tunnel Settings Window**

The fields that can be configured in **TPID Settings** are described below:

| Parameter | Description |
|---|---|
| **Inner TPID** | Enter the inner TPID value here. This value is in the hexadecimal form. The range is from 0x1 to 0xFFFF. The inner TPID is used to decide if the ingress packet is C-tagged. The Inner TPID is per system configurable. |
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Outer TPID** | Enter the outer TPID value here. This value is in the hexadecimal form. The range is from 0x1 to 0xFFFF. |

Click the **Apply** button to accept the changes made.

After clicking the **Dot1q Tunnel Port Settings** tab, the following page will appear.

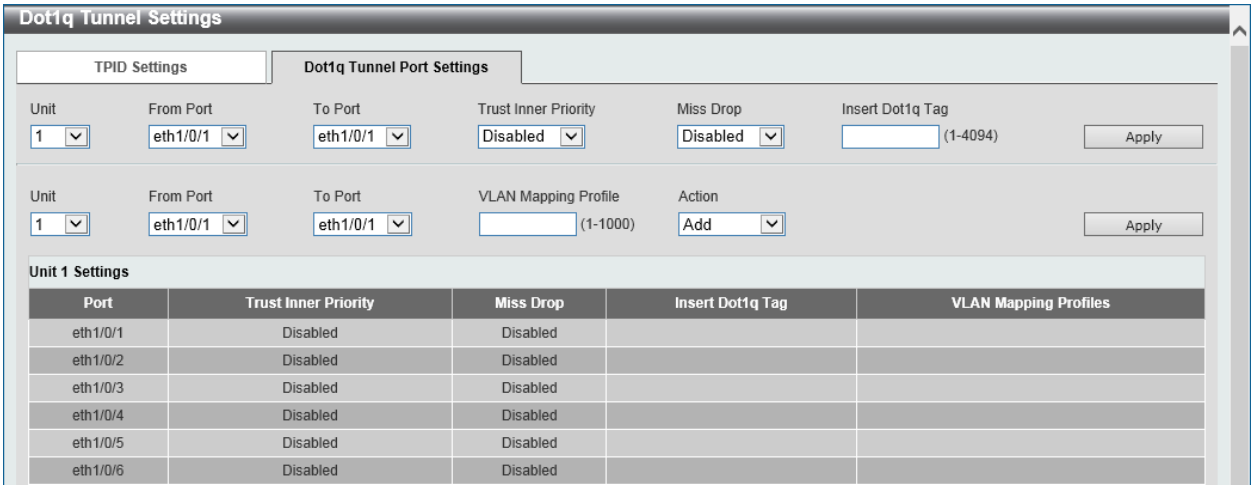



**Figure 5-31 Dot1q Tunnel Settings (Dot1q Tunnel Port Settings) Window**

The fields that can be configured in **Dot1q Tunnel Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Trust Inner Priority** | Select to enable or disable the 802.1Q inner trust priority feature here. When the trusting priority option, on an 802.1Q tunnel port, is enabled the priority of the VLAN tag in the received packets will be copied to the service VLAN tag. |
| **Miss Drop** | Select to enable or disable the miss drop feature here. If the VLAN mapping miss drop option is enabled on the receiving port, when the original VLAN of the received packets cannot match the VLAN mapping entries or rules on this port, the received packets will be dropped. |
| **Insert Dot1q Tag** | Enter the 802.1Q VLAN ID that is inserted to the untagged packets which are received on the 802.1Q tunnel port(s) here. The range is from 1 to 4094. |
| **VLAN Mapping Profile** | Enter the ID of the VLAN mapping profile here. A lower ID has a higher priority. The ID range is from 1 to 1000. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Remove** to remove an entry based in the information entered. |

Click the **Apply** button to accept the changes made.

# VLAN Mapping

This window is used to view and configure the VLAN mapping settings. If a profile is applied on an interface, the switch matches the incoming packets according to the rules of the profile. If the packets match a rule, the action of the rule will be taken. The action may be adding or replacing the outer-VID. Optionally, specify the priority of the new outer-TAG or specify the packets new inner-VID.

The match order depends on the rule's sequence number of the profile and stopped when first matched. If the sequence number is not specified, it will be allocated automatically. The sequence number begins from 10 and the increment is 10. Multiple different types of profiles could be configured onto one interface.

To view the following window, click **L2 Features > VLAN Tunnel > VLAN Mapping**, as shown below:

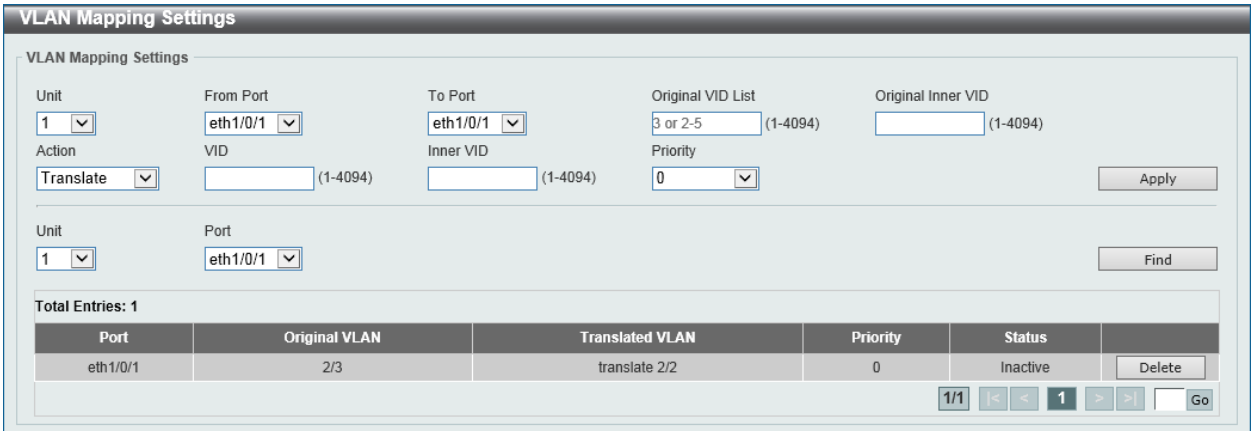



**Figure 5-32 VLAN Mapping Settings Window**

The fields that can be configured in **VLAN Mapping Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Port** | Select the switch's port that will be used for the search here. |
| **Original VID List** | Enter the original VLAN's ID list here. The range is from 1 to 4094. |
| **Original Inner VID** | Enter the original inner VLAN's ID here. The range is from 1 to 4094. |
| **Action** | Select the action that will be taken here. Options to choose from are **Translate** and **Dot1q-tunnel**.<br>• **Translate:** Specifies that the outer-VID will be added for matched packets.<br>• **Dot1q-tunnel:** Specifies that the outer-VID will replace the outer-VID of the matched packets. |
| **VID** | Enter the VLAN's ID here. The range is from 1 to 4094. |
| **Inner VID** | Enter the inner VLAN's ID here. The range is from 1 to 4094. |
| **Priority** | Select the 802.1p priority value here. The range is from 0 to 7. A lower value has a higher priority. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

# VLAN Mapping Profile

This window is used to view and configure the VLAN mapping profile settings.

To view the following window, click **L2 Features > VLAN Tunnel > VLAN Mapping Profile**, as shown below:

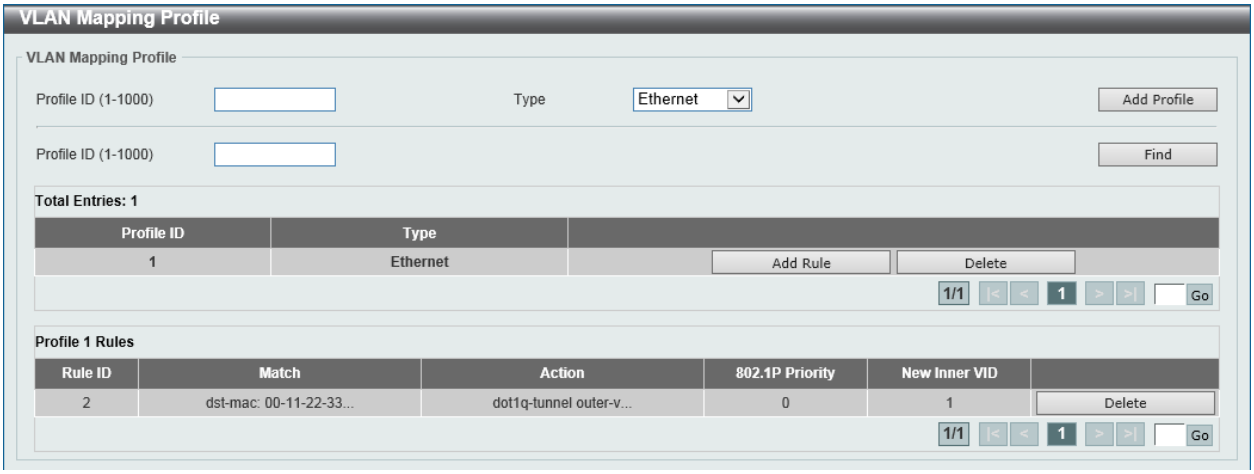



**Figure 5-33 VLAN Mapping Profile Window**

The fields that can be configured in **VLAN Mapping Profile** are described below:

| Parameter | Description |
|---|---|
| **Profile ID** | Enter the ID of the VLAN mapping profile here. A lower ID has a higher priority. The ID range is from 1 to 1000. |
| **Type** | Select the profile type here. Different profiles can match different fields. Options to choose from are **Ethernet**, **IP**, **IPv6**, and **Ethernet-IP**.<br>• **Ethernet:** The profile can match Layer 2 fields.<br>• **IP:** The profile can match Layer 3 IP fields.<br>• **IPv6:** The profile can match IPv6 destination or source addresses. |

Click the **Add Profile** button to add a new VLAN mapping profile.

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Add Rule** button next to an **Ethernet** type profile, the following page will appear.

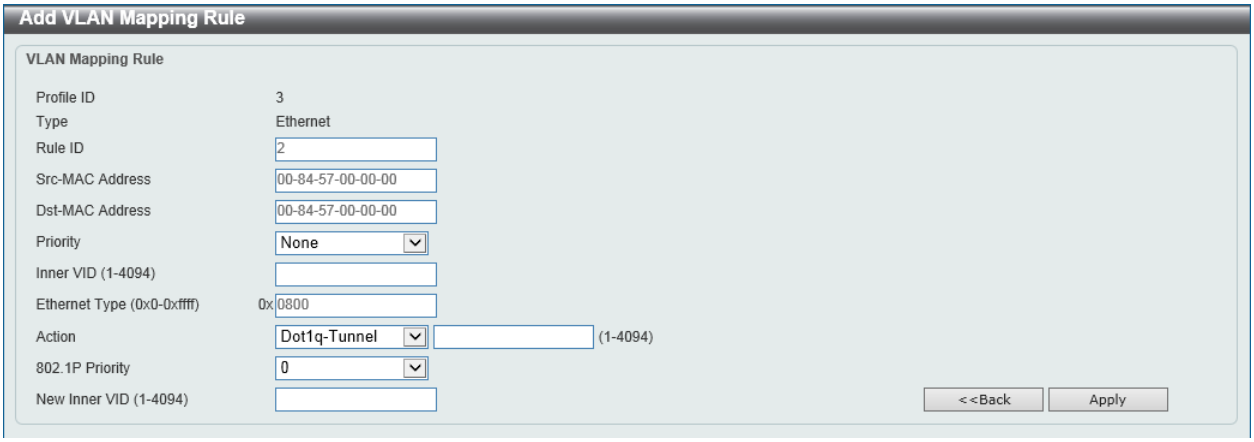



**Figure 5-34 VLAN Mapping Profile (Ethernet, Add Rule) Window**

The fields that can be configured in **VLAN Mapping Rule** are described below:

| Parameter | Description |
|---|---|
| **Rule ID** | Enter the VLAN mapping rule's ID here. If not specified, the rule ID begins from 10 and is incremented by 10 for every new rule. The range |

| Parameter | Description |
|---|---|
| | is from 1 to 10000 |
| **Src-MAC Address** | Enter the source MAC address here. |
| **Dst-MAC Address** | Enter the destination MAC address here. |
| **Priority** | Select the 802.1p priority value here. The range is from 0 to 7. A lower value has a higher priority. |
| **Inner VID** | Enter the inner VLAN's ID here. The range is from 1 to 4094. |
| **Ethernet Type** | Enter the Ethernet type value here. The range is from 0x0 to 0xFFFF. |
| **Action** | Select the action that will be taken here. Options to choose from are **Dot1q-Tunnel** and **Translate**.<br>• **Dot1q-Tunnel:** Specifies that the outer-VID will be added for matched packets.<br>• **Translate:** Specifies that the outer-VID will replace the outer-VID of the matched packets. |
| **New Outer VID** | Enter the new outer VLAN's ID here. The range is from 1 to 4094. |
| **802.1P Priority** | Select the 802.1p priority value here. The range is from 0 to 7. A lower value has a higher priority. |
| **New Inner VID** | After selecting Dot1q-Tunnel as the action, enter the new inner VLAN's ID here. The range is from 1 to 4094. This option is only available when **Dot1q-Tunnel** was selected as the action. |

Click the **<<Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

After clicking the **Add Rule** button next to an **IP** type profile, the following page will appear.

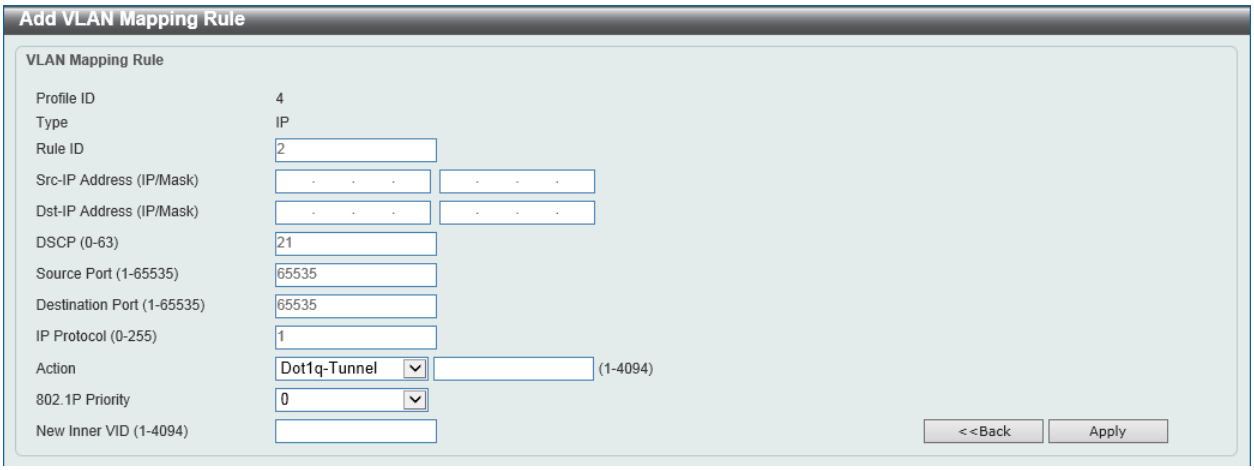



**Figure 5-35 VLAN Mapping Profile (IP, Add Rule) Window**

The fields that can be configured in **VLAN Mapping Rule** are described below:

| Parameter | Description |
|---|---|
| **Rule ID** | Enter the VLAN mapping rule's ID here. If not specified, the rule ID begins from 10 and is incremented by 10 for every new rule. The range is from 1 to 10000 |
| **Src-IP Address (IP/Mask)** | Enter the source IPv4 address and subnet mask here. |
| **Dst-IP Address (IP/Mask)** | Enter the destination IPv4 address and subnet mask here. |

| Parameter | Description |
|---|---|
| **DSCP** | Enter the DSCP value here. The range is from 0 to 63. |
| **Source Port** | Enter the source TCP/UDP port's number here. The range is from 1 to 65535. |
| **Destination Port** | Enter the destination TCP/UDP port's number here. The range is from 1 to 65535. |
| **IP Protocol** | Enter the Layer 3 IP protocol value here. The range is from 0 to 255. |
| **Action** | Select the action that will be taken here. Options to choose from are **Dot1q-Tunnel** and **Translate**.<br>• **Dot1q-Tunnel:** Specifies that the outer-VID will be added for matched packets.<br>• **Translate:** Specifies that the outer-VID will replace the outer-VID of the matched packets. |
| **New Outer VID** | Enter the new outer VLAN's ID here. The range is from 1 to 4094. |
| **802.1P Priority** | Select the 802.1p priority value here. The range is from 0 to 7. A lower value has a higher priority. |
| **New Inner VID** | After selecting Dot1q-Tunnel as the action, enter the new inner VLAN's ID here. The range is from 1 to 4094. This option is only available when **Dot1q-Tunnel** was selected as the action. |

Click the **<<Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

After clicking the **Add Rule** button next to an **IPv6** type profile, the following page will appear.

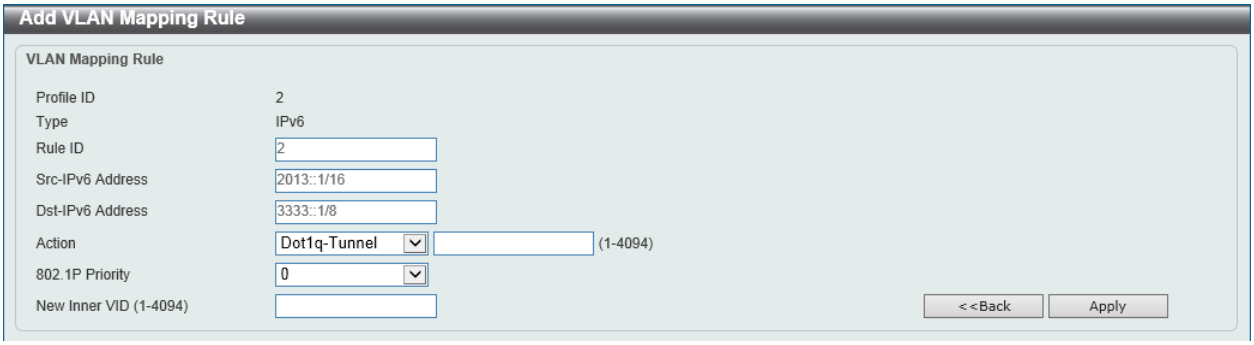



**Figure 5-36 VLAN Mapping Profile (IPv6, Add Rule) Window**

The fields that can be configured in **VLAN Mapping Rule** are described below:

| Parameter | Description |
|---|---|
| **Rule ID** | Enter the VLAN mapping rule's ID here. If not specified, the rule ID begins from 10 and is incremented by 10 for every new rule. The range is from 1 to 10000 |
| **Src-IPv6 Address** | Enter the source IPv6 address and prefix length here. |
| **Dst-IPv6 Address** | Enter the destination IPv6 address and prefix length here. |
| **Action** | Select the action that will be taken here. Options to choose from are **Dot1q-Tunnel** and **Translate**.<br>• **Dot1q-Tunnel:** Specifies that the outer-VID will be added for matched packets.<br>• **Translate:** Specifies that the outer-VID will replace the outer-VID |

| Parameter | Description |
|---|---|
| | of the matched packets. |
| **New Outer VID** | Enter the new outer VLAN's ID here. The range is from 1 to 4094. |
| **802.1P Priority** | Select the 802.1p priority value here. The range is from 0 to 7. A lower value has a higher priority. |
| **New Inner VID** | After selecting Dot1q-Tunnel as the action, enter the new inner VLAN's ID here. The range is from 1 to 4094. This option is only available when **Dot1q-Tunnel** was selected as the action. |

Click the **<<Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

After clicking the **Add Rule** button next to an **Ethernet-IP** type profile, the following page will appear.

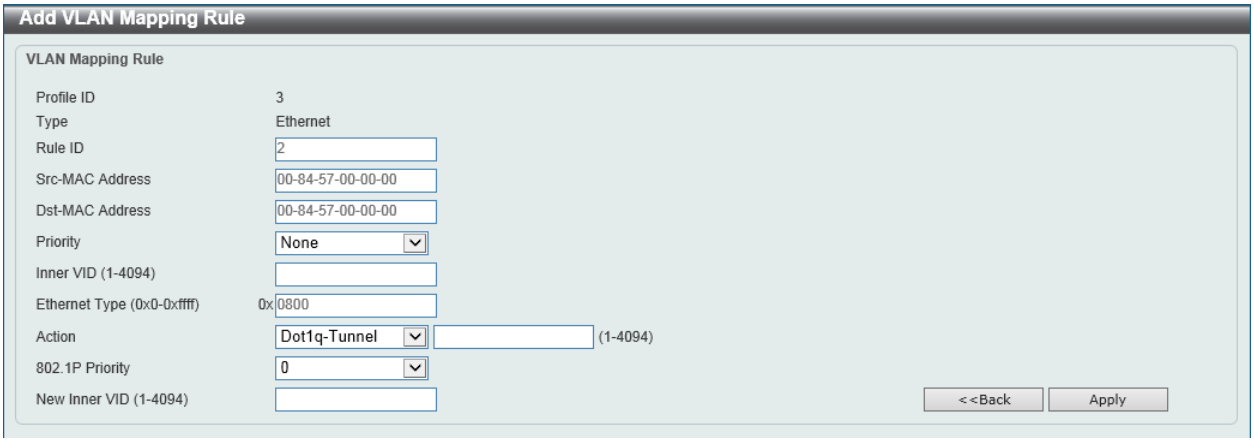



**Figure 5-37 VLAN Mapping Profile (Ethernet-IP, Add Rule) Window**

The fields that can be configured in **VLAN Mapping Rule** are described below:

| Parameter | Description |
|---|---|
| **Rule ID** | Enter the VLAN mapping rule's ID here. If not specified, the rule ID begins from 10 and is incremented by 10 for every new rule. The range is from 1 to 10000 |
| **Src-MAC Address** | Enter the source MAC address here. |
| **Dst-MAC Address** | Enter the destination MAC address here. |
| **Priority** | Select the 802.1p priority value here. The range is from 0 to 7. A lower value has a higher priority. |
| **Inner VID** | Enter the inner VLAN's ID here. The range is from 1 to 4094. |
| **Ethernet Type** | Enter the Ethernet type value here. The range is from 0x0 to 0xFFFF. |
| **Src-IP Address** | Enter the source IPv4 address and subnet mask here. |
| **Dst-IP Address** | Enter the destination IPv4 address and subnet mask here. |
| **DSCP** | Enter the DSCP value here. The range is from 0 to 63. |
| **Source Port** | Enter the source TCP/UDP port's number here. The range is from 1 to 65535. |
| **Destination Port** | Enter the destination TCP/UDP port's number here. The range is from 1 to 65535. |
| **IP Protocol** | Enter the Layer 3 IP protocol value here. The range is from 0 to 255. |

| Parameter | Description |
|---|---|
| **Action** | Select the action that will be taken here. Options to choose from are **Dot1q-Tunnel** and **Translate**.<br>• **Dot1q-Tunnel:** Specifies that the outer-VID will be added for matched packets.<br>• **Translate:** Specifies that the outer-VID will replace the outer-VID of the matched packets. |
| **New Outer VID** | Enter the new outer VLAN's ID here. The range is from 1 to 4094. |
| **802.1P Priority** | Select the 802.1p priority value here. The range is from 0 to 7. A lower value has a higher priority. |
| **New Inner VID** | After selecting Dot1q-Tunnel as the action, enter the new inner VLAN's ID here. The range is from 1 to 4094. This option is only available when **Dot1q-Tunnel** was selected as the action. |

Click the **<<Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

# STP

## STP Global Settings

This window is used to view and configure the STP global settings.

To view the following window, click **L2 Features > STP > STP Global Settings**, as shown below:

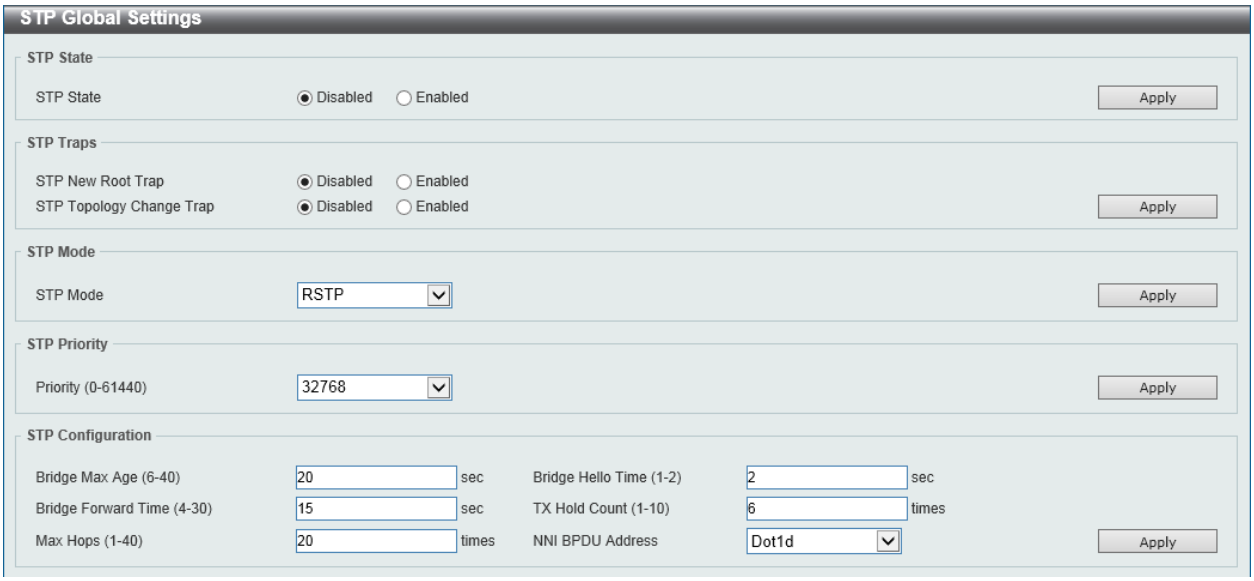



**Figure 5-38 STP Global Settings Window**

The field that can be configured for **STP State** is described below:

| Parameter | Description |
|---|---|
| **STP State** | Select to enable or disable the STP global state here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **STP Traps** are described below:

| Parameter | Description |
|---|---|
| **STP New Root Trap** | Select to enable or disable the STP new root trap option here. |
| **STP Topology Change Trap** | Select to enable or disable the STP topology change trap option here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **STP Mode** are described below:

| Parameter | Description |
|---|---|
| **STP Mode** | Select the STP mode used here. Options to choose from are **MSTP**, **RSTP**, and **STP**. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **STP Priority** are described below:

| Parameter | Description |
|---|---|
| **Priority** | Select the STP priority value here. This value is between 0 and 61440. By default, this value is 32768. The lower the value, the higher the priority. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **STP Configuration** are described below:

| Parameter | Description |
|---|---|
| **Bridge Max Age** | Enter the bridge's maximum age value here. This value must be between 6 and 40 seconds. By default, this value is 20 seconds. The maximum age value may be set to ensure that old information does not endlessly circulate through redundant paths in the network, preventing the effective propagation of the new information. Set by the Root Bridge, this value will aid in determining that the switch has spanning tree configuration values consistent with other devices on the bridged LAN. |
| **Bridge Hello Time** | After selecting **RSTP**/**STP** as the **Spanning Tree Mode**, this parameter will be available. Enter the bridge's hello time value here. This value must be between 1 and 2 seconds. By default, this value is 2 seconds. This is the interval between two transmissions of BPDU packets sent by the Root Bridge to tell all other switches that it is indeed the Root Bridge. This field will only appear here when STP or RSTP is selected for the STP Version. For MSTP, the Hello Time must be set on a port per port basis. |
| **Bridge Forward Time** | Enter the bridge's forwarding time value here. This value must be between 4 and 30 seconds. By default, this value is 15 seconds. Any port on the switch spends this time in the listening state while moving from the blocking state to the forwarding state. |
| **TX Hold Count** | Enter the transmit hold count value here. This value must be between 1 and 10 times. By default, this value is 6 times. This value is used to set the maximum number of Hello packets transmitted per interval. |
| **Max Hops** | Enter the maximum number of hops that are allowed. This value must be between 1 and 40 hops. By default, this value is 20 hops. This value is used to set the number of hops between devices in a spanning |

| Parameter | Description |
|---|---|
| | tree region before the BPDU (bridge protocol data unit) packet sent by the switch will be discarded. Each switch on the hop count will reduce the hop count by one until the value reaches zero. The switch will then discard the BDPU packet and the information held for the port will age out. |
| **NNI BPDU Address** | Select the NNI BPDU Address option here. Options to choose from are **Dot1d** and **Dot1ad**. By default, this option is **Dot1d**. This parameter is used to determine the BPDU protocol address for STP in the service provide site. It can use an 802.1d STP address, 802.1ad service provider STP address, or a user defined multicast address. |

Click the **Apply** button to accept the changes made.

# STP Port Settings

This window is used to view and configure the STP port settings.

To view the following window, click **L2 Features > STP > STP Port Settings**, as shown below:

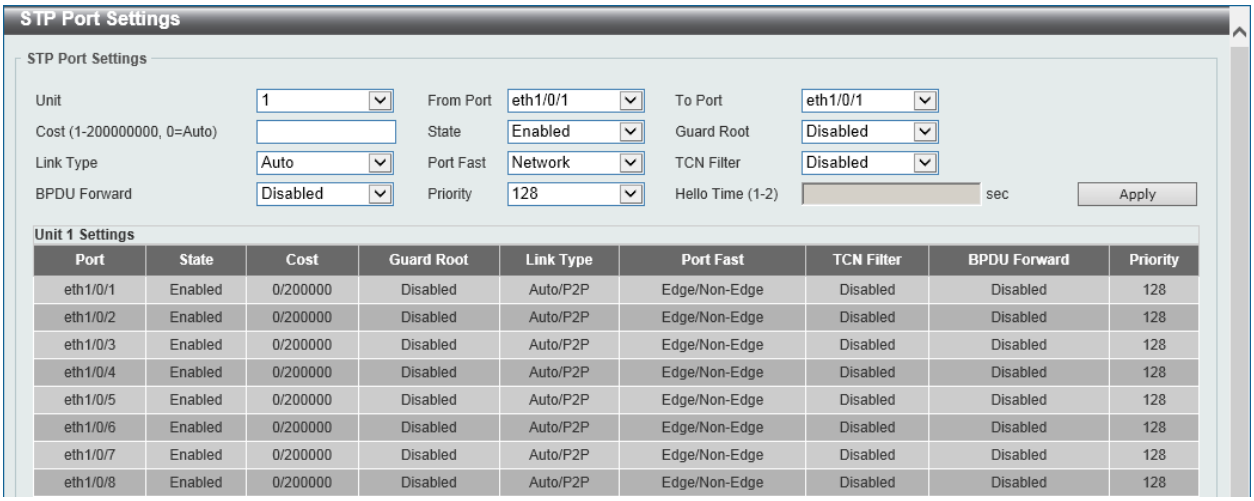



**Figure 5-39 STP Port Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Cost** | Enter the cost value here. This value must be between 1 and 200000000. This value defines a metric that indicates the relative cost of forwarding packets to the specified port list. Port cost can be set automatically or as a metric value. The default value is **0** (auto). Setting 0 for the external cost will automatically set the speed for forwarding packets to the specified port(s) in the list for optimal efficiency. The default port cost for a 100Mbps port is 200000, a Gigabit port is 20000, and a 10 Gigabit port is 2000. The lower the number, the greater the probability the port will be chosen to forward packets. |
| **State** | Select to enable or disable the STP port state. |
| **Guard Root** | Select to enable or disable the guard root function. |

| Parameter | Description |
|---|---|
| **Link Type** | Select the link type option here. Options to choose from are **Auto**, **P2P**, and **Shared**. A full-duplex port is considered to have a point-to-point (**P2P**) connection. On the opposite, a half-duplex port is considered to have a **Shared** connection .The port cannot transit into the forwarding state rapidly by setting the link type to **Shared**. By default this option is **Auto**. |
| **Port Fast** | Select the port fast option here. Options to choose from are **Network**, **Disabled**, and **Edge**.<br>• In the **Network** mode the port will remain in the non-port-fast state for three seconds. The port will change to the port-fast state if no BPDU is received and changes to the forwarding state. If the port received the BPDU later, it will change to the non-port-fast state.<br>• In the **Disable** mode, the port will always be in the non-port-fast state. It will always wait for the forward-time delay to change to the forwarding state.<br>• In the **Edge** mode, the port will directly change to the spanning-tree forwarding state when a link-up occurs without waiting for the forward-time delay. If the interface receives a BPDU later, its operation state changes to the non-port-fast state.<br>By default, this option is **Network**. |
| **TCN Filter** | Select to enable or disable the TCN filter option. Enabling TC filtering on a port is useful for an ISP to prevent the external bridge to a core region of the network, causing address flushing in that region, possibly because those bridges are not under the full control of the administrator. When a port is set to the TCN filter mode, the TC event received by the port will be ignored. By default, this option is **Disabled**. |
| **BPDU Forward** | Select to enable or disable BPDU forwarding. If enabled, the received STP BPDU will be forwarded to all VLAN member ports in the untagged form. By default, this option is **Disabled**. |
| **Priority** | Select the priority value here. Options to choose from are **0** to **240**. By default this option is **0**. A lower value has higher priority. |
| **Hello Time** | Enter the hello time value here. This value must be between **1** and **2** seconds. This value specifies the interval that a designated port will wait between the periodic transmissions of each configuration message. |

Click the **Apply** button to accept the changes made.

# MST Configuration Identification

This window is used to view and configure the MST configuration identification settings. These settings will uniquely identify a multiple spanning tree instance set on the switch. The switch initially possesses one CIST, or Common Internal Spanning Tree, of which the user may modify the parameters for but cannot change the MSTI ID for, and cannot be deleted.

To view the following window, click **L2 Features > STP > MST Configuration Identification**, as shown below:

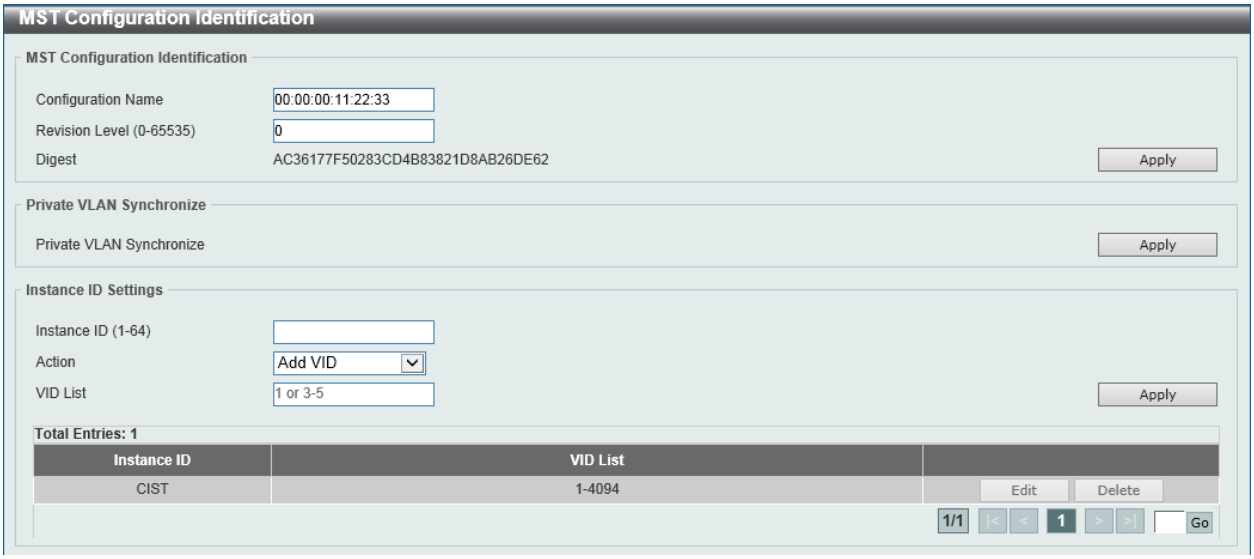



**Figure 5-40 MST Configuration Identification Window**

The fields that can be configured for **MST Configuration Identification** are described below:

| Parameter | Description |
|---|---|
| **Configuration Name** | Enter the MST. This name uniquely identifies the MSTI (Multiple Spanning Tree Instance). If a Configuration Name is not set, this field will show the MAC address to the device running MSTP. |
| **Revision Level** | Enter the revision level value here. This value must be between 0 and 65535. By default, this value is 0. This value, along with the Configuration Name, identifies the MSTP region configured on the switch. |

Click the **Apply** button to accept the changes made.

In the **Private VLAN Synchronize** section, the user can click the **Apply** button to synchronize the private VLANs.

The fields that can be configured for **Instance ID Settings** are described below:

| Parameter | Description |
|---|---|
| **Instance ID** | Enter the instance ID here. This value must be between 1 and 64. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add VID** and **Remove VID**. |
| **VID List** | Enter the VID list value here. This field is used to specify the VID range from configured VLANs set on the switch. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specific entry.

## STP Instance

This window is used to view and configure the STP instance settings.

To view the following window, click **L2 Features > STP > STP Instance**, as shown below:

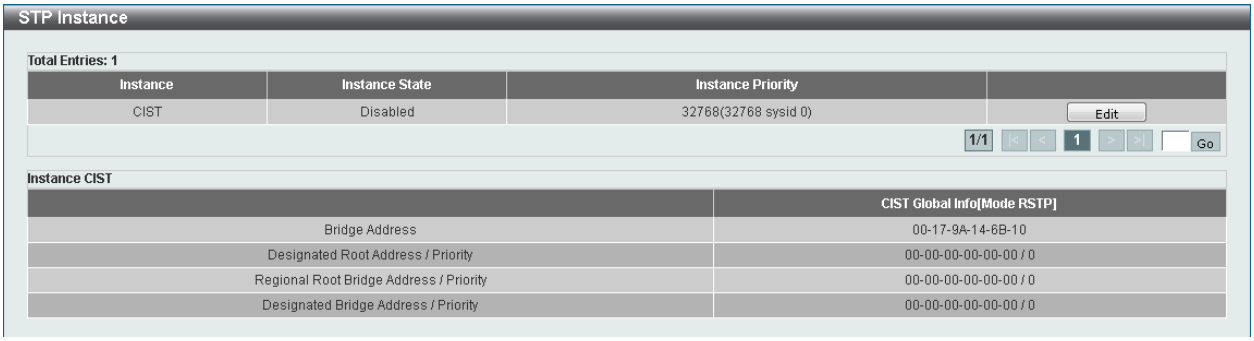



**Figure 5-41 STP Instance Window**

Click the **Edit** button to re-configure the specific entry.

## MSTP Port Information

This window is used to view and configure the MSTP port information settings.

To view the following window, click **L2 Features > STP > MSTP Port Information**, as shown below:

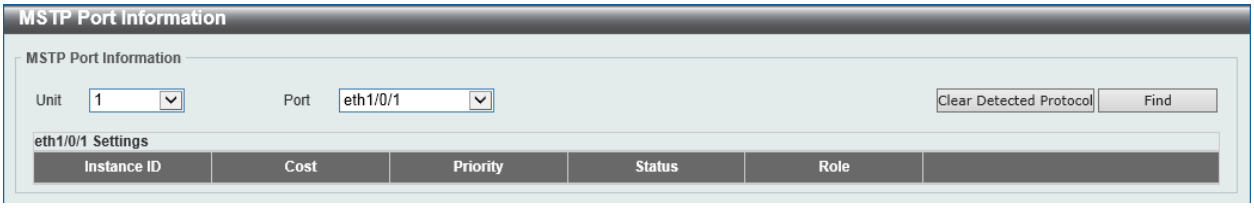



**Figure 5-42 MSTP Port Information Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this display here. |
| **Port** | Select the port number that will be cleared here. |

Click the **Clear Detected Protocol** button to clear the detected protocol settings for the port selected.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to re-configure the specific entry.

# ERPS (G.8032)

## ERPS

This window is used to view and configure Ethernet Ring Protection Switching (ERPS) settings.

To view the following window, click **L2 Features > ERPS (G.8032) > ERPS**, as shown below:

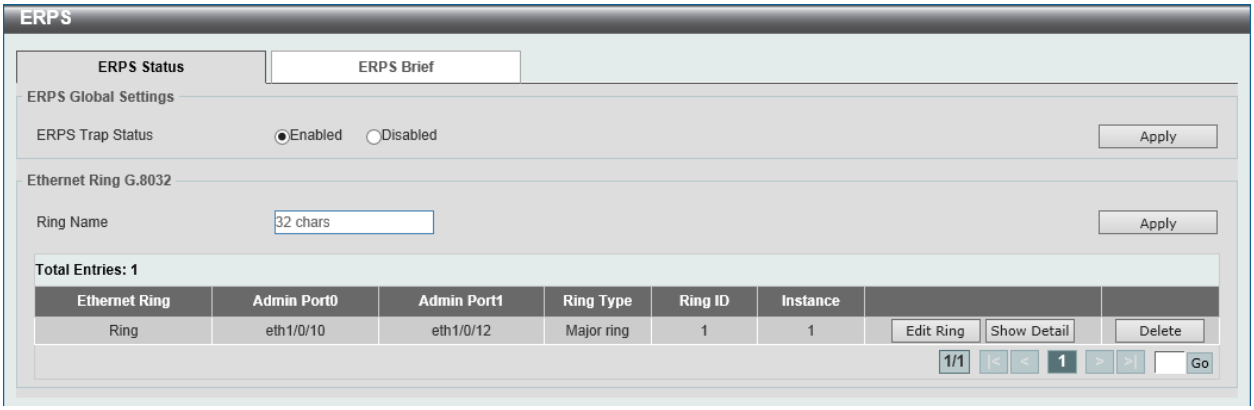



**Figure 5-43 ERPS Window**

The fields that can be configured in **ERPS Global Settings** are described below:

| Parameter | Description |
|---|---|
| **ERPS Trap Status** | Select to enable or disable the ERPS trap status here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Ethernet Ring G.8032** are described below:

| Parameter | Description |
|---|---|
| **Ring Name** | Enter the Ethernet Ring Protection (ERP) instance's name here. This name can be up to 32 characters long. |

Click the **Apply** button to create an ITU-T G.8032 ERP physical ring.

Click the **Edit Ring** button to modify an ITU-T G.8032 ERP physical ring.

Click the **Show Detail** button to view the ITU-T G.8032 ERP physical ring's status information.

Click the **Delete** button to delete the specified ITU-T G.8032 ERP physical ring.

After click the **Edit Ring** button, the following window will appear.


**Figure 5-44 ERPS (Edit Ring) Window**

The fields that can be configured in **Ethernet Ring Settings** are described below:

| Parameter | Description |
|---|---|
| **Instance ID** | Select the checkbox and enter the ERP instance number here. This value must be between 1 and 32. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |

| Parameter | Description |
|---|---|
| **Sub Ring Name** | Select the checkbox and enter the physical ring's sub-ring name here. This name can be up to 32 characters long. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |
| **Port0** | Select the checkbox and then select the switch's unit ID and the port number that will be the first ring port of the physical ring. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |
| **Port1** | Select the checkbox and then select the switch's unit ID and the port number that will be the second ring port of the physical ring. Select the **None** option, from the drop-down menu, specifies that the inter-connected node is a local node endpoint of an open ring. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |

Click the **Back** button to discard the changes made and return to the previous window.

Click the **Apply** button to accept the changes made.

After click the **Show Detail** button, the following window will appear.

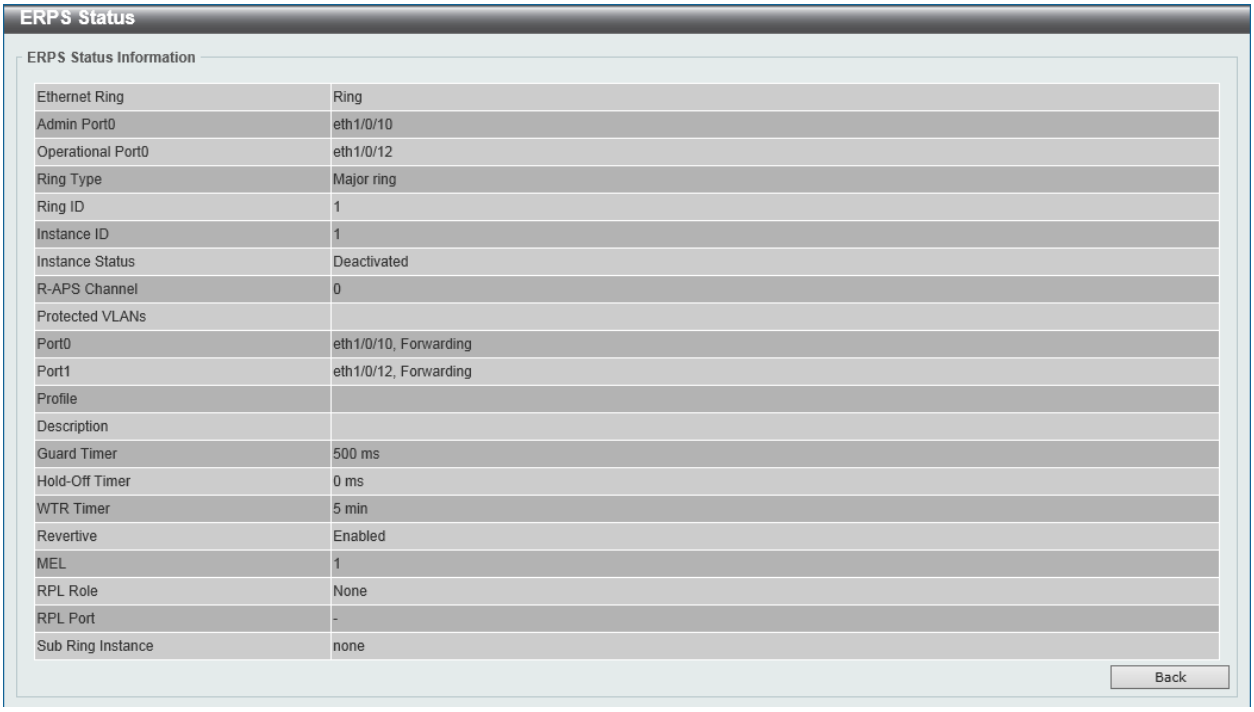



**Figure 5-45 ERPS (View Detail) Window**

After selecting the **ERPS Brief** tab option, at the top of the page, the following page will be available.

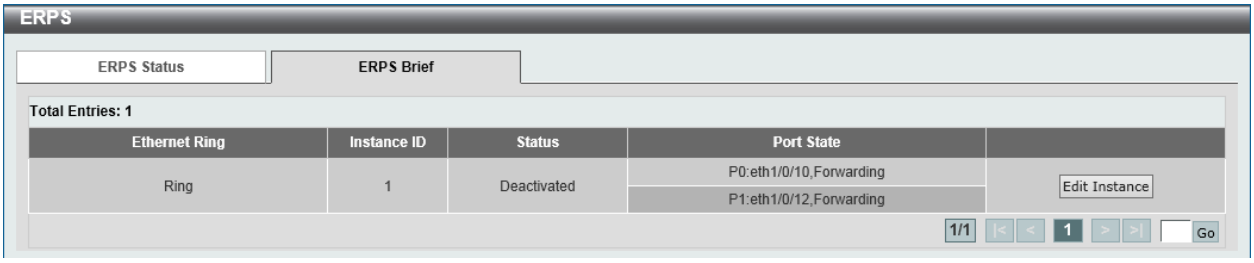
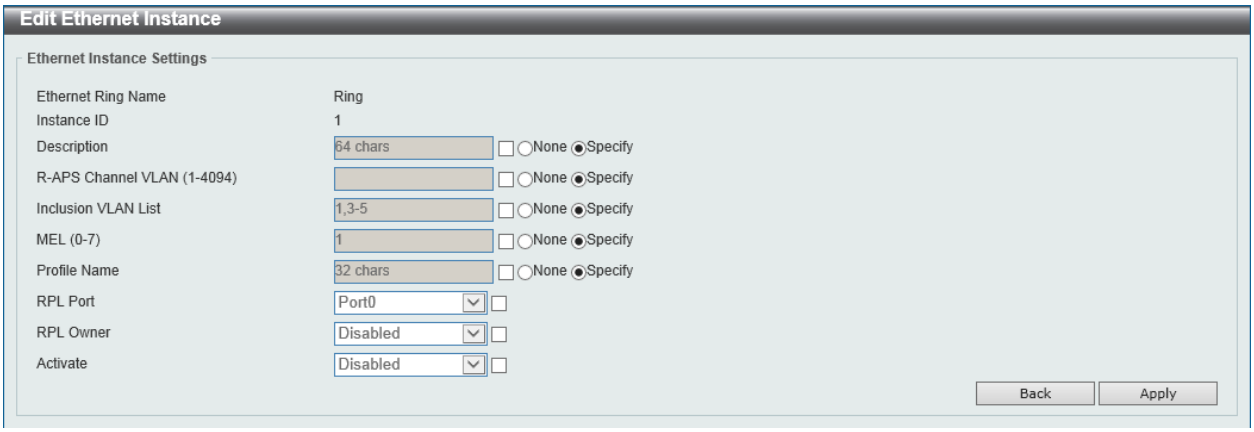



**Figure 5-46 ERPS (ERPS Brief) Window**

Click the **Edit Instance** button to configure the ERP instance.

After click the **Edit Instance** button, the following window will appear.




The fields that can be configured in **Ethernet Instance Settings** are described below:

| Parameter | Description |
|---|---|
| **Description** | Select the checkbox and enter the ERP instance's description here. This description can be up to 64 characters long. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |
| **R-APS Channel VLAN** | Select the checkbox and enter the R-APS channel VLAN's ID for the ERP instance here. The APS channel VLAN of a sub-ring instance is also the virtual channel of the sub-ring. This value must be between 1 and 4094. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |
| **Inclusion VLAN List** | Select the checkbox and enter the inclusion VLAN list here. A range is identified when a hyphen (-) is used. For example VLANs 1 to 5 can be entered as 1-5. A list is identified when commas (,) are used. For example, use VLANs 1,3,5. The VLANs specified here will be protected by the ERP mechanism. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |
| **MEL** | Select the checkbox and enter the ring MEL value of the ERP instance here. This value must be between 0 and 7. The configured MEL value of all ring nodes that participate in the same ERP instance should be identical. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |
| **Profile Name** | Select the checkbox and enter the G.8032 profile's name here that will be associated with this ERP instance. Multiple ERP instances can be associated with the same G.8032 profile. The instances associated with the same profile protect the same set of VLANs, or the VLANs protected by one instance are a subset of LANs protected by another instance. This name can be up to 32 characters long. Select the **Specify** radio button to configure this parameter as per normal. Select the **None** radio button to revert this parameter to the default setting. |
| **RPL Port** | Select the checkbox and then select the RPL port option here. Options to choose from are **Port0** and **Port1**. The option selected will be |

| Parameter | Description |
|---|---|
| | configured as the RPL port. |
| **RPL Owner** | Select the checkbox and then select whether this node is the RPL owner or neighbor. Options to choose from are **Enabled** and **Disabled**. Enabling this option will specify this RPL as an owner. |
| **Activate** | Select the checkbox and then select whether or not to active this ERP instance. Options to choose from are **Enabled** and **Disabled**. Enabling this option will active this ERP instance. |

Click the **Back** button to discard the changes made and return to the previous window.

Click the **Apply** button to accept the changes made.

# ERPS Profile

This window is used to view and configure the Ethernet Ring G.8032 profile settings.

To view the following window, click **L2 Features > ERPS (G.8032) > ERPS Profile**, as shown below:

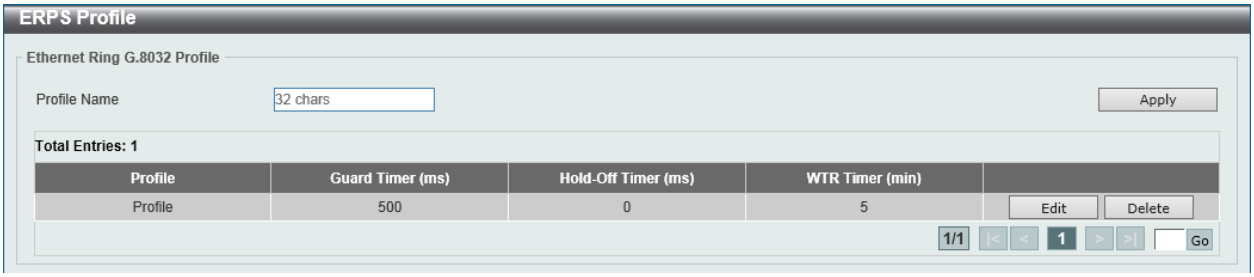



**Figure 5-47 ERPS Profile Window**

The fields that can be configured in **Ethernet Ring G.8032 Profile** are described below:

| Parameter | Description |
|---|---|
| **Profile Name** | Enter the G.8032 profile's name here. This name can be up to 32 characters long. Multiple ERP instances can be associated with the same G.8032 profile. The instances associated with the same profile protect the same set of VLANs, or the VLANs protected by one instance are a subset of LANs protected by another instance. |

Click the **Apply** button to associate the G.8032 profile with the ERP instance created.

Click the **Edit** button to modify the specified G.8032 profile.

Click the **Delete** button to disassociate the G.8032 profile.

After click the **Edit** button, the following window will appear.

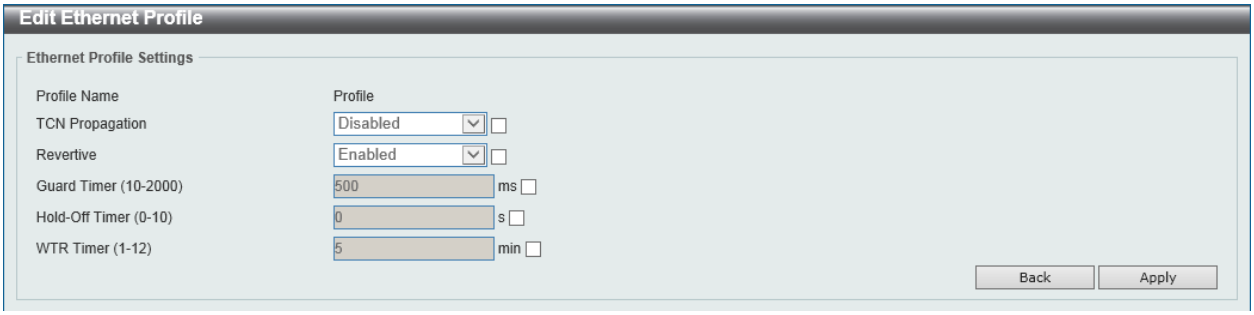



**Figure 5-48 ERPS Profile (Edit) Window**

The fields that can be configured in **Ethernet Profile Settings** are described below:

| Parameter | Description |
|---|---|
| **TCN Propagation** | Select the checkbox and then select the TCN propagation state. Options to choose from are **Enable** and **Disabled**. This function is used to enable the propagation of the topology change notifications from the sub-ERP instance to the major instance. |
| **Revertive** | Select the checkbox and then select the revertive state. Options to choose from are **Enable** and **Disabled**. This function is used to revert back to the working transport entity, for example, when the RPL was blocked. |
| **Guard Timer** | Select the checkbox and enter the guard timer value here. This value must be between 10 and 2000 milliseconds. By default, this value is 500 milliseconds. |
| **Hold-Off Timer** | Select the checkbox and enter hold-off timer value here. This value must be between 0 and 10 seconds. By default, this value is 0 seconds. |
| **WTR Timer** | Select the checkbox and enter the WTR timer value here. This value must be between 1 and 12 minutes. By default, this value is 5 minutes. |

Click the **Back** button to discard the changes made and return to the previous window.

Click the **Apply** button to accept the changes made.

# Loopback Detection

The Loopback Detection (LBD) function is used to detect the loop created by a specific port. This feature is used to temporarily shut down a port on the Switch when a CTP (Configuration Testing Protocol) packet has been looped back to the Switch. When the Switch detects CTP packets received from a port or a VLAN, this signifies a loop on the network. The Switch will automatically block the port or the VLAN and send an alert to the administrator. The Loopback Detection port will restart (change to normal state) when the Loopback Detection Recover Time times out. The Loopback Detection function can be implemented on a range of ports at a time. The user may enable or disable this function using the drop-down menu.

To view the following window, click **L2 Features > Loopback Detection**, as shown below:

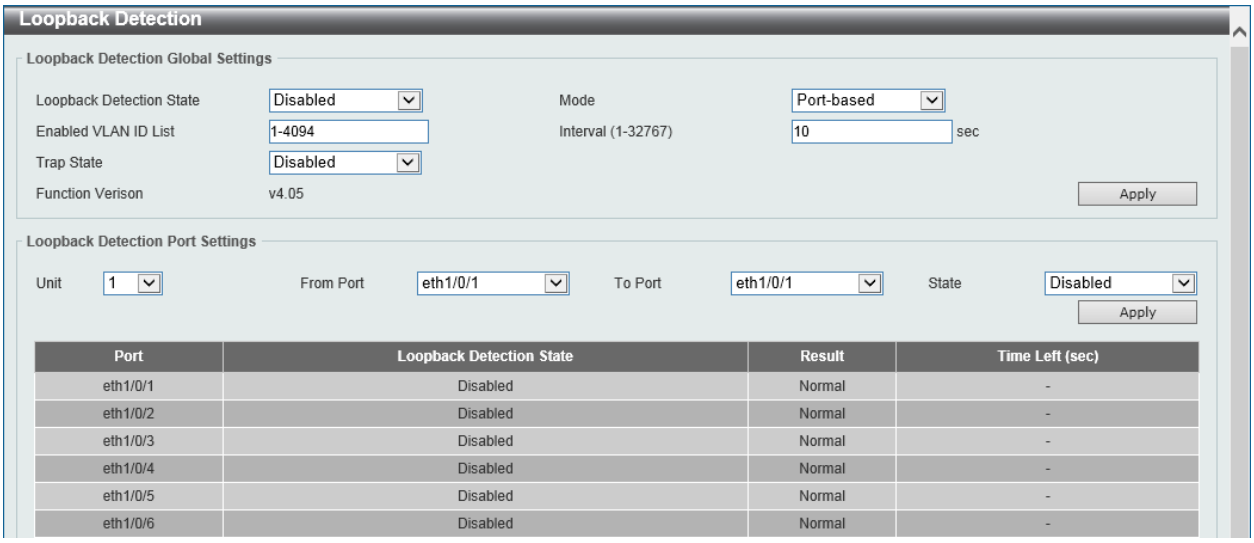



**Figure 5-49 Loopback Detection Window**

The fields that can be configured in **Loopback Detection Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Loopback Detection State** | Select to enable or disable loopback detection. The default is **Disabled**. |
| **Mode** | Select the loopback detection mode. Options to choose from are **Port-based** and **VLAN-based**. |
| **Enabled VLAN ID List** | Enter the VLAN ID for loop detection. This only takes effect when the **VLAN-based** is selected in the **Mode** drop-down list. |
| **Interval** | Enter the interval in seconds that the device will transmit all the CTP (Configuration Test Protocol) packets to detect a loop-back event. The valid range is from 1 to 32767 seconds. The default setting is 10 seconds. |
| **Trap State** | Select to enable or disable the loopback detection trap state. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Loopback Detection Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Select this option to enable or disable the state of the port. |

Click the **Apply** button to accept the changes made.

# Link Aggregation

**Understanding Port Trunk Groups**

Port trunk groups are used to combine a number of ports together to make a single high-bandwidth data pipeline. The switch supports up to 32 port trunk groups with up to 12 ports in each group.

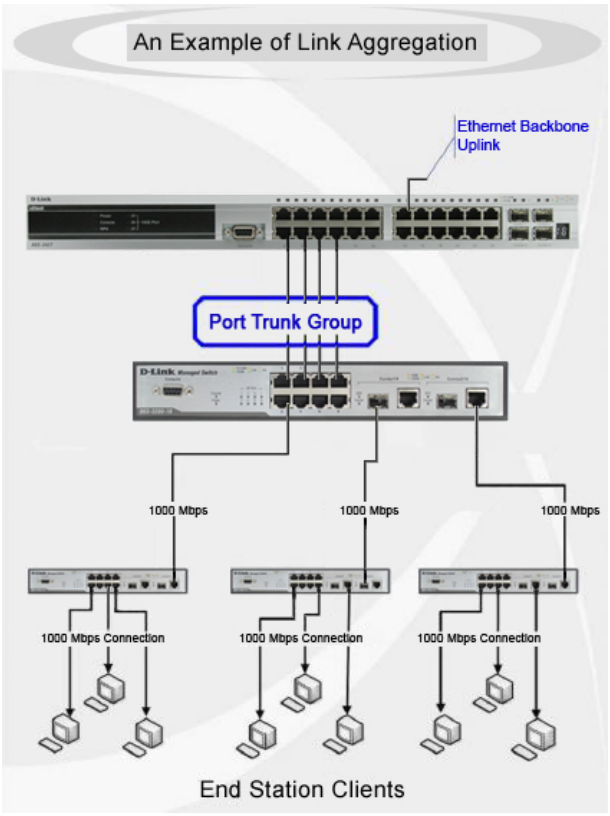



**Figure 5-50 Example of Port Trunk Group**

The switch treats all ports in a trunk group as a single port. Data transmitted to a specific host (destination address) will always be transmitted over the same port in a trunk group. This allows packets in a data stream to arrive in the same order they were sent.

Link aggregation allows several ports to be grouped together and to act as a single link. This gives a bandwidth that is a multiple of a single link's bandwidth.

Link aggregation is most commonly used to link a bandwidth intensive network device or devices, such as a server, to the backbone of a network.

The switch allows the creation of up to 32 link aggregation groups, each group consisting of up to 12 links (ports). Each port can only belong to a single link aggregation group.

All of the ports in the group must be members of the same VLAN, and their STP status, static multicast, traffic control; traffic segmentation and 802.1p default priority configurations must be identical. Port locking and 802.1X must not be enabled on the trunk group. Further, the LACP aggregated links must all be of the same speed and should be configured as full duplex.

Load balancing is automatically applied to the ports in the aggregated group, and a link failure within the group causes the network traffic to be directed to the remaining links in the group.

The Spanning Tree Protocol will treat a link aggregation group as a single link, on the switch level. On the port level, the STP will use the port parameters of the Master Port in the calculation of port cost and in determining the state of the link aggregation group. If two redundant link aggregation groups are configured on the Switch, STP will block one entire group; in the same way STP will block a single port that has a redundant link.

**NOTE:** If any ports within the trunk group become disconnected, packets intended for the disconnected port will be load shared among the other linked ports of the link aggregation group.

This window is used to view and configure the link aggregation settings. To view the following window, click **L2 Features > Link Aggregation**, as shown below:

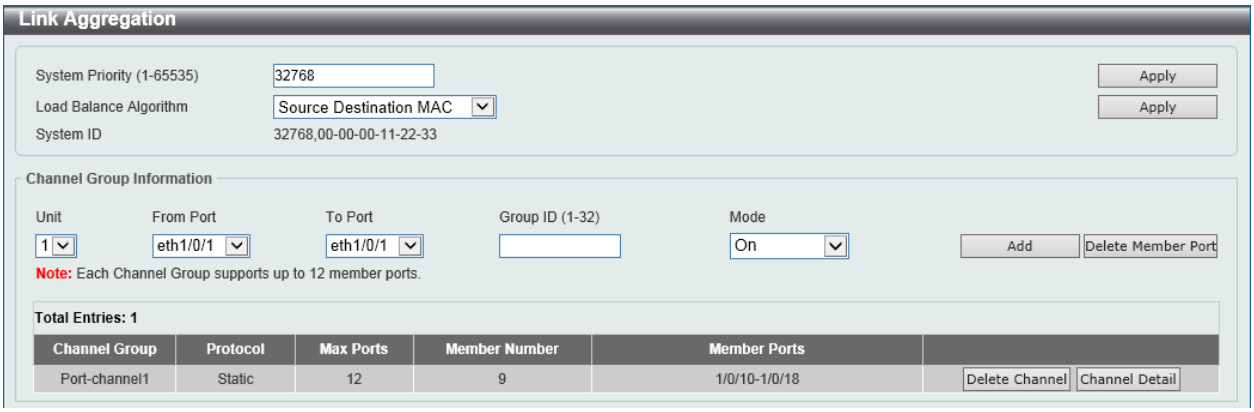



**Figure 5-51 Link Aggregation Window**

The fields that can be configured for **Link Aggregation** are described below:

| Parameter | Description |
|---|---|
| **System Priority** | Enter the system's priority value used here. This value must be between **1** and **65535**. By default, this value is **32768**. The system priority determines which ports can join a port-channel and which ports are put in the stand-alone mode. The lower value has a higher priority. If two or more ports have the same priority, the port number determines the priority |
| **Load Balance Algorithm** | Select the load balancing algorithm that will be used here. Options to choose from are **Source MAC**, **Destination MAC**, **Source Destination MAC**, **Source IP**, **Destination IP**, **Source Destination IP**, **Source L4 Port**, **Destination L4 Port**, and **Source Destination L4 Port**. By default, this option is **Source Destination MAC**. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Channel Group Information** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the list of ports that will be associated with this configuration here. |
| **Group ID** | Enter the channel group number here. This value must be between **1** and **32**. The system will automatically create the port-channel when a physical port first joins a channel group. An interface can only join one channel-group. |
| **Mode** | Select the mode option here. Options to choose from are **On**, **Active**, and **Passive**. If the mode **On** is specified, the channel group type is static. If the mode **Active** or **Passive** is specified, the channel group type is LACP. A channel group can only consist of either static members or LACP members. Once the type of channel group has been determined, other types of interfaces cannot join the channel group. |

Click the **Add** button to add a new channel group.

Click the **Delete Member Port** button, to delete the member port(s) specified from the group.

Click the **Delete Channel** button to delete the specified channel group.

Click the **Channel Detail** button to view more detailed information about the channel.

After clicking the **Channel Detail** button, the following page will be available.

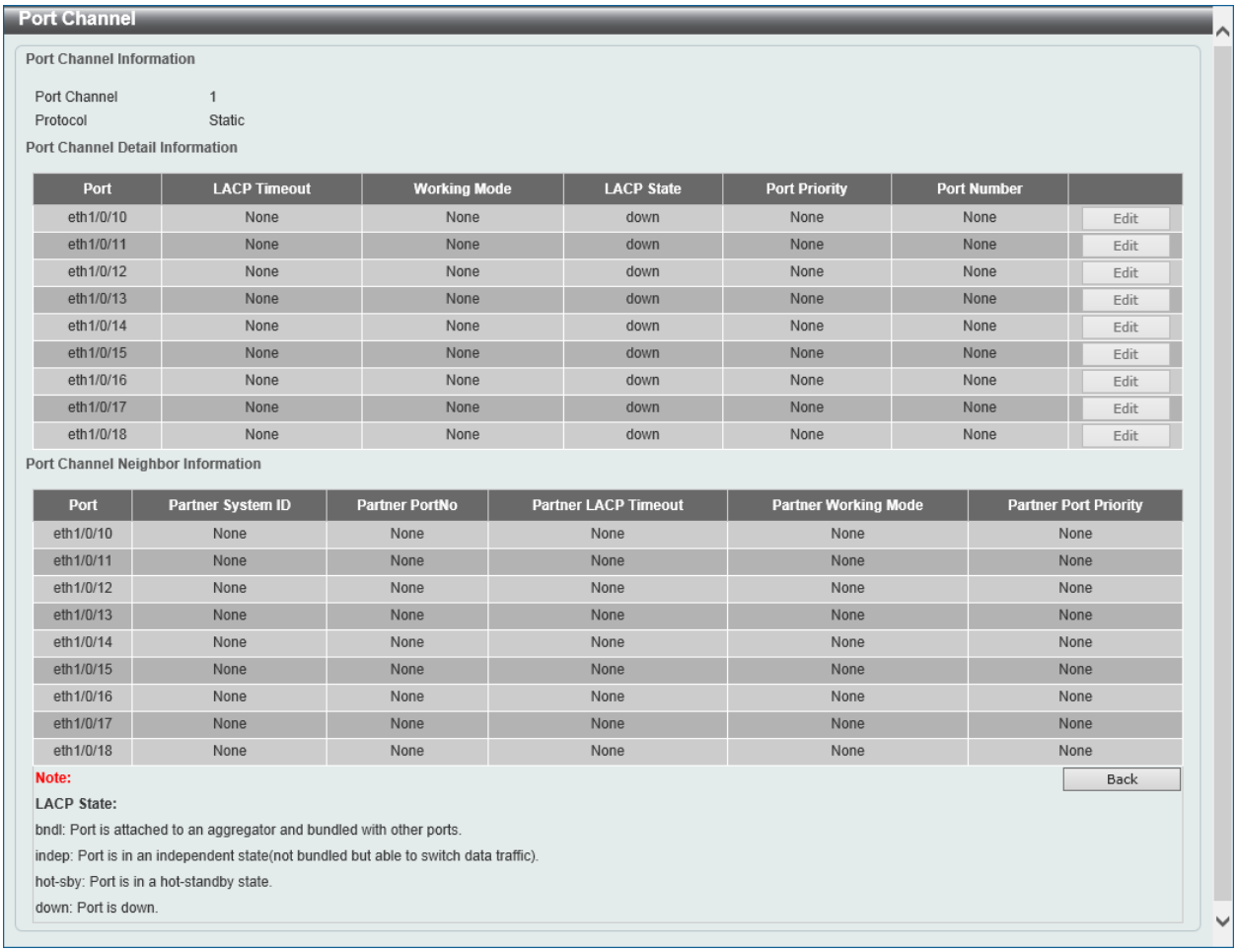



**Figure 5-52 Link Aggregation (Channel Detail) Window**

Click the **Edit** button to re-configure the specific entry.

Click the **Back** button to return to the previous page.

# L2 Protocol Tunnel

This window is used to view and configure the Layer 2 protocol tunnel settings.

To view the following window, click **L2 Features > L2 Protocol Tunnel**, as shown below:

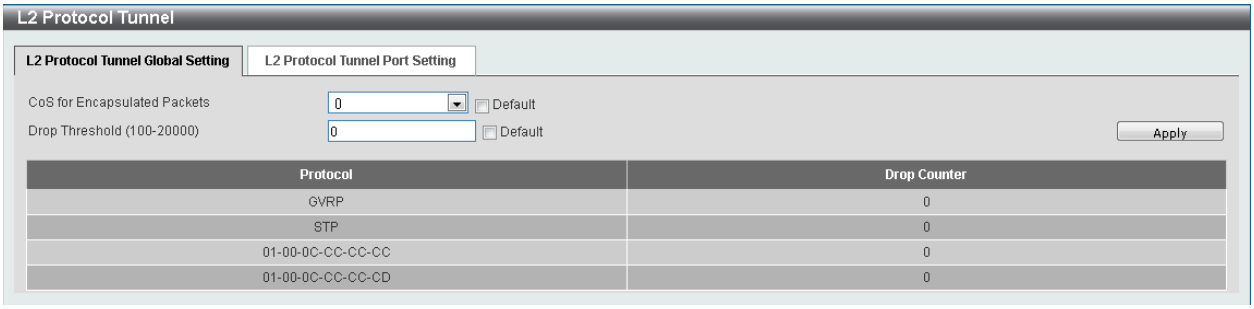



**Figure 5-53 L2 Protocol Tunnel (L2 Protocol Tunnel Global Setting) Window**

The fields that can be configured for **L2 Protocol Tunnel Global Settings** are described below:

| Parameter | Description |
|---|---|
| **CoS for Encapsulated Packets** | Select the CoS value for encapsulated packets here. This value is between 0 and 7. Tick the **Default** option to use the default value. |
| **Drop Threshold** | Enter the drop threshold value here. This value must be between 100 and 20000. By default, this value is 0. The tunneling of the Layer 2 protocol packets will consume CPU processing power in encapsulating, decapsulating, and forwarding of the packet. Use this option to restrict the CPU processing bandwidth consumed by specifying a threshold on the number of all Layer 2 protocol packets that can be processed by the system. When the maximum number of packets is exceeded, the excessive protocol packets are dropped. |

Click the **Apply** button to accept the changes made.

After selecting the **L2 Protocol Tunnel Port Setting** tab option, at the top of the page, the following page will be available.

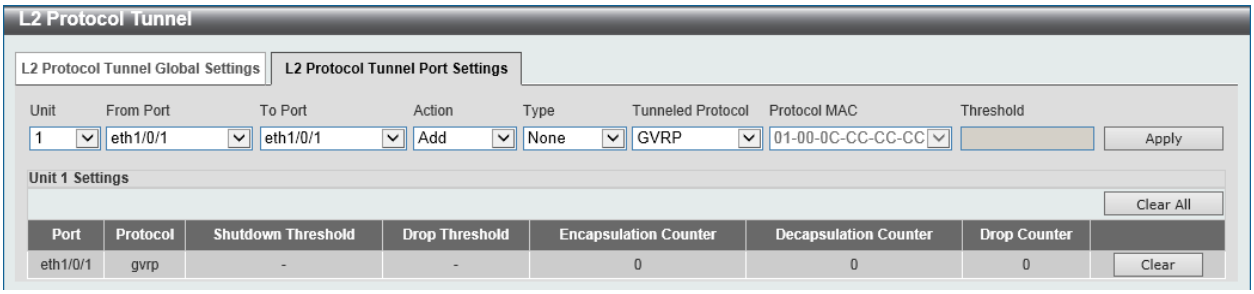



**Figure 5-54 L2 Protocol Tunnel (L2 Protocol Tunnel Port Setting) Window**

The fields that can be configured for **L2 Protocol Tunnel Port Setting** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |
| **Type** | Select the type option here. Options to choose from are **None**, **Shutdown**, and **Drop**. |
| **Tunneled Protocol** | Select the tunneled protocol option here. Options to choose from are **GVRP**, **STP**, **Protocol MAC**, and **All**. |

| Parameter | Description |
|---|---|
| **Protocol MAC** | After selecting the **Protocol MAC** option as the **Tunneled Protocol**, the following option will be available. Select the protocol MAC option here. Options to choose from are **01-00-0C-CC-CC-CC** and **01-00-0C-CC-CC-CD**. |
| **Threshold** | After selecting the **Shutdown** or **Drop** options as the **Type**, the following parameter will be available. Enter the threshold value here. This value must be between **1** and **4096**. |

Click the **Apply** button to accept the changes made.

Click the **Clear All** button to clear all the counter information.

Click the **Clear** button to clear all the counter information of the specific entry.

# L2 Multicast Control

## IGMP Snooping

Internet Group Management Protocol (IGMP) snooping allows the Switch to recognize IGMP queries and reports sent between network stations or devices and an IGMP host.

### IGMP Snooping Settings

In order to use IGMP Snooping it must first be enabled for the entire Switch under IGMP Global Settings at the top of the window. You may then fine-tune the settings for each VLAN by clicking the corresponding **Edit** button. When enabled for IGMP snooping, the Switch can open or close a port to a specific multicast group member based on IGMP messages sent from the device to the IGMP host or vice versa. The Switch monitors IGMP messages and discontinues forwarding multicast packets when there are no longer hosts requesting that they continue.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Settings**, as shown below:


**Figure 5-55 IGMP Snooping Settings Window**

The fields that can be configured in **Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Global State** | Select this option to enable or disable IGMP snooping global state. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **VLAN Status Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter a VLAN ID from 1 to 4094, and select to enable or disable IGMP snooping on the VLAN. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Snooping Table** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter a VLAN ID from 1 to 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

Click the **Show Detail** button to see the detail information of the specific VLAN.

Click the **Edit** button to re-configure the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.


**Figure 5-56 IGMP Snooping Settings (Show Detail) Window**

The window displays the detail information about IGMP snooping VLAN. Click the **Modify** button to edit the information in the following window.

After clicking the **Modify** or **Edit** button in IGMP Snooping Settings window, the following window will appear.

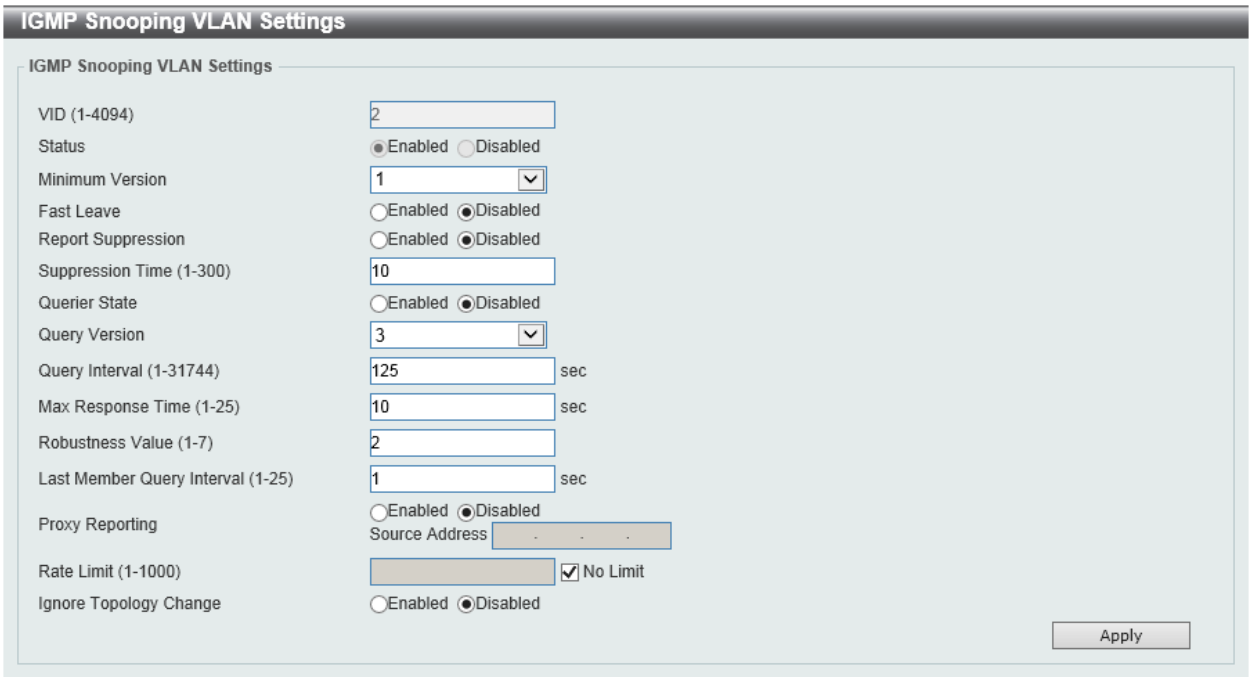



**Figure 5-57 IGMP Snooping Settings (Modify, Edit) Window**

The fields that can be configured in **IGMP Snooping VLAN Settings** are described below:

| Parameter | Description |
|---|---|
| **Minimum Version** | Select the minimum version of IGMP hosts that is allowed on the VLAN. Options to choose from are **1**, **2**, and **3**. |
| **Fast Leave** | Select this option to enable or disable the IGMP snooping fast leave function. If enabled, the membership is immediately removed when the system receive the IGMP leave message. |
| **Report Suppression** | Select this option to enable or disable the report suppression. The report suppression function only works for IGMPv1 and IGMPv2 traffic. When report suppression is enabled, the Switch suppresses the duplicate reports sent by hosts. The suppression for the same group report or leave will continue until the suppression time expired. For report or leave messages to the same group, only one report or leave message is forwarded. The remaining report and leave messages are suppressed. |
| **Suppression Time** | Enter the interval of suppressing duplicate IGMP reports or leaves. The range is from 1 to 300. |
| **Querier State** | Select this option to enable or disable the querier state. |
| **Query Version** | Select the general query packet version sent by the IGMP snooping querier. Options to choose from are **1**, **2**, and **3**. |
| **Query Interval** | Enter the interval at which the IGMP snooping querier sends IGMP general query messages periodically. The range is from 1 to 31744. |
| **Max Response Time** | Enter the maximum response time, in seconds, advertised in IGMP snooping queries. The range is from 1 to 25. |
| **Robustness Value** | Enter the robustness variable used in IGMP snooping. The range is from 1 to 7. |
| **Las Member Query Interval** | Enter the interval at which the IGMP snooping querier sends IGMP group-specific or group-source-specific (channel) query messages. The range is from 1 to 25. |

| Parameter | Description |
|---|---|
| **Proxy Reporting** | Select this option to enable or disable the proxy-reporting function. |
| **Source Address** | Enter the source IP of proxy reporting. This is available when **Enabled** is selected in **Proxy Reporting**. |
| **Rate Limit** | Enter the rate limit value here. The range is from 1 to 1000. Tick the **No Limit** option to apply no rate limit on this profile. |
| **Ignore Topology Change** | Select to enable or disable the ignore topology change feature here. |

Click the **Apply** button to accept the changes made.

## IGMP Snooping Groups Settings

This window is used to view and configure and view the IGMP snooping static group, and view IGMP snooping group.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Groups Settings**, as shown below:

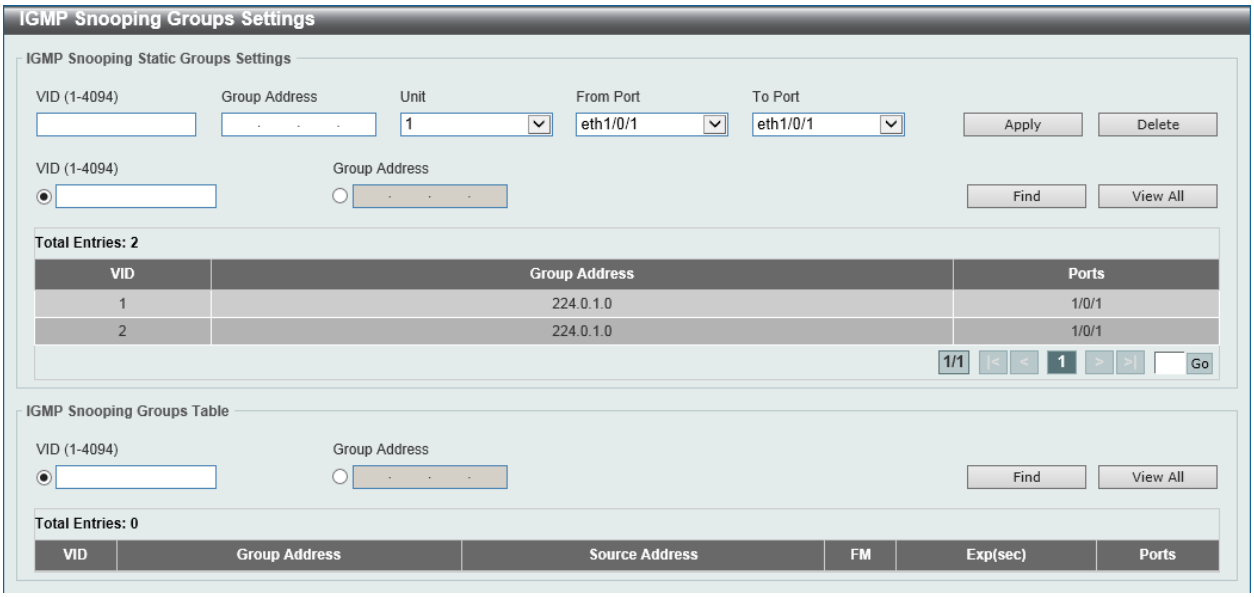



**Figure 5-58 IGMP Snooping Groups Settings Window**

The fields that can be configured in **IGMP Snooping Static Groups Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter a VLAN ID of the multicast group. The range is from 1 to 4094. |
| **Group Address** | Enter an IP multicast group address. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **VID** | Click the radio button and enter a VLAN ID of the multicast group. The range is from 1 to 4094. |
| **Group Address** | Click the radio button and enter an IP multicast group address. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **IGMP Snooping Groups Table** are described below:

| Parameter | Description |
|---|---|
| **VID** | Click the radio button and enter a VLAN ID of the multicast group. The range is from 1 to 4094. |
| **Group Address** | Click the radio button and enter an IP multicast group address. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

## IGMP Snooping Filter Settings

This window is used to view and configure the IGMP snooping feature's filter settings.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Filter Settings**, as shown below:

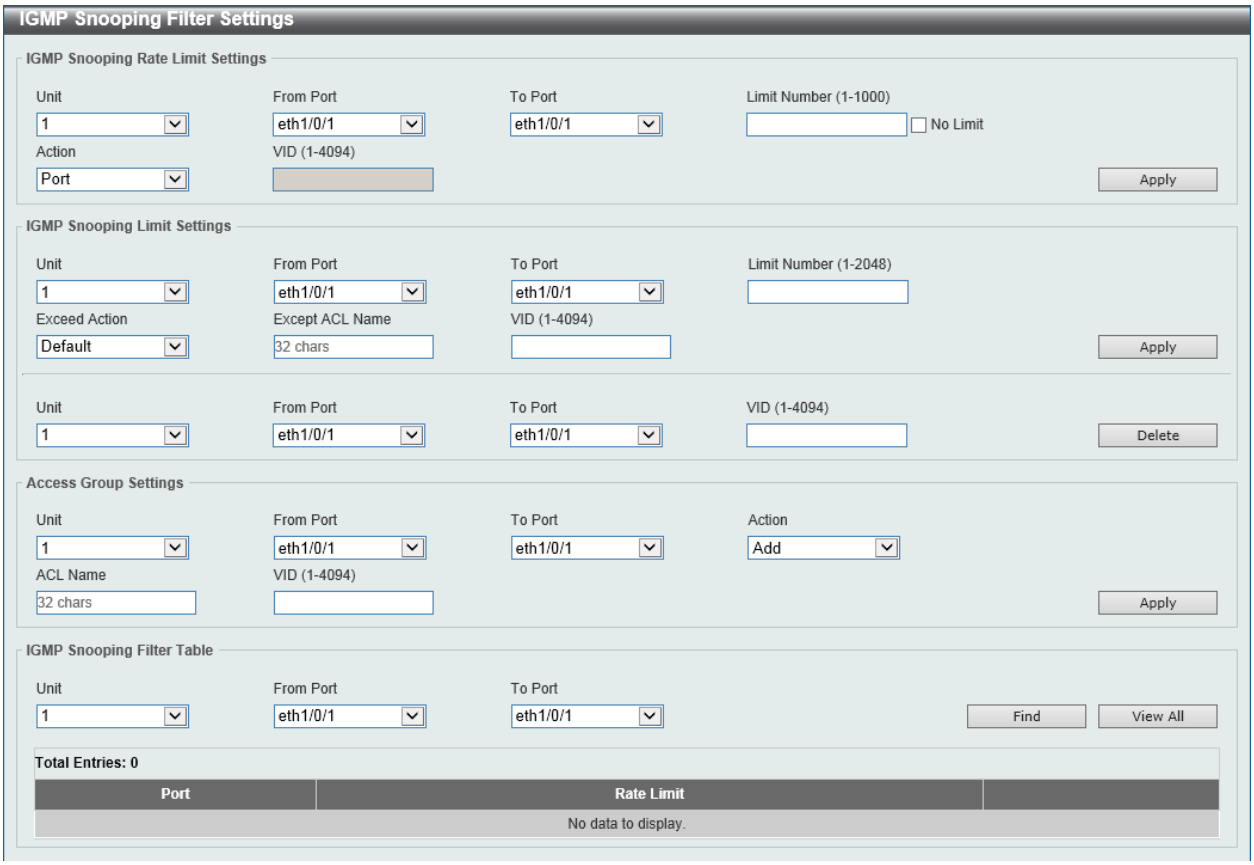



**Figure 5-59 IGMP Snooping Filter Settings Window**

The fields that can be configured in **IGMP Snooping Rate Limit Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. This is only |

| Parameter | Description |
|---|---|
| | available if the **Port** option was selected as the action below. |
| **Limit Number** | Enter the limit number here. This is to configure the rate of IGMP control packets that the switch can process on a specific interface. The range is from 1 to 1000 packets per second. Select the **No Limit** option to remove the limitation. |
| **Action** | Select the action that will be taken here. Options to choose from are **Port** and **VLAN**. |
| **VID** | Enter the VLAN's ID here. This is the Layer 2 VLAN on a trunk port and applies the filter to packets that arrive on that VLAN. The range is from 1 to 4094. This is only available if the **VLAN** option was selected as the action. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Snooping Limit Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Limit Number** | Enter the limit number here. This is used to set the limitation on the number of IGMP cache entries that can be created. The range is from 1 to 2048. |
| **Exceed Action** | Select the exceed action here. This parameter specifies the action for handling newly learned groups when the limitation is exceeded.<br>Options to choose from are **Default**, **Drop** and **Replace**.<br>• **Default:** Specifies that the default action will be taken.<br>• **Drop:** Specifies that the new group will be dropped.<br>• **Replace:** Specifies that the new group will replace the oldest group. |
| **Except ACL Name** | Enter the standard IP access list's name here. The group (*,G), or channel (S,G) permitted by the access list will be excluded from the limit. To permit a channel (S,G), specify S in the source address field and G in the destination address field of the access list entry. To permit a group (*,G), specify "any" in the source address field and G in the destination address field of the access list entry. This name can be up to 32 characters long. |
| **VID** | Enter the Layer 2 VLAN's name on a trunk port here. This applies the filter to packets that arrive on that VLAN. The range is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

The fields that can be configured in **Access Group Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |

| Parameter | Description |
|---|---|
| **ACL Name** | Enter the standard IP access list's name here. This is used to permit users to join a group (*, G), specify "any" in source address field and G in destination address field of the access list entry. This name can be up to 32 characters long. |
| **VID** | Enter the VLAN's ID used for this configuration here. The range is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Snooping Filter Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## IGMP Snooping Mrouter Settings

This window is used to view and configure the specified interface(s) as the multicast router ports or as forbidden to be multicast router ports on the Switch.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Mrouter Settings**, as shown below:

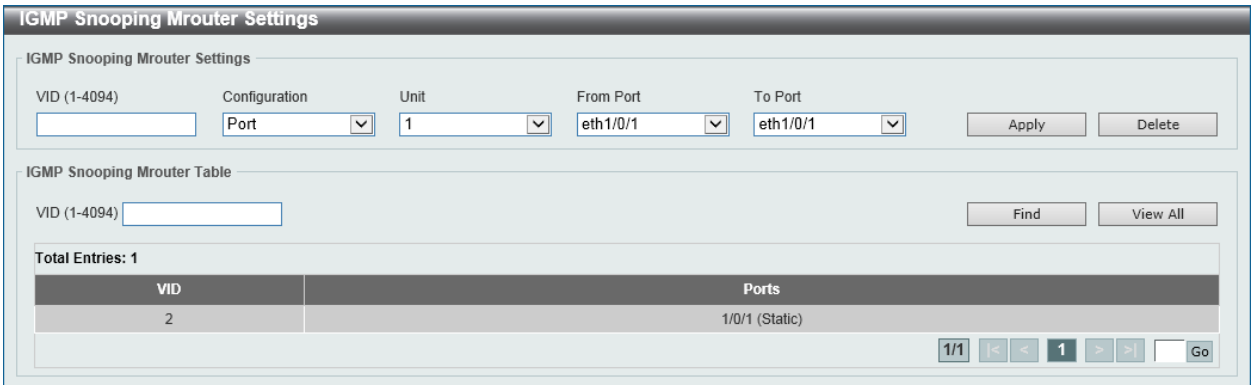



**Figure 5-60 IGMP Snooping Mrouter Settings Window**

The fields that can be configured in **IGMP Snooping Mrouter Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the VLAN ID used here. The range is from 1 to 4094. |
| **Configuration** | Select the port configuration. Options to choose from are **Port**, and **Forbidden Port**.<br>• **Port** - Select to have the configured ports to be static multicast router ports.<br>• **Forbidden Port** - Select to have the configured ports not to be multicast router ports. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

The fields that can be configured in **IGMP Snooping Mrouter Table** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the VLAN ID used here. The range is from 1 to 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## IGMP Snooping Statistics Settings

This window is used to view and clear the IGMP snooping related statistics.

To view the following window, click **L2 Features > L2 Multicast Control > IGMP Snooping > IGMP Snooping Statistics Settings**, as shown below:

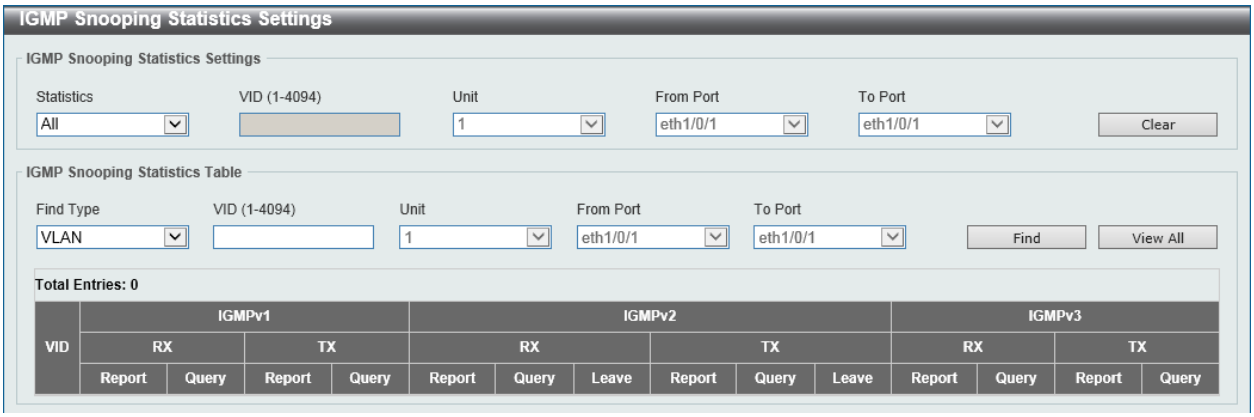



**Figure 5-61 IGMP Snooping Statistics Settings Window**

The fields that can be configured in **IGMP Snooping Statistics Settings** are described below:

| Parameter | Description |
|---|---|
| **Statistics** | Select the interface here. Options to choose from are **All**, **VLAN**, and **Port**. |
| **VID** | Enter a VLAN ID between 1 and 4094. This is available when **VLAN** is selected in the **Statistics** drop-down list. |
| **Unit** | Select the switch unit that will be used for this configuration here. This is available when **Port** is selected in the **Statistics** drop-down list. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. This is available when **Port** is selected in the **Statistics** drop-down list. |

Click the **Clear** button to clear the IGMP snooping related statistics.

The fields that can be configured in **IGMP Snooping Statistics Table** are described below:

| Parameter | Description |
|---|---|
| **Find Type** | Select the interface type. Options to choose from are **VLAN**, and **Port**. |

| Parameter | Description |
|---|---|
| **VID** | Enter a VLAN ID between 1 and 4094. This is available when **VLAN** is selected in the **Find Type** drop-down list. |
| **Unit** | Select the switch unit that will be used for this configuration here. This is available when **Port** is selected in the **Find Type** drop-down list. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. This is available when **Port** is selected in the **Find Type** drop-down list. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# MLD Snooping

Multicast Listener Discovery (MLD) Snooping is an IPv6 function used similarly to IGMP snooping in IPv4. It is used to discover ports on a VLAN that are requesting multicast data. Instead of flooding all ports on a selected VLAN with multicast traffic, MLD snooping will only forward multicast data to ports that wish to receive this data through the use of queries and reports produced by the requesting ports and the source of the multicast traffic.

MLD snooping is accomplished through the examination of the layer 3 part of an MLD control packet transferred between end nodes and a MLD router. When the Switch discovers that this route is requesting multicast traffic, it adds the port directly attached to it into the correct IPv6 multicast table, and begins the process of forwarding multicast traffic to that port. This entry in the multicast routing table records the port, the VLAN ID, and the associated multicast IPv6 multicast group address, and then considers this port to be an active listening port. The active listening ports are the only ones to receive multicast group data.

**MLD Control Messages**

These types of messages are transferred between devices using MLD snooping. These messages are all defined by four ICMPv6 packet headers, labeled 130, 131, 132, and 143.

- **Multicast Listener Query** - Similar to the IGMPv2 Host Membership Query for IPv4, and labeled as 130 in the ICMPv6 packet header, this message is sent by the router to ask if any link is requesting multicast data. There are two types of MLD query messages emitted by the router. The General Query is used to advertise all multicast addresses that are ready to send multicast data to all listening ports, and the Multicast Specific query, which advertises a specific multicast address that is also ready. These two types of messages are distinguished by a multicast destination address located in the IPv6 header and a multicast address in the Multicast Listener Query Message.
- **Multicast Listener Report, Version 1** - Comparable to the Host Membership Report in IGMPv2, and labeled as 131 in the ICMP packet header, this message is sent by the listening port to the Switch stating that it is interested in receiving multicast data from a multicast address in response to the Multicast Listener Query message.
- **Multicast Listener Done** - Akin to the Leave Group Message in IGMPv2, and labeled as 132 in the ICMPv6 packet header, this message is sent by the multicast listening port stating that it is no longer interested in receiving multicast data from a specific multicast group address, therefore stating that it is “done” with the multicast data from this address. Once this message is received by the Switch, it will no longer forward multicast traffic from a specific multicast group address to this listening port.
- **Multicast Listener Report, Version 2** - Comparable to the Host Membership Report in IGMPv3, and labeled as 143 in the ICMP packet header, this message is sent by the listening port to the Switch stating that it is interested in receiving multicast data from a multicast address in response to the Multicast Listener Query message.

# MLD Snooping Settings

This window is used to view and configure the MLD snooping settings.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Settings**, as shown below:

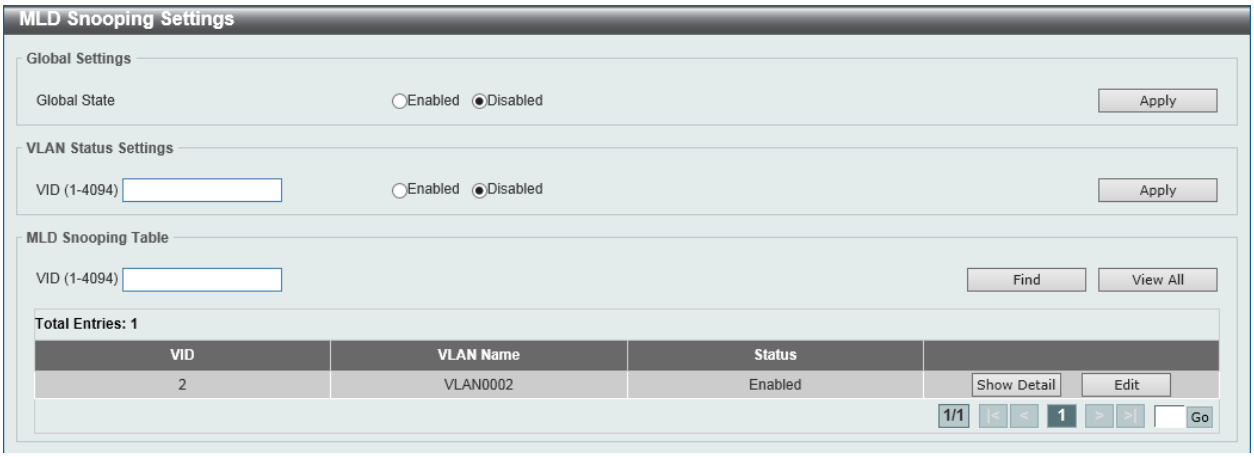



**Figure 5-62 MLD Snooping Settings Window**

The fields that can be configured in **Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Global State** | Select this option to enable or disable MLD snooping global state. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **VLAN Status Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter a VLAN ID from 1 to 4094, and select to enable or disable MLD snooping on the VLAN. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Snooping Table** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter a VLAN ID from 1 to 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

Click the **Show Detail** button to see the detail information of the specific VLAN.

Click the **Edit** button to re-configure the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show Detail** button, the following window will appear.


**Figure 5-63 MLD Snooping Settings (Show Detail) Window**

The window displays the detail information about MLD snooping VLAN. Click the **Modify** button to edit the information in the following window.

After clicking the **Modify** or **Edit** button in MLD Snooping Settings window, the following window will appear.

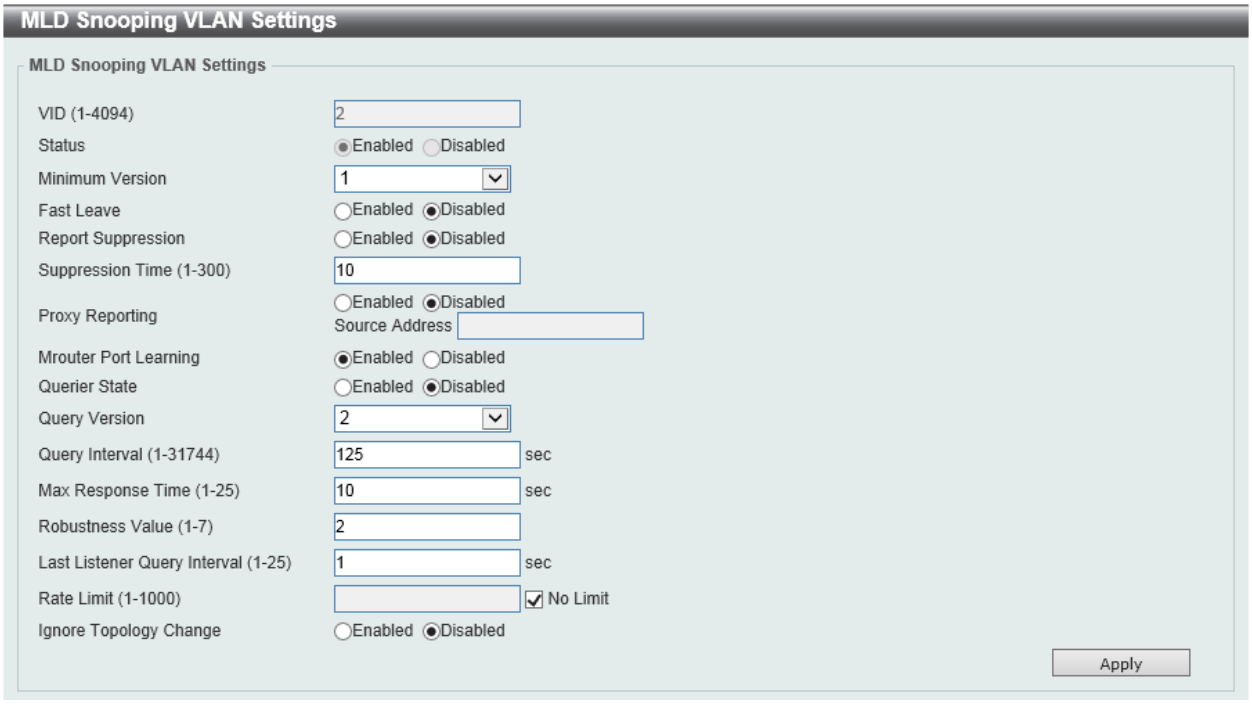



**Figure 5-64 MLD Snooping Settings (Modify, Edit) Window**

The fields that can be configured in **MLD Snooping VLAN Settings** are described below:

| Parameter | Description |
|---|---|
| **Minimum Version** | Select the minimum version of MLD hosts that is allowed on the VLAN. Options to choose from are **1** and **2**. |

| Parameter | Description |
|---|---|
| **Fast Leave** | Select this option to enable or disable the MLD snooping fast leave function. If enabled, the membership is immediately removed when the system receive the MLD leave message. |
| **Report Suppression** | Select this option to enable or disable the report suppression. |
| **Suppression Time** | Enter the interval of suppressing duplicate MLD reports or leaves. The range is from 1 to 300. |
| **Proxy Reporting** | Select this option to enable or disable the proxy-reporting function. |
| **Source Address** | Enter the source IP of proxy reporting. This is available when **Enabled** is selected in **Proxy Reporting**. |
| **Mrouter Port Learning** | Select this option to enable or disable Mrouter port learning. |
| **Querier State** | Select this option to enable or disable the querier state. |
| **Query Version** | Select the general query packet version sent by the MLD snooping querier. Options to choose from are **1**, and **2**. |
| **Query Interval** | Enter the interval at which the MLD snooping querier sends MLD general query messages periodically. The range is from 1 to 31744. |
| **Max Response Time** | Enter the maximum response time, in seconds, advertised in MLD snooping queries. The range is from 1 to 25. |
| **Robustness Value** | Enter the robustness variable used in MLD snooping. The range is from 1 to 7. |
| **Last Listener Query Interval** | Enter the interval at which the MLD snooping querier sends MLD group-specific or group-source-specific (channel) query messages. The range is from 1 to 25. |
| **Rate Limit** | Enter the rate limit value here. The range is from 1 to 1000. Tick the **No Limit** option to apply no rate limit on this profile. |
| **Ignore Topology Change** | Select to enable or disable the ignore topology change feature here. |

Click the **Apply** button to accept the changes made.

## MLD Snooping Groups Settings

This window is used to view and configure the MLD snooping static group, and view MLD snooping group.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Groups Settings**, as shown below:

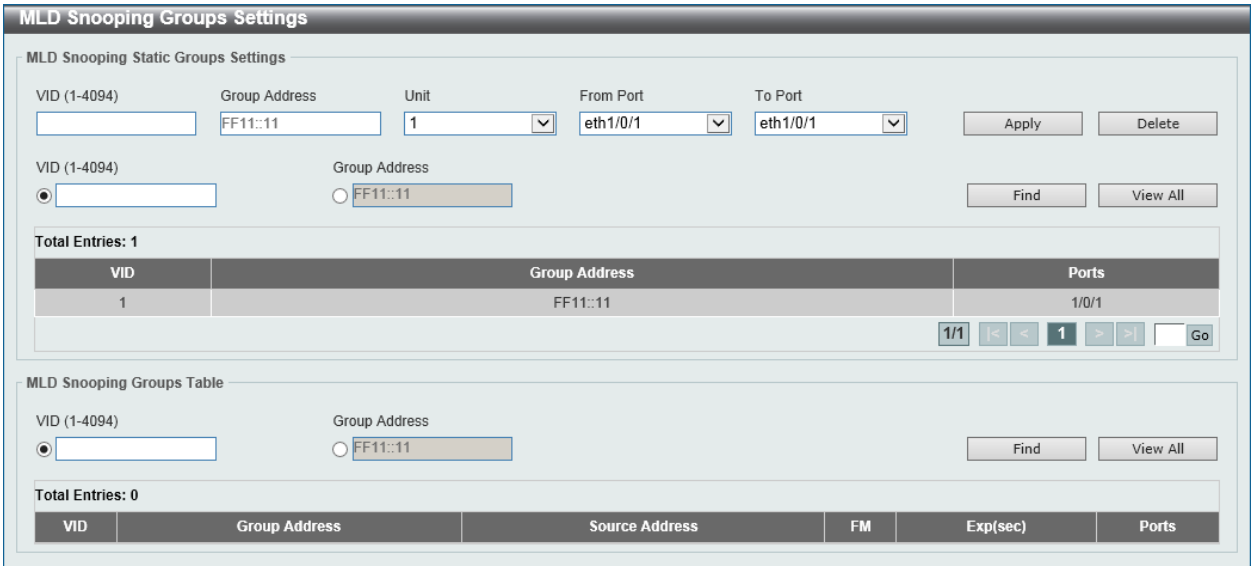



**Figure 5-65 MLD Snooping Groups Settings Window**

The fields that can be configured in **MLD Snooping Static Groups Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the VLAN ID of the multicast group here. The range is from 1 to 4094. |
| **Group Address** | Enter the IPv6 multicast group address here. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **VID** | Click the radio button and enter a VLAN ID of the multicast group. The range is from 1 to 4094. |
| **Group Address** | Click the radio button and enter an IP multicast group address. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **MLD Snooping Groups Table** are described below:

| Parameter | Description |
|---|---|
| **VID** | Click the radio button and enter a VLAN ID of the multicast group. The range is from 1 to 4094. |
| **Group Address** | Click the radio button and enter an IP multicast group address. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

## MLD Snooping Filter Settings

This window is used to view and configure the MLD snooping feature's settings.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Filter Settings**, as shown below:

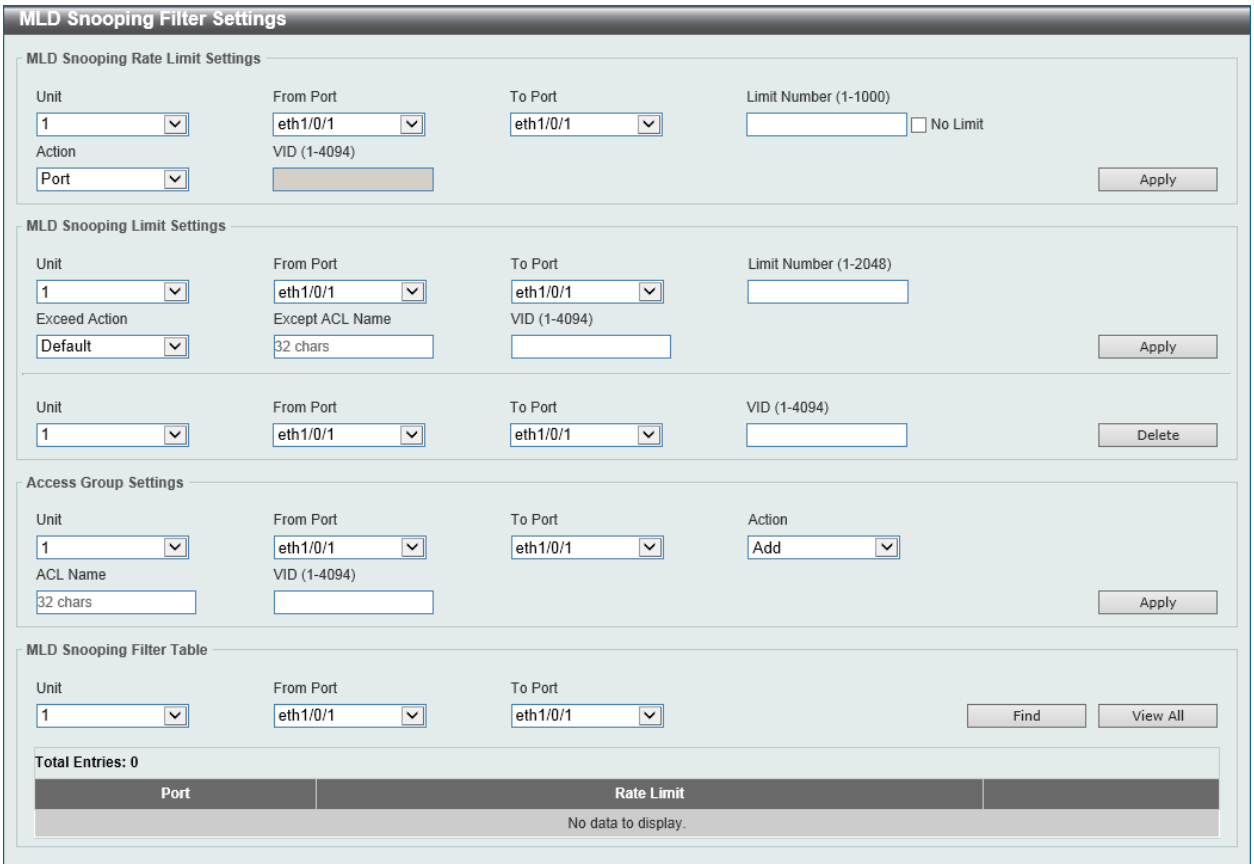



**Figure 5-66 MLD Snooping Filter Settings Window**

The fields that can be configured in **MLD Snooping Rate Limit Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. This is only available if the **Port** option was selected as the action below. |
| **Limit Number** | Enter the limit number here. This is to configure the rate of MLD control packets that the switch can process on a specific interface. The range is from 1 to 1000 packets per second. Select the **No Limit** option to remove the limitation. |
| **Action** | Select the action that will be taken here. Options to choose from are **Port** and **VLAN**. |
| **VID** | Enter the VLAN's ID here. This is the Layer 2 VLAN on a trunk port and applies the filter to packets that arrive on that VLAN. The range is from 1 to 4094. This is only available if the **VLAN** option was selected as the action. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Snooping Limit Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |

| Parameter | Description |
|---|---|
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Limit Number** | Enter the limit number here. This is used to set the limitation on the number of MLD cache entries that can be created. The range is from 1 to 2048. |
| **Exceed Action** | Select the exceed action here. This parameter specifies the action for handling newly learned groups when the limitation is exceeded.<br>Options to choose from are **Default**, **Drop** and **Replace**.<br>• **Default:** Specifies that the default action will be taken.<br>• **Drop:** Specifies that the new group will be dropped.<br>• **Replace:** Specifies that the new group will replace the oldest group. |
| **Except ACL Name** | Enter the standard IP access list's name here. The group (*,G), or channel (S,G) permitted by the access list will be excluded from the limit. To permit a channel (S,G), specify S in the source address field and G in the destination address field of the access list entry. To permit a group (*,G), specify "any" in the source address field and G in the destination address field of the access list entry. This name can be up to 32 characters long. |
| **VID** | Enter the Layer 2 VLAN's name on a trunk port here. This applies the filter to packets that arrive on that VLAN. The range is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

The fields that can be configured in **Access Group Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |
| **ACL Name** | Enter the standard IP access list's name here. This is used to permit users to join a group (*, G), specify "any" in source address field and G in destination address field of the access list entry. This name can be up to 32 characters long. |
| **VID** | Enter the VLAN's ID used for this configuration here. The range is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Snooping Filter Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# MLD Snooping Mrouter Settings

This window is used to view and configure the specified interface(s) as the router ports or forbidden to be IPv6 multicast router ports on the VLAN interface on the Switch.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Mrouter Settings**, as shown below:

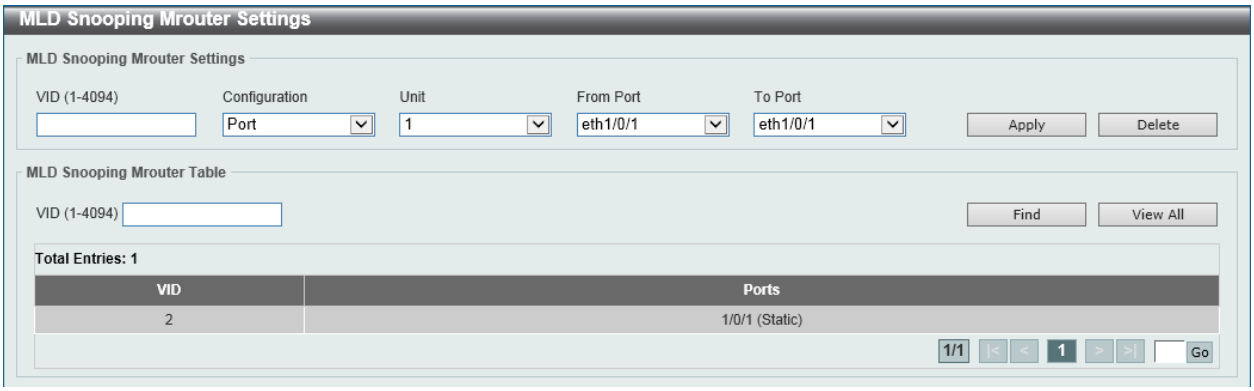



**Figure 5-67 MLD Snooping Mrouter Settings Window**

The fields that can be configured in **MLD Snooping Mrouter Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter a VLAN ID between 1 and 4094. |
| **Configuration** | Select the port configuration. Options to choose from are **Port**, **Forbidden Port**, and **Learn PIMv6**.<br>• **Port** - Select to have the configured ports as being connected to multicast-enabled routers.<br>• **Forbidden Port** - Select to have the configured ports as being not connected to multicast-enabled routers.<br>• **Learn PIMv6** - Select to enable dynamic learning of multicast router port. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

The fields that can be configured in **MLD Snooping Mrouter Table** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter a VLAN ID between 1 and 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# MLD Snooping Statistics Settings

This window is used to view and clear the MLD snooping related statistics.

To view the following window, click **L2 Features > L2 Multicast Control > MLD Snooping > MLD Snooping Statistics Settings**, as shown below:

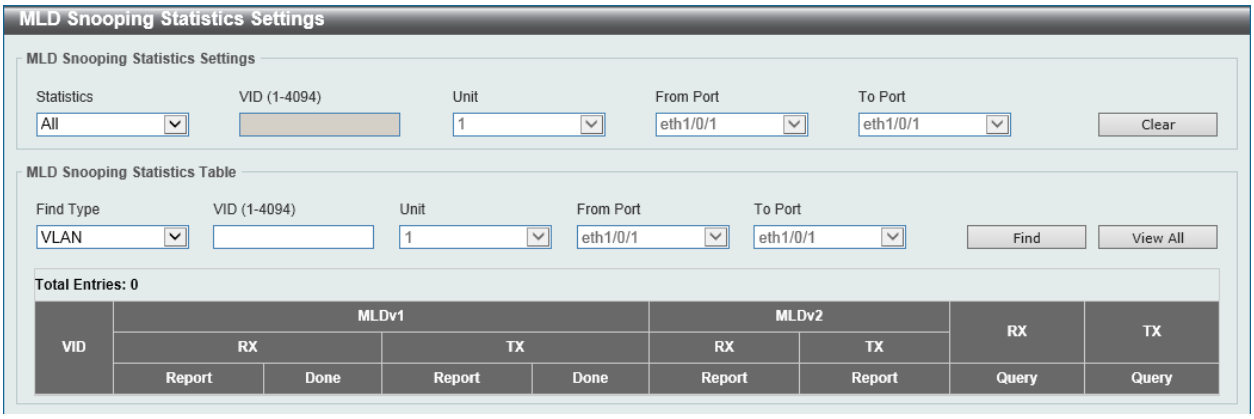



**Figure 5-68 MLD Snooping Statistics Settings Window**

The fields that can be configured in **MLD Snooping Statistics Settings** are described below:

| Parameter | Description |
|---|---|
| **Statistics** | Select the interface here. Options to choose from are **All**, **VLAN**, and **Port**. |
| **VID** | Enter a VLAN ID between 1 and 4094. This is available when **VLAN** is selected in the **Statistics** drop-down list. |
| **Unit** | Select the switch unit that will be used for this configuration here. This is available when **Port** is selected in the **Statistics** drop-down list. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. This is available when **Port** is selected in the **Statistics** drop-down list. |

Click the **Clear** button to clear the MLD snooping related statistics.

The fields that can be configured in **MLD Snooping Statistics Table** are described below:

| Parameter | Description |
|---|---|
| **Find Type** | Select the interface type. Options to choose from are **VLAN**, and **Port**. |
| **VID** | Enter a VLAN ID between 1 and 4094. This is available when **VLAN** is selected in the **Find Type** drop-down list. |
| **Unit** | Select the switch unit that will be used for this configuration here. This is available when **Port** is selected in the **Find Type** drop-down list. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. This is available when **Port** is selected in the **Find Type** drop-down list. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# Multicast VLAN

## Multicast VLAN Settings

This window is used to view and configure the multicast VLAN settings.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast VLAN > Multicast VLAN Settings**, as shown below:

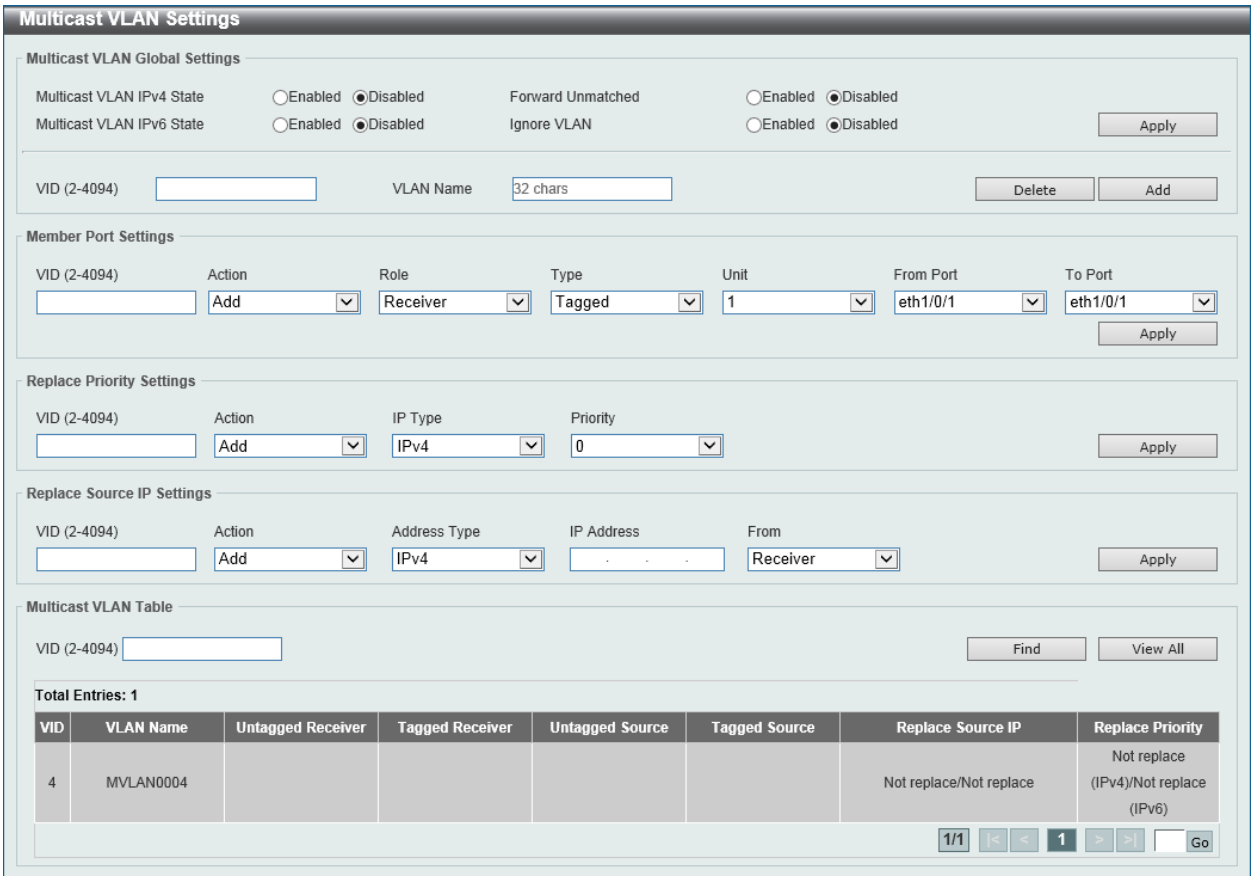



**Figure 5-69 Multicast VLAN Settings Window**

The fields that can be configured in **Multicast VLAN Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Multicast VLAN IPv4 State** | Select to enable or disable the IPv4 IGMP control packet process in multicast VLANs. |
| **Forward Unmatched** | Select the enable or disable the forward unmatched feature here. This specifies that if the received IGMP or MLD control packet is untagged, does not match any profile, and the associated default VLAN is a multicast VLAN, or is tagged with a multicast VLAN, but does not match the associated profile, then the packet will be forwarded or dropped based on this setting. By default, the packet will be dropped. |
| **Multicast VLAN IPv6 State** | Select to enable or disable the IPv6 IGMP control packet process in multicast VLANs. |
| **Ignore VLAN** | Select the enable or disable the ignore VLAN feature here. This specifies the setting for tagged IGMP or MLD control packets. If enabled, then the packet's VLAN is ignored and taken to match the profile to find its multicast VLAN. When this option is enabled, the switch will ignore the VLAN of the receiving IGMP or MLD control packet and try to find a match profile. |
| **VID** | Enter the VLAN ID of the multicast VLAN that will be created or deleted here. The range is 2 to 4094. |
| **VLAN Name** | Enter the VLAN name of the multicast VLAN that will be created or deleted here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

Click the **Add** button to add a new entry based on the information entered.

The fields that can be configured in **Member Port Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the multicast VLAN's ID that will be used here. The range is 2 to 4094. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |
| **Role** | Select the role here. Options to choose from are **Receiver** and **Source**.<br>• **Receiver:** Specifies to configure the port as a subscriber port that can only receive multicast data in the multicast VLAN.<br>• **Source:** Specifies to configure the port as an uplink port that can send multicast data in the multicast VLAN. |
| **Type** | Select the type here. Options to choose from are **Tagged** and **Untagged**.<br>• **Tagged:** Specifies that if a port is a tagged member, the packets sent from the port are tagged with the Multicast VLAN ID.<br>• **Untagged:** Specifies that if the port is an untagged member, then the packets will be forwarded in the untagged form. |
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Replace Priority Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the multicast VLAN's ID that will be used here. The range is 2 to 4094. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |
| **IP Type** | Select the IP type here. Options to choose from are **IPv4** and **IPv6**.<br>• **IPv4:** Specifies to the remap priority for IPv4 multicast packets forwarded on the multicast VLAN.<br>• **IPv6:** Specifies to the remap priority for IPv6 multicast packets forwarded on the multicast VLAN. |
| **Priority** | Select the priority value here. The range is from 0 to 7. A lower value represents a higher priority. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Replace Source IP Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the multicast VLAN's ID that will be used here. The range is 2 to 4094. |

| Parameter | Description |
|---|---|
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |
| **Address Type** | Select the address type here. Options to choose from are **IPv4** and **IPv6**.<br>• **IPv4:** Specifies to enter the source IPv4 address for IGMP control packet reporting up to routers.<br>• **IPv6:** Specifies to enter the source IPv6 address for MLD control packet reporting up to routers. |
| **IP Address** | Enter the IPv4/IPv6 address here. |
| **From** | Select the "from" option here. Options to choose from are **Receiver**, **Source**, and **Both**.<br>• **Receiver:** Specifies that the source IPv4/IPv6 address of the IGMP/MLD report/leave packet received on any multicast VLAN receiver port will be replaced.<br>• **Source:** Specifies that the source IPv4/IPv6 address of the IGMP/MLD report/leave packet received on any multicast VLAN source port will be replaced.<br>• **Both:** Specifies that the source IPv4/IPv6 address of the IGMP/MLD report/leave packet received on any port in the multicast VLAN will be replaced. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Multicast VLAN Table** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the multicast VLAN's ID that will be used here. The range is 2 to 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to view all the entries.

## Multicast VLAN Group Settings

This widow is used to view and configure the multicast VLAN's group settings.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast VLAN > Multicast VLAN Group Settings**, as shown below:

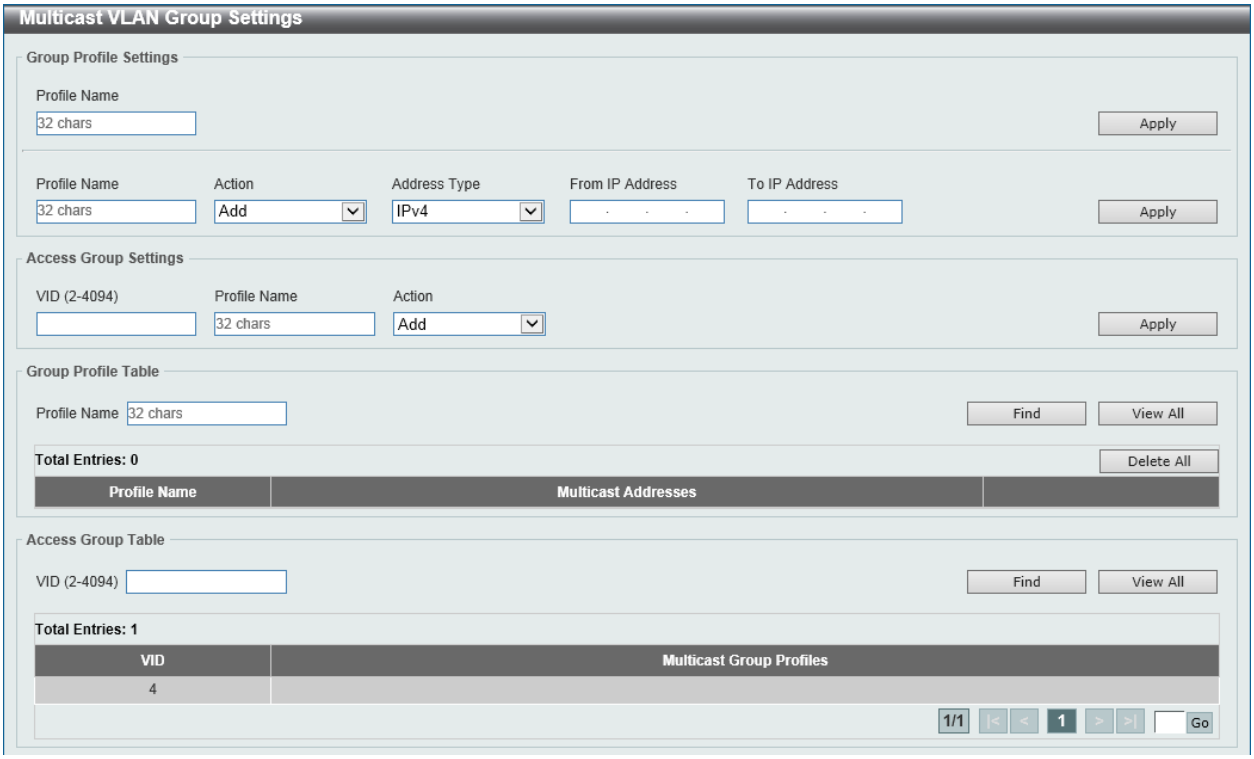



**Figure 5-70 Multicast VLAN Group Settings Window**

The fields that can be configured in **Group Profile Settings** are described below:

| Parameter | Description |
|---|---|
| **Profile Name** | Enter the group profile name for the multicast VLAN feature here. This name can be up to 32 characters long. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add** and **Delete**. Multiple ranges can be added to a multicast VLAN profile. The IP address ranges, specified in a single profile, must be of the same address family. |
| **Address Type** | Select the address type here. Options to choose from are **IPv4** and **IPv6**.<br>• **IPv4:** Specifies to use IPv4 multicast addresses in the range.<br>• **IPv6:** Specifies to use IPv6 multicast addresses in the range. |
| **From IP Address** | Enter the source IPv4/IPv6 address here. |
| **To IP Address** | Enter the destination IPv4/IPv6 address here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Access Group Settings** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the multicast VLAN's ID that will be used here. The range is 1 to 4094. |
| **Profile Name** | Enter the group profile name for the multicast VLAN feature here. This name can be up to 32 characters long. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add** and **Delete**. This is to add or delete the multicast group entirely. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Group Profile Table** are described below:

| Parameter | Description |
|---|---|
| **Profile Name** | Enter the group profile name for the multicast VLAN feature here. This name can be up to 32 characters long. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Delete All** button to delete all the entries found in the display table.

The fields that can be configured in **Access Group Table** are described below:

| Parameter | Description |
|---|---|
| **VID** | |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# Multicast Filtering

This window is used to view and configure the Layer 2 multicast filtering settings.

To view the following window, click **L2 Features > L2 Multicast Control > Multicast Filtering**, as shown below:

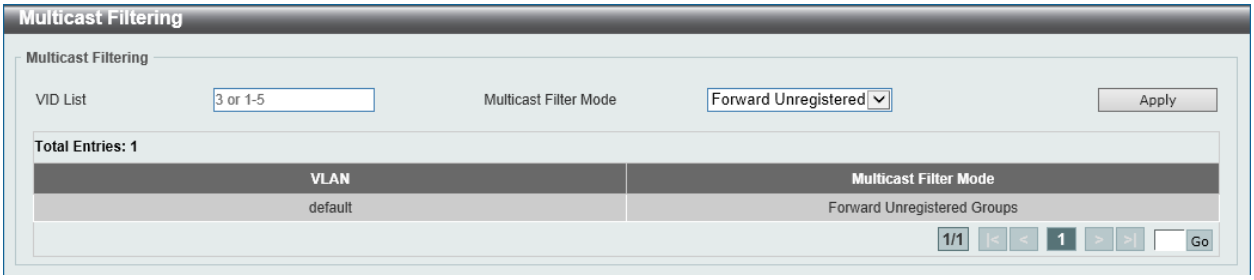



**Figure 5-71 Multicast Filtering Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the VLAN ID list that will be used for this configuration here. |
| **Multicast Filter Mode** | Select the multicast filter mode here. Options to choose from are **Forward Unregistered**, **Forward All**, and **Filter Unregistered**.<br>• When selecting the **Forward Unregistered** option, registered multicast packets will be forwarded based on the forwarding table and all unregistered multicast packets will be flooded based on the VLAN domain.<br>• When selecting the **Forward All** option, all multicast packets will be flooded based on the VLAN domain.<br>• When selecting the **Filter Unregistered** option, registered packets will be forwarded based on the forwarding table and all unregistered multicast packets will be filtered. |

Click the **Apply** button to accept the changes made.

# LLDP

## LLDP Global Settings

This window is used to view and configure the LLDP global settings.

To view the following window, click **L2 Features > LLDP > LLDP Global Settings**, as shown below:

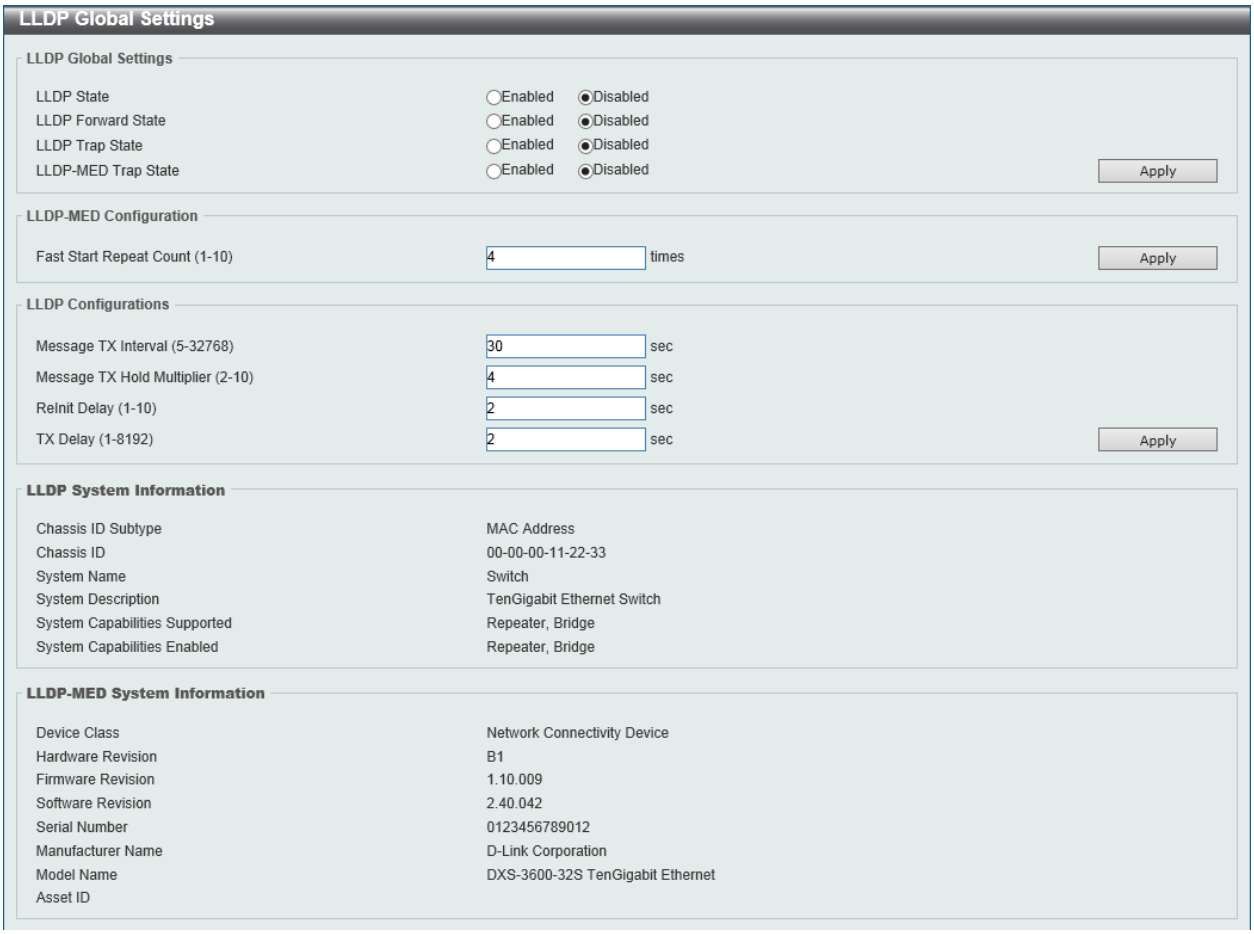



**Figure 5-72 LLDP Global Settings Window**

The fields that can be configured in **LLDP Global Settings** are described below:

| Parameter | Description |
|---|---|
| **LLDP State** | Select this option to enable or disable the LLDP feature |
| **LLDP Forward State** | Select this option to enable or disable LLDP forward state. When the **LLDP State** is disabled and **LLDP Forward Sate** is enabled, the received LLDPDU packet will be forwarded. |
| **LLDP Trap State** | Select this option to enable or disable the LLDP trap state. |
| **LLDP-MED Trap State** | Select this option to enable or disable the LLDP-MED trap state. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **LLDP-MED Settings** are described below:

| Parameter | Description |
|---|---|
| **Fast Start Repeat Count** | Enter the LLDP-MED fast start repeat count value. This value must be between 1 and 10. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **LLDP Configurations** are described below:

| Parameter | Description |
|---|---|
| **Message TX Interval** | Enter the interval between consecutive transmissions of LLDP advertisements on each physical interface. The range is from 5 to 32768 seconds. |
| **Message TX Hold Multiplier** | Enter the multiplier on the LLDPDUs transmission interval that used to compute the TTL value of an LLDPDU. This value must be between 2 and 10. |
| **ReInit Delay** | Enter the delay value for LLDP initialization on an interface. This value must be between 1 and 10 seconds. |
| **TX Delay** | Enter the delay value for sending successive LLDPDUs on an interface. The valid values are from 1 to 8192 seconds and should not be greater than one-fourth of the transmission interval timer. |

Click the **Apply** button to accept the changes made.

# LLDP Port Settings

This window is used to view and configure the LLDP port settings.

To view the following window, click **L2 Features > LLDP > LLDP Port Settings**, as shown below:

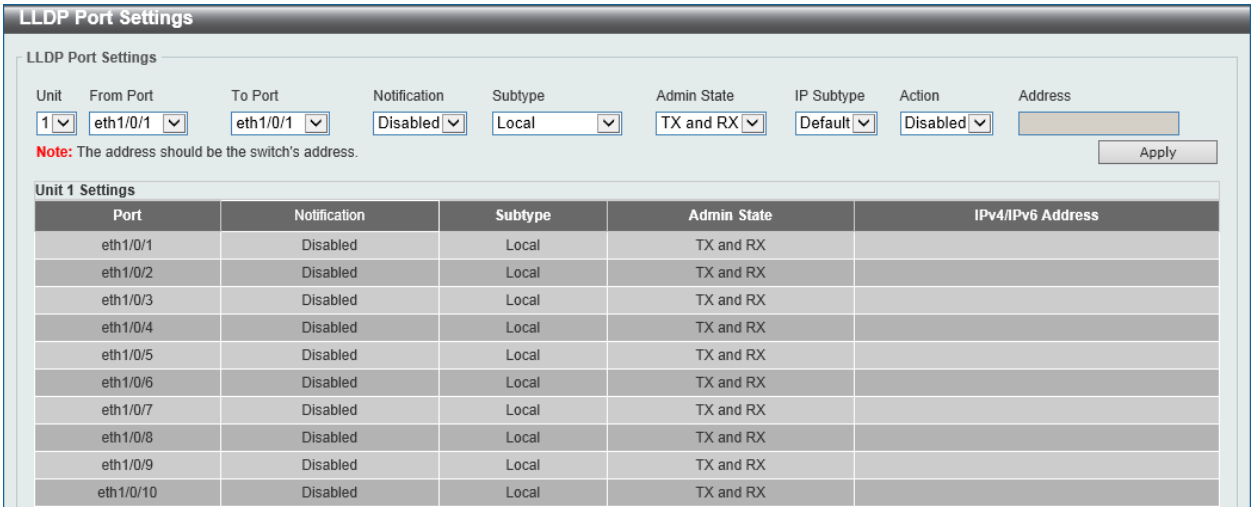



**Figure 5-73 LLDP Port Settings Window**

The fields that can be configured in **LLDP Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

| Parameter | Description |
|---|---|
| **Notification** | Select to enable or disable the notification feature here. |
| **Subtype** | Select the subtype of LLDP TLV(s). Options to choose from are **MAC Address**, and **Local**. |
| **Admin State** | Select the local LLDP agent and allow it to send and receive LLDP frames on the port. Options to choose from are **TX**, **RX**, **TX and RX**, and **Disabled**.<br>• **TX** - The local LLDP agent can only transmit LLDP frames.<br>• **RX** - The local LLDP agent can only receive LLDP frames.<br>• **TX and RX** - The local LLDP agent can both transmit and receive LLDP frames.<br>• **Disabled** - The local LLDP agent can neither transmit nor receive LLDP frames.<br>The default value is **TX and RX**. |
| **IP Subtype** | Select the type of the IP address information to be sent. Options to choose from are **Default**, **IPv4** and **IPv6**. |
| **Action** | Select this option to enable or disable the action field |
| **Address** | Enter the IP address that will be sent. |

Click the **Apply** button to accept the changes made.

**NOTE:** The IPv4 or IPv6 address entered here should be an existing LLDP management IP address.

# LLDP Management Address List

This window is used to view the LLDP management address list.

To view the following window, click **L2 Features > LLDP > LLDP Management Address List**, as shown below:


**Figure 5-74 LLDP Management Address List Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Subtype** | Select the subtype. Options to choose from are **All**, **IPv4** and **IPv6**. |

Click the **Find** button to locate a specific entry based on the selection made.

# LLDP Basic TLVs Settings

Type-length-value (TLV) allows the specific sending information as a TLV element within LLDP packets. This window is used to enable the settings for the Basic TLVs Settings. An active LLDP port on the

Switch always included mandatory data in its outbound advertisements. There are four optional data types that can be configured for an individual port or group of ports to exclude one or more of these data types from outbound LLDP advertisements. The mandatory data type includes four basic types of information (end of LLDPDU TLV, chassis ID TLV, port ID TLV, and Time to Live TLV). The mandatory data types cannot be disabled. There are also four data types which can be optionally selected. These include Port Description, System Name, System Description and System Capability.

To view the following window, click **L2 Features > LLDP > LLDP Basic TLVs Settings**, as shown below:

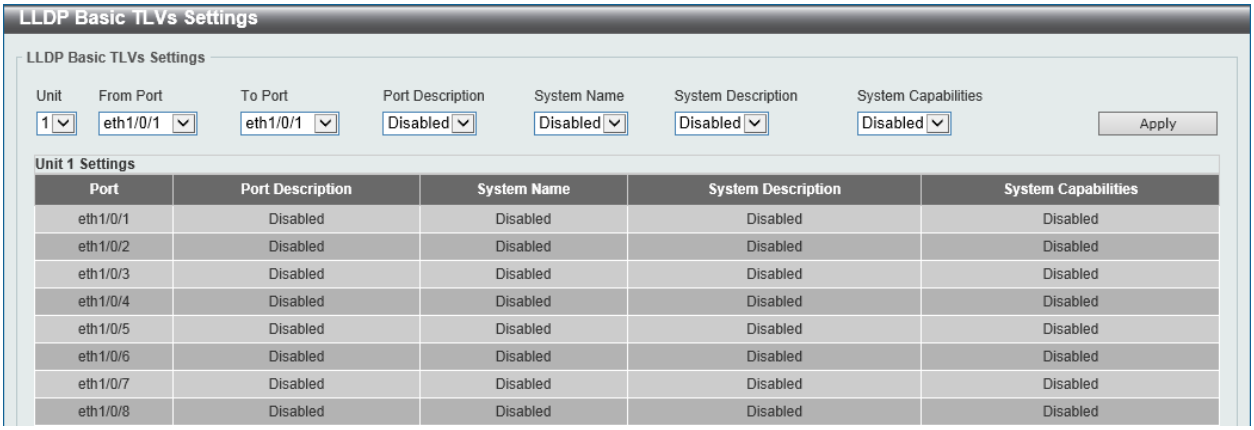



**Figure 5-75 LLDP Basic TLVs Settings Window**

The fields that can be configured in **LLDP Basic TLVs Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Port Description** | Select this option to enable or disable the Port Description option. |
| **System Name** | Select this option to enable or disable the System Name option. |
| **System Description** | Select this option to enable or disable the System Description option. |
| **System Capabilities** | Select this option to enable or disable the System Capabilities option. |

Click the **Apply** button to accept the changes made.

# LLDP Dot1 TLVs Settings

LLDP Dot1 TLVs are organizationally specific TLVs which are defined in IEEE 802.1 and used to configure an individual port or group of ports to exclude one or more of the IEEE 802.1 organizational port VLAN ID TLV data types from outbound LLDP advertisements.

To view the following window, click **L2 Features > LLDP > LLDP Dot1 TLVs Settings**, as shown below:

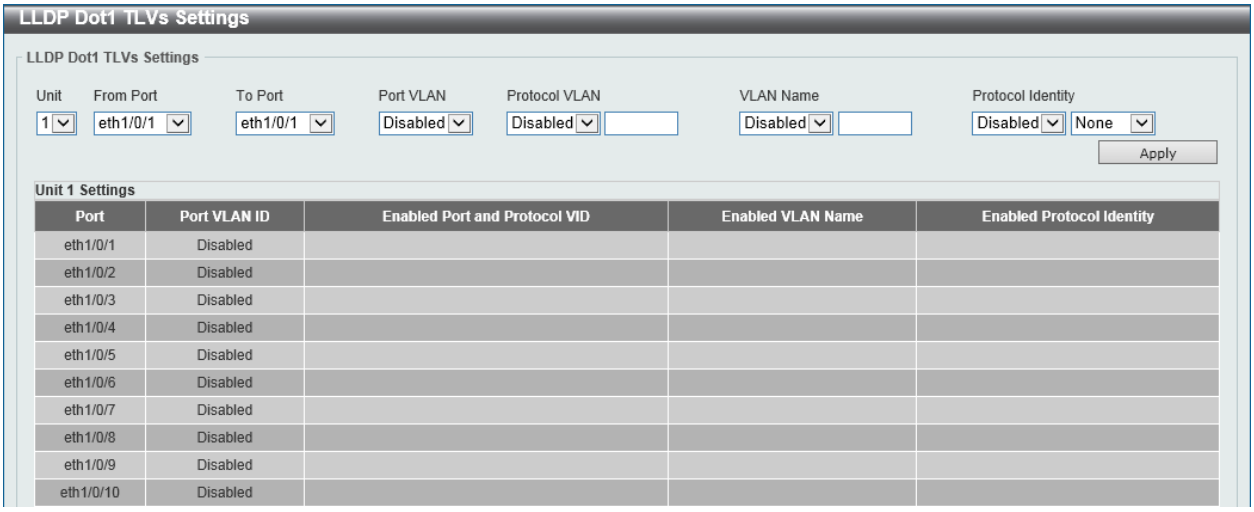



**Figure 5-76 LLDP Dot1 TLVs Settings Window**

The fields that can be configured in **LLDP Dot1 TLVs Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Port VLAN** | Select this option to enable or disable the port VLAN ID TLV to send. The Port VLAN ID TLV is an optional fixed length TLV that allows a VLAN bridge port to advertise the port's VLAN identifier (PVID) that will be associated with untagged or priority tagged frames. |
| **Protocol VLAN** | Select this option to enable or disable Port and Protocol VLAN ID (PPVID) TLV to send, and enter the VLAN ID in PPVID TLV. |
| **VLAN Name** | Select this option to enable or disable the VLAN name TLV to send, and enter the ID of the VLAN in the VLAN name TLV. |
| **Protocol Identity** | Select this option to enable or disable the Protocol Identity TLV to send, and the protocol name. Options for protocol name to choose from are **None**, **EAPOL**, **LACP**, **GVRP**, **STP**, and **All**. |

Click the **Apply** button to accept the changes made.

# LLDP Dot3 TLVs Settings

This window is used to view and configure an individual port or group of ports to exclude one or more IEEE 802.3 organizational specific TLV data type from outbound LLDP advertisements.

To view the following window, click **L2 Features > LLDP > LLDP Dot3 TLVs Settings**, as shown below:

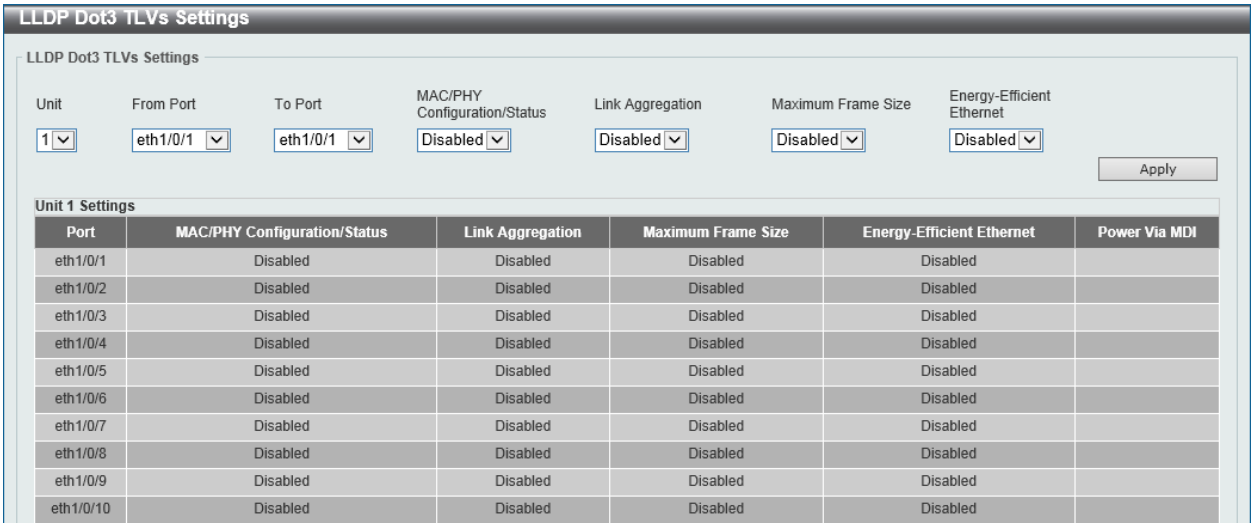



**Figure 5-77 LLDP Dot3 TLVs Settings Window**

The fields that can be configured in **LLDP Dot3 TLVs Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **MAC/PHY Configuration/Status** | Select this option to enable or disable the MAC/PHY Configuration/Status TLV to send. The MAC/PHY Configuration/Status TLV is an optional TLV that identifies (1) the duplex and bit-rate capability of the sending IEEE 802.3 LAN node, and (2) the current duplex and bit-rate settings of the sending IEEE 802.3 LAN node. |
| **Link Aggregation** | Select this option to enable or disable the Link Aggregation TLV to send. The Link Aggregation TLV indicates contains the following information. Whether the link is capable of being aggregated, whether the link is currently in an aggregation, and the aggregated port channel ID of the port. If the port is not aggregated, then the ID is 0. |
| **Maximum Frame Size** | Select this option to enable or disable the Maximum Frame Size TLV to send. The Maximum Frame Size TLV indicates the maximum frame size capability of the implemented MAC and PHY. |
| **Energy-Efficient Ethernet** | Select this option to enable or disable the Energy Efficient Ethernet TLV to send. The Energy Efficient Ethernet TLV indicates the reduce energy consumption capability of a link when no packets are being sent. |

Click the **Apply** button to accept the changes made.

# LLDP-MED Port Settings

This window is used to enable or disable transmitting LLDP-MED TLVs.

To view the following window, click **L2 Features > LLDP > LLDP-MED Port Settings**, as shown below:

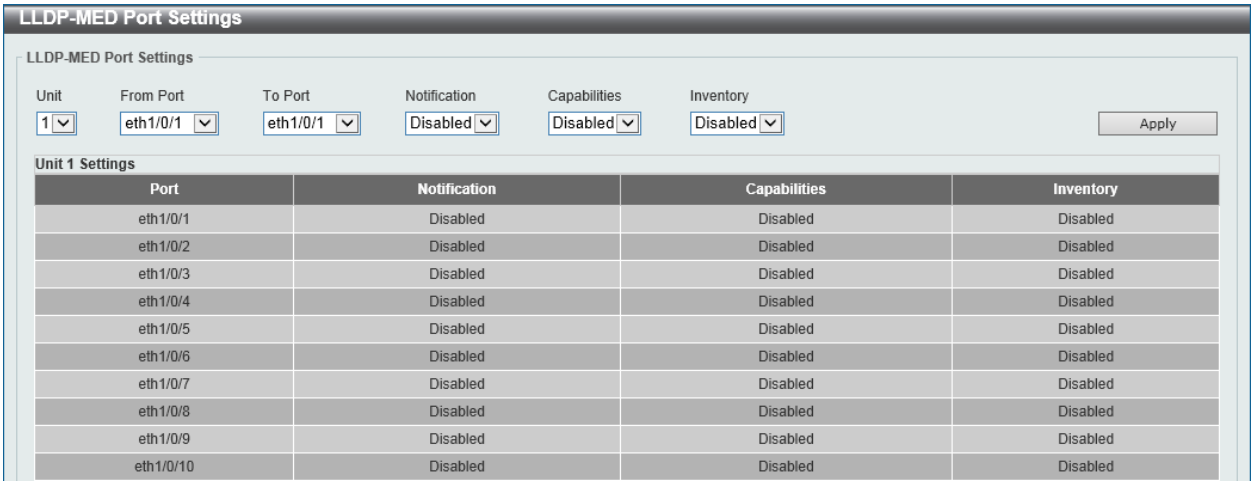



**Figure 5-78 LLDP-MED Port Settings Window**

The fields that can be configured in **LLDP-MED Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Notification** | Select this option to enable or disable transmitting the LLDP-MED notification TLV. |
| **Capabilities** | Select this option to enable or disable transmitting the LLDP-MED capabilities TLV. |
| **Inventory** | Select this option to enable or disable transmitting the LLDP-MED inventory management TLV. |

Click the **Apply** button to accept the changes made.

# LLDP-DCBX Port Settings

This window is used to view and configure which optional type-length-value settings (TLVs) in the Data Center Bridging Exchange protocol (DCBX) TLV set will be transmitted and encapsulated in the LLDPDUs and sent to neighbor devices.

To view the following window, click **L2 Features > LLDP > LLDP-DCBX Port Settings**, as shown below:

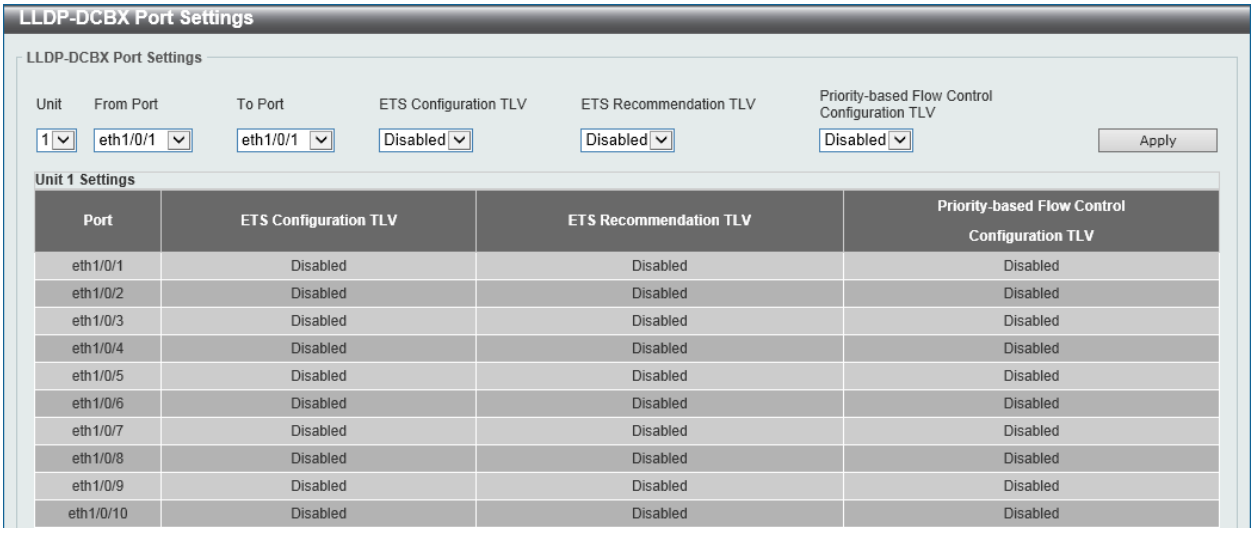



**Figure 5-79 LLDP-DCBX Port Settings Window**

The fields that can be configured in **LLDP-DCBX Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **ETS Configuration TLV** | Select to enable or disable Enhanced Transmission Selection (ETS) configuration TLV feature here. This specifies the ETS Configuration TLV to be sent. The Enhanced Transmission Selection Configuration TLV is an optional TLV that allows a bridge port to advertise the current ETS operational state and willing bit. |
| **ETS Recommendation TLV** | Select to enable or disable the ETS recommendation TLV feature here. This specifies the ETS Recommendation TLV to be sent. The Enhanced Transmission Selection Recommendation TLV is an optional TLV that allows a bridge port to advertise the ETS recommendation for the operational state of the remote port. |
| **Priority-based Flow Control Configuration TLV** | Select to enable or disable the Priority-based Flow Control (PFC) configuration TLV feature here. This specifies the PFC Configuration TLV to be sent. The Priority-based Flow Control TLV is an optional TLV that allows a bridge port to advertise the PFC current operational state and willing bit. |

Click the **Apply** button to accept the changes made.

# LLDP Statistics Information

This window is used to view the neighbor detection activity, LLDP Statistics and the settings for individual ports on the Switch.

To view the following window, click **L2 Features > LLDP > LLDP Statistics Information**, as shown below:

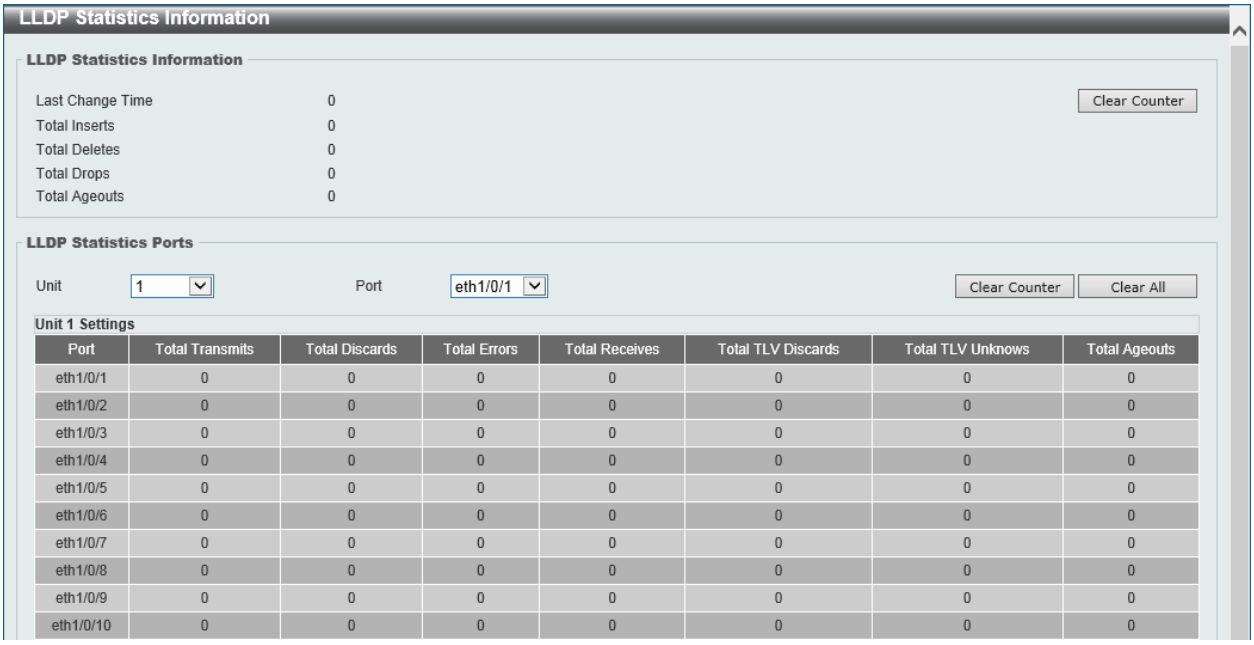



**Figure 5-80 LLDP Statistics Information Window**

The fields that can be configured in **LLDP Statistics Ports** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used here. |
| **Port** | Select the port number that will be used here. |

Click the **Clear Counter** button to clear the counter information for the statistics displayed.

Click the **Clear All** button to clear all the counter information displayed.

# LLDP Local Port Information

This window is used to display the information on a per port basis currently available for populating outbound LLDP advertisements in the local port brief table shown below.

To view the following window, click **L2 Features > LLDP > LLDP Local Port Information**, as shown below:

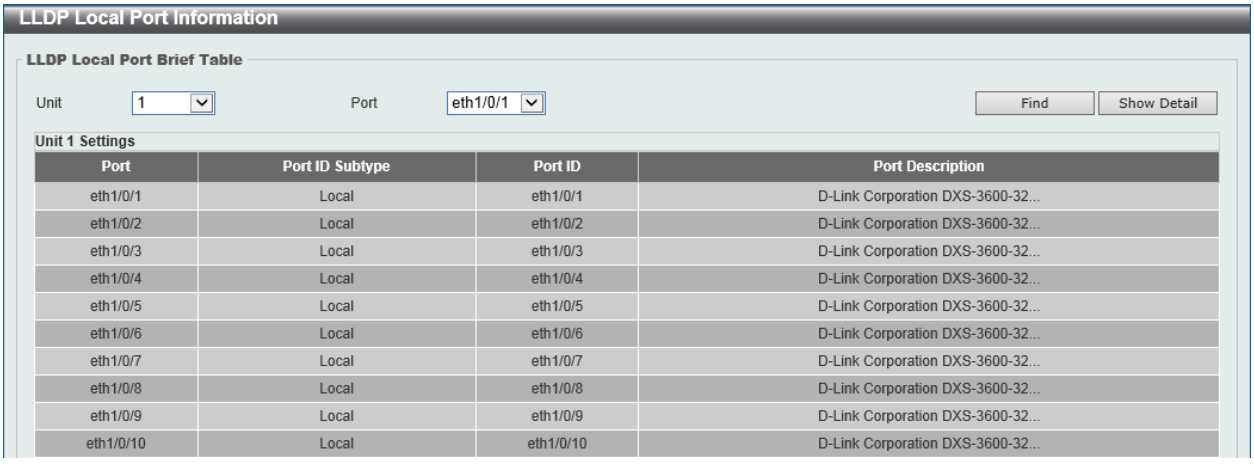



**Figure 5-81 LLDP Local Port Information Window**

The fields that can be configured in **LLDP Local Port Brief Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be displayed. |
| **Port** | Select the port number that will be displayed. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view detailed information of the specific port.

After clicking the **Show Detail** button, the following window will appear.

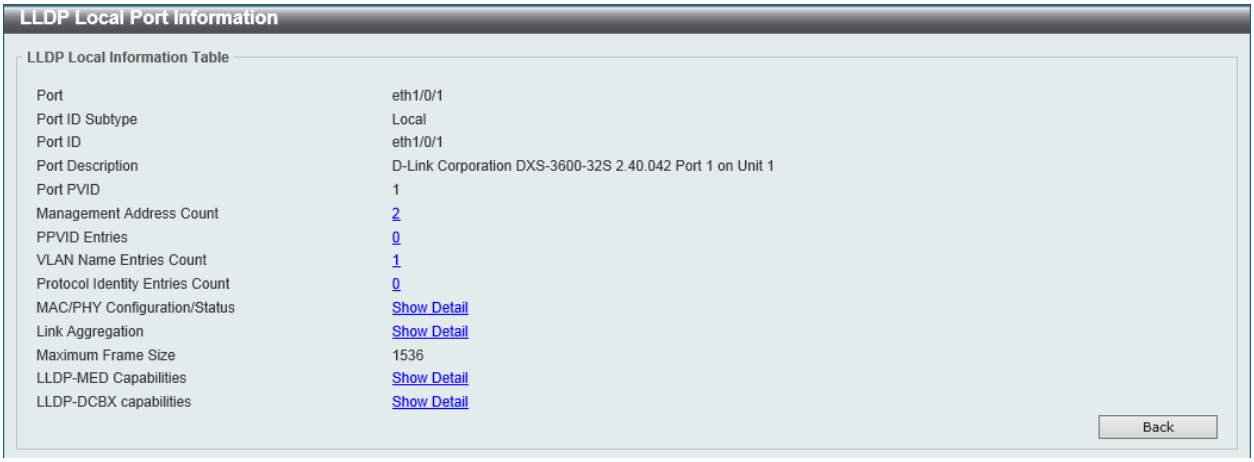



**Figure 5-82 LLDP Local Port Information (Show Detail) Window**

To view more details about, for example, the **MAC/PHY Configuration/Status**, click the Show Detail hyperlink.

Click the **Back** button to return to the previous window.

After clicking the Show Detail hyperlink, a new section will appear at the bottom of the window.

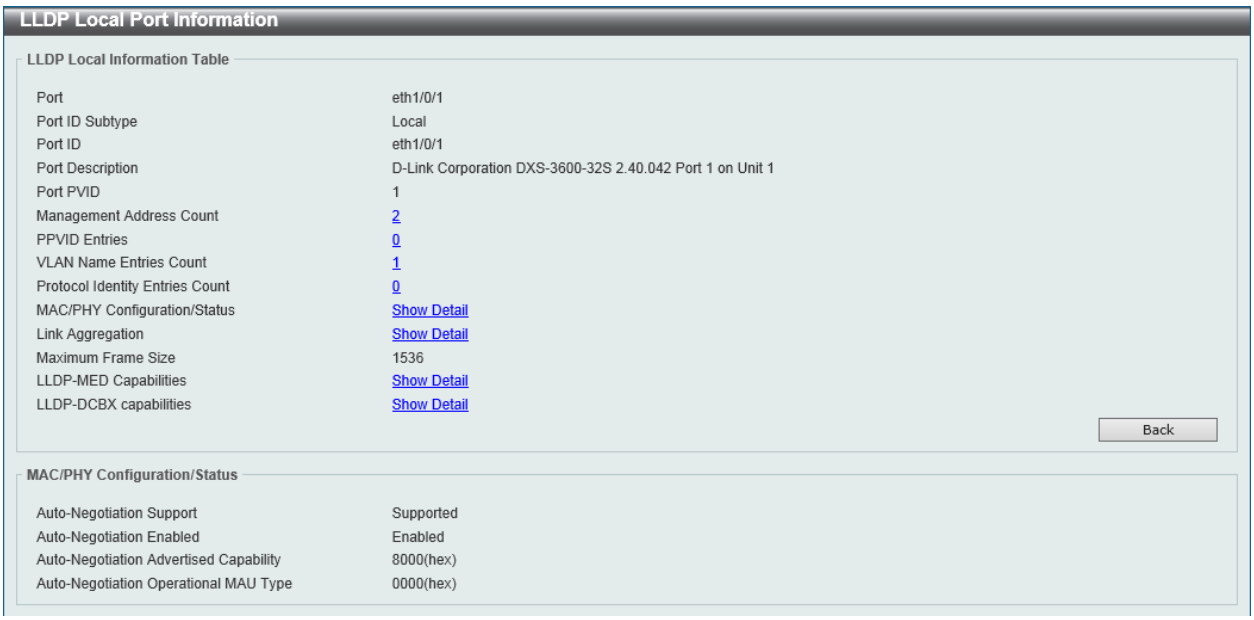



**Figure 5-83 LLDP Local Port Information (Show Detail) Window**

Click the **Back** button to return to the previous window.

# LLDP Neighbor Port Information

This window is used to display the information learned from the neighbors. The switch receives packets from a remote station but is able to store the information as local.

To view the following window, click **L2 Features > LLDP > LLDP Neighbor Port Information**, as shown below:

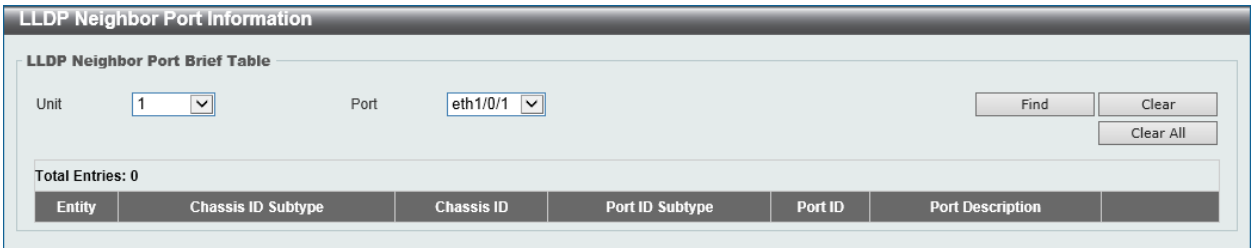



**Figure 5-84 LLDP Neighbor Port Information Window**

The fields that can be configured in **LLDP Neighbor Port Brief Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be displayed. |
| **Port** | Select the port number that will be displayed. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the specific port information.

Click the **Clear All** button to clear all the port information displayed.

# 6. Layer 3 Features

***ARP***
***Gratuitous ARP***
***IPv6 Neighbor***
***Interface***
***UDP Helper***
***IPv4 Static/Default Route***
***IPv4 Route Table***
***IPv6 Static/Default Route***
***IPv6 Route Table***
***Route Preference***
***ECMP Load Balancing Settings***
***IPv6 General Prefix***
***IP Tunnel Settings***
***URPF Settings***
***VRF***
***RIP***
***RIPng***
***OSPF***
***IP Multicast Routing Protocol***
***BGP***
***IP Route Filter***
***Policy Route***
***VRRP Settings***

## ARP

### ARP Aging Time

This window is used to view and configure the ARP aging time settings.

To view the following window, click **L3 Features > ARP > ARP Aging Time**, as shown below:


**Figure 6-1 ARP Aging Time Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Timeout** | After click the **Edit** button, enter the ARP aging timeout value here. |

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

### Static ARP

This window is used to view and configure the static ARP settings.

To view the following window, click **L3 Features > ARP > Static ARP**, as shown below:

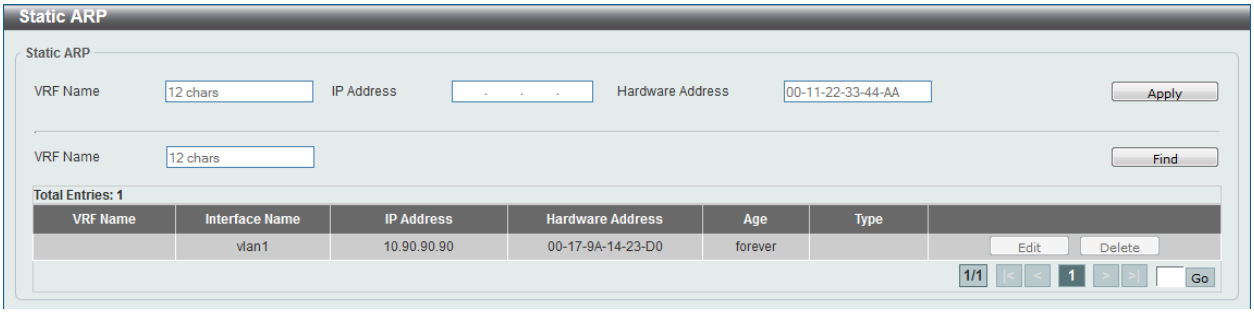



**Figure 6-2 Static ARP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the Virtual Routing and Forwarding (VRF) instance name used here. This name can be up to 12 characters long. |
| **IP Address** | Enter the IP address that will be associated with the MAC address here. |
| **Hardware Address** | Enter the MAC address that will be associated with the IP address here. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to find the entry, based on the information entered.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specific entry.

# Proxy ARP

This window is used to view and configure the proxy ARP settings. The Proxy ARP feature of the switch will allow the switch to reply to ARP requests destined for another device by faking its identity (IP and MAC Address) as the original ARP responder. Therefore, the switch can then route packets to the intended destination without configuring static routing or a default gateway. The host, usually a Layer 3 switch, will respond to packets destined for another device.

To view the following window, click **L3 Features > ARP > Proxy ARP**, as shown below:

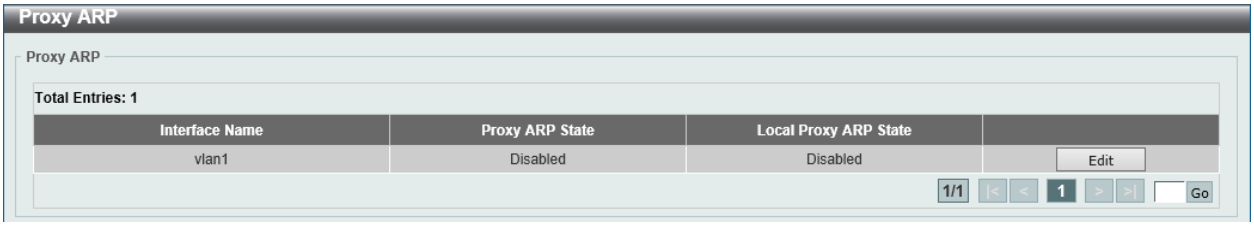



**Figure 6-3 Proxy ARP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Proxy ARP State** | Select to enable or disable the proxy ARP state here. |
| **Local Proxy ARP State** | Select to enable or disable the local proxy ARP state here. This local proxy ARP function allows the switch to respond to the proxy ARP, if |

| Parameter | Description |
|---|---|
| | the source IP and destination IP are in the same interface. |

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

## ARP Table

This window is used to view and configure the ARP table settings.

To view the following window, click **L3 Features > ARP > ARP Table**, as shown below:

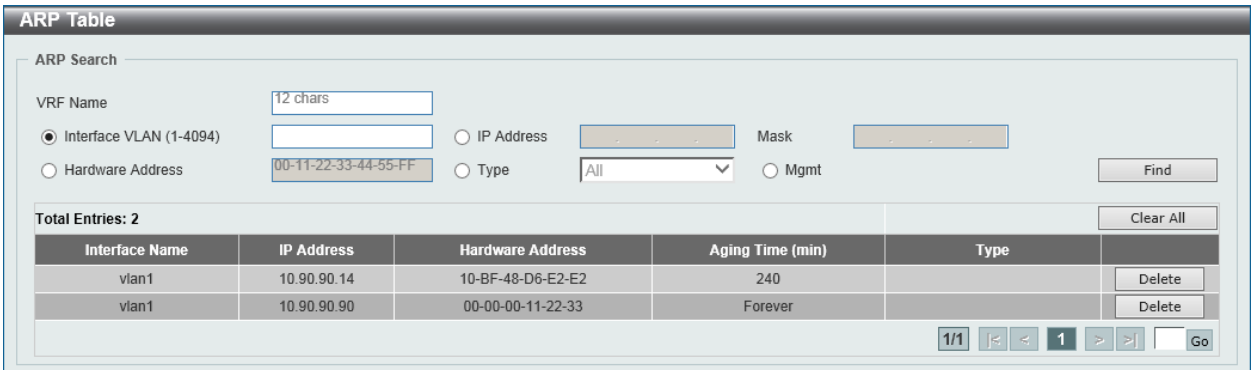



**Figure 6-4 ARP Table Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the Virtual Routing and Forwarding (VRF) instance name used here. This name can be up to 12 characters long. |
| **Interface VLAN** | Enter the interface's VLAN ID used here. This value must be between **1** and **4094**. |
| **IP Address** | Select and enter the IP address to display here. |
| **Mask** | After the **IP Address** option was selected, enter the mask address for the IP address here. |
| **Hardware Address** | Select and enter the MAC address to display here. |
| **Type** | Select the type option here. Options to choose from are **All** and **Dynamic**. |
| **Mgmt** | Select this option to display the Management port's information. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear All** button to clear all the information.

Click the **Delete** button to remove the specific entry.

# Gratuitous ARP

This window is used to view and configure the gratuitous ARP settings. A gratuitous ARP request packet is an ARP request packet where the source and the destination IP address are both set to the IP address of the sending device and the destination MAC address is the broadcast address.

Generally, a device use the gratuitous ARP request packet to discover whether the IP address is duplicated by other hosts or to preload or reconfigure the ARP cache entry of hosts connected to the interface.

To view the following window, click **L3 Features > Gratuitous ARP**, as shown below:

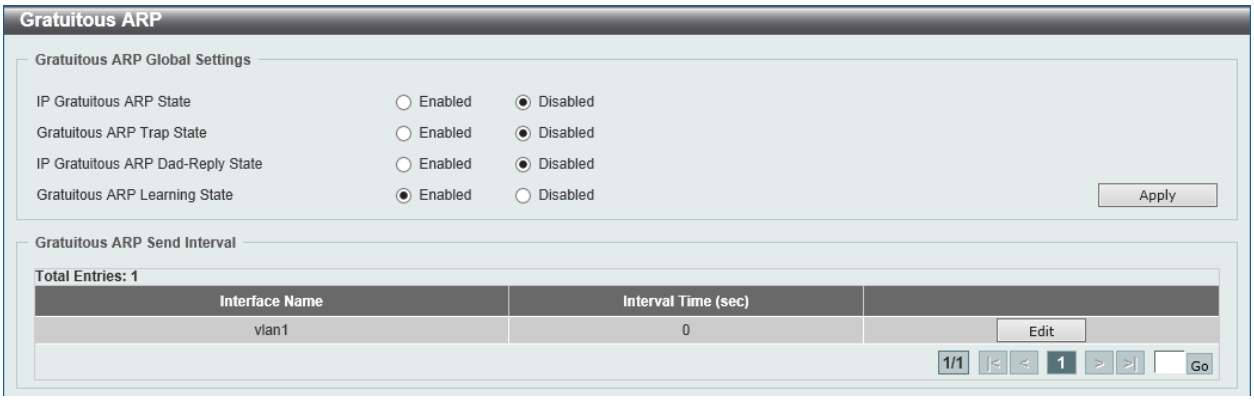



**Figure 6-5 Gratuitous ARP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **IP Gratuitous ARP State** | Select to enable or disable the learning of gratuitous ARP packets in the ARP cache table. |
| **Gratuitous ARP Trap State** | Select to enable or disable the gratuitous ARP feature's trap state here. |
| **IP Gratuitous ARP Dad-Reply State** | Select to enable or disable the IP gratuitous ARP Dad-reply state. |
| **Gratuitous ARP Learning State** | Select to enable or disable the gratuitous ARP learning state. Normally, the system will only learn the ARP reply packet or a normal ARP request packet that asks for the MAC address that corresponds to the system's IP address. This option used to enable or disable the learning of ARP entries in the ARP cache based on the received gratuitous ARP packet. The gratuitous ARP packet is sent by a source IP address that is identical to the IP that the packet is queries for. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

After clicking the **Edit** button, the field that can be configured for **Gratuitous ARP Send Interval** is described below:

| Parameter | Description |
|---|---|
| **Interval Time** | Enter the gratuitous ARP sending interval time, in seconds, here. |

Click the **Apply** button to accept the changes made.

# IPv6 Neighbor

This window is used to view and configure the IPv6 neighbor settings.

To view the following window, click **L3 Features > IPv6 Neighbor**, as shown below:

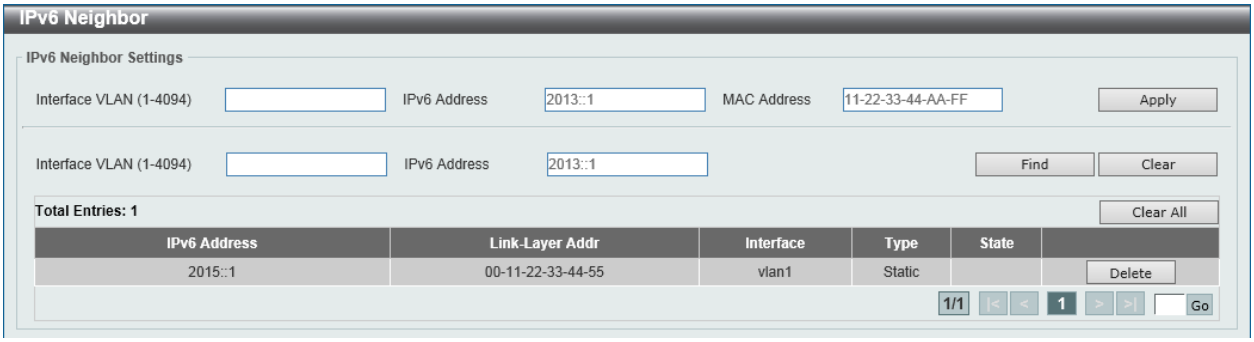



**Figure 6-6 IPv6 Neighbor Window**

The fields that can be configured in **IPv6 Neighbor Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. |
| **IPv6 Address** | Enter the IPv6 address. |
| **MAC Address** | Enter the MAC address. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear all the information for the specific port.

Click the **Clear All** button to clear all the dynamic IPv6 neighbor information in this table.

Click the **Delete** button to remove the specific entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# Interface

## IPv4 Interface

This window is used to view and configure the IPv4 interface settings.

To view the following window, click **L3 Features > Interface > IPv4 Interface**, as shown below:

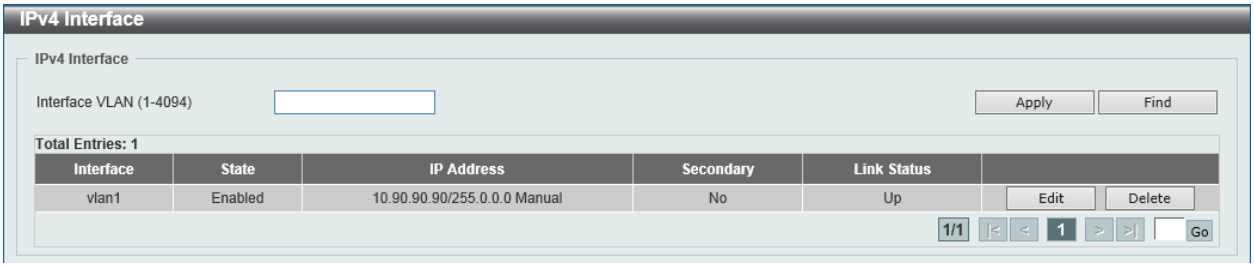



**Figure 6-7 IPv4 Interface Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the interface's VLAN ID here. This value must be between 1 and 4094. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specific entry.

After clicking the **Edit** button, the following page will be available.

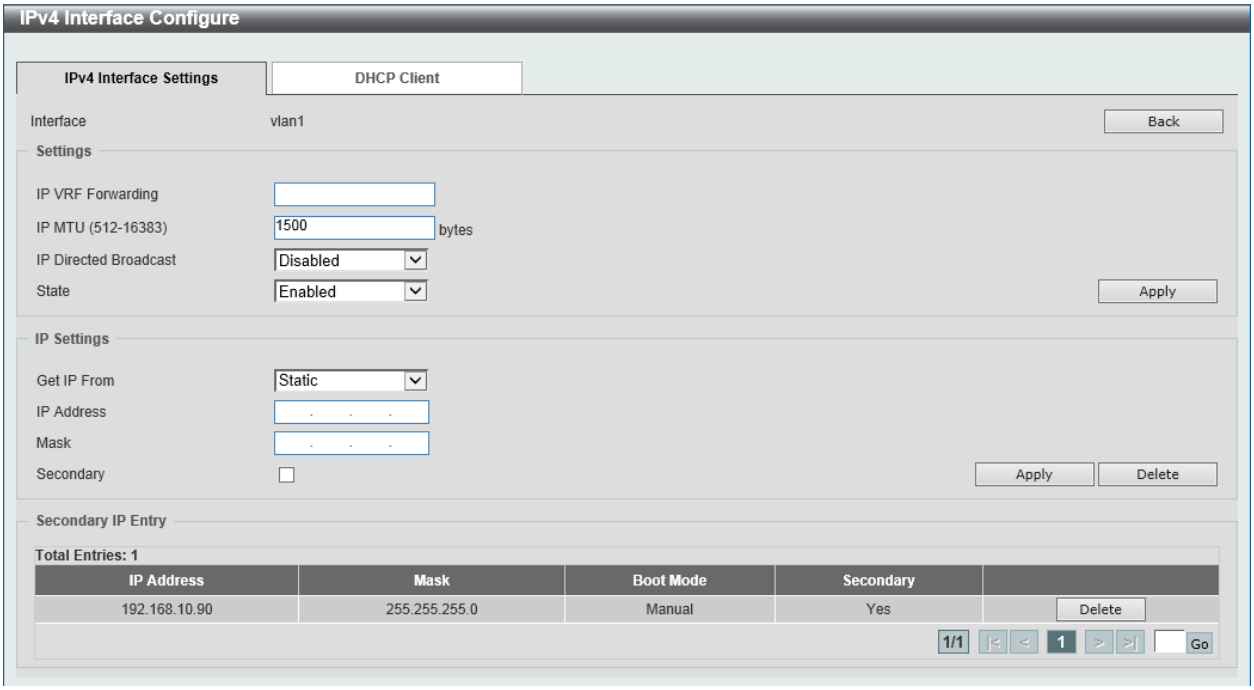



**Figure 6-8 IPv4 Interface (Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **IP VRF Forwarding** | Enter the VRF name here. This parameter is used to associate an interface to one VRF instance. By associating interfaces to different VRFs, the interfaces in different VRFs can be configured with the same IP address. The IP address space in one VRF is individual and can overlap among different VRFs. |
| **IP MTU** | Enter the MTU value here. The range is from 512 to 16383 bytes. By default, this value is 1500 bytes. |
| **IP Directed Broadcast** | Select to enable to disable the IP directed broadcast feature here. This parameter is used to enable or disable the conversion of IP directed broadcasts received by the interface to physical broadcasts when the destination network is directly connected to the switch. |
| **State** | Select to enable or disable the IPv4 interface's global state. |
| **Get IP From** | Select the get IP from option here. Options to choose from are **Static** and **DHCP**.<br>• When the **Static** option is selected, users can enter the IPv4 address of this interface manually in the fields provided.<br>• When the **DHCP** option is selected, this interface will obtain IPv4 information automatically from the DHCP server located on the local network. |
| **IP Address** | Enter the IPv4 address for this interface here. |
| **Mask** | Enter the IPv6 subnet mask for this interface here. |

| Parameter | Description |
|---|---|
| **Secondary** | Tick this option to use the IPv4 address and mask as the secondary interface configuration. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

After selecting the **DHCP Client** tab, the following page will appear.

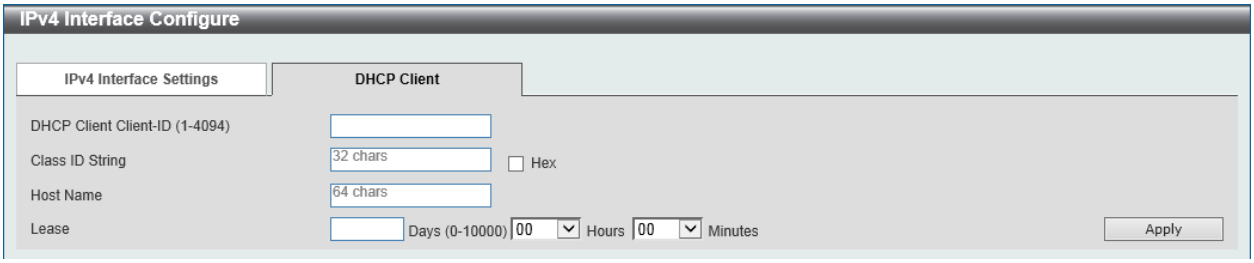



**Figure 6-9 User Management Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **DHCP Client Client-ID** | Enter the DHCP client's client ID here. The range is from 1 to 4094. This parameter is used to specify the VLAN interface whose hexadecimal MAC address will be used as the client ID sent with the discover message. |
| **Class ID String** | Enter the class ID string here. This string can be up to 32 characters long. Select the **Hex** option to enter the class ID string in the hexadecimal format. This string can be up to 64 characters long. This parameter is used to specify the vendor class identifier used as the value of Option 60 for the DHCP discover message. |
| **Host Name** | Enter the host name here. This string can be up to 64 characters long. This parameter is used to specify the value of the host name option to be sent with the DHCP discover message. |
| **Lease** | Enter and optionally select the DHCP client lease time here. In the text box the lease time, in days, can be entered. The range is from 0 to 10000 days. **Hours** and **Minutes** can also be selected optionally. |

Click the **Apply** button to accept the changes made.

# IPv6 Interface

This window is used to view and configure the IPv6 interface's settings.

To view the following window, click **L3 Features > Interface > IPv6 Interface**, as shown below:


**Figure 6-10 IPv6 Interface Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID that will be associated with the IPv6 entry. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Detail** button to view and configure more detailed settings for the IPv6 interface entry.

After clicking the **Detail** button, the following page will be available.

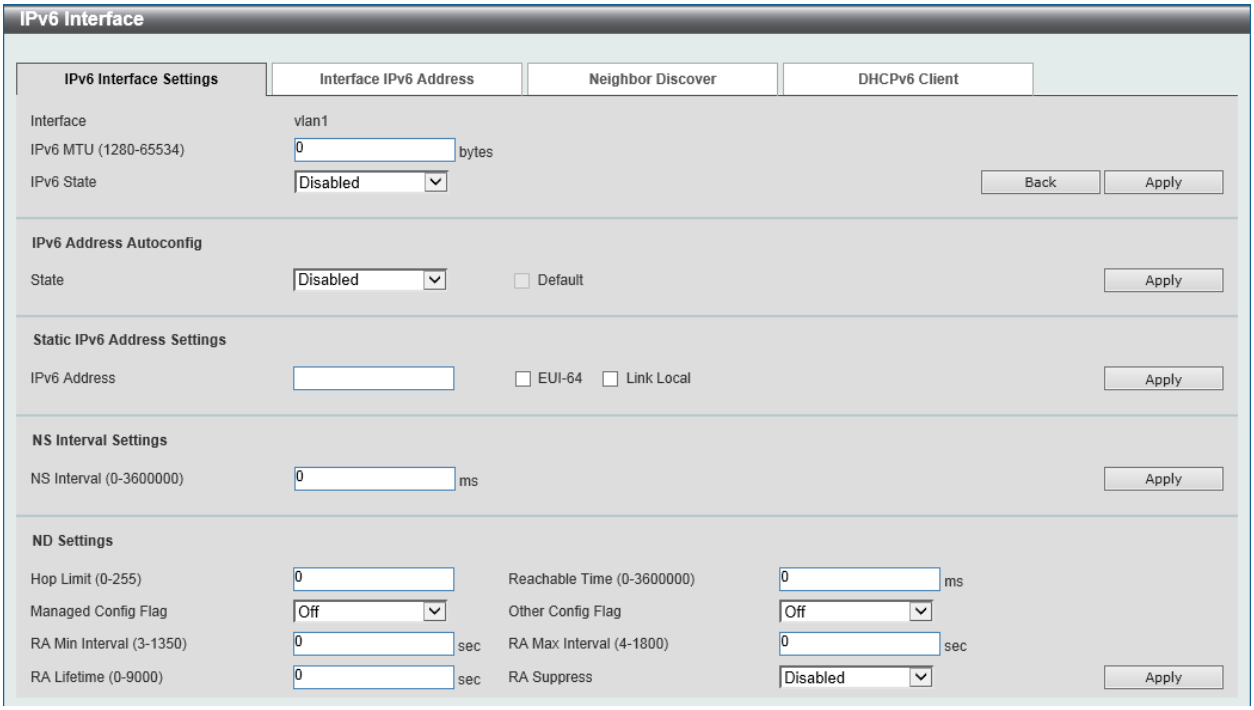



**Figure 6-11 IPv6 Interface (Detail, IPv6 Interface Settings) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **IPv6 MTU** | Enter the IPv6 MTU value here. The range is from 1280 to 65534 bytes. By default, this value is 1500 bytes. This parameter is used to configure the MTU to be advertised in RA messages. |
| **IPv6 State** | Select to enable or disable the IPv6 interface's global state here. |

Click the **Back** button to discard the changes made and return to the previous page.

Click the **Apply** button to accept the changes made.

The fields that can be configured for **IPv6 Address Autoconfig** are described below:

| Parameter | Description |
|---|---|
| **State** | Select to enable or disable the automatic configuration of the IPv6 address using the stateless auto-configuration feature here. Select the **Default** option to specify that if the default router is selected on this interface, a default route will be installed using that default router. This option can be specified only on one interface. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Static IPv6 Address Settings** are described below:

| Parameter | Description |
|---|---|
| **IPv6 Address** | Enter the IPv6 address for this IPv6 interface here. Select the **EUI-64** option to configure an IPv6 address on the interface using the EUI-64 interface ID. Select the **Link Local** option to configure a link-local address for the IPv6 interface. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **NS Interval Settings** are described below:

| Parameter | Description |
|---|---|
| **NS Interval** | Enter the NS interval value here. The range is from 0 to 3600000 milliseconds, in multiples of 1000. If the specified time is 0, the router will use 1 second on the interface and advertise 0 (unspecified) in the RA message. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **ND Settings** are described below:

| Parameter | Description |
|---|---|
| **Hop Limit** | Enter the hop limit value here. The range is from 0 to 255. The IPv6 packet originated at the system will also use this value as the initial hop limit. |
| **Reachable Time** | Enter the reachable time here. The range is from 0 to 3600000 milliseconds. If the specified time is 0, the router will use 1200 seconds on the interface and advertise 1200 (unspecified) in the RA message. The reachable time is used by the IPv6 node in determining the reachability of the neighbor nodes. |
| **Managed Config Flag** | Turn the managed config flag option **On** or **Off** here. When the neighbor host receives the RA which has flag turned on, the host should use a stateful configuration protocol to obtain IPv6 addresses. |
| **Other Config Flag** | Turn the other config flag option **On** or **Off** here. By setting the other configuration flag on, the router instructs the connected hosts to use a stateful configuration protocol to obtain auto-configuration information other than the IPv6 address. |
| **RA Min Interval** | Enter the minimum RA interval time value here. The range is from 3 to 1350 seconds. This value must be smaller than 0.75 times the |

| Parameter | Description |
|---|---|
| | maximum value. |
| **RA Max Interval** | Enter the maximum RA interval time value here. The range is from 4 to 1800 seconds. |
| **RA Lifetime** | Enter the RA lifetime value here. The range is from 0 to 9000 seconds. The lifetime value in RA instructs the received host the lifetime value for taking the router as the default router. |
| **RA Suppress** | Select to enable or disable the RA suppress feature here. |

Click the **Apply** button to accept the changes made.

After selecting the **Interface IPv6 Address** tab option, at the top of the page, the following page will be available.

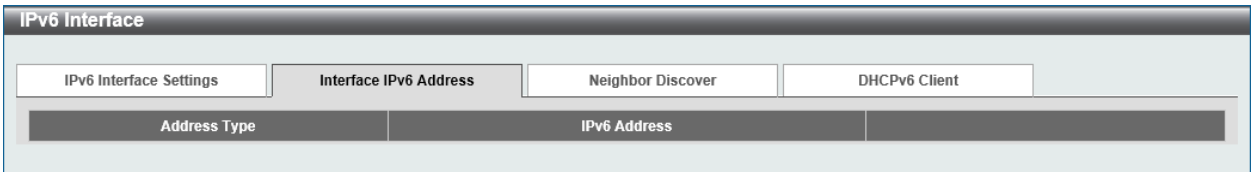



**Figure 6-12 IPv6 Interface (Detail, Interface IPv6 Address) Window**

Click the **Delete** button to delete the specified entry.

After selecting the **Neighbor Discover** tab option, at the top of the page, the following page will be available.


**Figure 6-13 IPv6 Interface (Detail, Neighbor Discover) Window**

After selecting the **DHCPv6 Client** tab option, at the top of the page, the following page will be available.

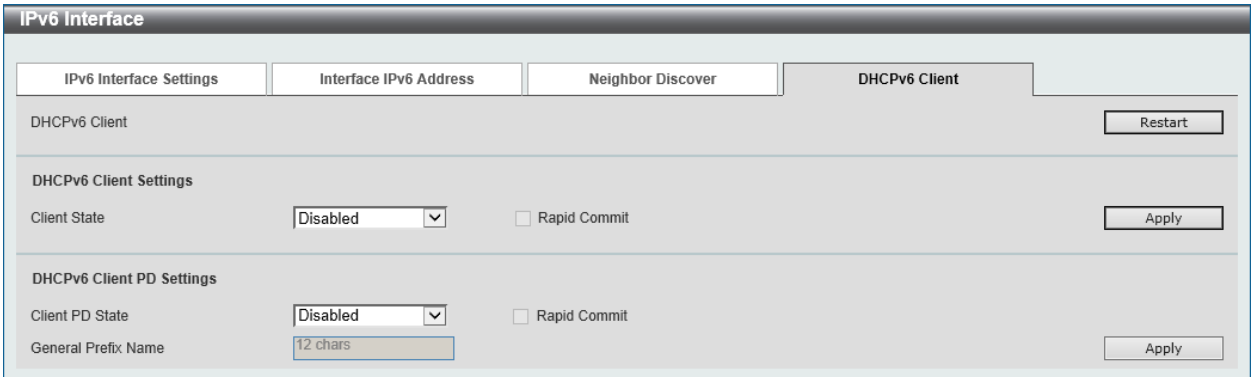



**Figure 6-14 IPv6 Interface (Detail, DHCPv6 Client) Window**

Click the **Restart** button to restart the DHCPv6 client service.

The fields that can be configured for **DHCPv6 Client Settings** are described below:

| Parameter | Description |
|---|---|
| **Client State** | Select to enable or disable the DHCPv6 client service here. Select the **Rapid Commit** option to proceed with two-message exchange for address delegation. The rapid-commit option will be filled in the Solicit message to request two messages handshake. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **DHCPv6 Client PD Settings** are described below:

| Parameter | Description |
|---|---|
| **Client PD State** | Select to enable or disable the DHCPv6 client process to request the prefix delegation through a specified interface. Select the **Rapid Commit** option to proceed with two-message exchange for prefix delegation. The rapid-commit option will be filled in the Solicit message to request two messages handshake. |
| **General Prefix Name** | Enter the IPv6 general prefix name here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

# Loopback Interface

This window is used to view and configure the loopback interface settings. A loopback interface is a software only interface which always stays in the up status.

To view the following window, click **L3 Features > Interface > Loopback Interface**, as shown below:

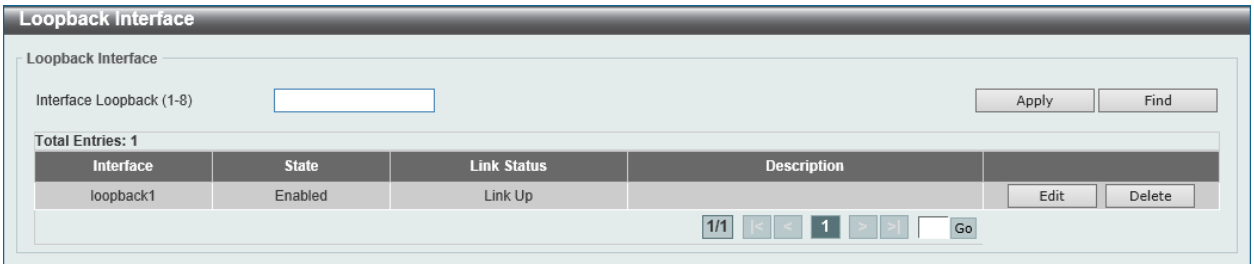



**Figure 6-15 Loopback Interface Window**

The fields that can be configured in **Loopback Interface** are described below:

| Parameter | Description |
|---|---|
| **Interface Loopback** | Enter the loopback interface's ID here. The range is from 1 to 8. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

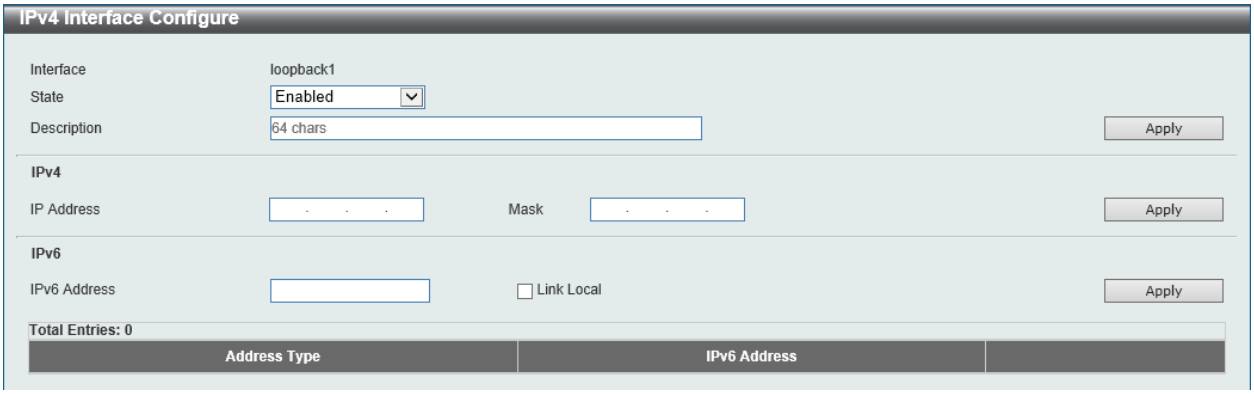



**Figure 6-16 Loopback Interface (Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **State** | Select to enable or disable the loopback interface here. |
| **Description** | Enter the description for the loopback interface here. This string can be up to 64 characters long. |
| **IP Address** | Enter the IPv4 address associated with this loopback interface here. |
| **Mask** | Enter the IPv4 subnet mask associated with this loopback interface here. |
| **IPv6 Address** | Enter the IPv6 address associated with this loopback interface here. |
| **Link Local** | Select this option to specify that the IPv6 address entered is the link-local IPv6 address. |

Click the **Apply** button to accept the changes made.

# Null Interface

This window is used to view and configure the NULL interface settings.

To view the following window, click **L3 Features > Interface > Null Interface**, as shown below:

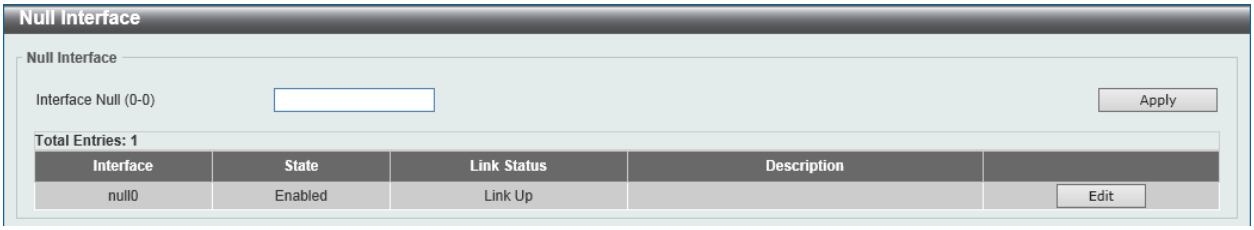



**Figure 6-17 Null Interface Window**

The fields that can be configured in **Null Interface** are described below:

| Parameter | Description |
|---|---|
| **Interface Null** | Enter the NULL interface's ID here. This value can only be 0. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the description for the NULL interface.

After clicking the **Edit** button, the following page will appear.

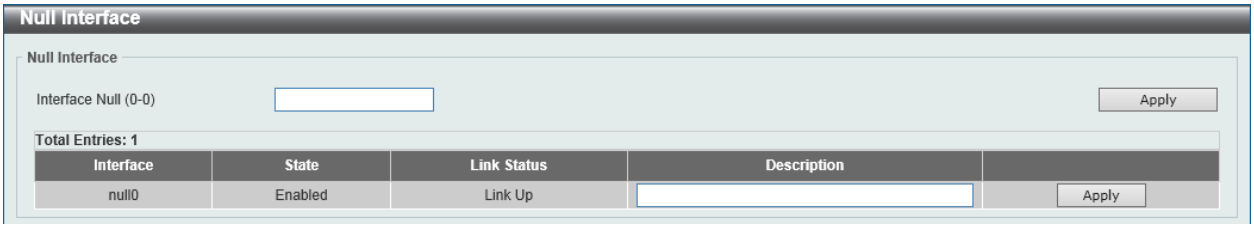



**Figure 6-18 Null Interface (Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Description** | Enter the description for the NULL interface here. This string can be up to 64 characters long. |

Click the **Apply** button to accept the changes made.

# UDP Helper

## IP Forward Protocol

This window is used to view and configure the IP forward protocol settings. This feature is used to enable the forwarding of a specific UDP service type of packets.

To view the following window, click **L3 Features > UDP Helper > IP Forward Protocol**, as shown below:

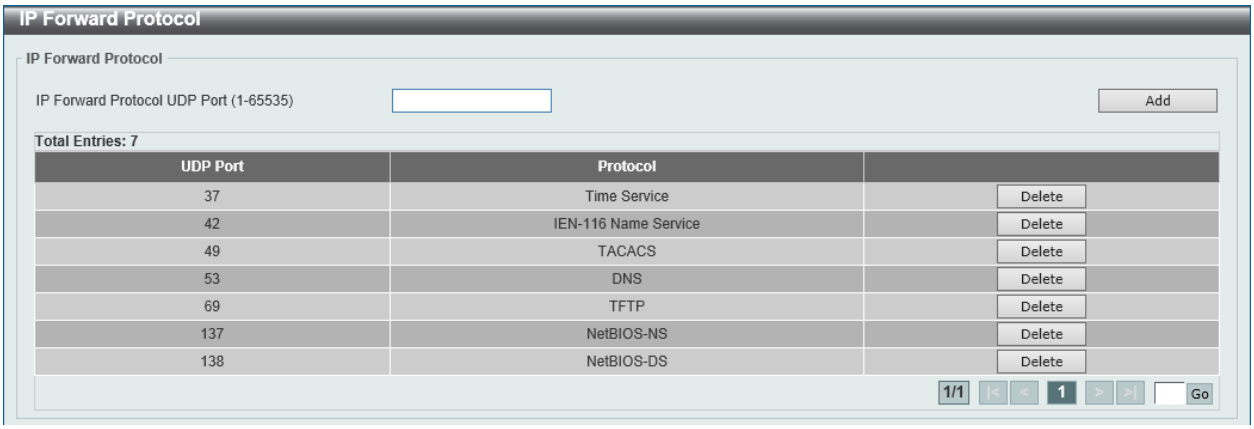



**Figure 6-19 IP Forward Protocol Window**

The fields that can be configured in **IP Forward Protocol** are described below:

| Parameter | Description |
|---|---|
| **IP Forward Protocol UDP Port** | Enter the destination port of the UDP service to be forwarded here. The range is from 1 to 65535. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## IP Helper Address

This window is used to add or remove a target address for the forwarding of UDP broadcast packets. This feature takes effect only when the received interface has an IP address assigned.

The system only forwards the packet that satisfies the following restriction.

- The destination MAC address must be a broadcast address.
- The destination IP address must be an all-one broadcast.
- The packets are IPv4 UDP packets.
- The IP TTL value must be greater than or equal to 2.

To view the following window, click **L3 Features > UDP Helper > IP Helper Address**, as shown below:


**Figure 6-20 IP Helper Address Window**

The fields that can be configured in **IP Helper Address** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID used here. The range is from 1 to 4094. |
| **Helper Address** | Enter the target IPv4 address for the forwarding of the UDP broadcast packet here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# IPv4 Static/Default Route

This window is used to view and configure the IPv4 static and default route settings. The switch supports static routing for IPv4 formatted addressing. Users can create up to 1024 static route entries for IPv4. For IPv4 static routes, once a static route has been set, the switch will send an ARP request packet to the next hop router that has been set by the user. Once an ARP response has been retrieved by the switch from that next hop, the route becomes enabled. However, if the ARP entry already exists, an ARP request will not be sent.

The switch also supports a floating static route, which means that the user may create an alternative static route to a different next hop. This secondary next hop device route is considered as a backup static route for when the primary static route is down. If the primary route is lost, the backup route will uplink and its status will become active.

Entries into the switch's forwarding table can be made using both an IP address subnet mask and a gateway.

To view the following window, click **L3 Features > IPv4 Static/Default Route**, as shown below:

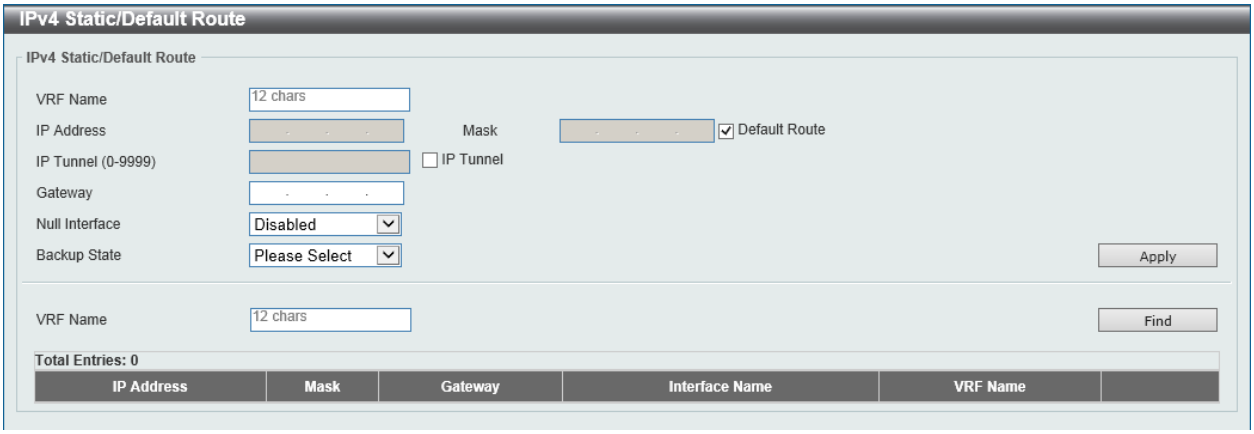



**Figure 6-21 IPv4 Static/Default Route Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance name used here. This name can be up to 12 characters long. |
| **IP Address** | Enter the IPv4 address for this route here. Tick the **Default Route** option to use the default route as the IPv4 address. |
| **Mask** | Enter the IPv4 network mask for this route here. |
| **IP Tunnel** | Select the IP Tunnel option to use the IP tunnel feature and enter the tunnel ID in the space provided. The range of IDs is from 0 to 9999. |
| **Gateway** | Enter the gateway address for this route here. |
| **Null Interface** | Select to enable or disable the NULL interface here. |
| **Backup State** | Select the backup state option here. Options to choose from are **Primary**, **Backup**, and **Weight**.<br>• When the **Primary** option is selected, the route will be used as the primary route to the destination.<br>• When the **Backup** option is selected, the route will be used as the backup route to the destination.<br>• When the **Weight** option is selected, the weight number must be entered with value greater than zero, but less than the maximum paths number. This number is used to replicate identical route path (multiple copies) in routing table, so the path get more chance to be hit for traffic routing. If weight number is not specified for the static route, the default for the path that exists in the hashing table is one copy. This value must be between 1 and 32. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specific entry.

# IPv4 Route Table

This window is used to view and configure the IPv4 route table settings.

To view the following window, click **L3 Features > IPv4 Route Table**, as shown below:

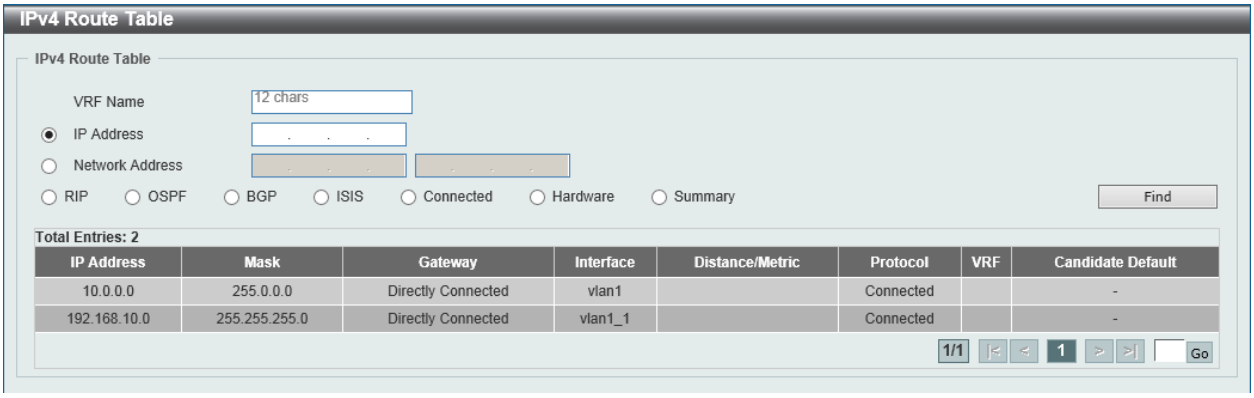



**Figure 6-22 IPv4 Route Table Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **IP Address** | Select and enter the single IPv4 address here. |
| **Network Address** | Select and enter the IPv4 network address here. In the first space enter the network prefix and in the second space enter the network mask. |
| **RIP** | Select this option to display only RIP routes. |
| **OSPF** | Select this option to display only OSPF routes. |
| **BGP** | Select this option to display only BGP routes. |
| **ISIS** | Select this option to display only IS-IS routes. |
| **Connected** | Select this option to display only connected routes. |
| **Hardware** | Select this option to display only hardware routes. Hardware routes are routes that have been written into the hardware chip. |
| **Summary** | Select this option to display a summary and count of the route sources configured on this switch. |

Click the **Find** button to locate a specific entry based on the information entered.

# IPv6 Static/Default Route

This window is used to view and configure the IPv6 static or default routes.

To view the following window, click **L3 Features > IPv6 Static/Default Route**, as shown below:

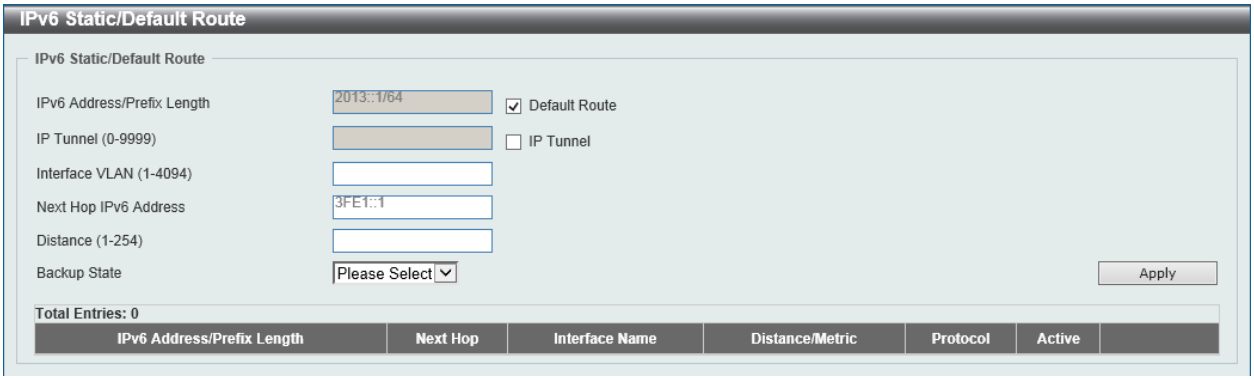



**Figure 6-23 IPv6 Static/Default Route Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **IPv6 Address/Prefix Length** | Enter the IPv6 address and prefix length for this route here. Tick the **Default Route** option to use this route as the default route. |
| **IP Tunnel** | Select the IP Tunnel option to use the IP tunnel feature and enter the tunnel ID in the space provided. The range of IDs is from 0 to 9999. |
| **Interface VLAN** | Enter the interface's VLAN ID that will be associated with this route here. |
| **Next Hop IPv6 Address** | Enter the next hop IPv6 address here. |
| **Distance** | Enter the administrative distance of the static route here. This value must be between **1** and **254**. A lower value represents a better route. If not specified, the default administrative distance for a static route is **1**. |
| **Backup State** | Select the backup state option here. Options to choose from are **Primary**, and **Backup**. When the **Primary** option is selected, the route is specified as the primary route to the destination. When the **Backup** option is selected, the route is specified as the backup route to the destination. |

Click the **Apply** button to accept the changes made.

# IPv6 Route Table

This window is used to view and configure the IPv6 route table.

To view the following window, click **L3 Features > IPv6 Route Table**, as shown below:

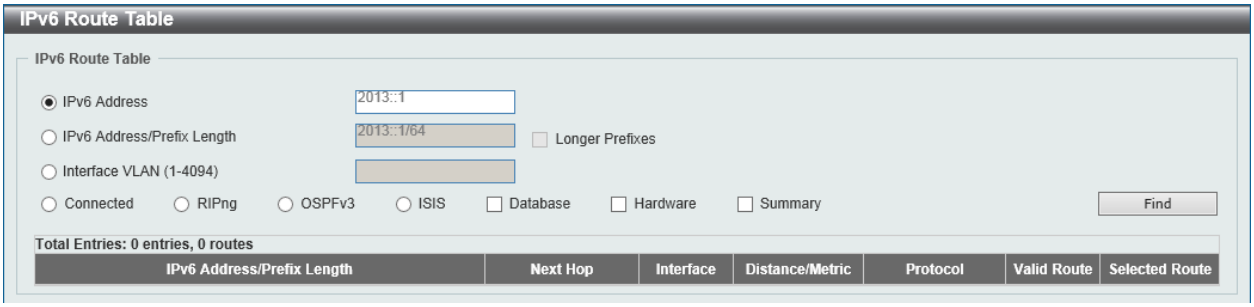



**Figure 6-24 IPv6 Route Table Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **IPv6 Address** | Select and enter the IPv6 address to display here. |
| **IPv6 Address/Prefix Length** | Select and enter the IPv6 address and prefix length to display here. Select the **Longer Prefixes** option to display the route and all of the more specific routes. |
| **Interface VLAN** | Select and enter the interface's VLAN ID to display here. |
| **Connected** | Select this option to display only connected routes. |
| **RIPng** | Select this option to display only RIPng routes. |
| **OSPFv3** | Select this option to display only OSPFv3 routes. |
| **ISIS** | Select this option to display only IS-IS routes. |
| **Database** | Select this option to display all the related entries in the routing database instead of just the best route. |
| **Hardware** | Select this option to display only hardware routes. Hardware routes are routes that have been written into the hardware chip. |
| **Summary** | Select this option to display a summary and count of the route sources configured on this switch. |

Click the **Find** button to locate a specific entry based on the information entered.

# Route Preference

This window is used to view and configure the route preference settings. Use this window to configure the distance representing the trust rating of the route. The route with a lower distance value is preferred over the route with a higher distance value. A route with the distance 255 will not be installed for routing of packets since it indicates that the route is not trusted.

To view the following window, click **L3 Features > Route Preference**, as shown below:

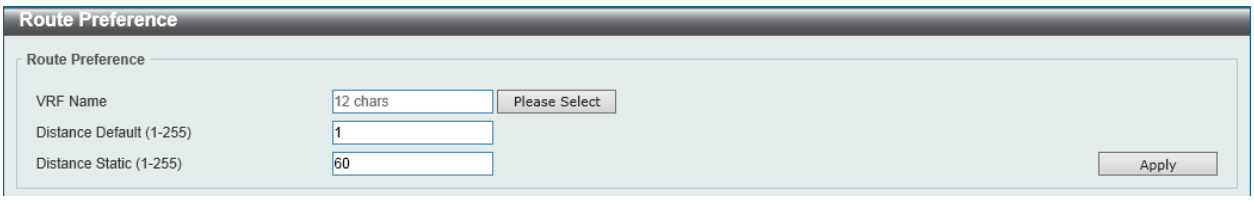



**Figure 6-25 Route Preference Window**

The fields that can be configured in **Route Preference** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Distance Default** | Enter the administrative distance of default routes here. The range is from 1 to 255. By default, this value is 1. |
| **Distance Static** | Enter the administrative distance of static default routes here. The range is from 1 to 255. By default, this value is 60. |

Click the **Apply** button to accept the changes made.

After clicking the **Please Select** button, the following page will appear.

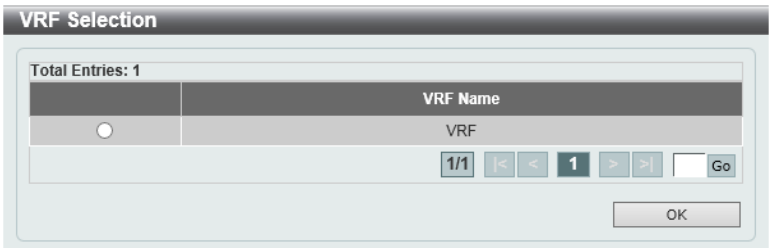



**Figure 6-26 Route Preference (Please Select) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# ECMP Load Balancing Settings

This window is used to view and configure the load balancing hash key used to determine the next hop entry from the multiple paths destined for the same destination. When a route has multiple paths in the routing table going to the same destination, the system will take the next hop entry based on the hashing result. Use this window to define the data which will be included in the hash value computation. The source IP address is always included in the hash value computation.

To view the following window, click **L3 Features > ECMP Load Balancing Settings**, as shown below:

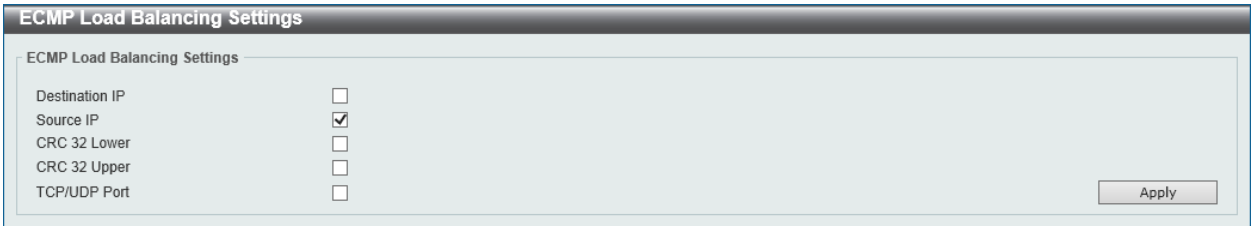



**Figure 6-27 ECMP Load Balancing Settings Window**

The fields that can be configured in **ECMP Load Balancing Settings** are described below:

| Parameter | Description |
|---|---|
| **Destination IP** | Select this option to include the destination IP address in the hash value computation. |
| **Source IP** | Select this option to include the source IP address in the hash value computation. |
| **CRC 32 Lower** | Select this option to include the lower 5 bits of the CRC in the hash value computation. |
| **CRC 32 Upper** | Select this option to include the upper 5 bits of the CRC in the hash value computation. |
| **TCP/UDP Port** | Select this option to include the TCP/UDP port number in the hash value computation. |

Click the **Apply** button to accept the changes made.

# IPv6 General Prefix

This window is used to view and configure the VLAN interface's IPv6 general prefix settings.

To view the following window, click **L3 Features > IPv6 General Prefix**, as shown below:

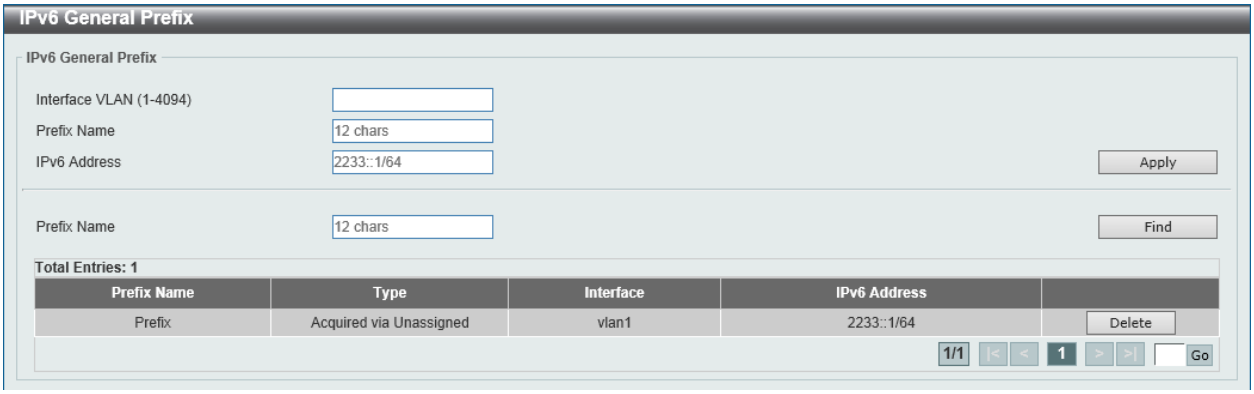



**Figure 6-28 IPv6 General Prefix Window**

The fields that can be configured in **IPv6 General Prefix** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface ID used here. The range is from 1 to 4094. |
| **Prefix Name** | Enter the IPv6 general prefix entry's name here. This name can be up to 12 characters long. |
| **IPv6 Address** | Enter the IPv6 address and prefix length here. The prefix length of the IPv6 address is also the local subnet on the VLAN interface. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

# IP Tunnel Settings

This window is used to view and configure the IP tunnel settings.

To view the following window, click **L3 Features > IP Tunnel Settings**, as shown below:

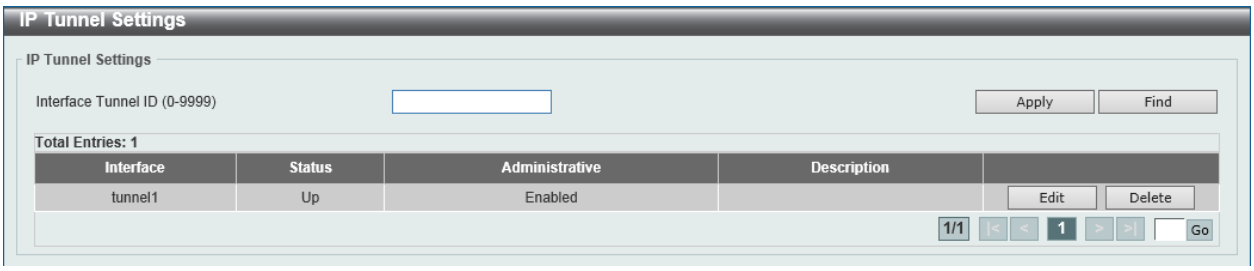



**Figure 6-29 IP Tunnel Settings Window**

The fields that can be configured in **IP Tunnel Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface Tunnel ID** | Enter the IP tunnel interface's ID here. The range is from 0 to 9999. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

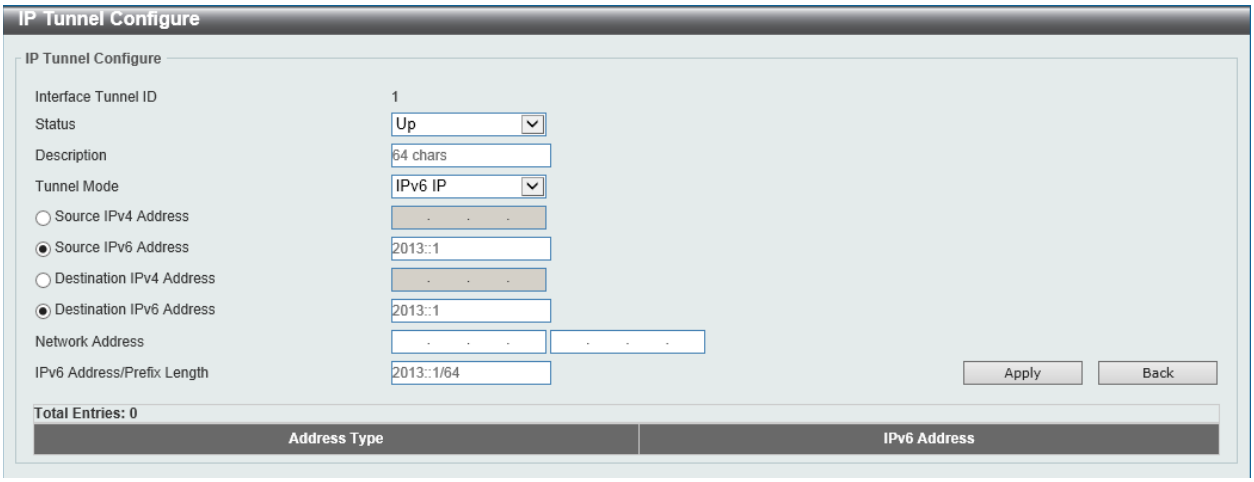



**Figure 6-30 IP Tunnel Settings (Edit) Window**

The fields that can be configured in **IP Tunnel Configure** are described below:

| Parameter | Description |
|---|---|
| **Status** | Select the IP tunnel interface's status here. Options to choose from are **Up** and **Down**. |
| **Description** | Enter the description for this IP tunnel interface here. This string can be up to 64 characters long. |
| **Tunnel Mode** | Select the tunnel mode here. Options to choose from are **IPv6 IP**, **6to4**, **ISATAP**, **GRE IP**, and **GRE IPv6**.<br>• **IPv6 IP:** Specifies that the interface is an IPv6 IP tunnel interface.<br>• **6to4:** Specifies that the interface is a 6to4 tunnel interface.<br>• **ISATAP:** Specifies that the interface is an ISATAP tunnel interface.<br>• **GRE IP:** Specifies that the interface is a GRE tunnel interface. The deliver protocol is IPv4 protocol.<br>• **GRE IPv6:** Specifies that the interface is a GRE tunnel interface. The deliver protocol is IPv6 protocol. |
| **Source IPv4 Address** | Select and enter the source IPv4 address for the tunnel interface here. |
| **Source IPv6 Address** | Select and enter the source IPv6 address for the tunnel interface here. |
| **Destination IPv4 Address** | Select and enter the destination IPv4 address for the tunnel interface here. |

| Parameter | Description |
|---|---|
| **Destination IPv6 Address** | Select and enter the destination IPv6 address for the tunnel interface here. |
| **Network Address** | Enter the network address(es) in the spaces provided here. |
| **IPv6 Address/Prefix Length** | Enter the IPv6 address and prefix length here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

# URPF Settings

This window is used to view and configure the Unicast Reverse Path Forwarding (URPF) settings.

One common method to initiate an attack is to utilize IPv4/IPv6 source address spoofing. When using this method, a hacker attempts to send traffic into the network with a source address that is known or trusted by the target. If no protection exists, the organizational network will allow the traffic and potentially be open to a number of different attack types. URPF helps to mitigate problems caused by malformed or forged IPv4/IPv6 source addresses passing through a router.

When Unicast RPF is effectively enabled on an interface, the switch examines all IPv4 and IPv6 packets received as input on that interface to make sure that the source address and source interface appear in the routing table and match the interface on which the packet was received.

The reverse path checking will not be performed in the following situations:

- The destination IPv4/IPv6 address is not a unicast address.
- The source IP address is an IPv6 address and the address is a link-local address.
- The received packet is a BOOTP/DHCP packet (the source IP is 0.0.0.0 and destination IP is 255.255.255.255).

To view the following window, click **L3 Features > URPF Settings**, as shown below:

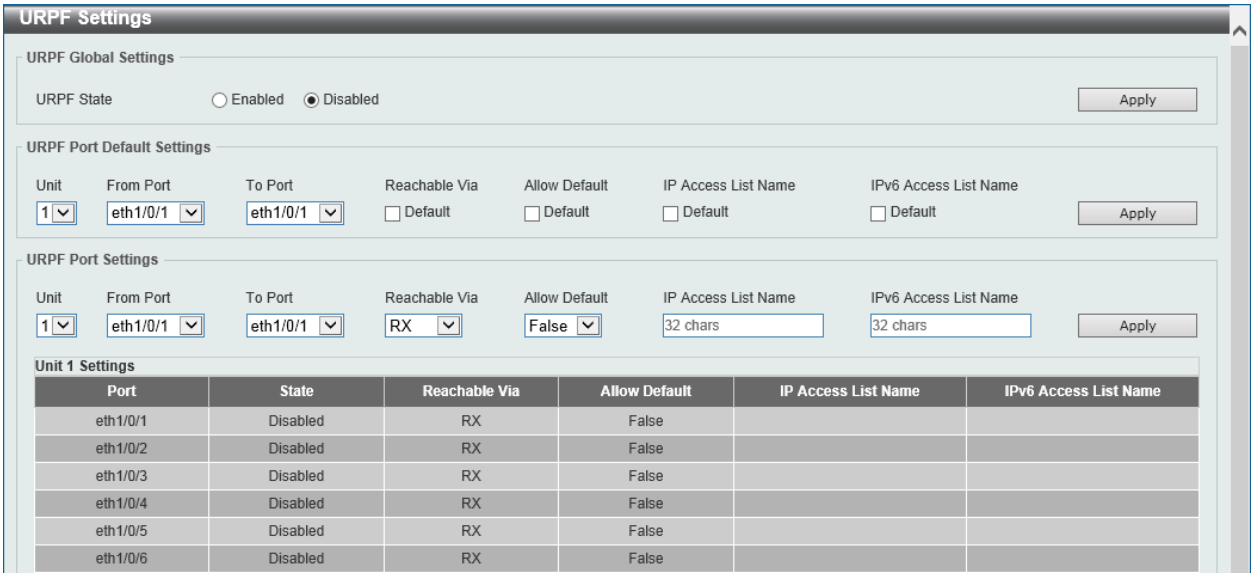



**Figure 6-31 URPF Settings Window**

The fields that can be configured in **URPF Global Settings** are described below:

| Parameter | Description |
|---|---|
| **URPF State** | Select to globally enable or disable the URPF feature here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **URPF Port Default Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Reachable Via** | Select the **Default** option here to specify to verify if the source address is present in the routing table and the incoming interface matches the source and is reachable through the interface on which the packet was received (sometimes referred to as the strict mode). |
| **Allow Default** | Select the **Default** option here to not allow the use of the default route for URPF verification. |
| **IP Access List Name** | Select the **Default** option here to specify that no IPv4 access list will be used in the check. |
| **IPv6 Access List Name** | Select the **Default** option here to specify that no IPv6 access list will be used in the check. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **URPF Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Reachable Via** | Select the reachable via option here. Options to choose from are **Any** and **RX**.<br>• **Any:** Specifies to verify if the source address is present in the routing table (sometimes referred to as the loose mode).<br>• **RX:** Specifies to verify if the source address is present in the routing table and the incoming interface matches the source and is reachable through the interface on which the packet was received (sometimes referred to as the strict mode). This is the default option. |
| **Allow Default** | Select the allow default state here. Options to choose from are **True** and **False**. This feature specifies whether to allow the use of the default route for URPF verification or not. |
| **IP Access List Name** | Enter the IPv4 access list's name here that will be used for the check. This name can be up to 32 characters long. |
| **IPv6 Access List Name** | Enter the IPv6 access list's name here that will be used for the check. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

# VRF

## VRF Settings

This window is used to view and configure the Virtual Routing and Forwarding (VRF) settings. After a new VRF instance is created, a new VRF routing table will be created. When a VRF instance is deleted, the related VRF routing table will be deleted at the same time and all routing instances based on this VRF will be destroyed. All IP interfaces associated to this VRF will be restored to the global routing instance. In the other words, all configurations based on this VRF will be removed.

To view the following window, click **L3 Features > VRF > VRF Settings**, as shown below:

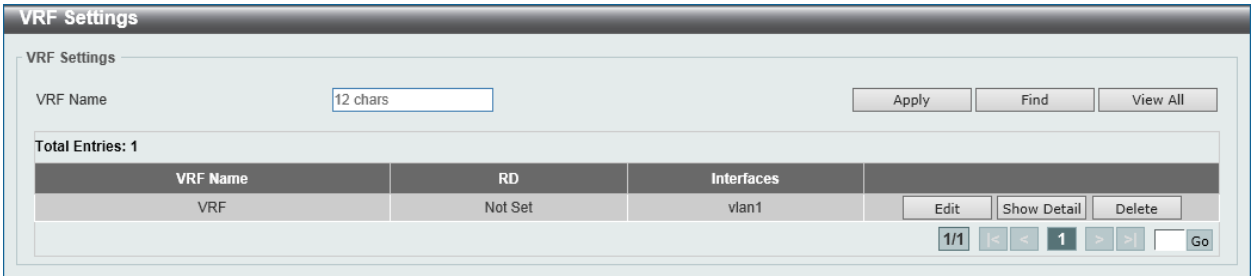



**Figure 6-32 VRF Settings Window**

The fields that can be configured in **VRF Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. |

Click the **Apply** button to add a new VRF instance.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

Click the **Show Detail** button to view more detailed information about the VRF instance.

Click the **Delete** button to delete the specified entry.

After clicking the **Edit** button, the following page will appear.

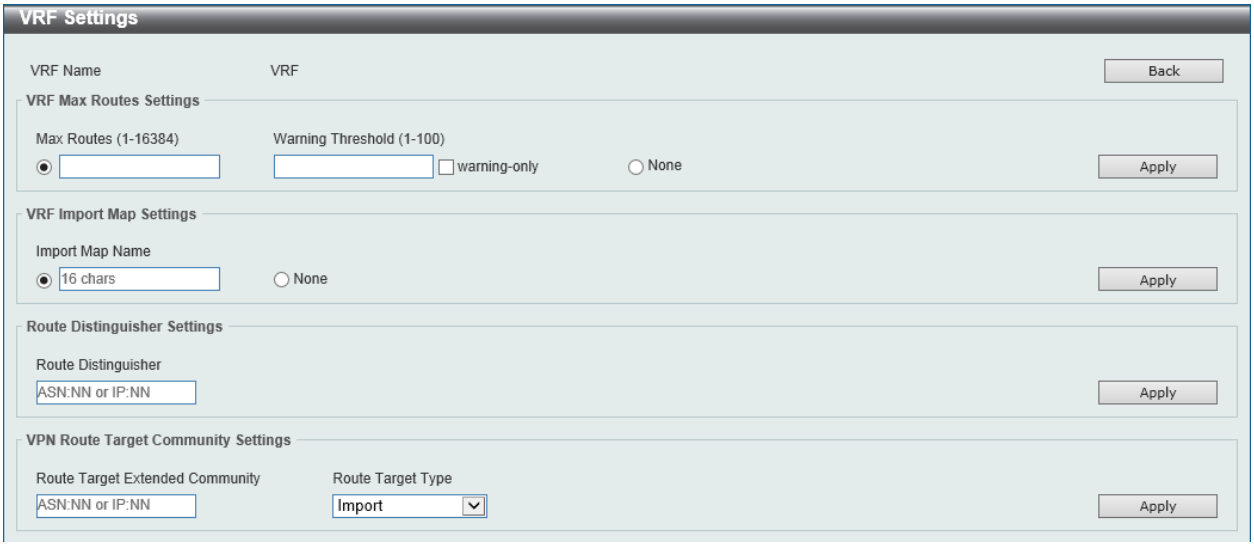



**Figure 6-33 VRF Settings (Edit) Window**

The fields that can be configured in **VRF Max Routes Settings** are described below:

| Parameter | Description |
|---|---|
| **Max Routes** | Enter the maximum number of routes allowed within the VRF instance here. The range is from 1 to 16384. |
| **Warning Threshold** | Enter the warning threshold value in percentage here. A notification message will be sent when the routes number reach the threshold and no more routes can be written into the hardware. The range is from 1 to 100 percent.<br>Selecting the **warning-only** option specifies that when the route numbers exceeds the threshold, a notification message will be sent, but more routes can be written into hardware. |
| **None** | Select this option to disable the VRF maximum routes feature. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

The fields that can be configured in **VRF Import Map Settings** are described below:

| Parameter | Description |
|---|---|
| **Import Map Name** | Enter the name of import route map of the VRF instance here. This feature is used to configure the import route map of one VRF. This is used by the routing protocol to filter the routes imported to the routing table associated with a VRF instance. One VRF only has one import route map. The new import route map will overwrite the value set before. This name can be up to 16 characters long. |
| **None** | Select this option to disable the VRF import map feature. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Route Distinguisher Settings** are described below:

| Parameter | Description |
|---|---|
| **Route Distinguisher** | Enter the VRF instance's route distinguisher, which is used to prepend an 8-bytes value to an IPv4 prefix to create a VPN-IPv4 prefix here. |

| Parameter | Description |
|---|---|
| | One VRF has only one route distinguisher and cannot be changed if it has been set to one value.<br>Specify an RD in one of the following two forms:<br>• **ASN-related** - It is formed by an AS number and an arbitrary number. For example, 123:2.<br>• **IP-address-related** - It is formed by an IP address and an arbitrary number. For example, 10.2.3.4:3. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **VPN Route Target Community Settings** are described below:

| Parameter | Description |
|---|---|
| **Route Target Extended Community** | Enter the route target extended community string here. This feature is used to add a route target to one VRF instance. The route target is a useful VPN application. One VRF instance can have multiple route targets. |
| **Route Target Type** | Select the route target type here. Options to choose from are **Import**, **Export**, and **Both**.<br>• **Import:** Specifies to add an import route target to the import routing information from the target VPN extended community.<br>• **Export:** Specifies to add an export route target to the export routing information to the target VPN extended community.<br>• **Both:** Specifies to add both the import route target and export route target. |

Click the **Apply** button to accept the changes made.

After clicking the **Show Detail** button, the following page will appear.

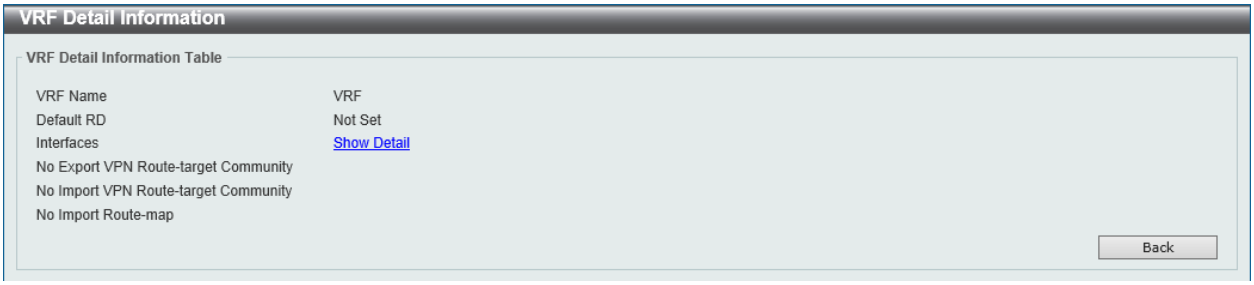



**Figure 6-34 VRF Settings (Show Detail) Window**

Click the **Back** button to return to the previous window.

After clicking the Show Detail link, next to the **Interfaces** option, the following page will appear.


**Figure 6-35 VRF Settings (Show Detail, Show Detail) Window**

Click the **Back** button to return to the previous window.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# VRF Interface Settings

This feature is used to view and configure the VRF instance's interface settings.

To view the following window, click **L3 Features > VRF > VRF Interface Settings**, as shown below:

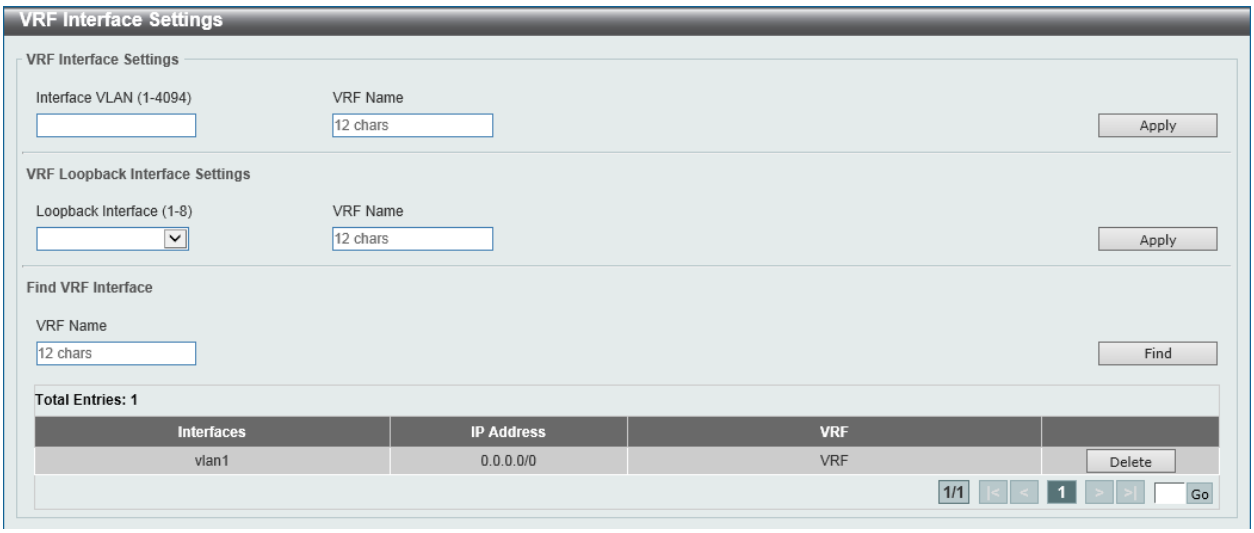



**Figure 6-36 VRF Interface Settings Window**

The fields that can be configured in **VRF Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID that will be associated with this VRF instance here. The range is from 1 to 4094. |
| **VRF Name** | Enter the VRF instance's name that will be associated with the specified VLAN interface here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **VRF Loopback Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Loopback Interface** | Enter the loopback interface's ID that will be associated with this VRF instance here. The range is from 1 to 8. |
| **VRF Name** | Enter the VRF instance's name that will be associated with the specified loopback interface here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find VRF Interface** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# RIP

## RIP Settings

This window is used to view and configure the Routing Information Protocol (RIP) feature's settings.

To view the following window, click **L3 Features > RIP > RIP Settings**, as shown below:


**Figure 6-37 RIP Settings Window**

The fields that can be configured in **RIP Global Settings** are described below:

| Parameter | Description |
|---|---|
| **RIP State** | Select to globally enable or disable the Routing Information Protocol (RIP) feature here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **VRF Address Family Table** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

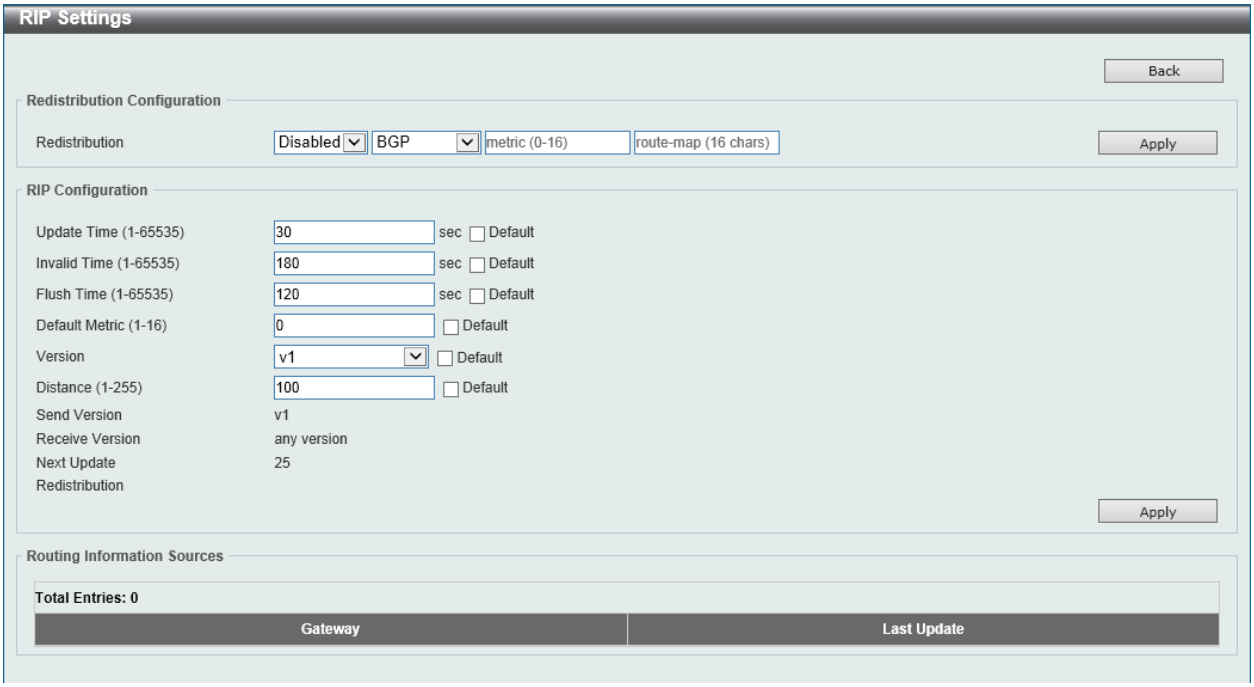



**Figure 6-38 RIP Settings (Edit) Window**

The fields that can be configured in **Redistribution Configuration** are described below:

| Parameter | Description |
|---|---|
| **Redistribution** | First, select to enable or disable the RIP redistribution feature here.<br>Second, select the routing protocol (domain) that will be redistributed into RIP. Options to choose from are **BGP**, **Connected**, **ISIS**, **OSPF**, and **Static**. The **Static** option means to redistribute IP static routes. The **Connected** option refers to routes that are established automatically by virtue of configuring IP address on an interface.<br>Third, enter the value to be used as the metric for the redistributed route here. The range is from 0 to 16.<br>Fourth, enter the route map's name that is used in the filtering of the routes to be redistributed to the current routing protocol. If not specified, all routes are redistributed. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

The fields that can be configured in **RIP Configuration** are described below:

| Parameter | Description |
|---|---|
| **Update Time** | Enter the update interval in seconds at which the update message is sent. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value here which is 30 seconds. |
| **Invalid Time** | Enter the invalidate timer value in seconds here. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value here which is 180 seconds. |
| **Flush Time** | Enter the flush timer value in seconds here. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value here which is 120 seconds. |
| **Default Metric** | Enter the default metric value here. The range is from 1 to 16. The default metric is used in redistributing routes from other routing protocols. The routes being redistributed are learned by other protocols and have incompatible metric as RIP. The specifying of the metric allows the metric to be synced. Select the **Default** option to use the default metric value, which is 0. |
| **Version** | Select the global RIP version that will be used as the default version for all interfaces here. Options to choose from are **v1** (RIPv1) and **v2** (RIPv2). Select the **Default** option to specify that this feature should use the default configuration. By default, RIPv1 and RIPv2 packets are received, but only RIPv1 packets are sent. |
| **Distance** | Enter the administrative distance for RIP here. The range is from 1 to 255. A lower value represents a better route. Select the **Default** option to use the default administrative distance for RIP, which is 100. |

Click the **Apply** button to accept the changes made.

# RIP Distribute List

This window is used to view and configure the RIP distribution list settings.

To view the following window, click **L3 Features > RIP > RIP Distribute List**, as shown below:

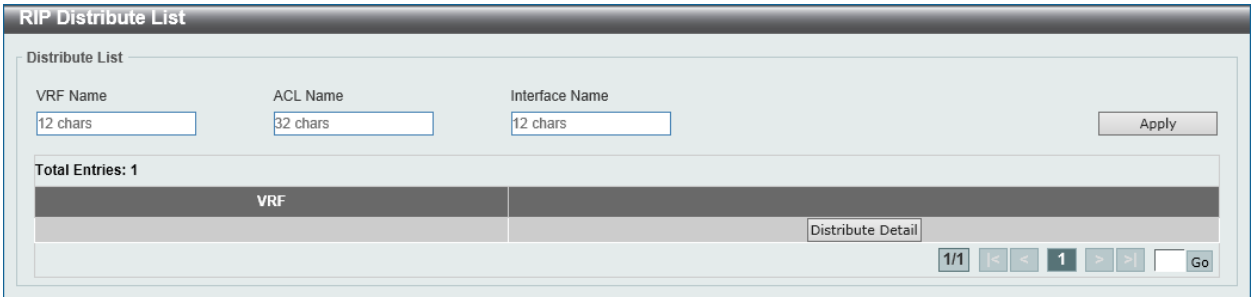



**Figure 6-39 RIP Distribute List Window**

The fields that can be configured in **Distribute List** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. |
| **ACL Name** | Enter the access list's name that will be used here. This name can be up to 32 characters long. |
| **Interface Name** | Enter the interface's name that will be used here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Distribute Detail** button to view more detailed information about the distribute list configuration.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Distribute Detail** button, the following page will appear.

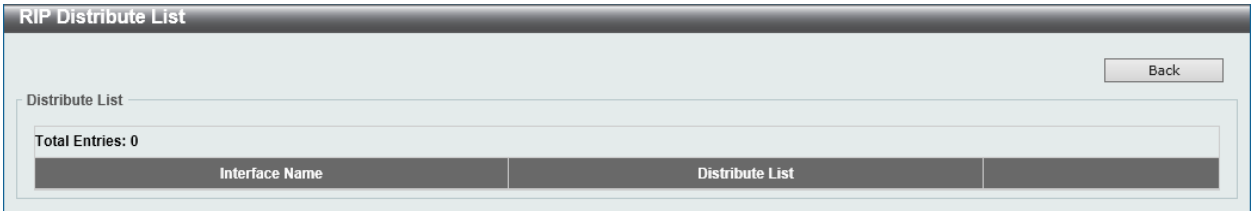



**Figure 6-40 RIP Distribute List (Distribute Detail) Window**

Click the **Back** button to return to the previous window.

# RIP Interface Settings

This window is used to view and configure the RIP interface's settings.

To view the following window, click **L3 Features > RIP > RIP Interface Settings**, as shown below:

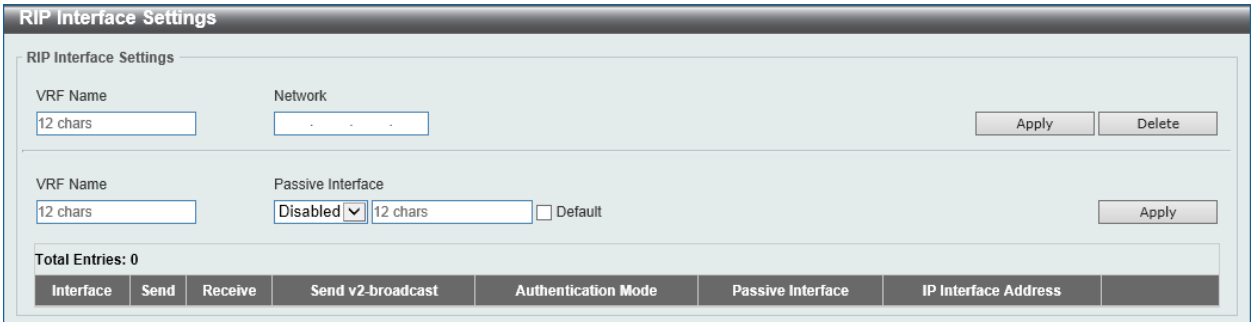



**Figure 6-41 RIP Interface Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. |
| **Network** | Enter the IPv4 network address used by RIP here. The interface that has a subnet defined belonging to a network specified here will be activated with RIP. |
| **Passive Interface** | Select to enable or disable the passive interface feature here. This feature is used to disable the sending and receiving of routing updates on an interface. However, RIP packet from other routers received on this interface will continue to be processed. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

## RIP Database

This window is used to display the Routing Information Protocol (RIP) routing database. Summary address entries will appear in the database only if relevant child routes exist and are being summarized. When the last child route for a summary address becomes invalid, the summary address is also removed from the routing table.

To view the following window, click **L3 Features > RIP > RIP Database**, as shown below:

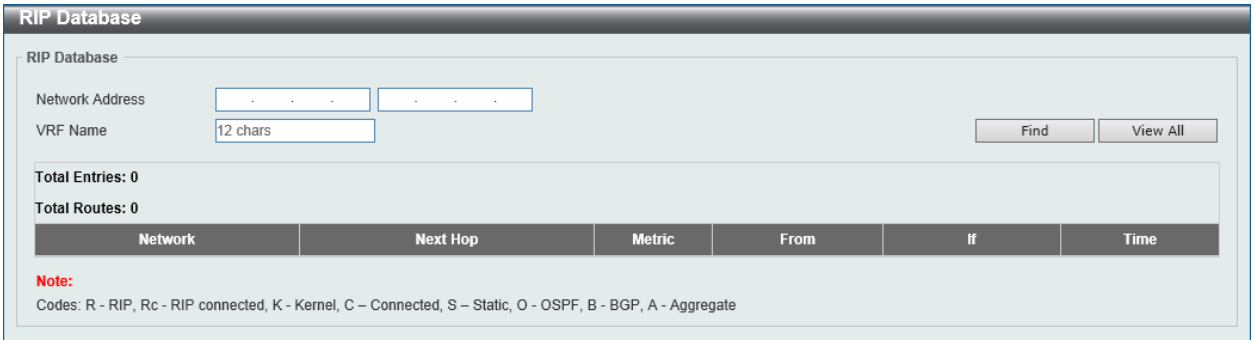



**Figure 6-42 RIP Database Window**

The fields that can be configured in **RIP Database** are described below:

| Parameter | Description |
|---|---|
| **Network Address** | Enter the subnet prefix and the prefix length of the network(s) to be displayed here. |
| **VRF Name** | Enter the VRF instance's name that will be used in this display here. This name can be up to 12 characters long. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# RIPng

## RIPng Settings

This window is used to view and configure the Routing Information Protocol Next Generation (RIPng) settings, also known as IPv6 RIP.

To view the following window, click **L3 Features > RIPng > RIPng Settings**, as shown below:

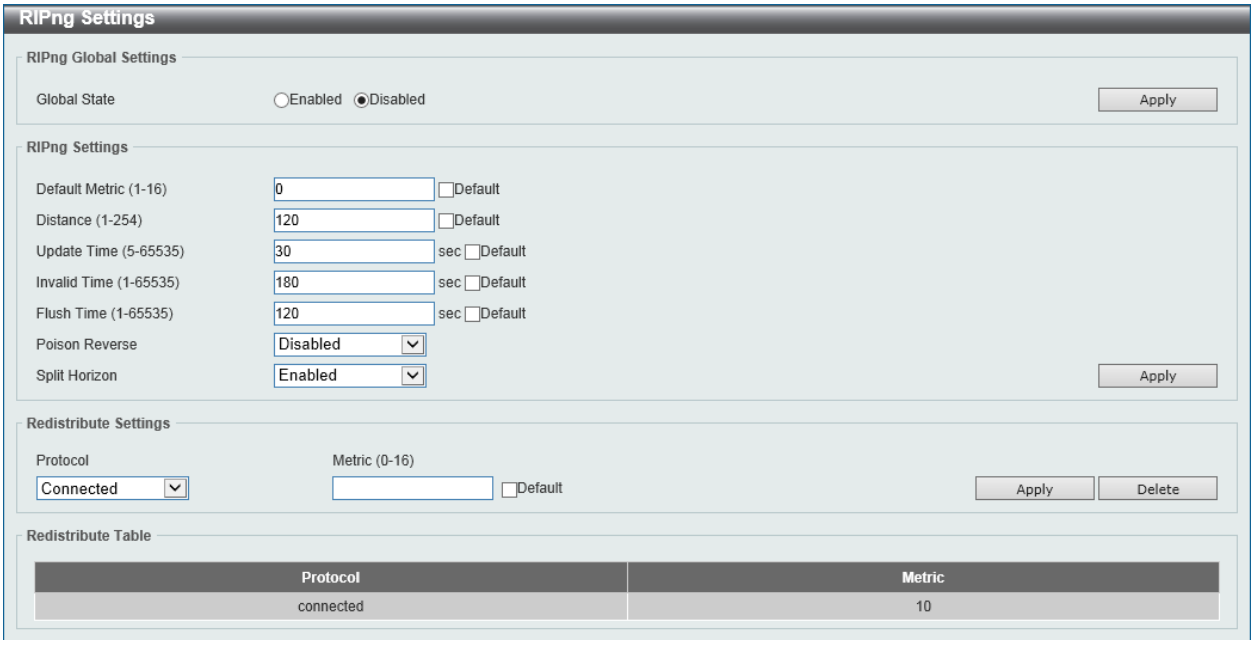



**Figure 6-43 RIPng Settings Window**

The fields that can be configured in **RIPng Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Global State** | Select to globally enable or disable the RIPng feature here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RIPng Settings** are described below:

| Parameter | Description |
|---|---|
| **Default Metric** | Enter the default metric value here. The range is from 1 to 16. This value is used to specify the default metric for routes redistributed from other routing protocols. If the routes being redistributed are learned from other protocols, then they have an incompatible metric as IPv6 RIP. Re-specifying of metric allows the metric to be synced. Select the **Default** option to use the default metric value, which is 1. |
| **Distance** | Enter the administrative distance for RIPng here. The range is from 1 to 254. The distance value represents the trust rating of the route. The route with a lower distance value is preferred over the route with the higher distance value. A route with a distance of 255 will not be installed for the routing of packets since it indicates that the route is not trusted. Select the **Default** option to use the default administrative distance for RIPng, which is 120. |
| **Update Time** | Enter the update interval value at which the update message is sent here. The range is from 5 to 65535 seconds. Select the **Default** option to use the default value here which is 30 seconds. |
| **Invalid Time** | Enter the invalidate timer value in seconds here. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value here which is 180 seconds. |
| **Flush Time** | Enter the flush timer value in seconds here. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value here which is 120 seconds. |

| Parameter | Description |
|---|---|
| **Poison Reverse** | Select to enable or disable the poison reverse feature here. When poison reverse is enabled, the routes learned from an interface will be advertised out to the same interface with an unreachable metric. |
| **Split Horizon** | Select to enable or disable the split horizon feature here. When split horizon is enabled, the routes learned from an interface will be not advertised out to the same interface. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Redistribute Settings** are described below:

| Parameter | Description |
|---|---|
| **Protocol** | Select the protocol whose routes are to be redistributed here. Options to choose from are **Connected**, **Static**, **OSPF**, and **ISIS**. The **Static** option means to redistribute IPv6 static routes. The **Connected** option refers to routes that are established automatically by virtue of configuring IPv6 address on an interface. |
| **Metric** | Enter the value to be used as the metric for the redistributed routes here. The range is from 0 to 16. Select the **Default** option to use the default metric value. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

# RIPng Interface Settings

This window is used to view and configure the RIPng feature's interface settings.

To view the following window, click **L3 Features > RIPng > RIPng Interface Settings**, as shown below:

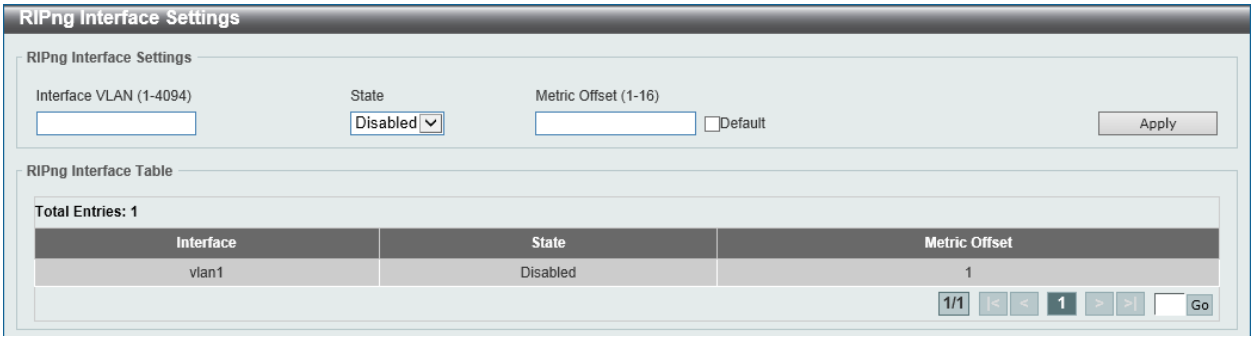



**Figure 6-44 RIPng Interface Settings Window**

The fields that can be configured in **RIPng Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **State** | Select to enable of disable the IPv6 RIP feature on the VLAN interface specified. |
| **Metric Offset** | Enter the value to be added to the metric of an IPv6 RIP route received on the configured interface here. The range is from 1 to 16. The metric refers to the hop count. By default, when receiving an IPv6 RIP route, a metric value of 1 is added to the route before it is inserted into the |

| Parameter | Description |
|---|---|
| | routing table. Use this option to influence the metric of routes received on different interfaces and thus influence the preference of the route.<br>Select the **Default** option to use the default metric offset value, which is 1. |

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## RIPng Database

This window is used to display the RIPng feature's routing database.

To view the following window, click **L3 Features > RIPng > RIPng Database**, as shown below:

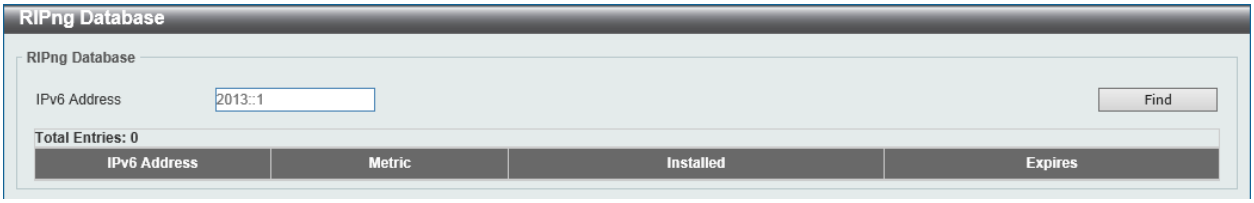



**Figure 6-45 RIPng Database Window**

The fields that can be configured in **RIPng Database** are described below:

| Parameter | Description |
|---|---|
| **IPv6 Address** | Enter the IPv6 address that will be used for this display here. |

Click the **Find** button to locate a specific entry based on the information entered.

# OSPF

## OSPFv2

### OSPFv2 Process Settings

This window is used to view and configure the OSPFv2 process settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Process Settings**, as shown below:

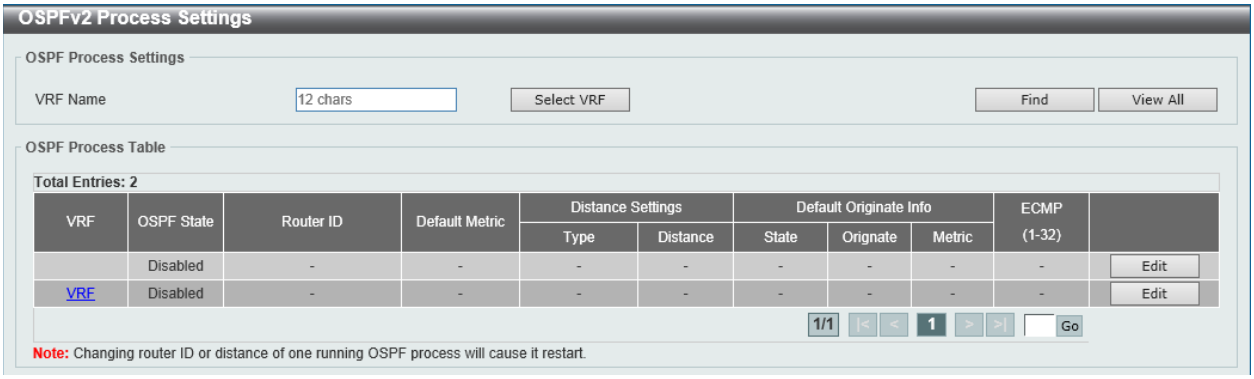



**Figure 6-46 OSPFv2 Process Settings Window**

The fields that can be configured in **OSPF Process Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Select VRF** button, the following page will appear.

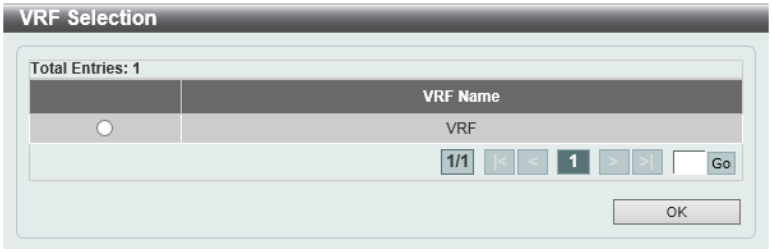



**Figure 6-47 OSPFv2 Process Settings (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

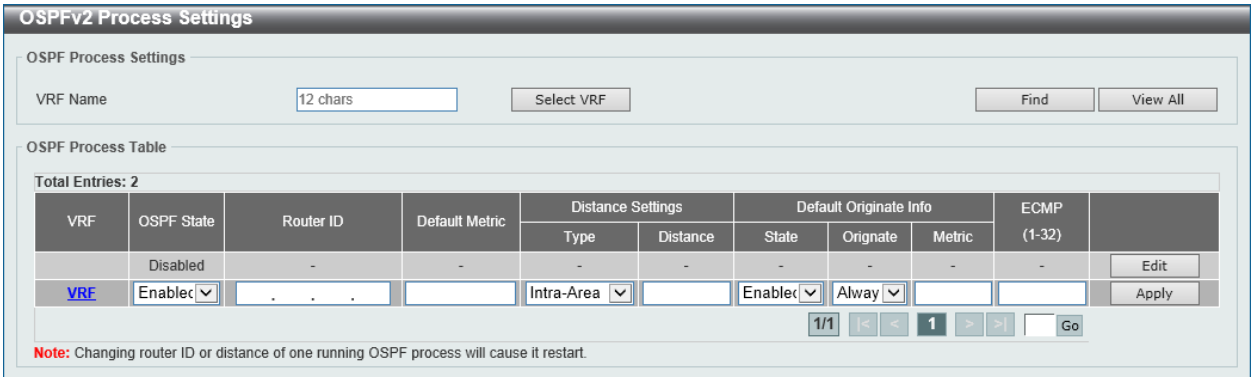



**Figure 6-48 OSPFv2 Process Settings (Edit) Window**

The fields that can be configured in **OSPF Process Table** are described below:

| Parameter | Description |
|---|---|
| **OSPF State** | Select to enable or disable the OSPFv2 feature's state on the specified VRF instance. |
| **Router ID** | Enter the router ID in the IPv4 address format here. The router ID is a 32-bit number assigned to each router running the OSPF protocol. This number uniquely identifies the router within an Autonomous System. Each router has a unique router ID. If the router is already active when this command is configured, the new router ID will not take effect immediately. It is applied on the next reload or manual restart of the OSPF process. |
| **Default Metric** | Enter the default metric value used here. The range is from 1 to 16777214. |
| **Type** | Select the distance setting's type here. Options to choose from are **Intra-Area**, **Inter-Area**, **External-1**, and **External-2**.<br>• **Inter-Area:** Specifies the distance for OSPF inter-area routes.<br>• **Intra-Area:** Specifies the distance for OSPF intra-area routes.<br>• **External-1:** Specifies the distance for OSPF external type-5 and type-7 routes with a type-1 metric.<br>• **External-2:** Specifies the distance for OSPF external type-5 and type-7 routes with a type-2 metric. |
| **Distance** | Enter the administrative distance value here. The range is from 1 to 255. |
| **State** | Select to enable or disable the default originate information feature's state here. This feature is used to generate a default external route (type-5 LSA) network 0.0.0.0 to the AS. |
| **Originate** | Select the originate option here. Options to choose from are **Always** and **None**. Selecting the **Always** option specifies to always generate the default route regardless of existence of a default route in the redistricted routes. |
| **Metric** | Enter the cost value associated with the generated default route here. If not specified, the default metric cost is 1. The range is from 0 to 16777214. |
| **ECMP** | Enter the Equal Cost Multiple Paths (ECMP) value here. The range is from 1 to 32. |

Click the **Apply** button to accept the changes made.

After clicking the VRF link, the following page will appear.

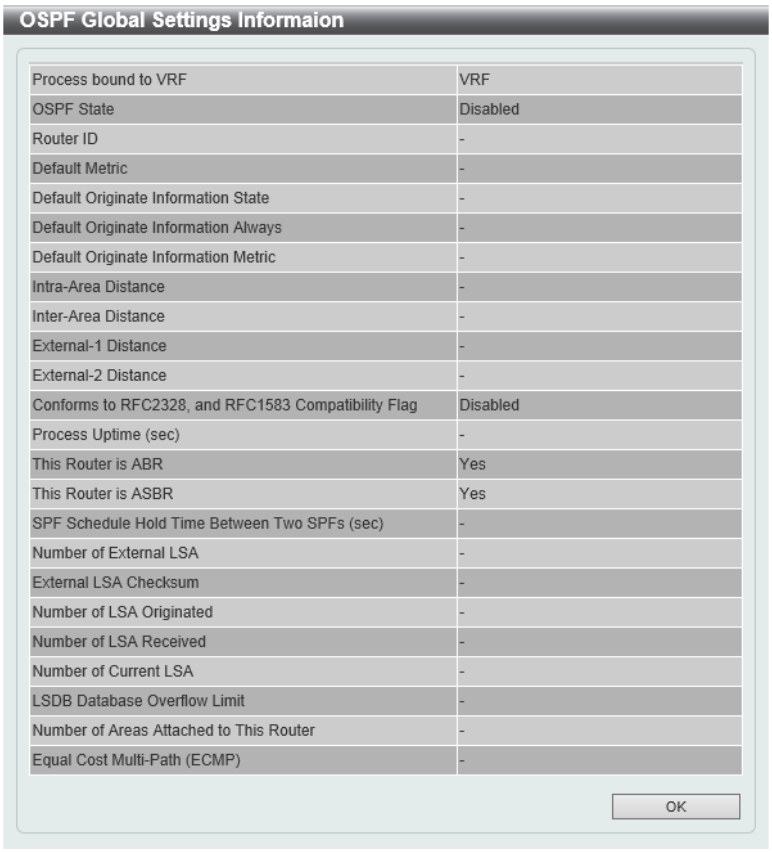



**Figure 6-49 OSPFv2 Process Settings (VRF) Window**

Click the **OK** button to close the window and return to the previous page.

## OSPFv2 Distribute List

This window is used the view and configure the OSPFv2 distribute list settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Distribute List**, as shown below:


**Figure 6-50 OSPFv2 Distribute List Window**

The fields that can be configured in **OSPFv2 Distribute List** are described below:

| Parameter | Description |
|---|---|
| **VRF** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance |

| Parameter | Description |
|---|---|
| | from the list. |
| **ACL Name** | Enter the access list's name that will be used here. This name can be up to 32 characters long. |
| **Interface Name** | Enter the interface's name that will be used here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Distribute Detail** button to view more detailed information about the distribute list configuration.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Select VRF** button, the following page will appear.

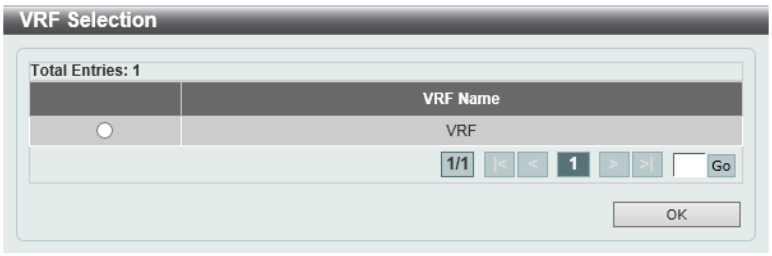



**Figure 6-51 OSPFv2 Distribute List (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Distribute Detail** button, the following page will appear.


**Figure 6-52 OSPFv2 Distribute List (Distribute Detail) Window**

Click the **Back** button to return to the previous window.

## OSPFv2 Passive Interface Settings

This window is used to view and configure the OSPFv2 feature's passive interface settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Passive Interface Settings**, as shown below:


**Figure 6-53 OSPFv2 Passive Interface Settings Window**

The fields that can be configured in **OSPF Passive Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **Interface Name** | Enter the interface's name that will be used here. This name can be up to 12 characters long. Select the **Default** option to use the default interface here. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Select VRF** button, the following page will appear.

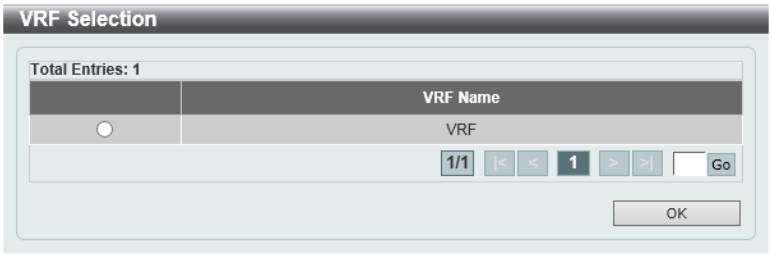



**Figure 6-54 OSPFv2 Passive Interface Settings (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## OSPFv2 Area Settings

This window is used to view and configure the OSPFv2 feature's area settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Area Settings**, as shown below:

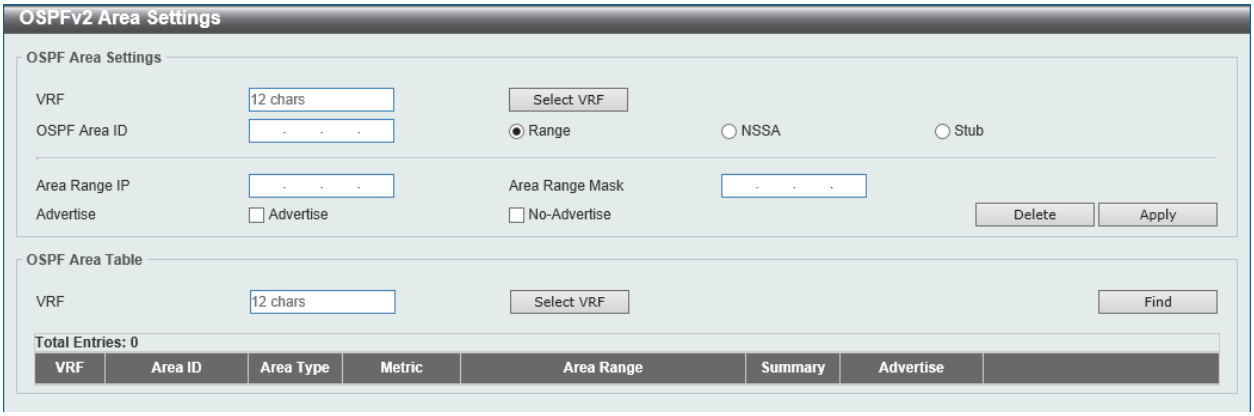



**Figure 6-55 OSPFv2 Area Settings Window**

The fields that can be configured in **OSPF Area Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **OSPF Area ID** | Enter the OSPFv2 area ID here. The area will be created on an interface if the subnet configured on the interface falls in the range of the network specified here. |
| **Range** | Select this option to summarize OSPF routes at an area border router. |
| **NSSA** | Select this option to assign the OSPF area as a Not-So-Stubby Area (NSSA) area. |
| **Stub** | Select this option to specify an OSPF area as a stub area. |
| **Area Range IP** | Enter the OSPF area range's IP address here. |
| **Area Range Mask** | Enter the OSPF area range's subnet mask here. |
| **Advertise** | Select the advertise option here. Options to choose from are **Advertise** and **No-Advertise**.<br>• **Advertise:** Specifies to advertise a Type-3 summary LSA for the specified range of addresses.<br>• **Not-Advertise:** Specifies to suppress the advertising of Type-3 summary LSAs. Component routes are still hidden behind it. |

Click the **Delete** button to delete an entry based on the information entered.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Area Table** are described below:

| Parameter | Description |
|---|---|
| **VRF** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Select VRF** button, the following page will appear.

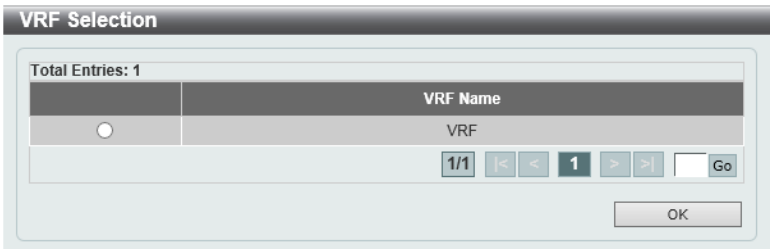



**Figure 6-56 OSPFv2 Area Settings (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## OSPFv2 Interface Settings

This window is used to view and configure the OSPFv2 interface settings.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Interface Settings**, as shown below:

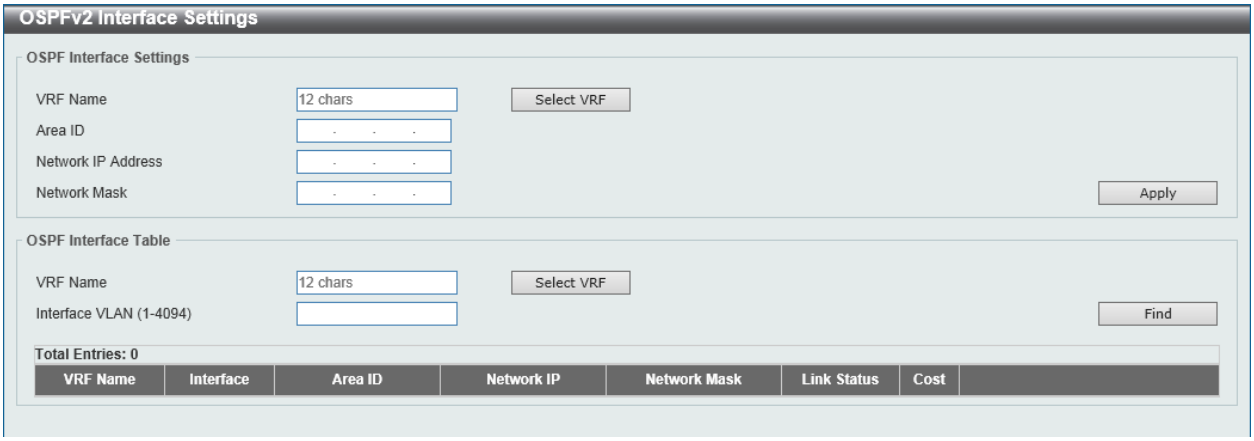



**Figure 6-57 OSPFv2 Interface Settings Window**

The fields that can be configured in **OSPF Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **Area ID** | Enter the OSPFv2 area's ID here. |
| **Network IP Address** | Enter the network's IPv4 address here. |
| **Network Mask** | Enter the network's IPv4 subnet mask here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Interface Table** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **Interface VLAN** | Enter the VLAN interface's ID to be displayed here. The range is from 1 to 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Select VRF** button, the following page will appear.

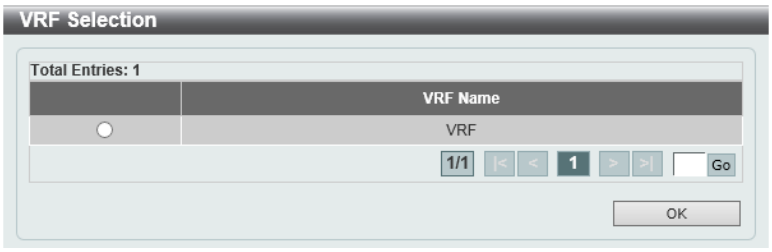



**Figure 6-58 OSPFv2 Interface Settings (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## OSPFv2 Redistribute Settings

This window is used to view and configure the OSPFv2 redistribution settings. External Routes can be redistributed to normal areas as Type-5 external routes and redistributed to NSSA stub areas as Type-7 external routes by the ASBR.

If the redistributed external route is of Type-1, the metric represents the internal metric. If the redistributed external route is of Type-2, the metric represents the external metric. An internal metric will consider the cost of the route from itself to the redistributing router plus the advertised cost to reach the destination. An external metric only considers the advertised metric to reach the destination.

By default, **Connected** and **Static** routes will not be redistributed. BGP and RIP can be redistributed to OSPF. If no metric value is specified by the default metric, routes redistributed from other protocols will get 20 as the metric value with the following exception. BGP will get 1 as the metric value.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Redistribute Settings**, as shown below:

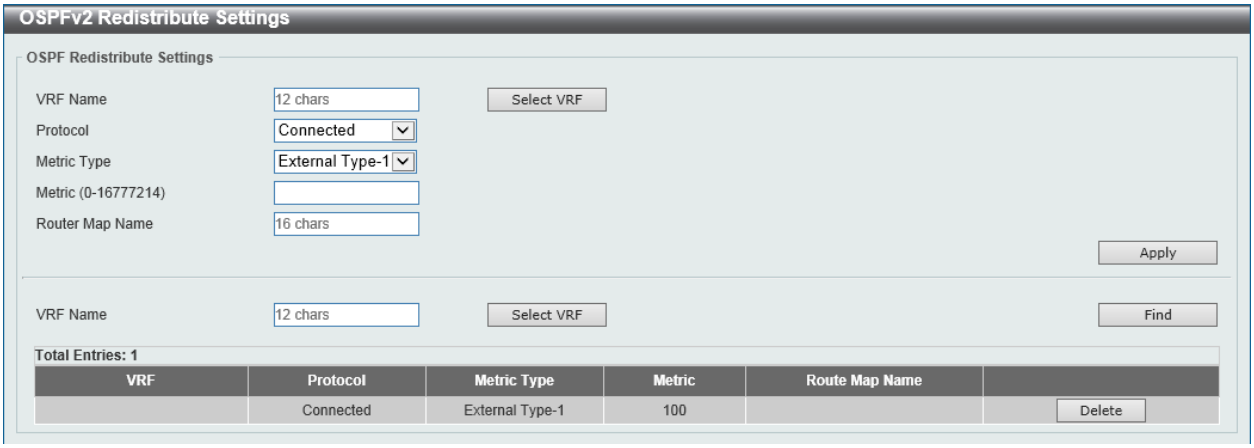



**Figure 6-59 OSPFv2 Redistribute Settings Window**

The fields that can be configured in **OSPF Redistribute Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **Protocol** | Select the source protocol that will be redistributed here. Options to choose from are **Connected**, **Static**, **RIP**, **BGP**, and **ISIS**. For routing protocols like Open Shortest Path First (OSPF), these routes will be redistributed as external to the autonomous system. |
| **Metric Type** | Select the metric type here. Option to choose from are **External Type-1** and **External Type-2**. This specifies the external link type of the route being redistributed into the OSPF routing domain. If a metric type is not specified, the switch will adopt a Type-2 external route. |
| **Metric** | Enter the metric value for the redistributed routes here. The range is from 0 to 16777214. |
| **Router Map Name** | Enter the route map's name here that filters the imported routes from this source routing protocol. If not specified, all routes are redistributed. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

After clicking the **Select VRF** button, the following page will appear.


**Figure 6-60 OSPFv2 Redistribute Settings (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## OSPFv2 Virtual Link Settings

This window is used to view and configure the OSPFv2 feature's virtual link settings. If a non-zero area is not physically connected to the zero area, it must be connected to the zero area via a virtual link. The virtual link is a point-to-point link. The router will send the OSPF message to the neighbor router as unicast IP packet.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Virtual Link Settings**, as shown below:

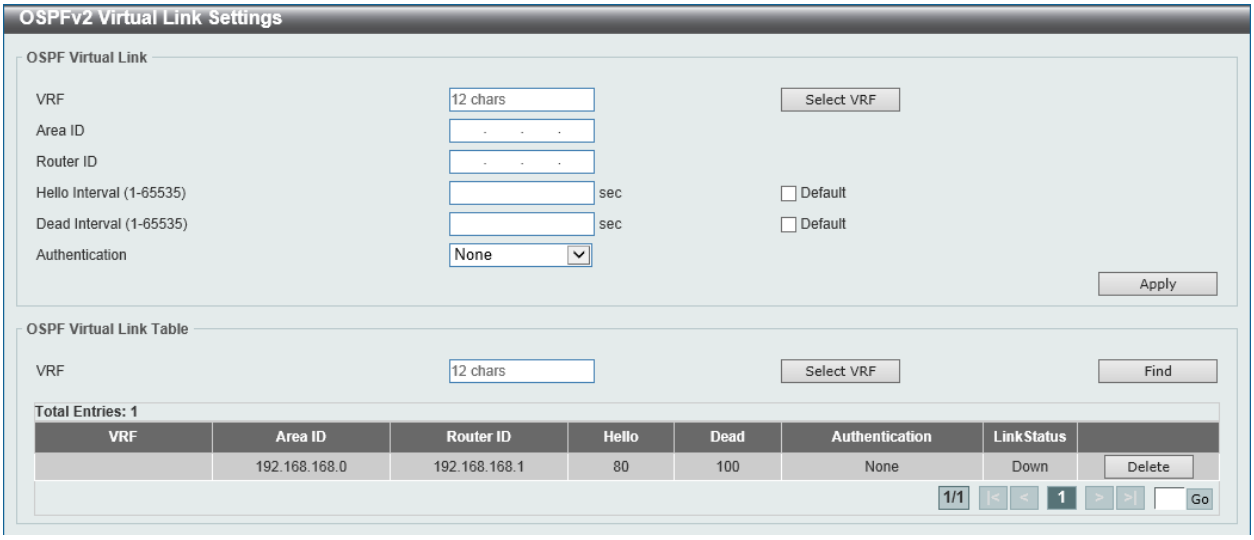



**Figure 6-61 OSPFv2 Virtual Link Settings Window**

The fields that can be configured in **OSPF Virtual Link** are described below:

| Parameter | Description |
|---|---|
| **VRF** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **Area ID** | Enter the OSPFv2 area's ID here. This area will be used to establish the virtual link. It can be specified as either a decimal value or as an IPv4 address. |
| **Router ID** | Enter the router ID of the virtual link neighbor here. |
| **Hello Interval** | Enter the hello packet interval that the router sends on the virtual link here. The range is from 1 and 65535 seconds. Select the **Default** option to use the default value, which is 10 seconds. |
| **Dead Interval** | Enter the dead interval time that a neighbor is regarded as off-line if no hello packets are received within that time here. The range is from 1 and 65535 seconds. Select the **Default** option to use the default value, which is 40 seconds. |
| **Authentication** | Select the authentication type used here. Options to choose from are **None**, **Simple Password**, and **MD5**. If the authentication type is not |

| Parameter | Description |
|---|---|
| | specified for the virtual link, the password authentication type for the area will be used. |
| **Password** | After selecting the **Simple Password** authentication type, enter the password used for password authentication here. This password can be up to 8 characters long. |
| **MD5 Key ID** | After selecting the **MD5** authentication type, enter the MD5 authentication method's key ID here. The range is from 1 to 255. |
| **MD5 Key** | After selecting the **MD5** authentication type, enter the MD5 authentication method's key here. This key can be up to 16 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Virtual Link Table** are described below:

| Parameter | Description |
|---|---|
| **VRF** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

After clicking the **Select VRF** button, the following page will appear.

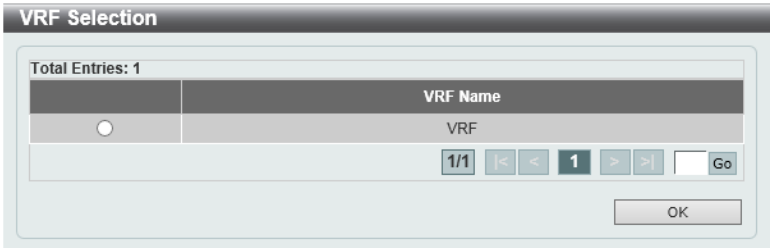



**Figure 6-62 OSPFv2 Virtual Link Settings (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## OSPFv2 LSDB Table

This window is used to display the OSPFv2 feature's LSDB table and information.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 LSDB Table**, as shown below:

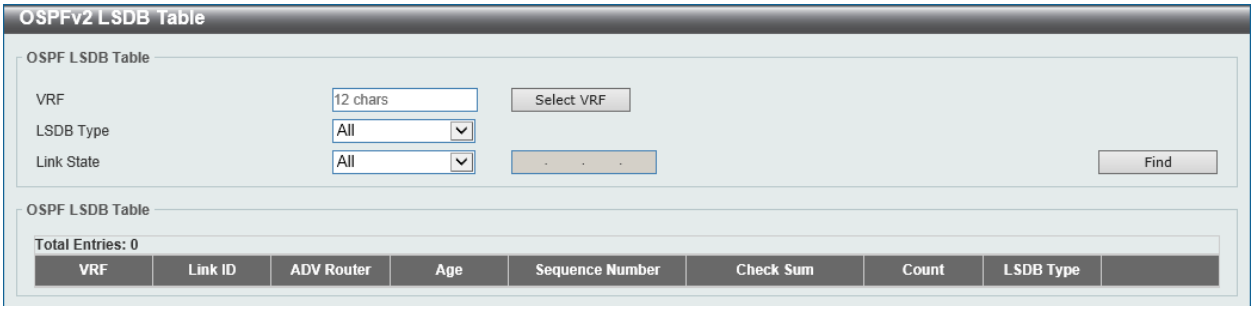



**Figure 6-63 OSPFv2 LSDB Table Window**

The fields that can be configured in **OSPF LSDB Table** are described below:

| Parameter | Description |
|---|---|
| **VRF** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **LSDB Type** | Select the LSDB type of information that will be displayed here. Options to choose from are **All**, **Router**, **Network**, **Summary**, **ASBR Summary**, **External**, **Stub**, and **NSSA External**. |
| **Link State** | Select the link state information that will be displayed here. Options to choose from are **All**, **Link State ID**, **Self Originate**, and **Adv Router**.<br>• **All:** Specifies to display all OSPFv2 link state information.<br>• **Link State ID:** Specifies to display information associated with the link state ID. Enter the link state ID in the space provided here.<br>• **Self Originate:** Specifies to display LSAs generated by the local router.<br>• **Adv Router:** Specifies to display all of the LSAs generated by the advertising router. Enter the advertising router's ID in the space provided here. |

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Select VRF** button, the following page will appear.

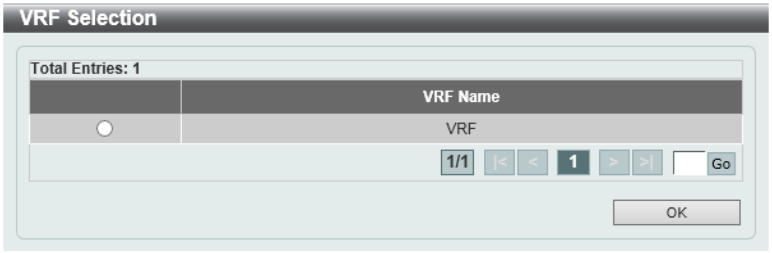



**Figure 6-64 OSPFv2 LSDB Table (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# OSPFv2 Neighbor Table

This window is used to display information of OSPF neighbors.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Neighbor Table**, as shown below:

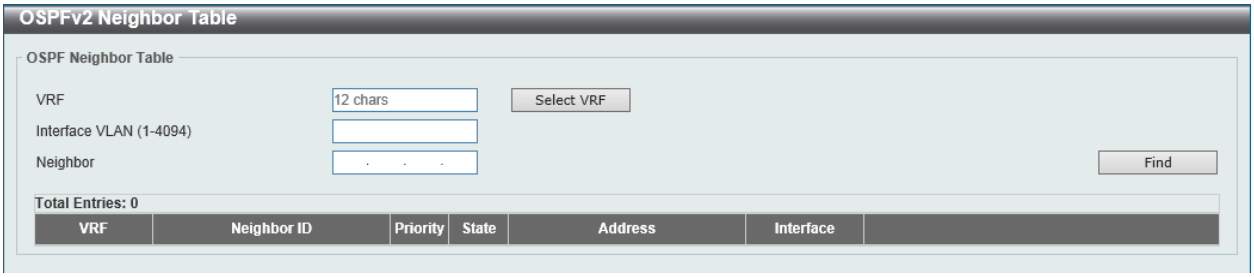



**Figure 6-65 OSPFv2 Neighbor Table Window**

The fields that can be configured in **OSPF Neighbor Table** are described below:

| Parameter | Description |
|---|---|
| **VRF** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **Interface VLAN** | Enter the VLAN interface's ID that will be used in this display here. The range is from 1 to 4094. |
| **Neighbor** | Enter the neighbor's ID here. |

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Select VRF** button, the following page will appear.

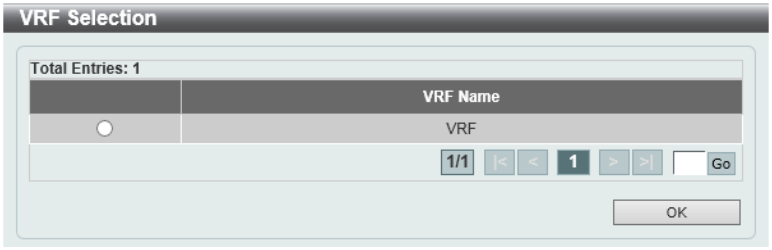



**Figure 6-66 OSPFv2 Neighbor Table (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# OSPFv2 Host Route Settings

This window is used to view and configure the OSPFv2 feature's host route settings. The router will advertise specific host routes as the router's LSA for a stub link.

To view the following window, click **L3 Features > OSPF > OSPFv2 > OSPFv2 Host Route Settings**, as shown below:

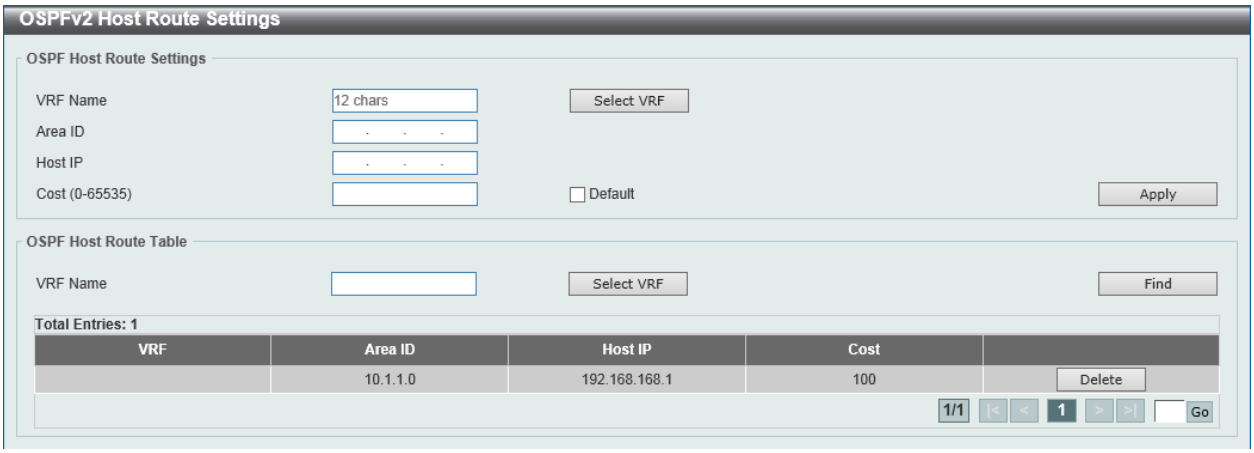



**Figure 6-67 OSPFv2 Host Route Settings Window**

The fields that can be configured in **OSPF Host Route Settings** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |
| **Area ID** | Enter the OSPF area's ID here. |
| **Host IP** | Enter the host's IPv4 address here. |
| **Cost** | Enter the cost value for the stub entry here. The range is from 0 to 65535. Select the **Default** option to use the default value, which is 1. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Host Route Table** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Select VRF** button to open a new window to select and use a configured VRF instance from the list. |

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Select VRF** button, the following page will appear.

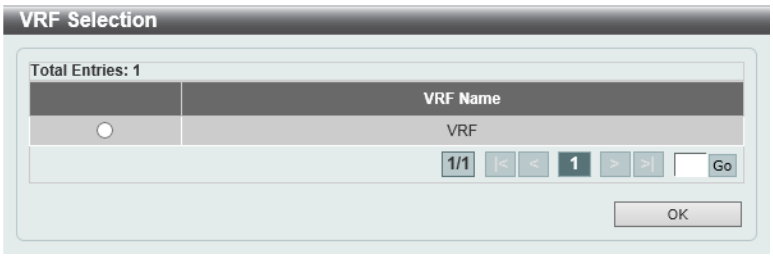



**Figure 6-68 OSPFv2 Host Route Settings (Select VRF) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# OSPFv3

## OSPFv3 Process Settings

This window is used to view and configure the OSPFv3 feature's process settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Process Settings**, as shown below:


**Figure 6-69 OSPFv3 Process Settings Window**

The fields that can be configured in **OSPFv3 Process Settings** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the OSPFv3 process' ID here. The range is from 1 to 65535. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

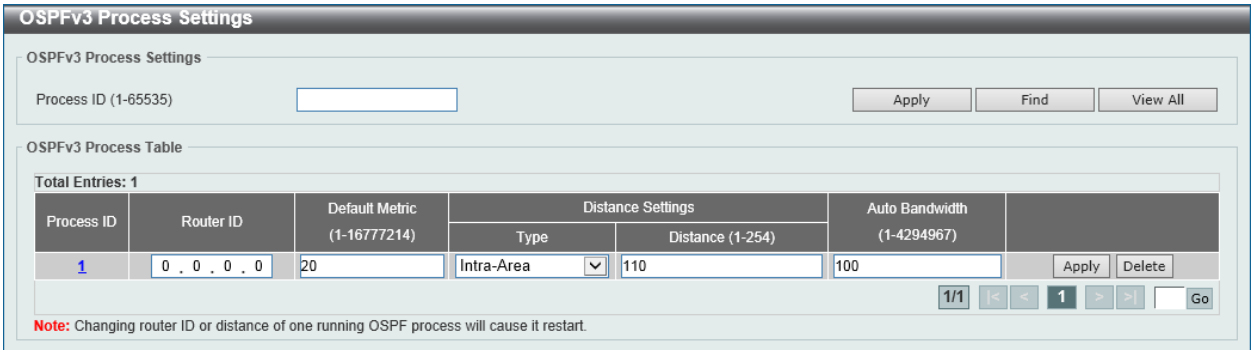



**Figure 6-70 OSPFv3 Process Settings (Edit) Window**

The fields that can be configured in **OSPFv3 Process Table** are described below:

| Parameter | Description |
|---|---|
| **Router ID** | Enter the router ID for the OSPF process here. |
| **Default Metric** | Enter the default metric value for the OSPF process here. The range is from 1 to 16777214. By default, this value is 20. This value is used in conjunction with the OSPFv3 redistribute feature to cause the current routing protocol to use the same metric value for all redistributed routes. A default metric helps solve the problem of redistributing routes with incompatible metric. Whenever metrics don't convert, using a default metric provides a reasonable substitute and enables the redistribution to proceed. |
| **Type** | Select the distance type here. Options to choose from are **Inter-Area**, **Inter-Area**, and **External**.<br>• **Intra-Area:** Specifies the distance for OSPF intra-area routes.<br>• **Inter-Area:** Specifies the distance for OSPF inter-area routes.<br>• **External:** Specifies the distance for OSPF external routes. |
| **Distance** | Enter the distance value for the OSPF process here. The range is from 1 to 254. By default, this value is 110 for all OSPF routes. |
| **Auto Bandwidth** | Enter the auto-bandwidth value here. This feature is used to control the reference value IPv6 OSPF uses when calculating metrics for interfaces. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the Process ID's link (**1**) in the table, the following page will appear.


**Figure 6-71 OSPFv3 Process Settings (Process ID) Window**

Click the **OK** button to close the window and return to the previous window.

## OSPFv3 Passive Interface Settings

This window is used to view and configure the OSPFv3 feature's passive interface settings. If an interface is passive, the OSPF routing update packets are not sent nor received through the specified interface.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Passive Interface Settings**, as shown below:


**Figure 6-72 OSPFv3 Passive Interface Settings Window**

The fields that can be configured in **OSPFv3 Passive Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the OSPFv3 process' ID here. The range is from 1 to 65535. |
| **Interface Name** | Enter the passive interface's name here. This name can be up to 12 characters long. Select the **Default** option specify all the interfaces as passive interfaces. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

# OSPFv3 Area Settings

This window is used to view and configure the OSPFv3 area's settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Area Settings**, as shown below:

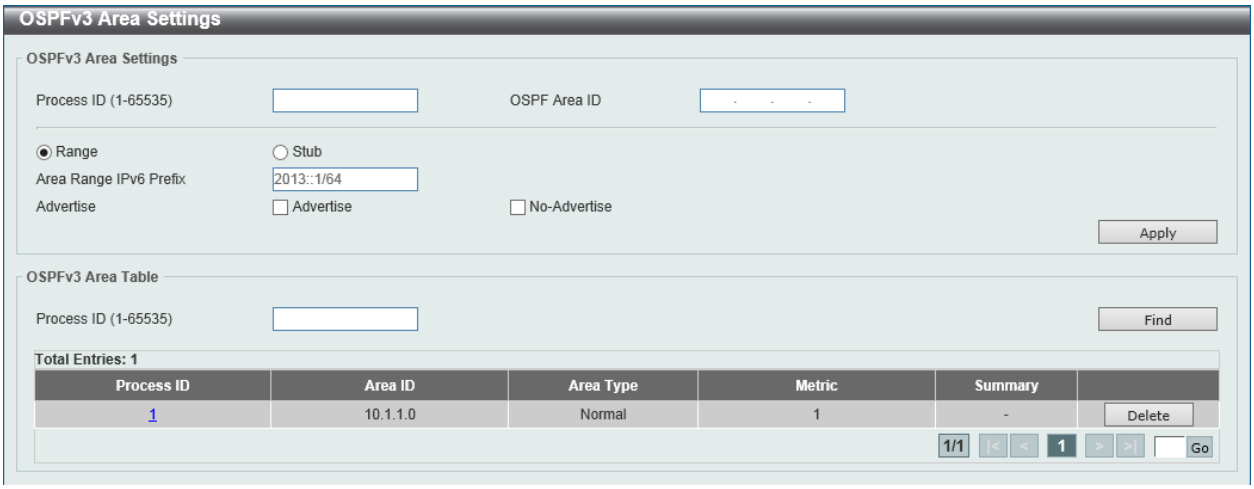



**Figure 6-73 OSPFv3 Area Settings Window**

The fields that can be configured in **OSPFv3 Area Settings** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the process ID of the OSPF area used here. The range is from 1 to 65535. |
| **OSPF Area ID** | Enter the OSPF area's ID used here. It can be specified as an IPv4 address. |
| **Range** | Select this option to consolidate and summarize routes at an area boundary. This feature is used only with ABRs. It is used to consolidate or summarize routes for an area. The result is that a single summary route is advertised to other areas by the ABR. Routing information is condensed at area boundaries. External to the area, a single route is advertised for each address range. |
| **Stub** | Select this option to define an area as a stub area. |
| **Area Range IPv6 Prefix** | After selecting the **Range** option, enter the OSPF area range's IPv6 prefix and prefix length here. |
| **Advertise** | After selecting the **Range** option, select the advertise option here. Options to choose from are **Advertise** and **No-Advertise**.<br>• **Advertise:** Specifies to advertise and generate a Type-3 summary LSA for the specified address range.<br>• **No-Advertise:** Specifies to set the status to Do-Not-Advertise for the specified address range. The Type-3 summary LSA is suppressed, and the component networks remain hidden from other networks. |
| **Metric** | After selecting the **Stub** option, enter the stub area's metric value here. The range is from 0 to 65535. Select the **Default Metric** option use the default metric value for this area, which is 1. Select the **No-Summary** option to prevent an ABR from sending summary LSAs into the stub area. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPFv3 Area Table** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the process ID of the OSPF area used here. The range is from 1 to 65535. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

## OSPFv3 Interface Settings

This window is used to view and configure the OSPFv3 feature's interface settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Interface Settings**, as shown below:

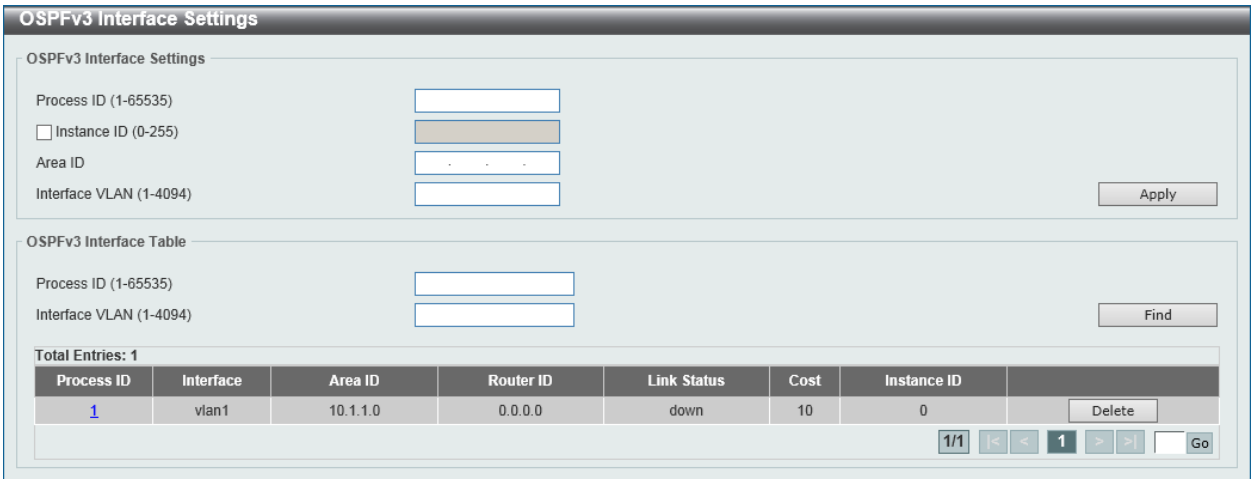



**Figure 6-74 OSPFv3 Interface Settings Window**

The fields that can be configured in **OSPFv3 Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535. |
| **Instance ID** | Enter the instance identifier here. The range is from 0 to 255. If not specified, the default is 0. |
| **Area ID** | Enter the identifier of the area here. It can be specified as an IPv4 address. |
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Interface Table** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the ID for an IPv6 OSPF routing process here. The range is from 1 to 65535. |
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

After clicking the Process ID link (**1**) button, the following page will appear.

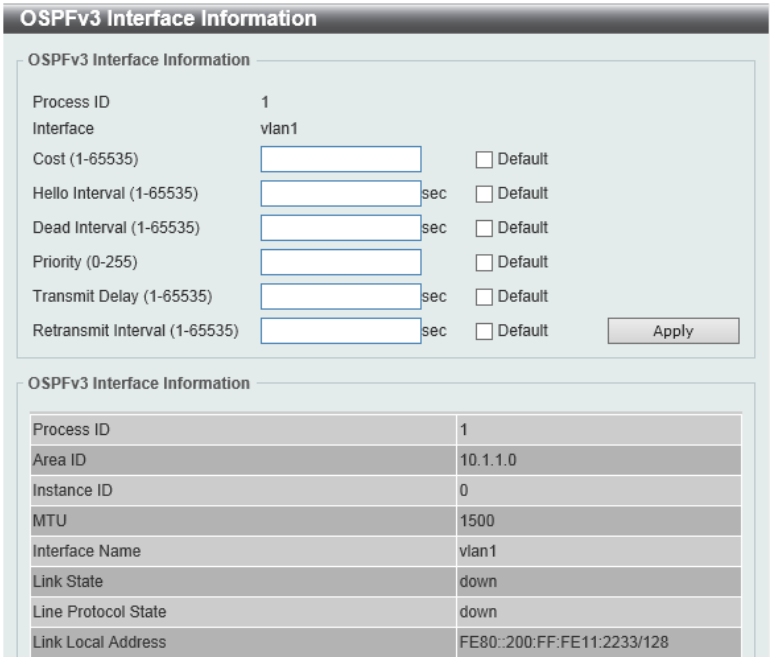



**Figure 6-75 OSPFv3 Interface Settings (Process ID) Window**

The fields that can be configured in **OSPFv3 Interface Information** are described below:

| Parameter | Description |
|---|---|
| **Cost** | Enter cost value here. It is an unsigned integer value expressed as the link-state metric. The range is from 1 to 65535. Select the **Default** option to use the default value. |
| **Hello Interval** | Enter the hello interval value, between the hello packets that the router sends on an interface here. This value is advertised in the hello packets. The shorter the hello interval, the earlier topological changes will be detected, but more routing traffic will ensue. This value must be the same for all routers and access servers on a specific network. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value, which is 10 seconds. |
| **Dead Interval** | Enter the dead interval value here, during which no packets are received and after which a neighbor is regarded as off-line. The interval is advertised in router hello packets. This value must be the same for all routers and access servers on a specific network. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value, which is 40 seconds. |
| **Priority** | Enter the priority value of the router here. The range is from 0 to 255. Set the priority to help determine the OSPF Designated Router (DR) for a network. If two routers attempt to become the DR, the router with the higher router priority becomes the DR. If the router priority is the same for two routers, the router with the higher router ID takes precedence.<br>Only routers with nonzero router priority values are eligible to become the designated or backup designated router. Configure router priority for multi-access networks (not point-to-point) only.<br>Select the **Default** option to use the default value, which is 1. |

| Parameter | Description |
|---|---|
| **Transmit Delay** | Enter the transmit delay value here. The range is from 1 to 65535 seconds. LSUs must have their ages incremented by the amount specified in the seconds argument before transmission. The value assigned should take into account the transmission and propagation delays for the interface.<br>If the delay is not added before transmission over a link, the time in which the LSA propagates over the link is not considered. This setting has more significance on very low speed links.<br>Select the **Default** option to use the default value, which is 1 second. |
| **Retransmit Interval** | Enter the retransmit interval value here. The range is from 1 to 65535 seconds. After sending an LSA to a neighbor, the router keeps the LSA until it receives an acknowledgement. In case the router does not receive an acknowledgement during the set time (the retransmit interval value), it retransmits the LSA. Set the retransmission interval value conservatively to avoid needless retransmission. The interval should be greater than the expected round-trip delay between two routers.<br>Select the **Default** option to use the default value, which is 5 seconds. |

Click the **Apply** button to accept the changes made.

## OSPFv3 Redistribute Settings

This window is used to view and configure the OSPFv3 feature's redistribution settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Redistribute Settings**, as shown below:


**Figure 6-76 OSPFv3 Redistribute Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535. |
| **Protocol** | Select the source protocol from which routes will be redistributed here. Options to choose from are **Connected**, **Static**, **RIPng**, and **ISIS**. |
| **Metric Type** | Select the external link type associated with the default route advertised into the IPv6 OSPF routing domain here. Options to choose from are **External Type-1** and **External Type-2**. If a metric type is not specified, the switch adopts a Type-2 external route. This is only for |

| Parameter | Description |
|---|---|
| | IPv6 OSPF. |
| **Metric** | Enter the metric value here. This value is used when redistributing other processes to an IPv6 OSPF process. The range is from 0 to 16777214. The default metric is value 20 when no metric value is specified. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

## OSPFv3 Virtual Link Settings

This window is used to view and configure the OSPFv3 feature's virtual link settings.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Virtual Link Settings**, as shown below:

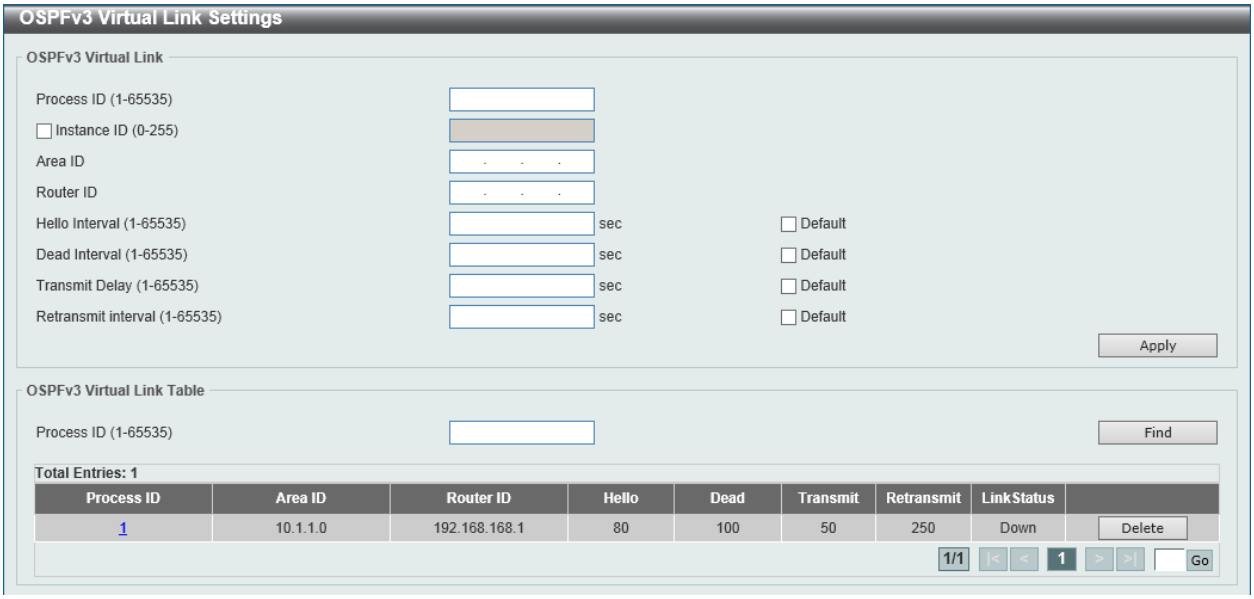



**Figure 6-77 OSPFv3 Virtual Link Settings Window**

The fields that can be configured in **OSPFv3 Virtual Link** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535. |
| **Instance ID** | Select and enter the instance's ID here. The range is from 0 to 255. |
| **Area ID** | Enter the OSPF area's ID here. It can be specified as an IPv4 address. |
| **Router ID** | Enter the router's ID here associated with the virtual link neighbor. |
| **Hello Interval** | Enter the hello interval value between the hello packets that the router sends on an interface here. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value, which is 10 seconds. |
| **Dead Interval** | Enter the dead interval value, during which no packets are received and after which a neighbor is regarded as off-line, here. The range is |

| Parameter | Description |
|---|---|
| | from 1 to 65535 seconds. Select the **Default** option to use the default value, which is 40 seconds. |
| **Transmit Delay** | Enter the transmit delay value here that the router uses to wait before it transmits a packet. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value, which is 1 second. |
| **Retransmit Interval** | Enter the retransmit interval value here that the router uses to wait before it retransmits a packet. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value, which is 5 seconds. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **OSPF Virtual Link Table** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the ID for an IPv6 OSPF routing process here. The range is from 1 to 65535. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the Process ID link (**1**), the following page will appear.

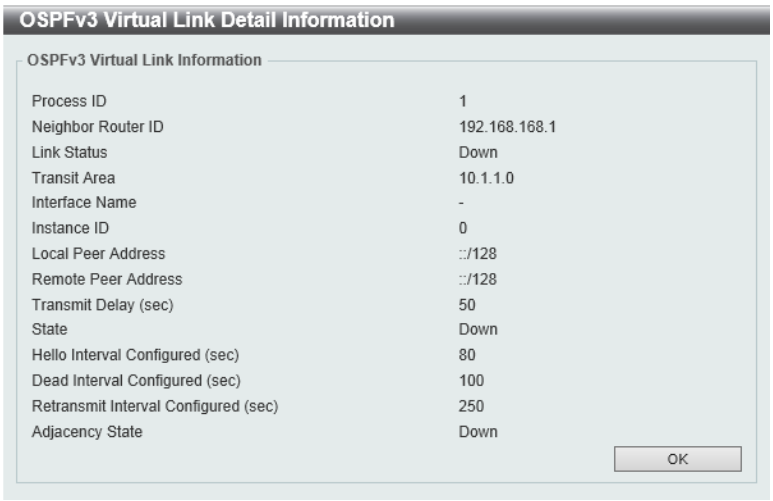



**Figure 6-78 OSPFv3 Virtual Link Settings (Process ID) Window**

Click the **OK** button to close the window and return to the previous window.

## OSPFv3 LSDB Table

This window is used to find and display the OSPFv3 feature's LSDB information.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 LSDB Table**, as shown below:

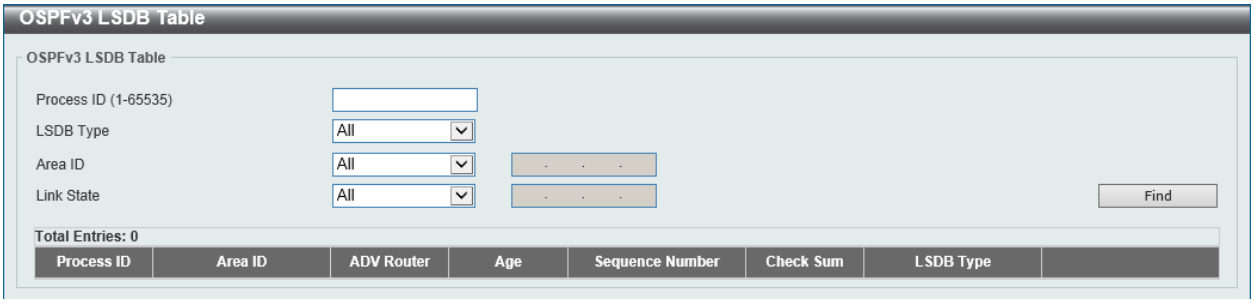



**Figure 6-79 OSPFv3 LSDB Table Window**

The fields that can be configured in **OSPFv3 LSDB Table** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535. |
| **LSDB Type** | Select the LSDB display type here. Options to choose from are **All**, **Router**, **Network**, **Prefix**, **Link**, **Inter-Area Prefix**, **Inter-Area Router**, and **External**.<br>• **All:** Specifies to display all types of LSDB information.<br>• **Router:** Specifies to display information only about the router LSAs.<br>• **Network:** Specifies to display information only about the network LSAs.<br>• **Prefix:** Specifies to display information on the intra-area-prefix LSAs.<br>• **Link:** Specifies to display information about the link LSAs.<br>• **Inter-Area Prefix:** Specifies to display information only about LSAs based on inter-area prefix LSAs.<br>• **Inter-Area Router:** Specifies to display information only about LSAs based on inter-area router LSAs.<br>• **External:** Specifies to display information only about the external LSAs. |
| **Area ID** | Select the area ID option here. Options to choose from are **All** and **Area ID**. To display all the LSAs of the specified area, select the **Area ID** option and enter the OSPF area's ID in the space provided. It can be specified as an IPv4 address. |
| **Link State** | Select the link state option here. Options to choose from are **All**, **Self Originate**, and **Adv Router**.<br>• **All:** Specifies to display all the LSAs.<br>• **Self Originate:** Specifies to display only self-originated LSAs (from the local router).<br>• **Adv-Router:** Specifies to display all the LSAs of the advertising router. Enter the router's ID in the space provided. The router ID can be specified as an IPv4 address. |

Click the **Find** button to locate a specific entry based on the information entered.

## OSPFv3 Neighbor Table

This window is used to find and display the OSPFv3 neighbor information.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Neighbor Table**, as shown below:


**Figure 6-80 OSPFv3 Neighbor Table Window**

The fields that can be configured in **OSPFv3 Neighbor Table** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535. |
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Neighbor** | Enter the OSPF neighbor's ID here. It can be specified as an IPv4 address. |

Click the **Find** button to locate a specific entry based on the information entered.

## OSPFv3 Border Router Table

This window is used to find and display the OSPFv3 border router information.

To view the following window, click **L3 Features > OSPF > OSPFv3 > OSPFv3 Border Router Table**, as shown below:

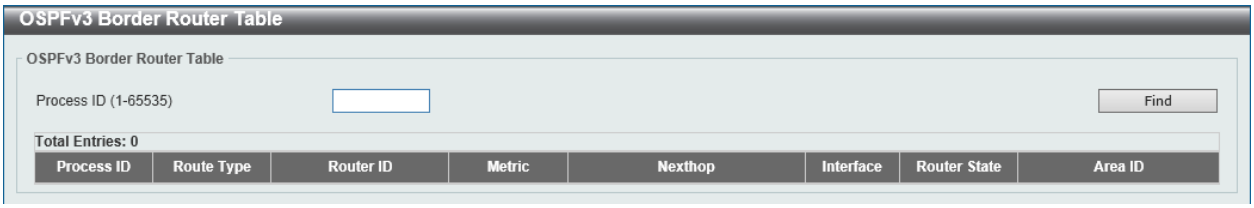



**Figure 6-81 OSPFv3 Border Router Table Window**

The fields that can be configured in **OSPFv3 Border Router Table** are described below:

| Parameter | Description |
|---|---|
| **Process ID** | Enter the ID for an IPv6 OSPF routing process here. It is locally assigned and should be unique for each IPv6 OSPF routing process on the router. The range is from 1 to 65535. |

Click the **Find** button to locate a specific entry based on the information entered.

# IP Multicast Routing Protocol

## IGMP

### IGMP Interface Settings

The window is used to find and display the Internet Group Management Protocol (IGMP) feature's interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP > IGMP Interface Settings**, as shown below:


**Figure 6-82 IGMP Interface Settings Window**

The fields that can be configured in **IGMP Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

### IGMP Static Group Settings

This window is used to view and configure the IGMP static group settings. Use this window to create an IGMP static group in the case that the attached host does not support the IGMP protocol. Once configured, the group member entry is added to the IGMP cache.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP > IGMP Static Group Settings**, as shown below:

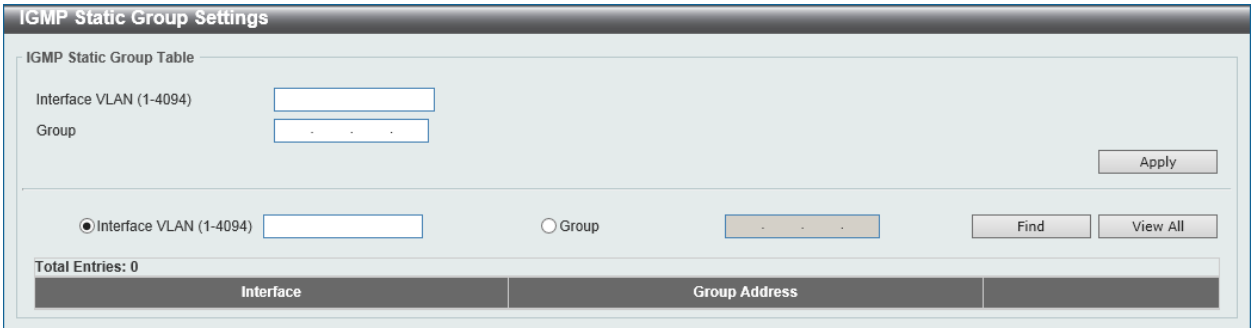



**Figure 6-83 IGMP Static Group Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Group** | Enter the IP multicast group's address here. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## IGMP Dynamic Group Table

This window is used to find, clear and display IGMP dynamic group information. The IGMP buffer includes a list that contains the dynamic multicast groups that the hosts in the direct subnet join. Use this window to clear the dynamic group information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP > IGMP Dynamic Group Table**, as shown below:

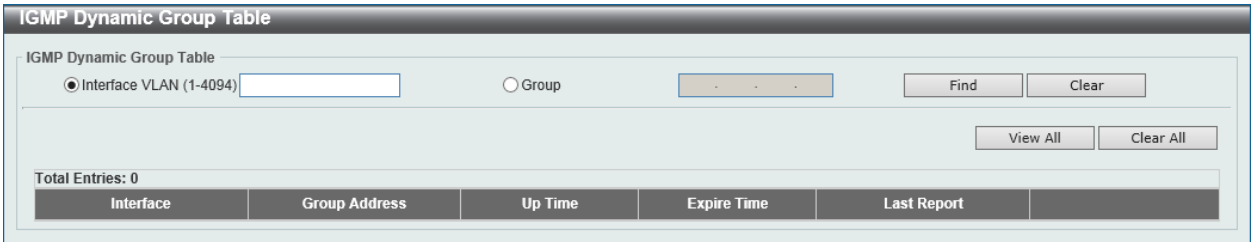



**Figure 6-84 IGMP Dynamic Group Table Window**

The fields that can be configured in **IGMP Dynamic Group Table** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Group** | Enter the IP multicast group's address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

Click the **View All** button to display all the entries.

Click the **Clear All** button to clear all the entries.

## IGMP SSM Mapping Settings

This window is used to view and configure the IGMP SSM mapping settings. The deployment of source specific multicast (SSM) allows the network service provider to manage the IP multicast address easily.

When SSM is enabled, the last hop router will initiate to establish a source-based tree for the channel (S, G) on receiving a (S, G) INCLUDE mode request that falls in the SSM range from the attached IGMPv3 hosts.

There are cases that the attached host is IGMPv1 or IGMPv2 hosts which only issue (*, G) requests. With the SSM mapping, if the multicast group being requested that falls in the SSM range, the router is able to map the (*, G) to a (S, G) requests based on the group address to source address mapping defined here. The router will then issue to establish the source-based tree for the mapped (S, G). If multiple associations exist, the router will issue to establish a (S, G) source-based tree for each S.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP > IGMP SSM Mapping Settings**, as shown below:

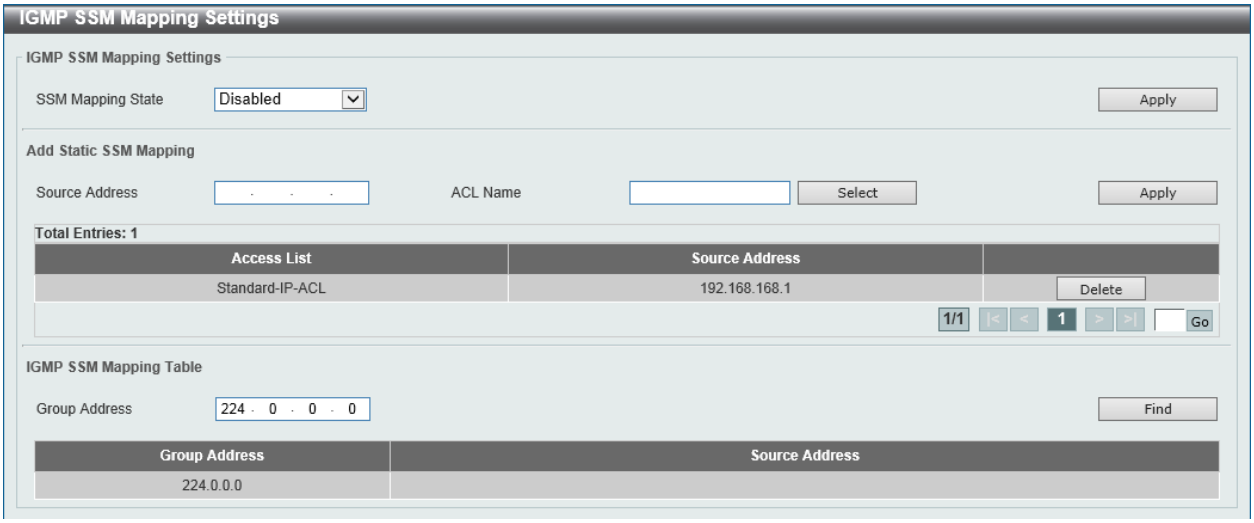



**Figure 6-85 IGMP SSM Mapping Settings Window**

The fields that can be configured in **IGMP SSM Mapping Settings** are described below:

| Parameter | Description |
|---|---|
| **SSM Mapping State** | Select to enable or disable the SSM mapping feature for IGMPv1 or IGMPv2 hosts. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Add Static SSM Mapping** are described below:

| Parameter | Description |
|---|---|
| **Source Address** | Enter the source address to be associated with the group defined in the access list here. |
| **ACL Name** | Enter the standard IP access list's name here that contains the multicast groups to be mapped. To permit a group, specify "any" in source address field and specify the group address in destination address field of the access list entry.<br>Alternatively, click the **Select** button to find and select any of the exiting access lists configured on this switch to be used in this configuration. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **IGMP SSM Mapping Table** are described below:

| Parameter | Description |
|---|---|
| **Group Address** | Enter the IGMP multicast group address here. |

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Select** button, the following page will appear.

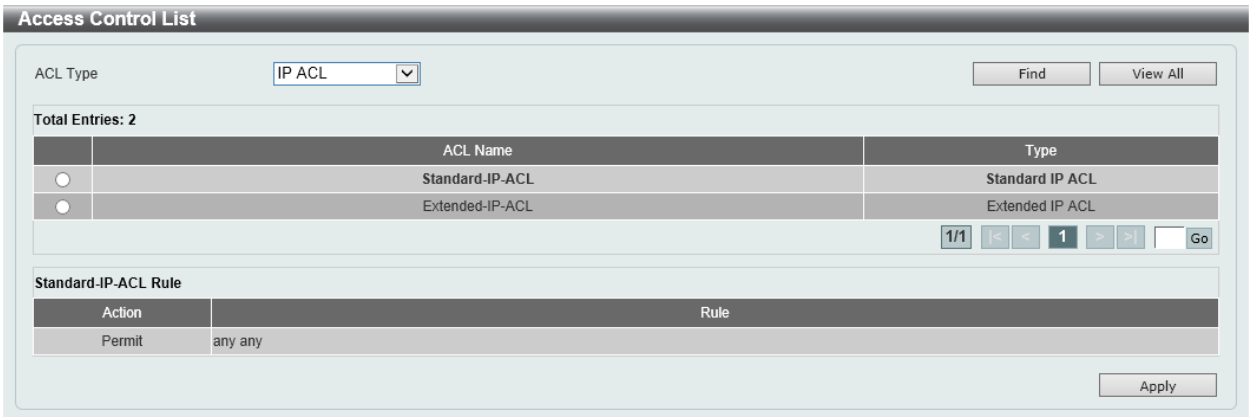



**Figure 6-86 IGMP SSM Mapping Settings (Select) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

# MLD

## MLD Interface Settings

This window is used to view and configure the Multicast Listener Discovery (MLD) interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD > MLD Interface Settings**, as shown below:

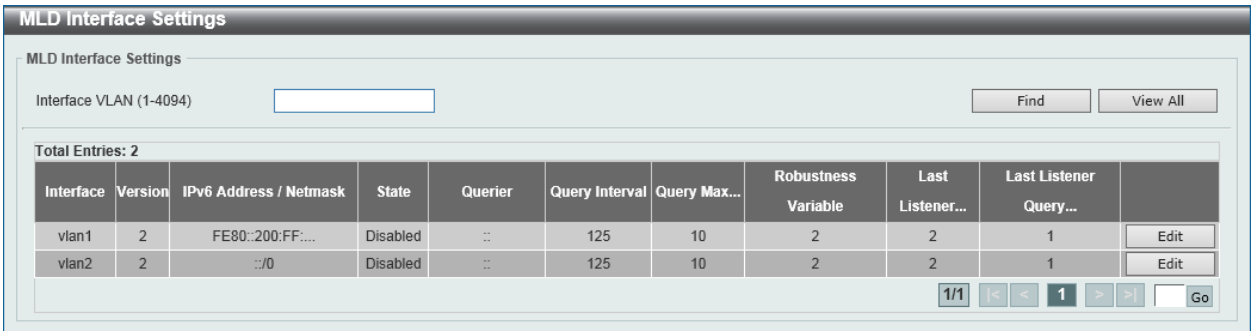



**Figure 6-87 MLD Interface Settings Window**

The fields that can be configured in **MLD Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the associated VLAN ID of the interface here. The range is from 1 to 4094. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

After clicking the **Edit** button, the following page will appear.

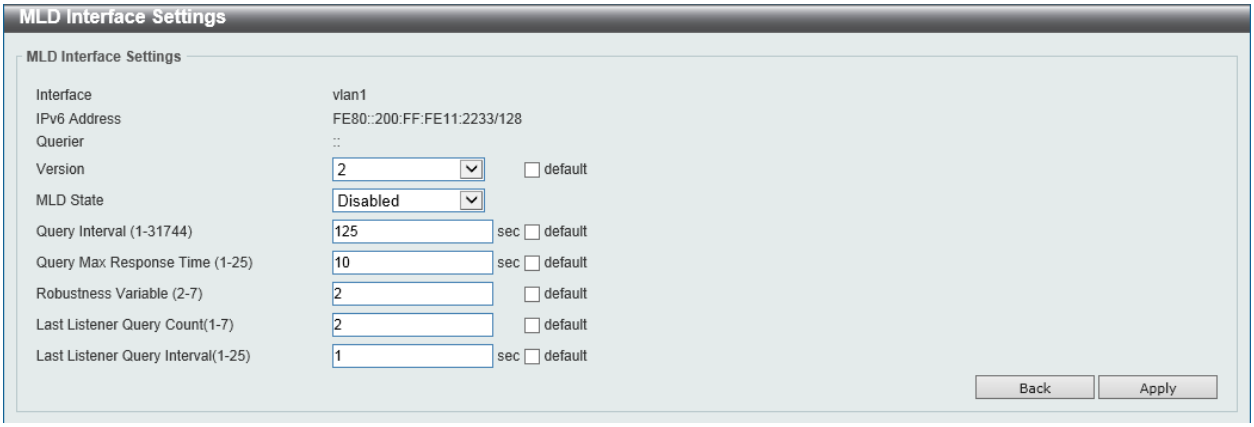



**Figure 6-88 MLD Interface Settings (Edit) Window**

The fields that can be configured in **MLD Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Version** | Select the MLD version that will be used on the interface here. Options to choose from are **1** and **2**. Select the **Default** option to use the default version, which is MLDv2. |
| **MLD State** | Select to enable or disable the MLD feature on this interface here. |
| **Query Interval** | Enter the query interval here. This specifies to configure the frequency at which the designated router sends MLD general-query messages. On receiving the general query, the MLD listener needs to respond the report packet to claim that it is interested in the specified multicast group. The range is from 1 to 31744 seconds. Select the **Default** option to use the default value, which is 125 seconds. |
| **Query Max Response Time** | Enter the maximum query response time value here. This specifies to set the maximum response time, in seconds, advertised in MLD queries. The range is from 1 to 25 seconds. Select the **Default** option to use the default value, which is 10 seconds. |
| **Robustness Variable** | Enter the robustness variable value here. The robustness variable provides fine-tuning to allow for expected packet loss on an interface. The range is from 2 to 7. Select the **Default** option to use the default value, which is 2. |
| **Last Listener Query Count** | Enter the last member query count value here. This is used to configure the number of group-specific or group-source specific queries sent before the router assumes there are no local members of a group. If the router does not receive reports from hosts within the timeout period, the router will stop sending the multicast group traffic to the interface. The range is from 1 to 7. Select the **Default** option to use the default value, which is 2. |

| Parameter | Description |
|---|---|
| **Last Listener Query Interval** | Enter the interval for the amount of time between group-specific or group-source-specific queries here. When an MLD querier receives a packet to leave the specific group or channel, it will send a group specific query or group source specific query. The leave timer starts once the MLD querier receives the packet from an interface. If the interface does not receive the report packet before the leave timer expires, then the interface's membership will be removed from the group or channel that is to be leaved. The value of the leave timer is the value of the last-listener-query-interval times the last-listener-query-count. The range is from 1 to 25 seconds. Select the **Default** option to use the default value, which is 1 seconds. |

Click the **Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

## MLD Group Table

This window is used to find and display the MLD group information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD > MLD Group Table**, as shown below:


**Figure 6-89 MLD Group Table Window**

The fields that can be configured in **MLD Group Table** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Group** | Enter the group IPv6 address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## MLD SSM Mapping Settings

This window is used to view and configure the MLD SSM mapping settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD > MLD SSM Mapping Settings**, as shown below:

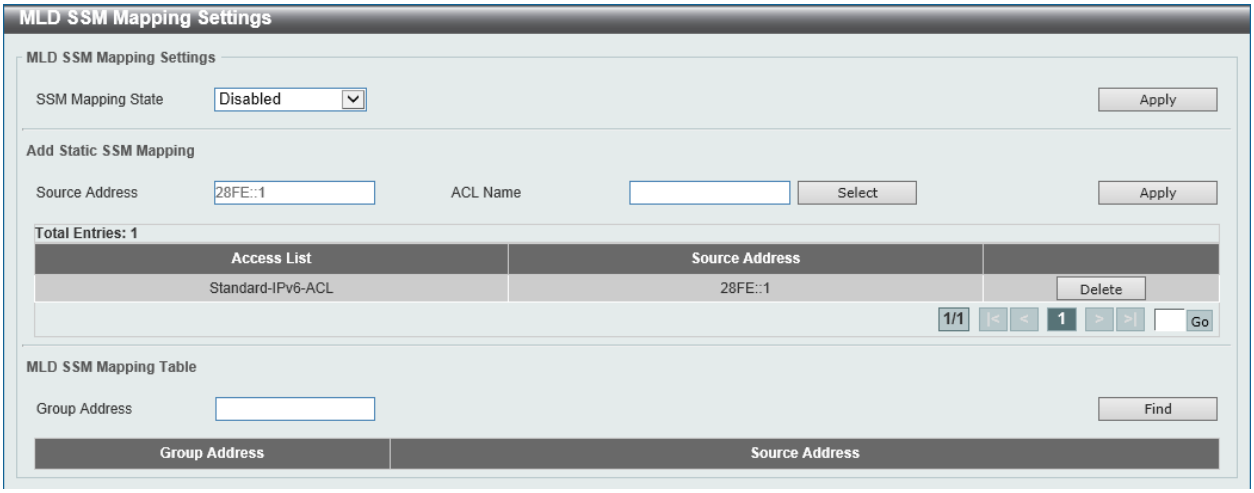



**Figure 6-90 MLD SSM Mapping Settings Window**

The fields that can be configured in **MLD SSM Mapping Settings** are described below:

| Parameter | Description |
|---|---|
| **SSM Mapping State** | Select to enable or disable the Source Specific Multicast (SSM) mapping feature for groups in the configured SSM range. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Add Static SSM Mapping** are described below:

| Parameter | Description |
|---|---|
| **Source Address** | Enter the source address associated with an MLD membership for a group identified by the access list here. |
| **ACL Name** | Enter the standard IPv6 access list's name here that contains the multicast groups to be mapped. To permit a group, specify "any" in source address field and specify the group address in destination address field of the access list entry.<br>Alternatively, click the **Select** button to find and select any of the exiting access lists configured on this switch to be used in this configuration. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

The fields that can be configured in **MLD SSM Mapping Table** are described below:

| Parameter | Description |
|---|---|
| **Group Address** | Enter the MLD multicast group's address here. |

Click the **Find** button to locate a specific entry based on the information entered.

After clicking the **Select** button, the following page will appear.


**Figure 6-91 MLD SSM Mapping Settings (Select) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

# IGMP Proxy

## IGMP Proxy Settings

This window is used to view and configure the IGMP proxy settings. The IGMP proxy only works in a simple tree topology. Make sure that there are no other multicast routers except for the proxy devices in the simple tree topology. When receiving IGMP report packets from a downstream interface, IGMP proxy will update its membership database which is generated by the merger of all subscriptions on any downstream interface. If the database is changed, the proxy device will send unsolicited reports or leaves from upstream interface. It can also send membership reports from the upstream interface when queried.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP Proxy > IGMP Proxy Settings**, as shown below:

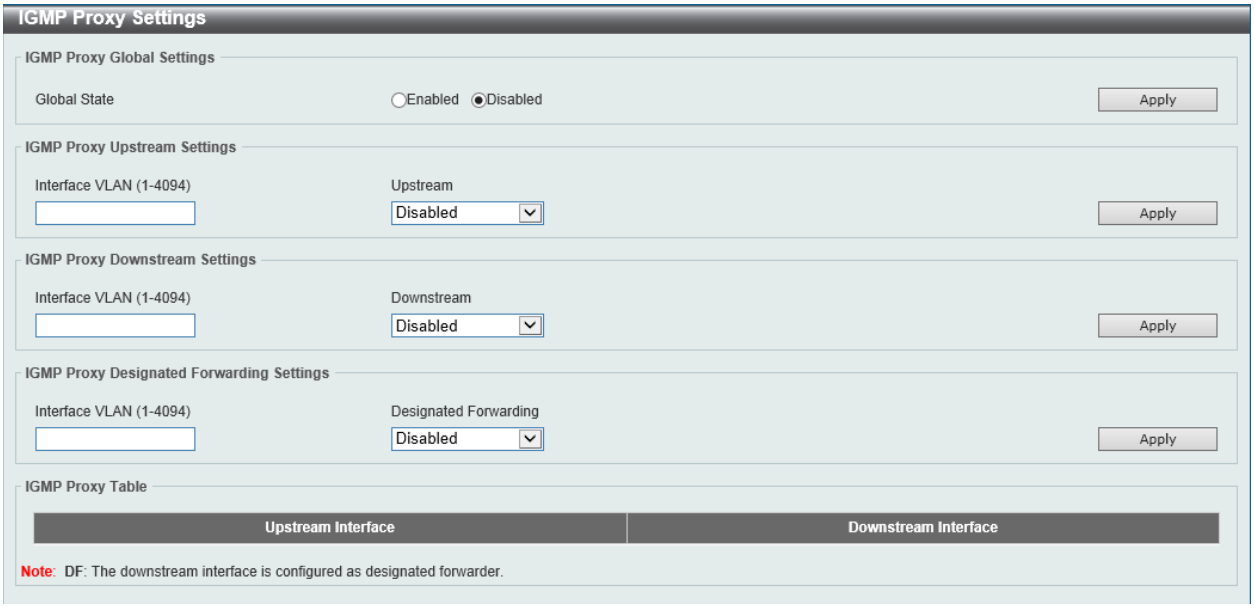



**Figure 6-92 IGMP Proxy Settings Window**

The fields that can be configured in **IGMP Proxy Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Global State** | Select to globally enable or disable the IGMP proxy feature here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Proxy Upstream Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Upstream** | Select to enable or disable the interface as the upstream in IGMP proxy here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Proxy Downstream Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Downstream** | Select to enable or disable the interface as the downstream in IGMP proxy here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IGMP Proxy Designated Forwarding Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Designated Forwarding** | Select to enable or disable designated forwarding on a non-querier IGMP proxy downstream interface here. To avoid local loops and redundant traffic for links that are considered downstream links by |

| Parameter | Description |
|---|---|
| | multiple IGMP-based forwarders, IGMP proxy uses the IGMP querier election to elect a single forwarder on a LAN. Use this option to make a non-querier device as forwarder. Use the configuration in the appropriate topology. Improper usage may cause local loops or redundant traffic. The feature does not take effect if the interface is not set as the downstream interface or set as the upstream interface. |

Click the **Apply** button to accept the changes made.

## IGMP Proxy Group Table

This window is used to find and display IGMP proxy group information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP Proxy > IGMP Proxy Group Table**, as shown below:


**Figure 6-93 IGMP Proxy Group Table Window**

The fields that can be configured in **IGMP Proxy Group Table** are described below:

| Parameter | Description |
|---|---|
| **Group Address** | Enter the IPv4 group multicast address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## IGMP Proxy Forwarding Table

This window is used to find and display IGMP proxy forwarding information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IGMP Proxy > IGMP Proxy Forwarding Table**, as shown below:


**Figure 6-94 IGMP Proxy Forwarding Table Window**

The fields that can be configured in **IGMP Proxy Forwarding Table** are described below:

| Parameter | Description |
|---|---|
| **Group Address** | Enter the IPv4 group multicast address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# MLD Proxy

## MLD Proxy Settings

This window is used to view and configure the MLD proxy settings. The MLD proxy only works in a simple tree topology. Make sure there are no other multicast routers except for the proxy devices in the simple tree topology.

When receiving MLD report packet from a downstream interface, MLD proxy will update its membership database which is generated by the merger of all subscriptions on any downstream interface. If the database is changed, the proxy device will send unsolicited reports or leaves from upstream interface. It can also send membership reports from the upstream interface when queried.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD Proxy > MLD Proxy Settings**, as shown below:

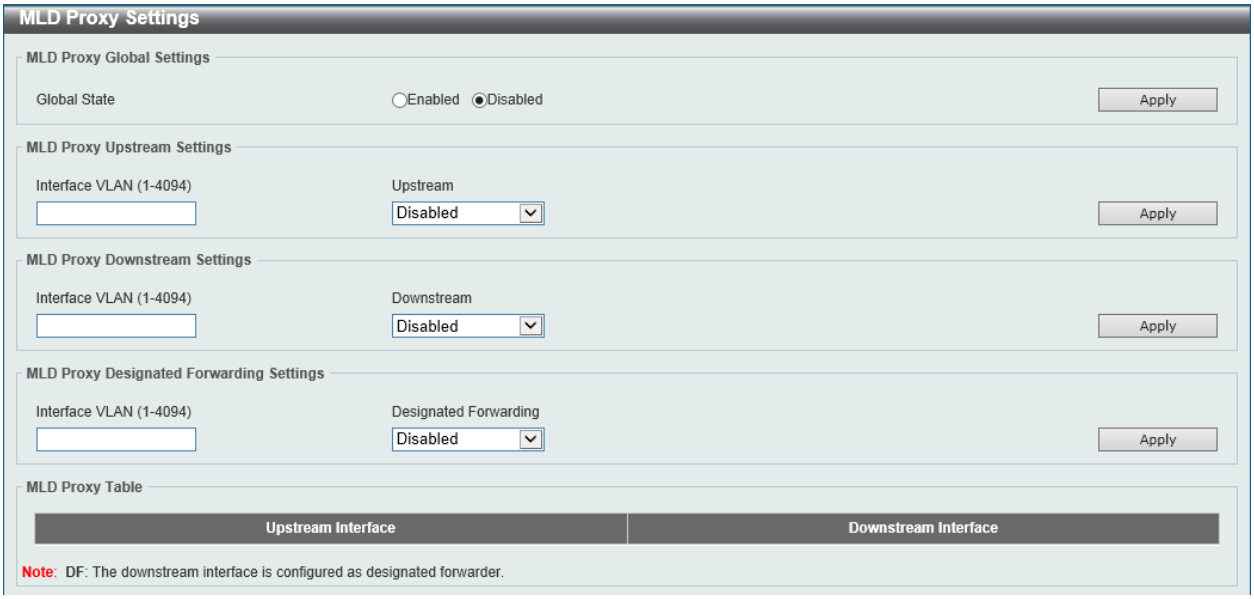



**Figure 6-95 MLD Proxy Settings Window**

The fields that can be configured in **MLD Proxy Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Global State** | Select to globally enable or disable the MLD proxy feature here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Proxy Upstream Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Upstream** | Select to enable or disable the interface as the upstream in MLD proxy here. This feature only takes effect if the interface has an IPv6 address configured. Only one upstream can exist in an MLD proxy device. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Proxy Downstream Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Downstream** | Select to enable or disable the interface as the downstream in MLD proxy here. This feature only takes effect when the interface has an IPv6 address configured. Multiple downstream interfaces can be configured on an MLD proxy device. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MLD Proxy Designated Forwarding Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VLAN** | Enter the VLAN interface's ID here. The range is from 1 to 4094. |
| **Designated Forwarding** | Select to enable or disable designated forwarding on a non-querier MLD proxy downstream interface here. To avoid local loops and redundant traffic for links that are considered downstream links by multiple MLD-based forwarders, MLD proxy uses the MLD querier election to elect a single forwarder on a LAN. Administrators can use this command to make a non-querier device to be forwarder. Use this feature in the appropriate topology. Improper usage may cause local loops or redundant traffic.<br>This feature does not take effect if the interface is not set as the downstream interface or set as upstream interface. |

Click the **Apply** button to accept the changes made.

## MLD Proxy Group Table

This window is used to find and display MLD proxy group information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD Proxy > MLD Proxy Group Table**, as shown below:

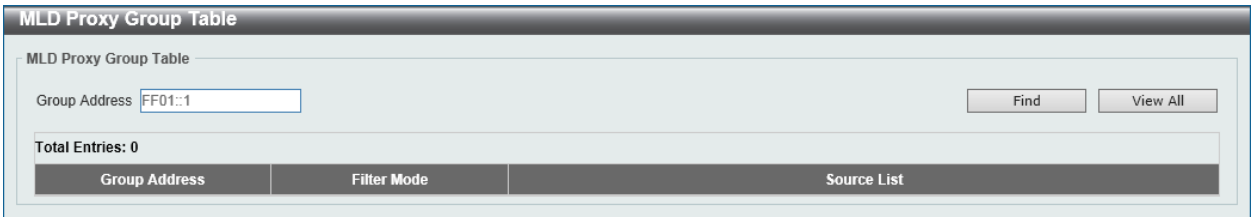



**Figure 6-96 MLD Proxy Group Table Window**

The fields that can be configured in **MLD Proxy Group Table** are described below:

| Parameter | Description |
|---|---|
| **Group Address** | Enter the IPv6 group multicast address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## MLD Proxy Forwarding Table

This window is used to find and display MLD proxy forwarding information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > MLD Proxy > MLD Proxy Forwarding Table**, as shown below:


**Figure 6-97 MLD Proxy Forwarding Table Window**

The fields that can be configured in **MLD Proxy Forwarding Table** are described below:

| Parameter | Description |
|---|---|
| **Group Address** | Enter the IPv6 group multicast address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# DVMRP

## DVMRP Interface Settings

This window is used to view and configure the Distance Vector Multicast Routing Protocol (DVMRP) interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > DVMRP > DVMRP Interface Settings**, as shown below:

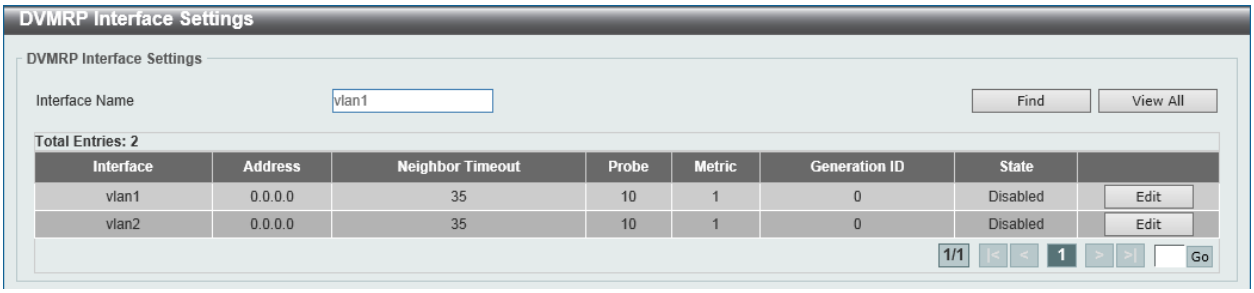



**Figure 6-98 DVMRP Interface Settings Window**

The fields that can be configured in **DVMRP Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the VLAN interface's name used here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

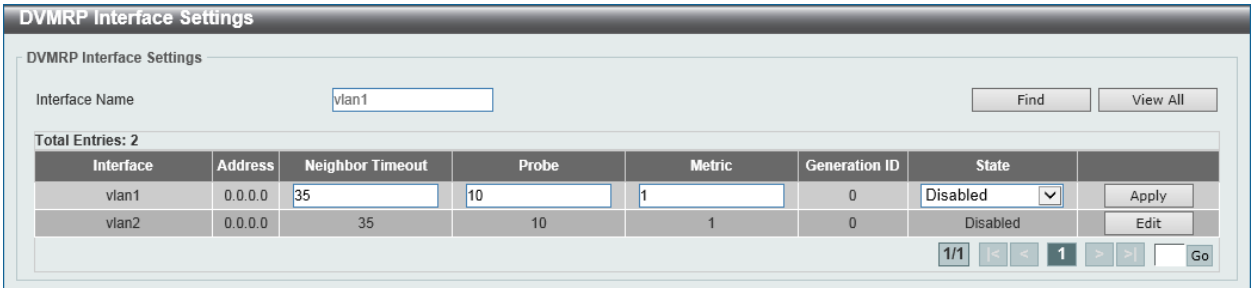



**Figure 6-99 DVMRP Interface Settings (Edit) Window**

The fields that can be configured in the table are described below:

| Parameter | Description |
|---|---|
| **Neighbor Timeout** | Enter the neighbor's lifetime value here. If the router has not received a probe message from a neighbor after the neighbor timeout interval, the neighbor is supposed to be down. The range is from 1 to 65535 seconds. By default, this value is 35 seconds. |
| **Probe** | Enter the DVMRP probe interval value here. The range is from 1 to 65535 seconds. By default, this value is 10 seconds. |
| **Metric** | Enter the metric value here. The range is from 1 to 32. A value of 32 means infinity (unreachable). For each source network reported, a route metric is associated with the route being reported. The metric is the sum of the interface metrics between the router originating the report and the source network. For DVMRP, the metric with 32 means infinity (unreachable). This limits the breadth across the whole DVMRP network and is necessary to place an upper bound on the convergence time of the protocol. |
| **State** | Select to enable or disable the DVMRP feature on the selected interface. |

Click the **Apply** button to accept the changes made.

## DVMRP Routing Table

This window is used to find and display DVMRP routing information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > DVMRP > DVMRP Routing Table**, as shown below:


**Figure 6-100 DVMRP Routing Table Window**

The fields that can be configured in **DVMRP Routing Table** are described below:

| Parameter | Description |
|---|---|
| **Source Network** | Enter the source IPv4 network address and mask length here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## DVMRP Neighbor Table

This window is used to find and display DVMRP neighbor information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > DVMRP > DVMRP Neighbor Table**, as shown below:

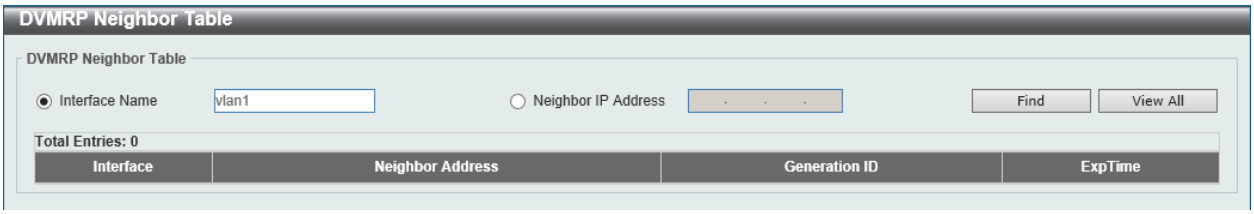



**Figure 6-101 DVMRP Neighbor Table Window**

The fields that can be configured in **DVMRP Neighbor Table** are described below:

| Parameter | Description |
|---|---|
| **Interface name** | Enter the VLAN interface's name here. |
| **Neighbor IP Address** | Select and enter the IPv4 address of the neighbor here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# PIM

## PIM for IPv4

### PIM Interface

This window is used to view and configure the Protocol Independent Multicast (PIM) interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM Interface**, as shown below:

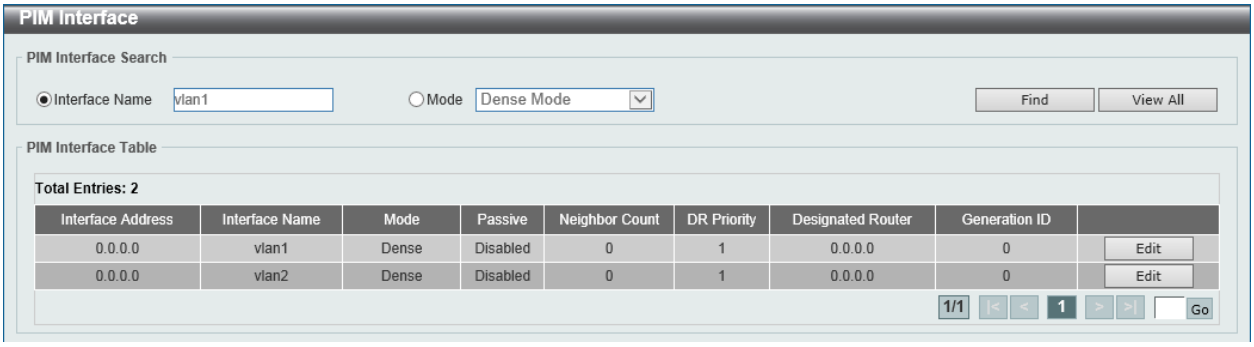



**Figure 6-102 PIM Interface Window**

The fields that can be configured in **PIM Interface Search** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Select and enter the name of the interface here. |

| Parameter | Description |
|---|---|
| **Mode** | Select the operation mode of PIM entries used in this filtered search here. Options to choose from are **Dense Mode**, **Sparse Mode**, and **Sparse-Dense Mode**. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

After clicking the **Edit** button, the following page will appear.

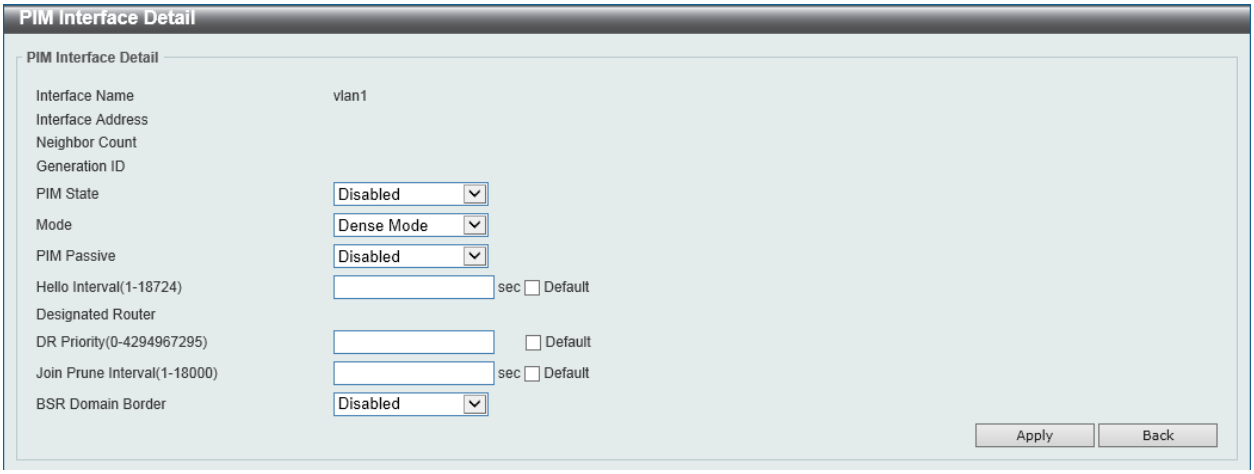



**Figure 6-103 PIM Interface (Edit) Window**

The fields that can be configured in **PIM Interface Detail** are described below:

| Parameter | Description |
|---|---|
| **PIM State** | Select to enable or disable the PIM feature's state on this interface here. |
| **Mode** | Select the PIM mode here. Options to choose from are **Dense Mode**, **Sparse Mode**, and **Sparse-Dense Mode**.<br>• **Dense Mode:** PIM-DM assumes that when a source starts sending, all downstream routers wants to receive the multicast data stream. Initially multicast data stream are flooded to all downstream routers and the interfaces that have group members. If there are no downstream routers or group members, the router will send prune message to indicate that the multicast data stream is not desired.<br>• **Sparse Mode:** When multicast traffic is received on a sparse mode interface, the first hop router will encapsulate and send the register message to RP. If the router is not the first hop router, the traffic will be forwarded based on the mroute entry. A sparse mode interface will only be populated as mroute member interface if receive join message from the downstream router or if group member on a sparse mode interface, PIM join process will be triggered to create the shared tree or the source tree.<br>• **Sparse-Dense Mode:** When interface is configured as PIM Sparse-Dense mode, a multicast group received by the interface can operate in either sparse mode or dense mode of operation. When the interface receives multicast traffic, if there is a known RP for the group, then this group will operate in sparse mode, otherwise this multicast group will operate in dense mode. |

| Parameter | Description |
|---|---|
| **PIM Passive** | Select to enable or disable the PIM passive feature here. When the passive mode is enabled, the interface will neither send PIM messages out nor accept PIM messages from this interface. The router will act as if it is the only PIM router on the network. Use this feature only when there is only one PIM router on the LAN. |
| **Hello Interval** | Enter the interval at which hello messages are sent here. The range is from 1 to 18724 seconds. A PIMv2 router learns PIM neighbors via the PIM hello message. This feature configures the frequency of the hello message. Routers configured for IP multicasting send PIM hello messages to detect PIM routers. For SM, hello messages also determine the router to act as the designated router for each LAN segment. The configured query interval is also used as the value for hold time. By configuring a smaller period for the interval, the unresponsive neighbor can be discovered faster and thus the failover and recovery will become more efficient. Select the **Default** option to use the default value, which is 30 seconds. |
| **DR Priority** | After selecting to use the **Sparse Mode** or the **Sparse-Dense Mode**, this parameter will be available. Enter the Designated Router's (DR) priority value here. The range is from 0 to 4294967295. A larger value represents the higher priority. In the Dense Mode (DM), the DR priority option will not be carried in the hello message. The router with the highest priority value will be the DR. If multiple routers are with the same priority status, the router with the highest IP address will be the DR. If there is a router that does not support the DR priority in its hello message on the LAN, all routers on the LAN will ignore DR priority and only use IP address to elect DR. Select the **Default** option to use the default value, which is 1. |
| **Join Prune Interval** | After selecting to use the **Sparse Mode** or the **Sparse-Dense Mode**, this parameter will be available. Enter the Join/Prune message interval value here. The range is from 1 to 18000 seconds. When configuring the Join/Prune interval, consider the factors, such as the configured bandwidth and expected average number of multicast route entries for the attached network or link. For the Sparse Mode (SM), routers will periodically send join messages based on this interval. The hold-time in a Join/Prune message is 3.5 times the join-prune-interval. The receiving router will start a timer based on this hold-time, and prune the interface if no join message was received on this interface. Select the **Default** option to use the default value, which is 60 seconds. |
| **BSR Domain Border** | Select to enable or disable the Bootstrap Router (BSR) domain border feature here. The feature only takes effect when the interface is PIM enabled. Use this feature on the interface that border with another domain to avoid the exchange of BSR messages across two domains. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

## PIM BSR Candidate

This window is used to view and configure the PIM BSR candidate settings. This feature only takes effect when the interface has an IP address configured and is in the PIM sparse mode.

This feature causes the router to send bootstrap messages to announce the IP address of the designated interface as the CBSR address. The hash mask is used by all routers within a domain, to map a group to one of the Rendezvous Points (RP) from the matching set of group-range-to-RP maps (this set all have the same longest mask length and same highest priority). The algorithm takes as an input the group

address and the addresses of the candidate RPs from the maps, and gives as an output one RP address to be used.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM BSR Candidate**, as shown below:

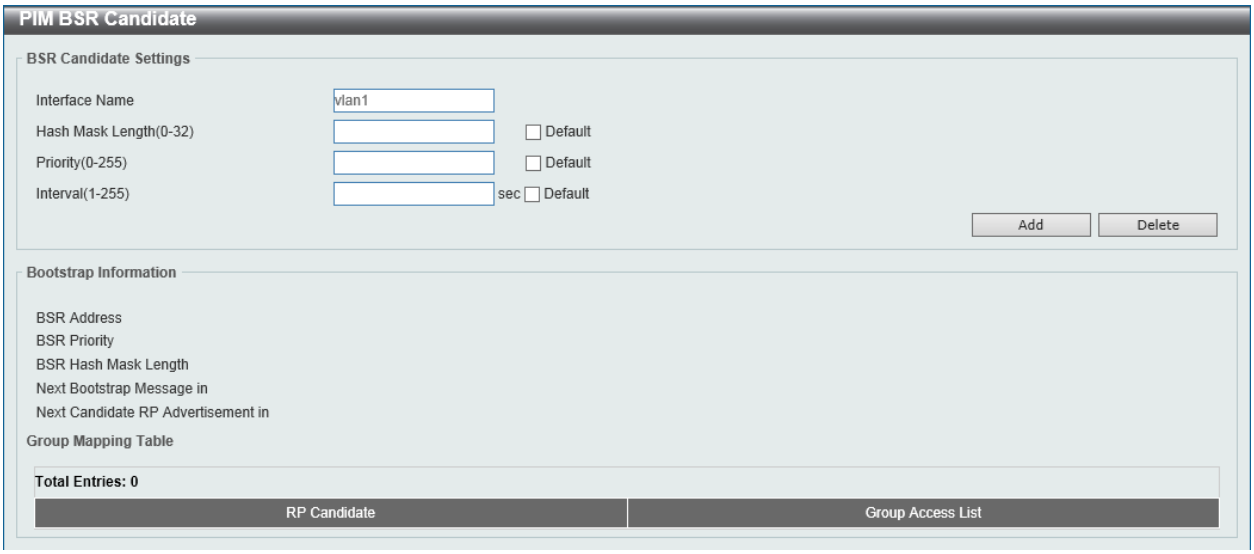



**Figure 6-104 PIM BSR Candidate Window**

The fields that can be configured in **BSR Candidate Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the name of the interface here. |
| **Hash Mask Length** | Enter the hash mask length for RP selection here. The range is from 0 to 32. Select the **Default** option to use the default value, which is 30. |
| **Priority** | Enter the Candidate Bootstrap Router's (CBSR) priority value here. The candidate with the highest priority is preferred. If the priority values are the same, the router with the highest IP address is preferred. The range is from 0 to 255. Select the **Default** option to use the default value, which is 64. |
| **Interval** | Enter the interval value between originating bootstrap messages here. The range is from 1 to 255 seconds. Select the **Default** option to use the default value, which is 60 seconds. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to delete an entry based on the information entered.

## PIM RP Address

This window is used to view and configure the static multicast groups to RP mapping. In a multicast domain, the static multicast group to RP mapping can be used together with BSR. All routers in a domain should have a consistent multicast group to RP mapping. The first hop router that initiates a register message will use the mapping entries to determine the RP for sending the PIM register message destined for a specific group. The last hop router that initiates a join message uses the mapping entries to determine the RP for sending the join and prune message for a specific group. When a router receives a join message, it will check the mapping entries for forwarding of the message. When a RP receives a register message, if the router is not the right RP for the multicast group, a register-stop message will be sent.

Multiple RPs can be defined, each with a single access list.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM RP Address**, as shown below:

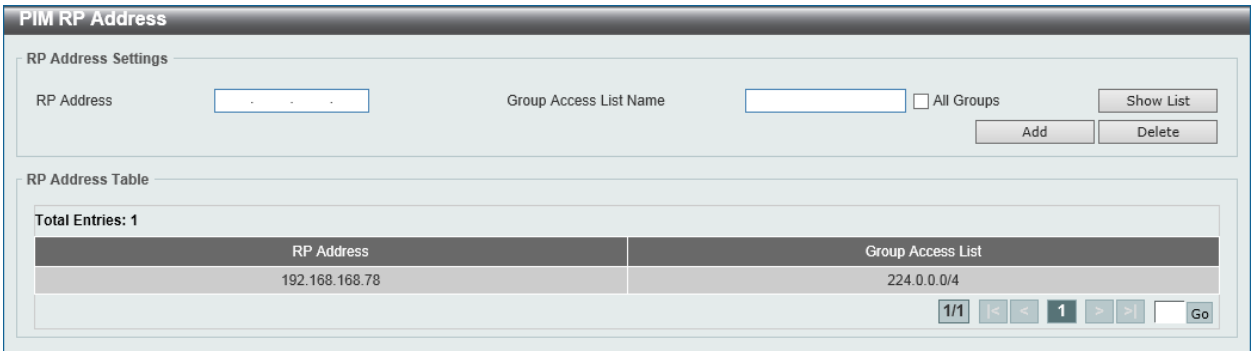



**Figure 6-105 PIM RP Address Window**

The fields that can be configured in **RP Address Settings** are described below:

| Parameter | Description |
|---|---|
| **RP Address** | Enter the RP's IPv4 address here. |
| **Group Access List Name** | Enter the standard access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this switch to be used in this configuration.<br>Select the **All Groups** option to map the RP to all multicast groups. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to delete an entry based on the information entered.

After clicking the **Show List** button, the following page will appear.

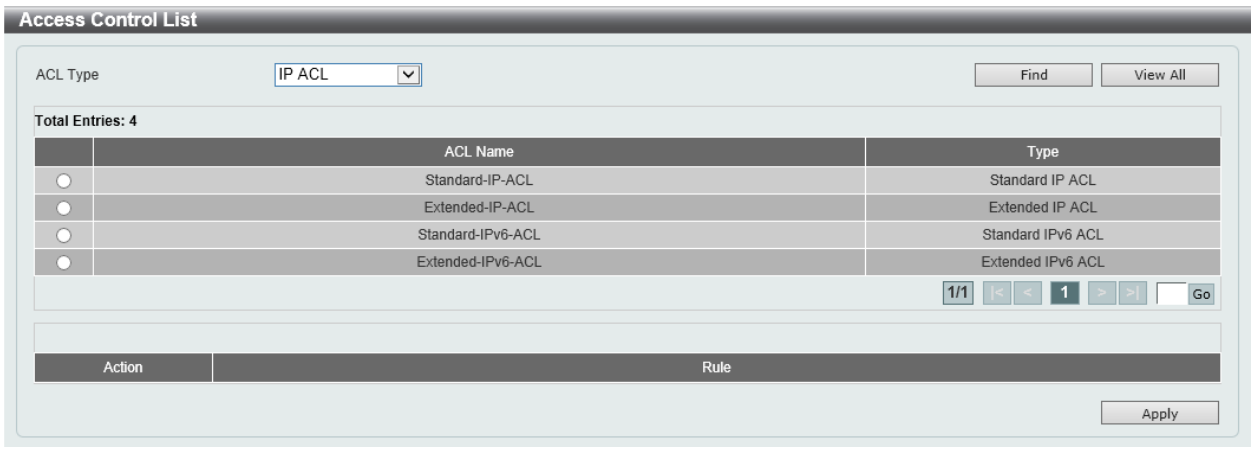



**Figure 6-106 PIM RP Address (Show List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

## PIM RP Candidate

This window is used to view and configure the PIM RP candidate settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM RP Candidate**, as shown below:

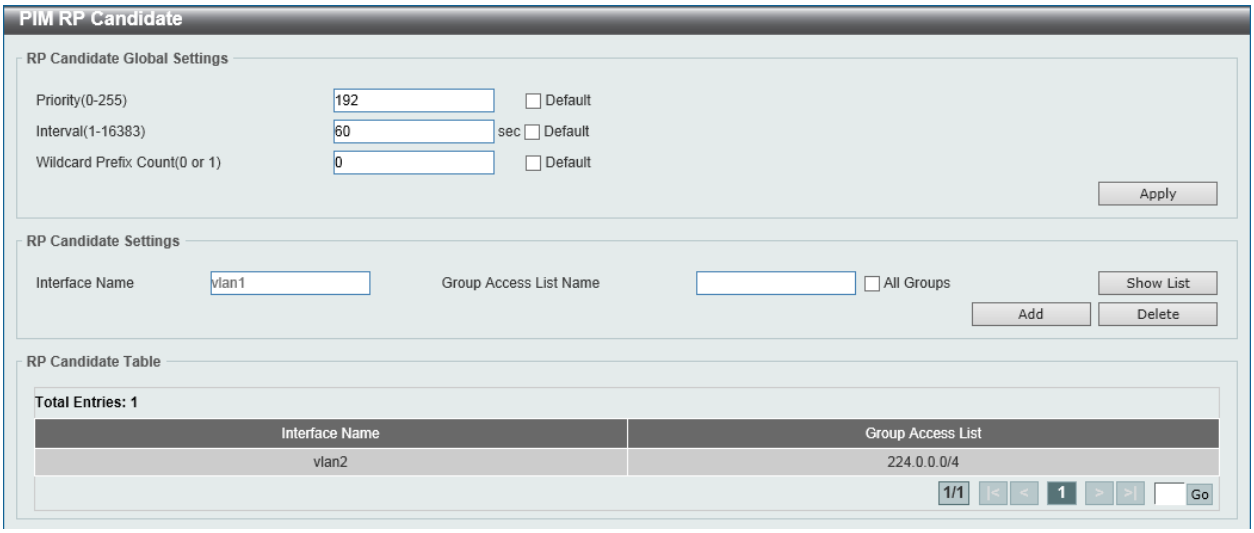



**Figure 6-107 PIM RP Candidate Window**

The fields that can be configured in **RP Candidate Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Priority** | Enter the candidate RP's priority value here. The range is from 0 to 255. Select the **Default** option to use the default value, which is 192. |
| **Interval** | Enter the candidate RP's advertisement interval value here. The range is from 1 to 16383 seconds. Select the **Default** option to use the default value, which is 60 seconds. |
| **Wildcard Prefix Count** | Enter the multicast group address wildcard (224.0.0.0/4) prefix count value in the C-RP message here. This value can either be 1 or 0. Select the **Default** option to use the default value, which is 0. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RP Candidate Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the name of the interface here. |
| **Group Access List Name** | Enter the standard access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this switch to be used in this configuration.<br>Select the **All Groups** option to map the candidate RP to all multicast groups. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to delete an entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show List** button, the following page will appear.

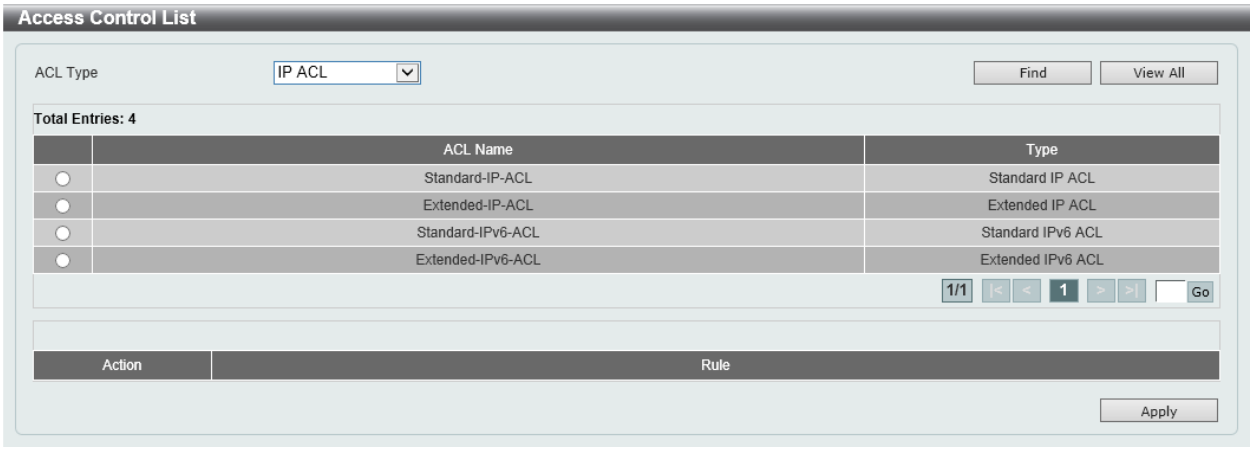



**Figure 6-108 PIM RP Candidate (Show List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

## PIM RP Table

This window is used to find and display PIM RP information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM RP Table**, as shown below:

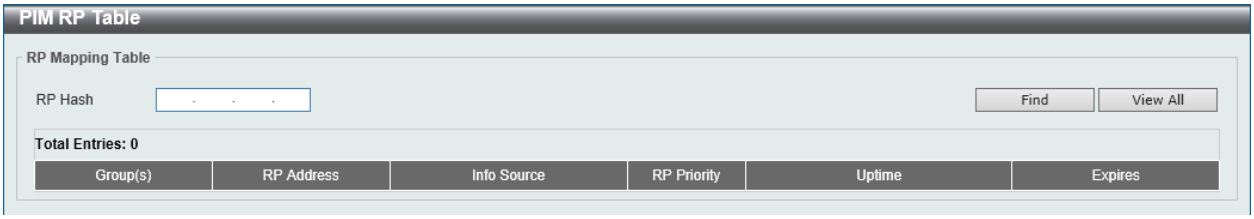



**Figure 6-109 PIM RP Table Window**

The fields that can be configured in **RP Mapping Table** are described below:

| Parameter | Description |
|---|---|
| **RP Hash** | Enter the RP hash address here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

## PIM Register Settings

This window is used to view and configure the PIM register settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM Register Settings**, as shown below:

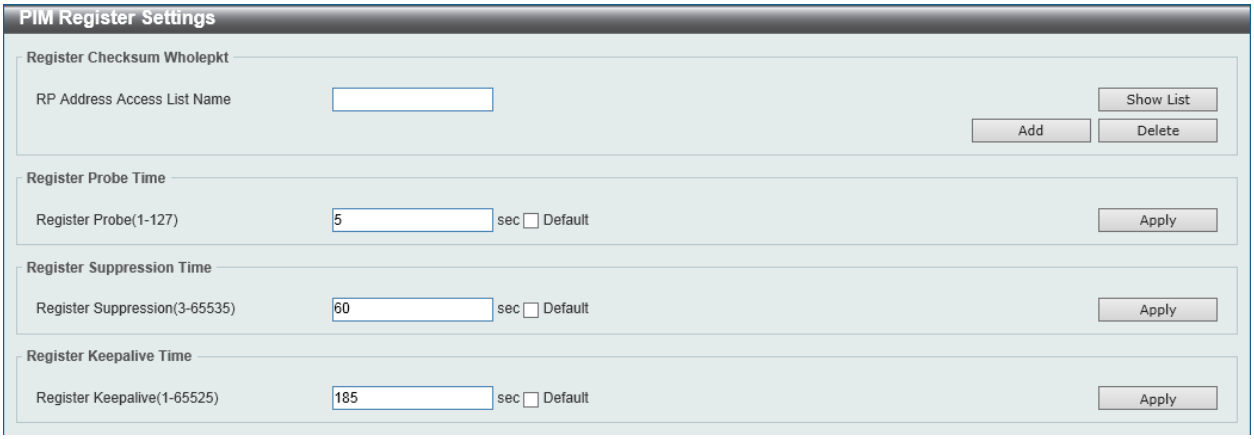



**Figure 6-110 PIM Register Settings Window**

The fields that can be configured in **Register Checksum Wholepkt** are described below:

| Parameter | Description |
|---|---|
| **RP Address Access List Name** | Enter the standard access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this switch to be used in this configuration. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to delete an entry based on the information entered.

The fields that can be configured in **Register Probe Time** are described below:

| Parameter | Description |
|---|---|
| **Register Probe** | Enter the register probe time value here. The range is from 1 to 127 seconds. The register probe time is the time before the Register Stop Timer (RST) expires when a DR may send a Null-Register to the RP to cause it to resend a Register-Stop message. Select the **Default** option to use the default value, which is 5 seconds. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Register Suppression Time** are described below:

| Parameter | Description |
|---|---|
| **Register Suppression** | Enter the register suppression timeout value here. The range is from 3 to 65535 seconds. When a DR receives the register stop message, it |

| Parameter | Description |
|---|---|
| | will start the suppression timer. During the suppression period, a DR stops sending the register message to the RP.<br>Use this feature on the first hop router. The value of the register probe time must be less than half the value of the register suppression time to prevent a possible negative value in the setting of the register stop timer. The minimal value for the register suppression time is 3. Select the **Default** option to use the default value, which is 60 seconds. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Register Keepalive Time** are described below:

| Parameter | Description |
|---|---|
| **Register Keepalive** | Enter the register keep-alive time value here. The range from 1 to 65525 seconds. Select the **Default** option to use the default value, which is 185 seconds. |

Click the **Apply** button to accept the changes made.

After clicking the **Show List** button, the following page will appear.

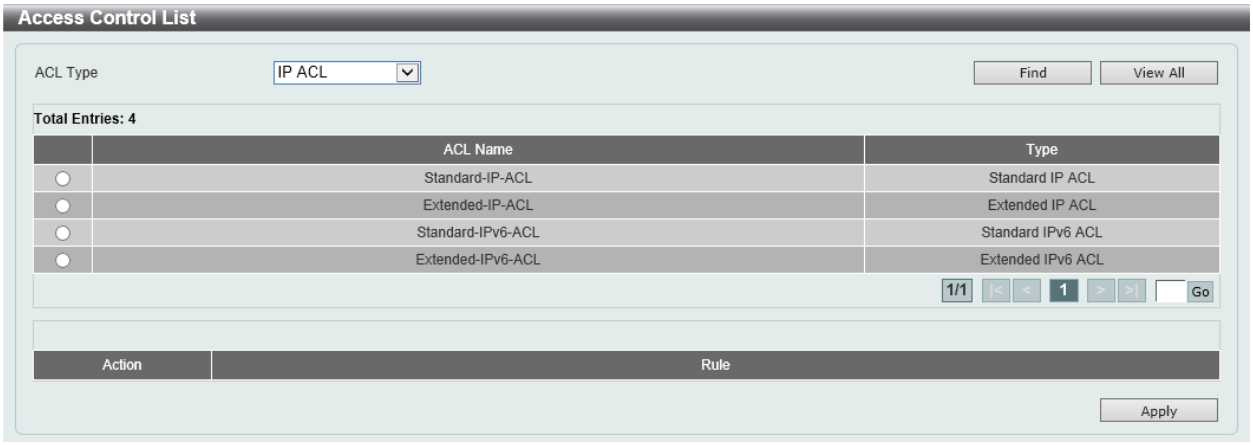



**Figure 6-111 PIM Register Settings (Show List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

## PIM SPT Threshold Settings

This window is used to view and configure the PIM SPT threshold settings. Use this feature on the last hop of the router. In the PIM-SM mode, initially the multicast traffic from the source will be flowing along the RPT share tree to the receiver. After the first packet arrives at the last hop router, for each group of traffic, it can operate in one of the following two modes. With the mode **Infinity**, the traffic keeps following the share tree. With the mode **0**, the source tree will be established and the traffic switchover to the source tree.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM SPT Threshold Settings**, as shown below:

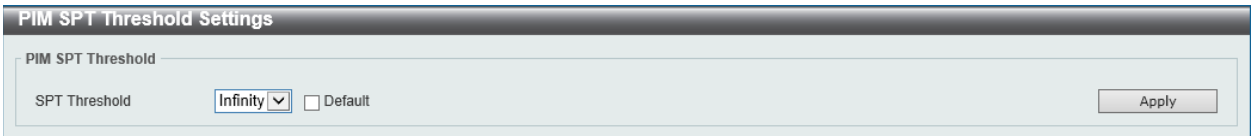



**Figure 6-112 PIM SPT Threshold Settings Window**

The fields that can be configured in **PIM SPT Threshold** are described below:

| Parameter | Description |
|---|---|
| **SPT Threshold** | Select the SPT threshold option here. Options to choose from are **0** and **Infinity**.<br>• **0:** Specifies to establish the source tree right at the arrival of the first packet.<br>• **Infinity:** Specifies to always rely on the shared tree.<br>Select the **Default** option to use the default setting, which is **Infinity**. |

Click the **Apply** button to accept the changes made.

## PIM SSM Settings

This window is used to view and configure the PIM SSM settings. Use this feature on the last hop of the router only. When SSM is enabled, the last hop router will initiate to establish a source-based tree for the channel (S,G) on receiving a IGMPv3 include (S, G) request that falls in the SSM range from the attached hosts.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM SSM Settings**, as shown below:


**Figure 6-113 PIM SSM Settings Window**

The fields that can be configured in **PIM SSM Settings** are described below:

| Parameter | Description |
|---|---|
| **Multicast Group Address Name** | Enter the standard IP access list's name here that defines the user-specified SSM group addresses. The group address should be defined in the destination IP address field of the rule entry. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this switch to be used in this configuration. Selecting the **Default SSM Group (232.0.0.0/8)** option specifies to use the default SSM group addresses. The default SSM group address range is |

| Parameter | Description |
|---|---|
| | 232/8. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to delete an entry based on the information entered.

After clicking the **Show List** button, the following page will appear.

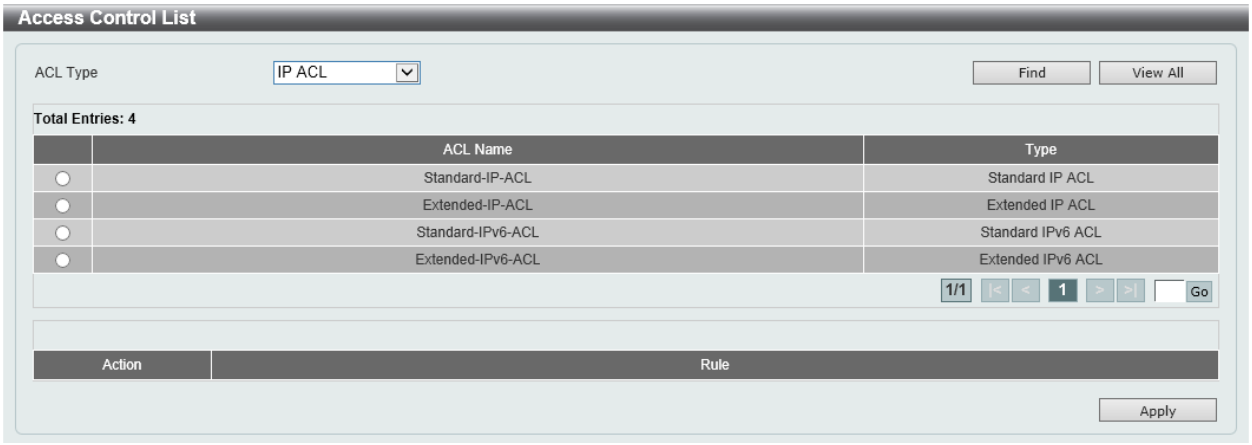



**Figure 6-114 PIM SSM Settings (Show List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

## PIM Neighbor Table

This window is used to find and display PIM neighbor information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv4 > PIM Neighbor Table**, as shown below:


**Figure 6-115 PIM Neighbor Table Window**

The fields that can be configured in **Neighbor Information Table** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the VLAN interface's name here to display PIM-SM neighbor information. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# PIM for IPv6

## PIM for IPv6 Interface

This window is used to view and configure the PIM feature's IPv6 interface settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 Interface**, as shown below:

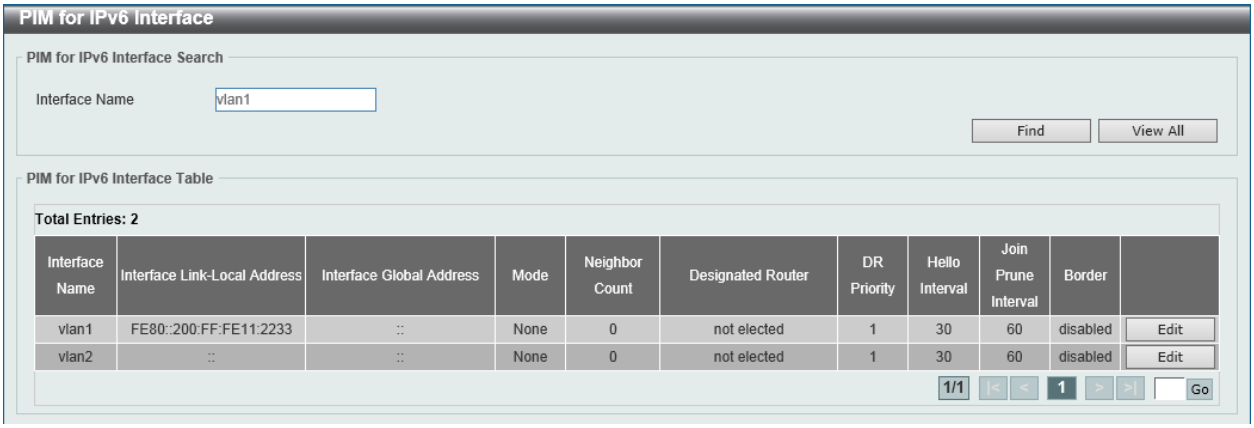



**Figure 6-116 PIM for IPv6 Interface Window**

The fields that can be configured in **PIM for IPv6 Interface Search** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the VLAN interface name here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

After clicking the **Edit** button, the following page will appear.

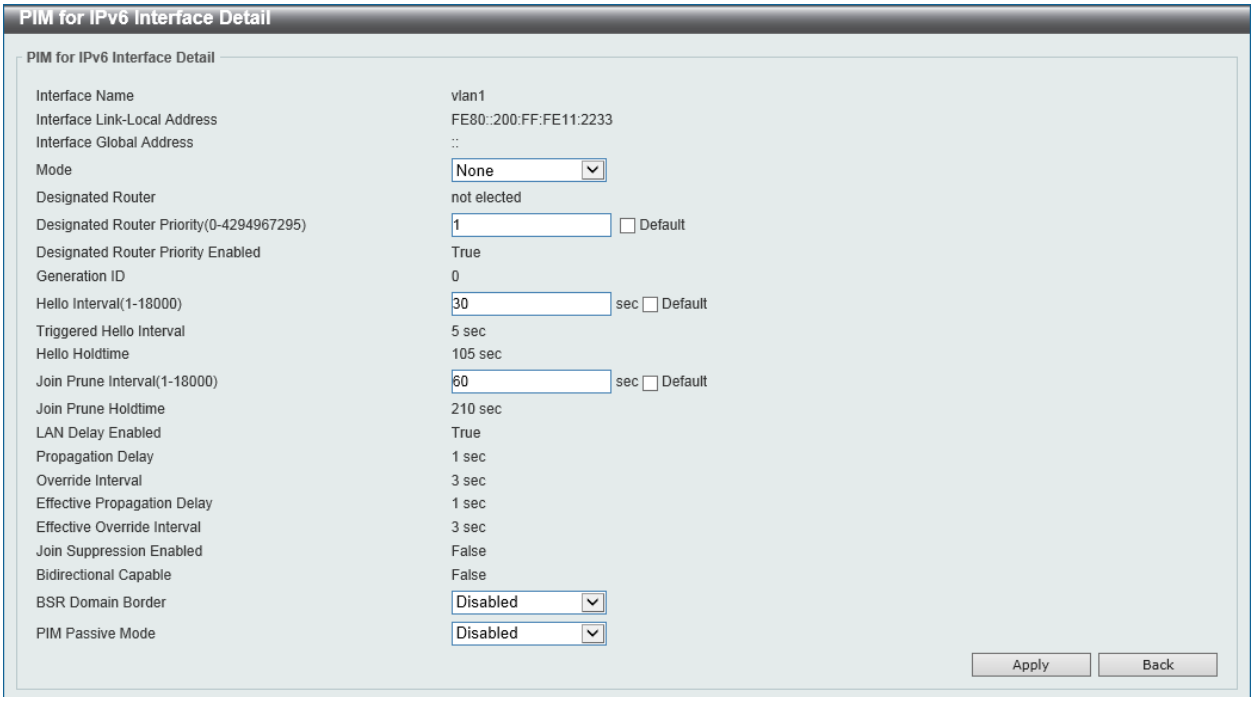



**Figure 6-117 PIM for IPv6 Interface (Edit) Window**

The fields that can be configured in **PIM for IPv6 Interface Detail** are described below:

| Parameter | Description |
|---|---|
| **Mode** | Select the IPv6 PIM mode used in this interface here. Options to choose from are **None** and **Sparse Mode**. |
| **Designated Router Priority** | Enter the DR priority value here. The range is from 0 to 4294967295. A larger value means a higher priority. Select the **Default** option to use the default value, which is 1. This feature only takes effective when the VLAN interface is PIM-SM mode enabled. When a DR is a candidate for election, the following conditions apply:<br>• The router with the highest priority value configured on an interface will be elected as the DR. If multiple routers have the same highest priority, then the router with the highest IPv6 address configured on the interface will be elected as the DR.<br>• If a router does not advertise a priority value in its hello messages, the router is regarded as having the highest priority and will be elected as the DR. If there are multiple routers do not include the DR priority option in their hello messages, then the router with the highest IPv6 address will be elected as the DR. |
| **Hello Interval** | Enter hello message interval value here. The range is from 1 to 18000 seconds. A PIM router learns PIM neighbors via the hello message. Routers configured for IP multicast send PIM hello messages to detect PIM routers. For SM, hello messages are also used to determine which router will be elected as the designated router for each LAN segment. Select the **Default** option to use the default value, which is 30 seconds. |
| **Join Prune Interval** | Enter the Join/Prune message interval value here. The range is from 1 to 18000 seconds. When configuring the Join/Prune interval, the user needs to consider the factors, such as configured bandwidth and expected average number of multicast route entries for the attached network or link (for example, the period would be longer for lower-speed links, or for routers in the center of the network that expect to have a larger number of entries). |

| Parameter | Description |
|---|---|
| | For SM-mode, the router will periodically send the join message based on this interval. The hold-time in a Join/Prune message is 3.5 times the join-prune-interval. The receiving router will start a timer based on this hold-time, and prune the interface if no join message is received on this interface. Select the **Default** option to use the default value, which is 60 seconds. |
| **BSR Domain Border** | Select to enable or disable the BSR domain border feature here. When an interface is configured as a border, it will prevent bootstrap router (BSR) messages from being sent or received through it. |
| **PIM Passive Mode** | Select to enable or disable the PIM passive mode for this interface here. This feature only takes effect when the interface is IPv6 PIM enabled. When the passive mode is enabled, the interface will neither send PIM messages out nor accept PIM messages from this interface. The router will act as it is the only PIM router on the network. Use this feature only when there is only one PIM router on the LAN. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

## PIM for IPv6 BSR Candidate Settings

This window is used to view and configure the IPv6 PIM BSR candidate settings. This feature only affects PIM-SM operation. This will cause the router to send bootstrap messages to all its PIM neighbors, with the address of the designated interface as the BSR address. A PIM-SM domain must contain a unique BSR (Bootstrap Router) which is responsible for collect and advertise the RP information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 BSR Candidate Settings**, as shown below:

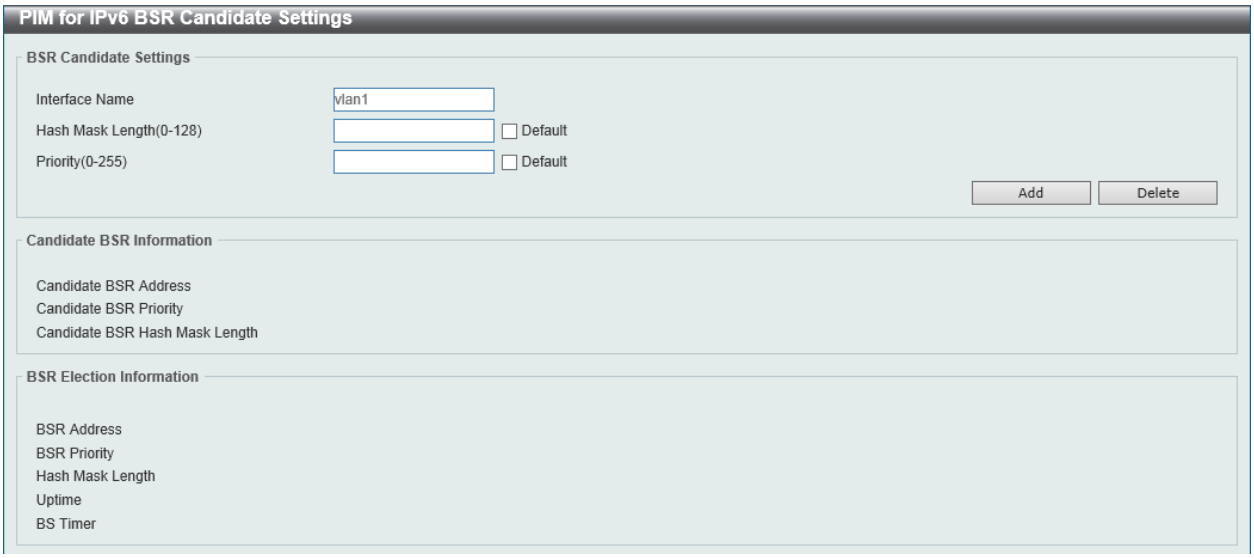



**Figure 6-118 PIM for IPv6 BSR Candidate Settings Window**

The fields that can be configured in **BSR Candidate Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the VLAN interface's name used here. |
| **Hash Mask Length** | Enter the hash mask length for RP selection here. The range is from 0 to 128. The mask (128 bits maximum) that is to be logically AND with the group address before the hash function is executed. All groups |

| Parameter | Description |
|---|---|
| | with the same seed hash (correspond) to the same RP. Therefore one RP can be derived for multiple groups. Select the **Default** option to use the default value, which is 126. |
| **Priority** | Enter the priority value for the BSR candidate here. The range is from 0 to 255. The BSR with the larger priority is preferred. If the priority values are the same, the router with the larger IPv6 address is the BSR. Select the **Default** option to use the default value, which is 64. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to delete an entry based on the information entered.

## PIM for IPv6 BSR Table

This window is used to view IPv6 PIM BSR information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 BSR Table**, as shown below:

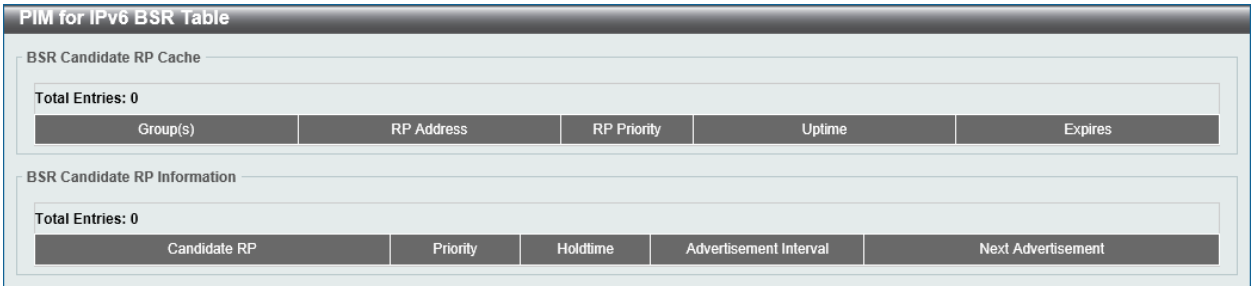



**Figure 6-119 PIM for IPv6 BSR Table Window**

## PIM for IPv6 RP Address

This window is used to view and configure the IPv6 PIM RP address settings. This feature only affects PIM-SM operation. Use this feature to statically define the RP address for multicast groups that are to operate in sparse mode.

Use a single RP for more than one group. The conditions specified by the access list determine for which groups the RP can be used. Multiple RP can be defined, each with a single access list. The new setting overrides the old one.

All routers in a domain should have a consistent multicast group to RP mapping. The first hop router that initiates a register message will use the mapping entries to determine the RP for sending the PIM register message destined for a specific group. The last hop router that initiates a join message uses the mapping entries to determine the RP for sending the join and prune message for a specific group. When a router receives a join message, it will check the mapping entries for forwarding of the message. When a RP receives a register message, if the router is not the right RP for the multicast group, a register-stop message will be sent.

If the PIM domain is using embedded-RP, only the RP needs to be statically configured as the RP for the embedded RP ranges. The other routers will discover the RP address from the IPv6 group address. If these routers want to select a static RP instead of the embedded RP, the specific embedded RP group range must be configured in the access list of the static RP.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 RP Address**, as shown below:

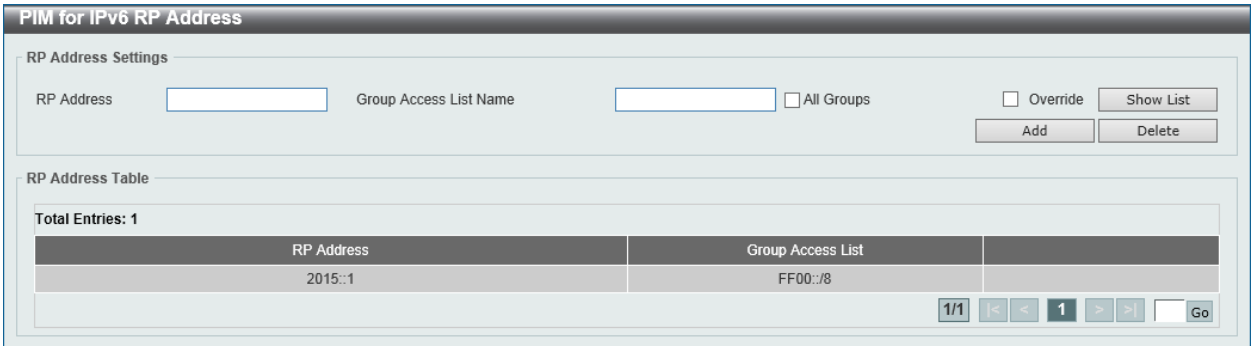



**Figure 6-120 PIM for IPv6 RP Address Window**

The fields that can be configured in **RP Address Settings** are described below:

| Parameter | Description |
|---|---|
| **RP Address** | Enter the RP's IPv6 address here. |
| **Group Access List Name** | Enter the standard IPv6 access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this switch to be used in this configuration.<br>Select the **All Groups** option to map the RP to all multicast groups. |
| **Override** | Selecting this option specifies that the static RP will override dynamically learned RPs. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to delete an entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show List** button, the following page will appear.

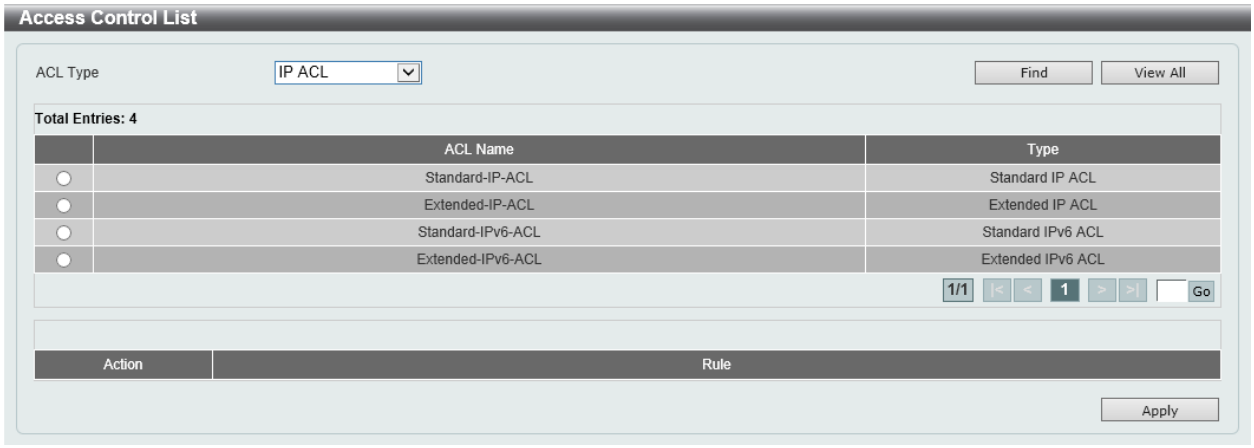



**Figure 6-121 PIM for IPv6 RP Address (Show List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |

| Parameter | Description |
|---|---|
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

## PIM for IPv6 RP Candidate

This window is used to view and configure the IPv6 PIM RP candidate settings. Only one group access list can be specified for each interface. The latest configuration overrides the previous one. This feature can be issued multiple times for different interfaces. This configuration causes the router to send a PIMv2 message advertising itself as a candidate RP to the BSR.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 RP Candidate**, as shown below:

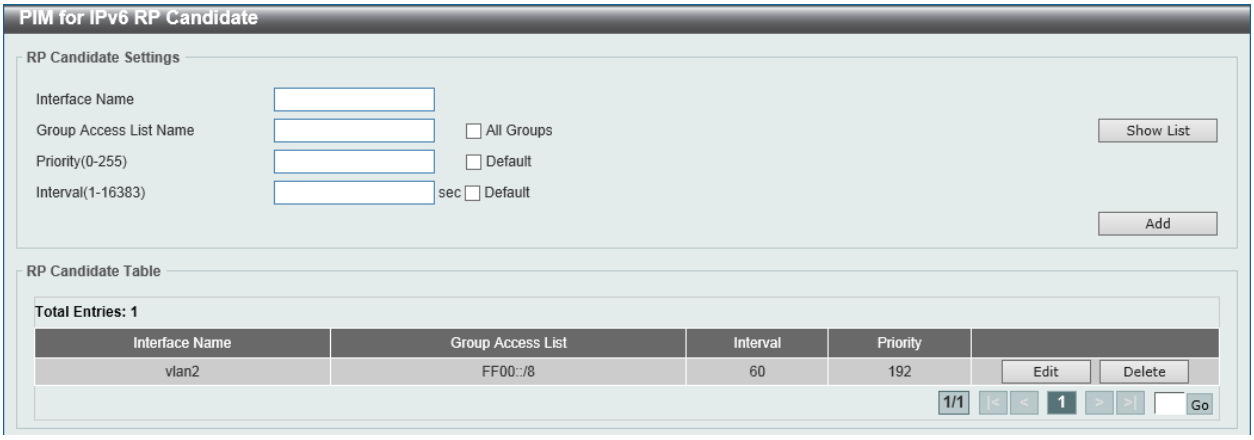



**Figure 6-122 PIM for IPv6 RP Candidate Window**

The fields that can be configured in **RP Candidate Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the interface's name here whose IPv6 address will be advertised as the candidate RP (C-RP). |
| **Group Access List Name** | Enter the standard IPv6 access list that will be used here. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this switch to be used in this configuration.<br>Select the **All Groups** option to map the candidate RP to all multicast groups. |
| **Priority** | Enter the RP's priority value here. The range is from 0 to 255. Select the **Default** option to use the default value, which is 192. |
| **Interval** | Enter the RP candidate's advertisement interval value here. The range is from 1 to 16383 seconds. Select the **Default** option to use the default value, which is 60 seconds. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Show List** button, the following page will appear.

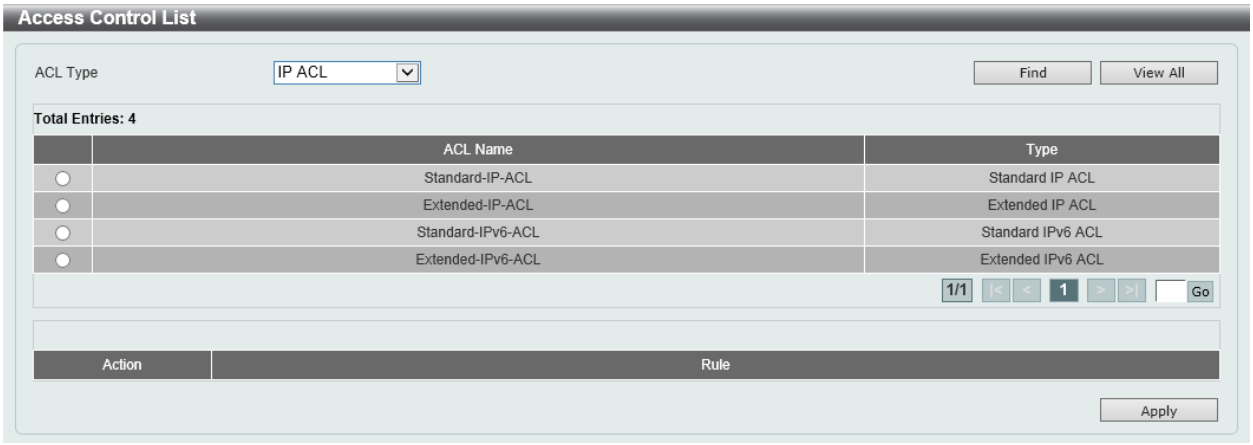



**Figure 6-123 PIM for IPv6 RP Candidate (Show List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

After clicking the **Edit** button, the following page will appear.

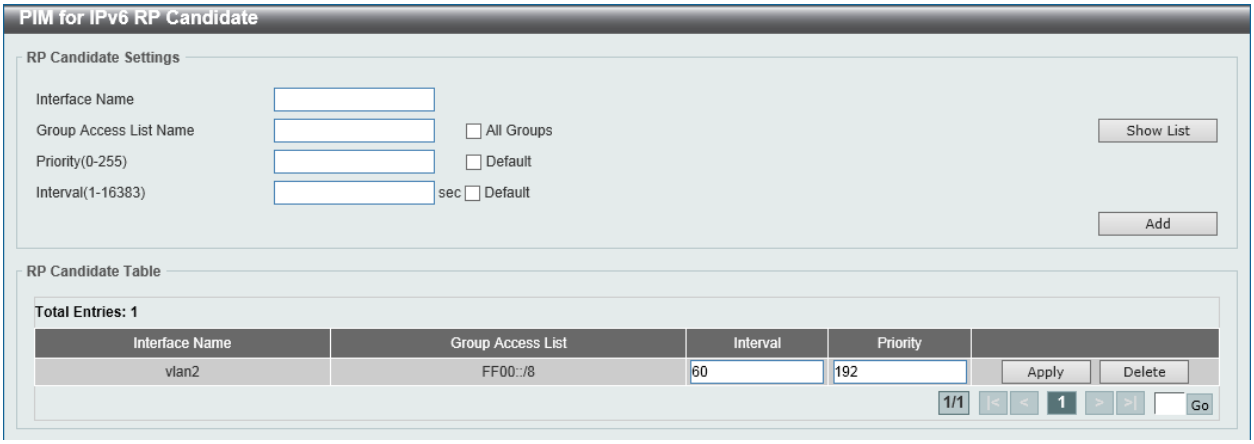



**Figure 6-124 PIM for IPv6 RP Candidate (Edit) Window**

The fields that can be configured in **RP Candidate Table** are described below:

| Parameter | Description |
|---|---|
| **Interval** | Enter the RP candidate's advertisement interval value here. The range is from 1 to 16383 seconds. |
| **Priority** | Enter the RP's priority value here. The range is from 0 to 255. |

Click the **Apply** button to accept the changes made.

## PIM for IPv6 RP Embedded Settings

This window view and configure the IPv6 PIM embedded settings. Embedded RP defines an address allocation policy in which the address of the RP is encoded in an IPv6 multicast group address. This allows an easy deployment of scalable inter-domain multicast and simplifies the intra-domain multicast configuration as well. IPv6 Multicast group addresses embedded with RP information start with ff70::/12 where the flag value of 7 means embedded RP.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 RP Embedded Settings**, as shown below:

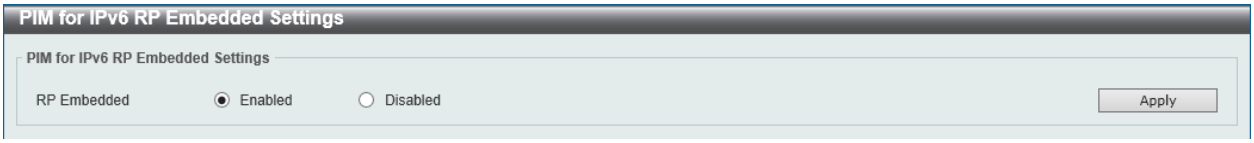



**Figure 6-125 PIM for IPv6 RP Embedded Settings Window**

The fields that can be configured in **PIM for IPv6 RP Embedded Settings** are described below:

| Parameter | Description |
|---|---|
| **RP Embedded** | Select to enable or disable the RP embedded feature here. |

Click the **Apply** button to accept the changes made.

## PIM for IPv6 RP Table

This window is used to find and display IPv6 PIM RP information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 RP Table**, as shown below:

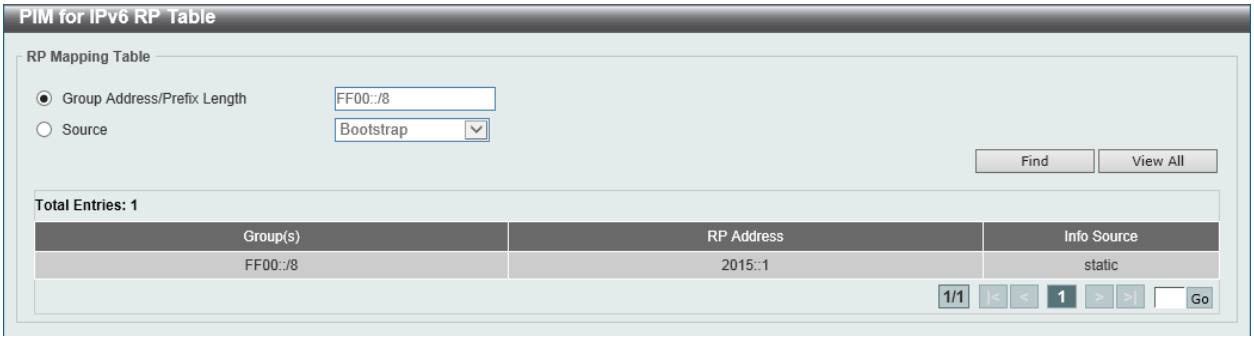



**Figure 6-126 PIM for IPv6 RP Table Window**

The fields that can be configured in **RP Mapping Table** are described below:

| Parameter | Description |
|---|---|
| **Group Address/Prefix Length** | Enter the multicast group's IPv6 address and prefix length here. |

| Parameter | Description |
|---|---|
| **Source** | Select the source to display here. Options to choose from are **Bootstrap**, **Embedded RP**, and **Static**.<br>• **Bootstrap:** Specifies to display ranges learned through the BSR.<br>• **Embedded RP:** Specifies to display group ranges learned through the embedded rendezvous point (RP).<br>• **Static:** Specifies to display ranges enabled by static configuration. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## PIM for IPv6 Register Settings

This window is used to view and configure the IPv6 PIM register settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 Register Settings**, as shown below:

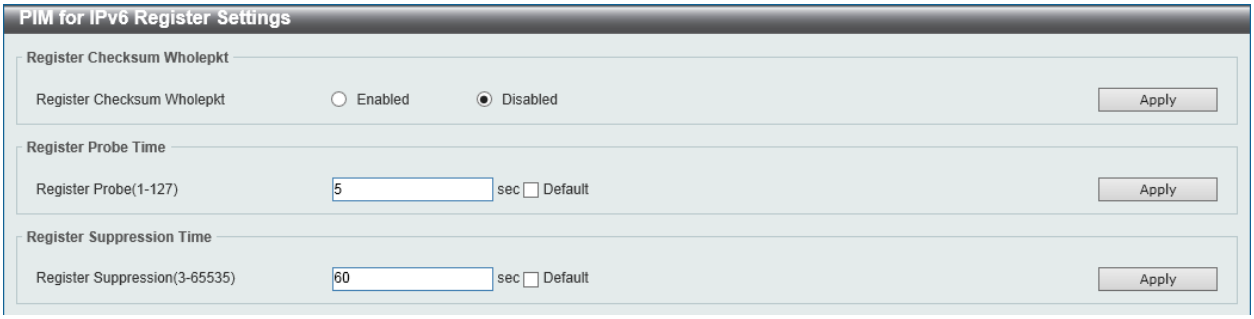



**Figure 6-127 PIM for IPv6 Register Settings Window**

The fields that can be configured in **Register Checksum Wholepkt** are described below:

| Parameter | Description |
|---|---|
| **Register Checksum Wholepkt** | Select the enable or disable the register checksum whole-packet feature here. When enabled, it configures the router to calculate the checksum of register message over the entire PIM message including the data portion. By default, the register checksum methodology is PIM RFC-compliant, excluding the data portion in the Register message. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Register Probe Time** are described below:

| Parameter | Description |
|---|---|
| **Register Probe** | Enter the register probe time value here. The range is from 1 to 127 seconds. The register-probe time is the time before the Register-Stop Timer (RST) expires when a DR may send a Null-Register to the RP to cause it to resend a Register-Stop message. Select the **Default** option to use the default value, which is 5 seconds. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Register Suppression Time** are described below:

| Parameter | Description |
|---|---|
| **Register Suppression** | Enter the register suppression timeout value here. The range is from 3 to 65535 seconds. When a DR receives the register-stop message, it will start the suppression timer. During the suppression time a DR will stop sending Register-encapsulated data to the RP. This timer should be configured on the designated router. The value of the Register Probe Time must be less than half the value of the Register Suppression Time to prevent a possible negative value in the setting of the Register-Stop Timer. The minimal value for Register Suppression Time is 3. Select the **Default** option to use the default value, which is 60 seconds. |

Click the **Apply** button to accept the changes made.

## PIM for IPv6 SPT Threshold Settings

This window is used to view and configure the Shortest Path Tree (SPT) threshold settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 SPT Threshold Settings**, as shown below:

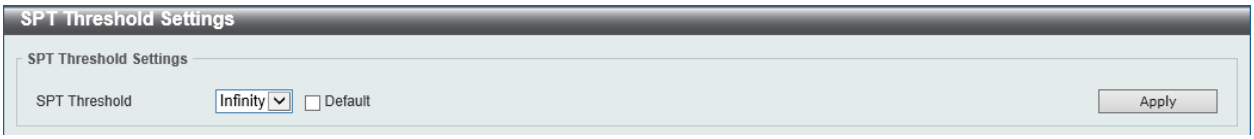



**Figure 6-128 SPT Threshold Settings Window**

The fields that can be configured in **SPT Threshold Settings** are described below:

| Parameter | Description |
|---|---|
| **SPT Threshold** | Select the SPT threshold value here. Options to choose from are **0** and **Infinity**. Select the Default option to use the default setting, which is **Infinity**.<br>• **0:** Specifies to establish the source tree right at the arrival of the first packet.<br>• **Infinity:** Specifies to always rely on the shared tree. |

Click the **Apply** button to accept the changes made.

## PIM for IPv6 SSM Settings

This window is used the view and configure the IPv6 PIM Source-Specific Multicast (SSM) settings. PIM-SSM builds trees that are rooted in just one source. The SSM feature forwards datagram traffic to receivers from only those multicast sources that the receivers have explicitly joined, thus optimizing bandwidth utilization and denying unwanted Internet broadcast traffic. Further, instead of the use of RP and shared trees, SSM uses information found on source addresses for a multicast group. This information is provided by receivers through the source addresses relayed to the last-hop devices by MLD membership reports, resulting in shortest-path trees directly to the sources.

In SSM, delivery of datagrams is based on (S, G) channels. Traffic for one (S, G) channel consists of datagrams with an IPv6 unicast source address S and the multicast group address G as the IPv6 destination address. Systems will receive this traffic by becoming members of the (S, G) channel. Signaling is not required, but receivers must subscribe or unsubscribe to (S, G) channels to receive or not receive traffic from specific sources. That is MLD version 2 is required for SSM to operate.

In order to achieve the full benefit of SSM, all routers in a domain should have a consistent configuration about SSM group address range.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 SSM Settings**, as shown below:


**Figure 6-129 PIM for IPv6 SSM Settings Window**

The fields that can be configured in **SSM Settings** are described below:

| Parameter | Description |
|---|---|
| **Multicast Group Address Name** | Enter the standard IPv6 access list's name here that defines the user-specified SSM group addresses. Alternatively, click the **Show List** button to find and select any of the exiting access lists configured on this switch to be used in this configuration. Selecting the **Default SSM Group (FF3x::/32)** option specifies to use the default SSM group addresses. The default SSM group address range is FF3x::/32. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to delete an entry based on the information entered.

After clicking the **Show List** button, the following page will appear.

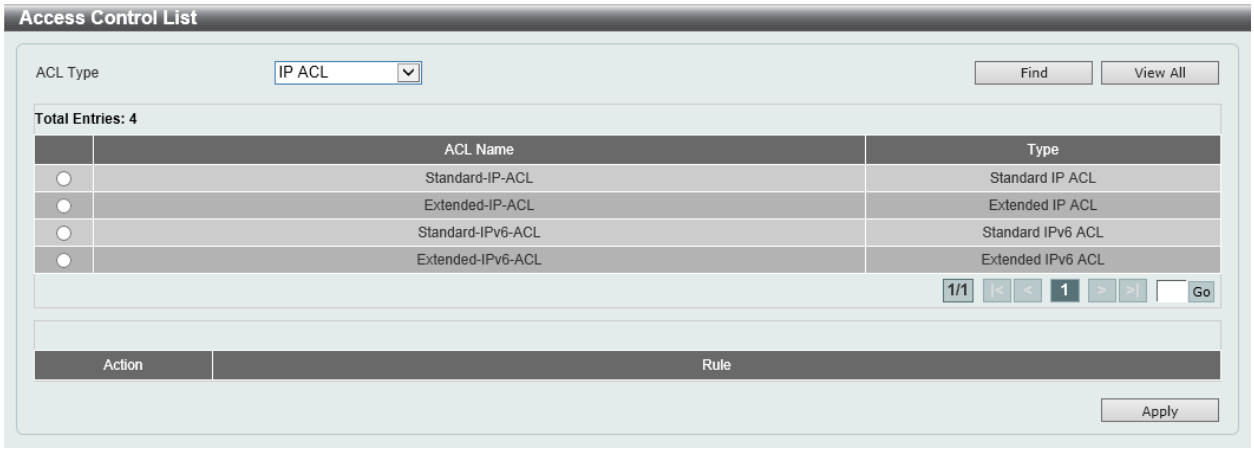



**Figure 6-130 PIM for IPv6 SSM Settings (Show List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type that will be used to display the type of existing access lists in the table here. Options to choose from are **IP ACL**, **Expert IP ACL**, **IPv6 ACL**, **Expert IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Click the **Find** button to display a list of access lists based on the selection made.

Click the **View All** button to display all configured access lists.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Apply** button to use the selected access list.

## PIM for IPv6 (S,G) Keepalive Time

This window is used to view and configure the IPv6 PIM (S,G) keep-alive time settings. This feature is used to configure the keep-alive timer, which is the period during which the PIM router will maintain the (S, G) state in the absence of explicit (S, G) local membership or (S, G) join messages received to maintain it.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 (S,G) Keepalive Time**, as shown below:

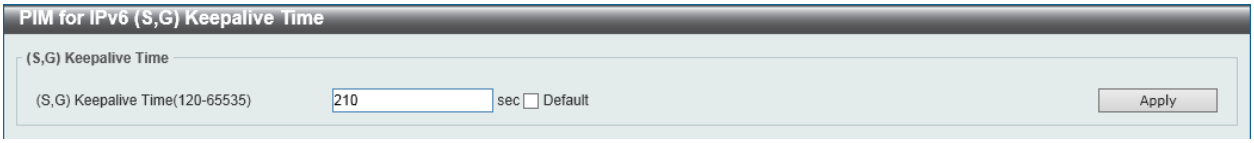



**Figure 6-131 PIM for IPv6 (S,G) Keepalive Time Window**

The fields that can be configured in **(S,G) Keepalive Time** are described below:

| Parameter | Description |
|---|---|
| **(S,G) Keepalive Time** | Enter the (S,G) keep-alive time value here. This specifies the period during which the PIM router will maintain the (S, G) state in the absence of explicit (S, G) local membership or (S, G) join messages received to maintain it. The range is from 120 to 65535 seconds. Select the **Default** option to use the default value, which is 210 seconds. |

Click the **Apply** button to accept the changes made.

## PIM for IPv6 Mroute Table

This window is used to display all entries in the IPv6 multicast routing table. The switch populates the multicast routing table by creating source, group (S,G) entries from star, group (*,G) entries. The star (*) refers to all source addresses, the "S" refers to a single source address, and the "G" is the destination multicast group address. In creating (S,G) entries, the software uses the best path to that destination group found in the unicast routing table, through Reverse Path Forwarding (RPF).

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 Mroute Table**, as shown below:


**Figure 6-132 PIM for IPv6 Mroute Table Window**

## PIM for IPv6 Neighbor Table

This window is used to display IPv6 PIM neighbor information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > PIM > PIM for IPv6 > PIM for IPv6 Neighbor Table**, as shown below:

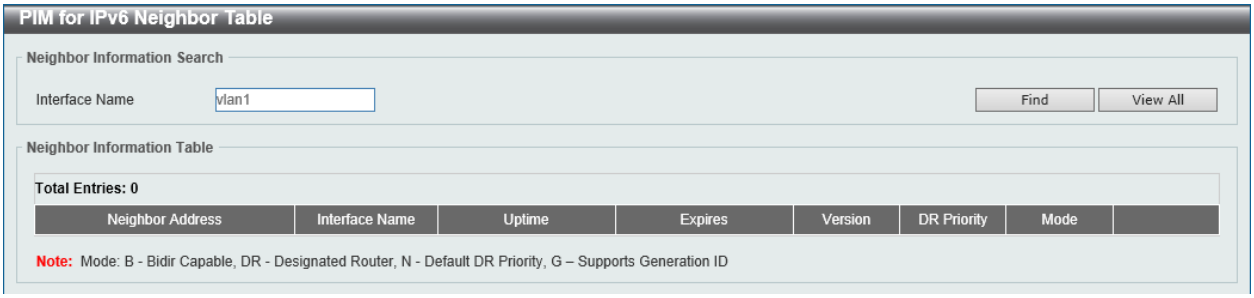



**Figure 6-133 PIM for IPv6 Neighbor Table Window**

The fields that can be configured in **Neighbor Information Search** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the VLAN interface's name used in this display here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# IPMC

## IP Multicast Global Settings

This window is used to view and configure the IP Multicast (IPMC) global settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast Global Settings**, as shown below:

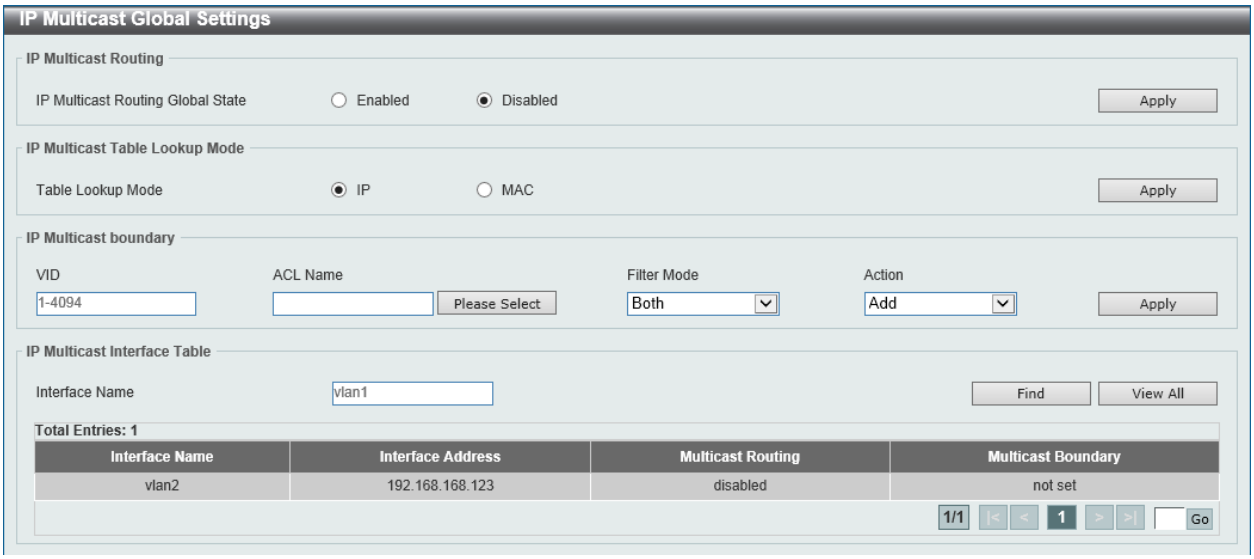



**Figure 6-134 IP Multicast Global Settings Window**

The fields that can be configured in **IP Multicast Routing** are described below:

| Parameter | Description |
|---|---|
| **IP Multicast Routing Global State** | Select to globally enable or disable the IP multicast routing feature here. When IP multicast routing is disabled, the system will stop routing multicast packets even though the multicast routing protocol is enabled. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP Multicast Table Lookup Mode** are described below:

| Parameter | Description |
|---|---|
| **Table Lookup Mode** | Select the IP multicast table lookup mode here. Options to choose from are **IP** and **MAC**.<br>• **IP:** Specifies the multicast forwarding lookup based on the IP address.<br>• **MAC:** Specifies the multicast forwarding lookup based on the MAC address. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP Multicast Boundary** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the VLAN ID that will be used here. The range is from 1 to 4094. |
| **ACL Name** | Click the **Please Select** button to select a pre-configured access list which includes a list of permit or denied (*,G) or (S,G) entries. To permit users to join a channel (S,G), specify S in source address field and G in destination address field of the access list entry. To permit users to join a group (*,G), specify “any” in source address field and G in destination address field of the access list entry. |
| **Filter Mode** | Select the filter mode here. Options to choose from are **Both**, **Out**, and **In**.<br>• **Both:** Specifies to use both the **Out** and **In** filtering methods.<br>• **Out:** Specifies to filter the PIM join message or IGMP join message arrive at the interface. This filtering prevent the interface from becoming an outgoing interface for the denied (*,G) or (S,G) entries.<br>• **In:** Specifies to filter the multicast user traffic arriving at the interface based on the specified access list. This filters the multicast traffic for specific group traffic, or for specific groups from specific source. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP Multicast Interface Table** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the interface’s name that will be used for the search here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Please Select** button, the following page will appear.

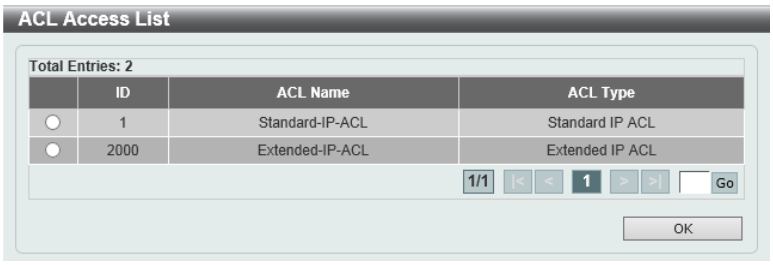



**Figure 6-135 IP Multicast Global Settings (Please Select) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL List** | Select the radio button of the access list in the table that will be used here. |

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **OK** button to use the selected access list.

## IP Multicast Route Settings

This window is used to view and configure the IP multicast route settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast Route Settings**, as shown below:

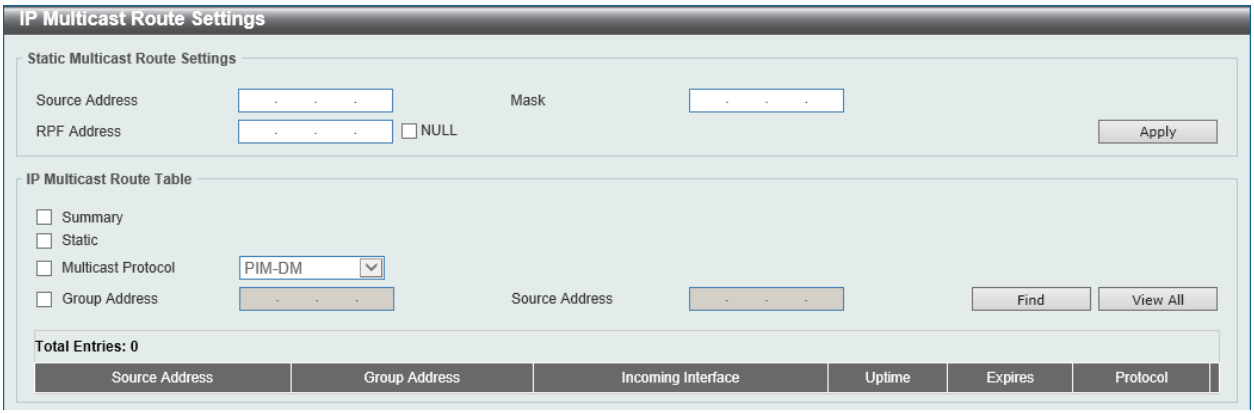



**Figure 6-136 IP Multicast Route Settings Window**

The fields that can be configured in **Static Multicast Route Settings** are described below:

| Parameter | Description |
|---|---|
| **Source Address** | Enter the network address of the multicast source here. |
| **Mask** | Specifies the network mask for the multicast source here. |
| **RPF Address** | Enter the RPF neighbor's IP address to reach the network here. Selecting the **NULL** option specifies that the RPF check will always fail for multicast traffic sent from this source network. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP Multicast Route Table** are described below:

| Parameter | Description |
|---|---|
| **Summary** | Selecting this option specifies to display a one-line, abbreviated summary of each entry in the IP multicast routing table. |
| **Static** | Selecting this option specifies to display the multicast static routes. |
| **Multicast Protocol** | Select this option and then select the multicast protocol that will be used in this display here. Options to choose from are **PIM-DM**, **PIM-SM**, and **DVMRP**.<br>• **PIM-DM:** Specifies to display only the PIM-DM routes.<br>• **PIM-SM:** Specifies to display only the PIM-SM routes.<br>• **DVMRP:** Specifies to display only the DVMRP routes. |
| **Group Address** | Select and enter the multicast group IP address here. |
| **Source Address** | Enter the multicast source IP address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## IP Multicast RPF Table

This window is used to display Reverse Path Forwarding (RPF) information for a given unicast host address.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast RPF Table**, as shown below:


**Figure 6-137 IP Multicast RPF Table Window**

The fields that can be configured in **IP Multicast RPF Table** are described below:

| Parameter | Description |
|---|---|
| **IP Address** | Enter the unicast host's IPv4 address here. |

Click the **Find** button to locate a specific entry based on the information entered.

## IP Multicast Forwarding Cache

This window is used to display the content of the IP multicast routing forwarding cache database.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast Forwarding Cache**, as shown below:

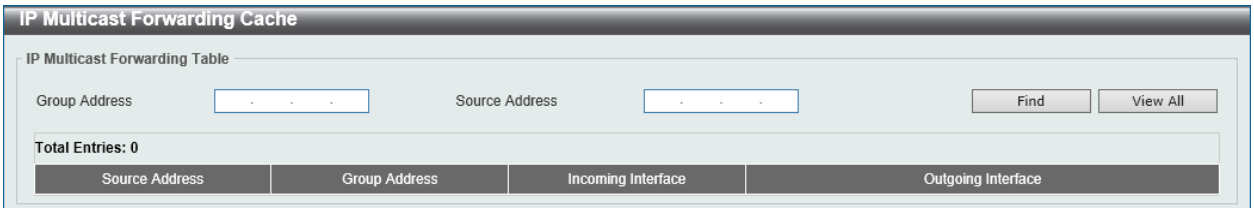



**Figure 6-138 IP Multicast Forwarding Cache Window**

The fields that can be configured in **IP Multicast Forwarding Table** are described below:

| Parameter | Description |
|---|---|
| **Group Address** | Enter the multicast group's IP address here. |
| **Source Address** | Enter the multicast source's IP address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## IP Multicast Protocol Statistics

This window is used to view and clear the IP multicast protocol statistics information.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPMC > IP Multicast Protocol Statistics**, as shown below:

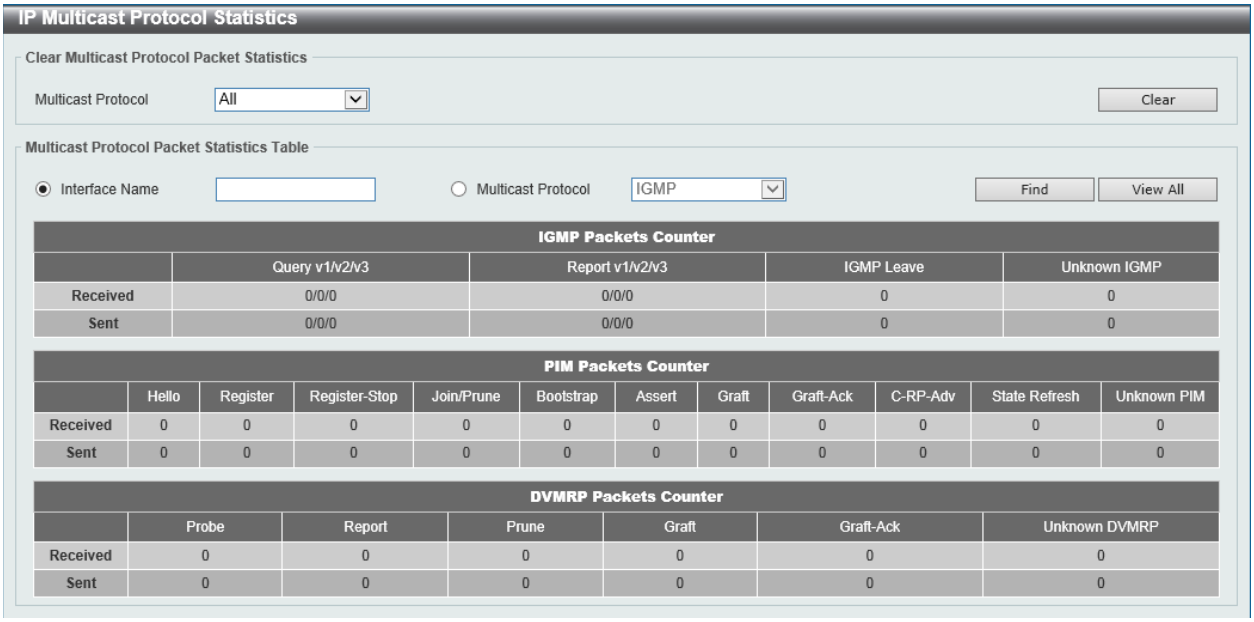



**Figure 6-139 IP Multicast Protocol Statistics Window**

The fields that can be configured in **Clear Multicast Protocol Packet Statistics** are described below:

| Parameter | Description |
|---|---|
| **Multicast Protocol** | Select the multicast protocol that will be cleared here. Options to choose from are **IGMP**, **PIM**, **DVMRP**, and **All**. |

Click the **Clear** button to clear the entries based on the information specified.

The fields that can be configured in **Multicast Protocol Packet Statistics Table** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the interface's name that will be used in the display here. |
| **Multicast Protocol** | Select the multicast protocol that will be used in the display here. Options to choose from are **IGMP**, **PIM**, and **DVMRP**. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# IPv6MC

## IPv6 Multicast Global Settings

This window is used to view and configure the IPv6 multicast feature's global settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 Multicast Global Settings**, as shown below:

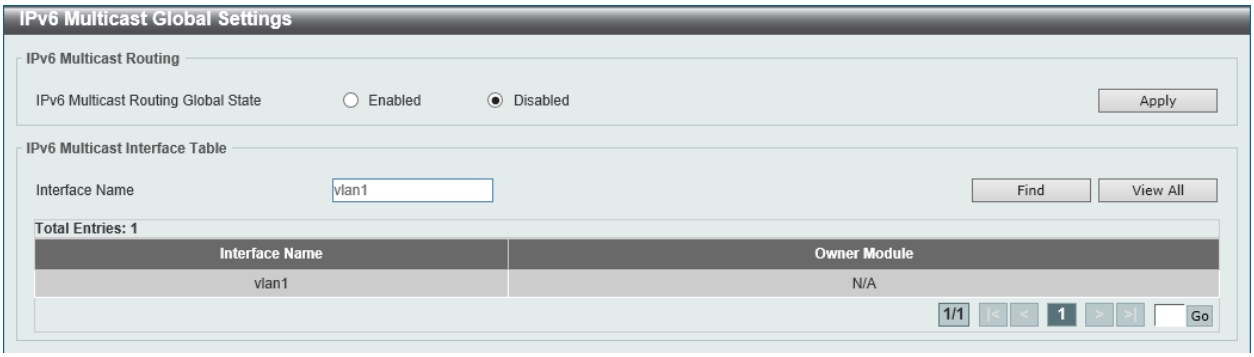



**Figure 6-140 IPv6 Multicast Global Settings Window**

The fields that can be configured in **IPv6 Multicast Routing** are described below:

| Parameter | Description |
|---|---|
| **IPv6 Multicast Routing Global State** | Select to globally enable or disable the IPv6 multicast routing feature here. When IPv6 multicast routing is disabled, the system will stop routing multicast packets even though the multicast routing protocol is enabled. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IPv6 Multicast Interface Table** are described below:

| Parameter | Description |
|---|---|
| **Interface Name** | Enter the VLAN interface's name that will be used here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## IPv6 Static Multicast Route Settings

This window is used to view and configure the IPv6 multicast static route settings.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 Static Multicast Route Settings**, as shown below:

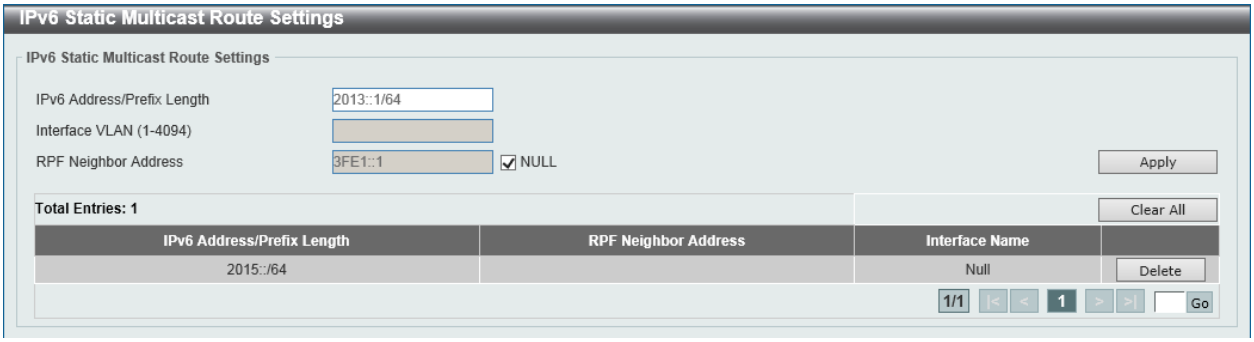



**Figure 6-141 IPv6 Static Multicast Route Settings Window**

The fields that can be configured in **IPv6 Static Multicast Route Settings** are described below:

| Parameter | Description |
|---|---|
| **IPv6 Address/Prefix Length** | Enter IPv6 network address and prefix length for the multicast source here. |
| **Interface VLAN** | Enter the RPF VLAN interface's ID here. The range is from 1 to 4094. The interface where the RPF neighbor IPv6 address is located is the RPF interface. |
| **RPF Neighbor Address** | Enter the IPv6 address of the next hop here that can be used to reach the specified network. Selecting the **NULL** option specifies that the RPF check result will always fail. |

Click the **Apply** button to accept the changes made.

Click the **Clear All** button to clear all the IPv6 multicast static routes.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## IPv6 Multicast Routing Table

This window is used to display the contents of the IPv6 dynamic multicast routing table.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 Multicast Routing Table**, as shown below:


**Figure 6-142 IPv6 Multicast Routing Table Window**

The fields that can be configured in **IPv6 Multicast Routing Table** are described below:

| Parameter | Description |
|---|---|
| **Group IPv6 Address** | Enter the multicast group's IPv6 address here. |
| **Source IPv6 Address** | Enter the multicast source's IPv6 address here. Selecting the **Summary** option specifies to display a one-line, abbreviated summary |

| Parameter | Description |
|---|---|
| | of each entry in the IPv6 multicast routing table. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## IPv6 Multicast Routing Forwarding Cache Table

This window is used to display the contents of the IPv6 multicast routing forwarding cache database.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 Multicast Routing Forwarding Cache Table**, as shown below:

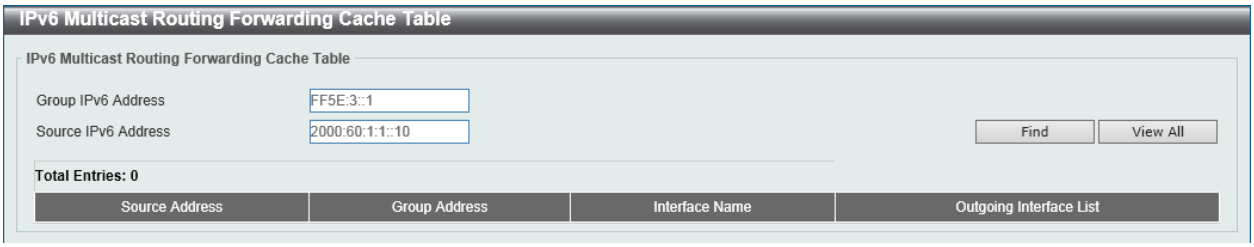



**Figure 6-143 IPv6 Multicast Routing Forwarding Cache Table Window**

The fields that can be configured in **IPv6 Multicast Routing Forwarding Cache Table** are described below:

| Parameter | Description |
|---|---|
| **Group IPv6 Address** | Enter the multicast group's IPv6 address here. |
| **Source IPv6 Address** | Enter the multicast source's IPv6 address here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

## IPv6 RPF Table

This window is used to display Reverse Path Forwarding (RPF) information for a given unicast host address.

To view the following window, click **L3 Features > IP Multicast Routing Protocol > IPv6MC > IPv6 RPF Table**, as shown below:

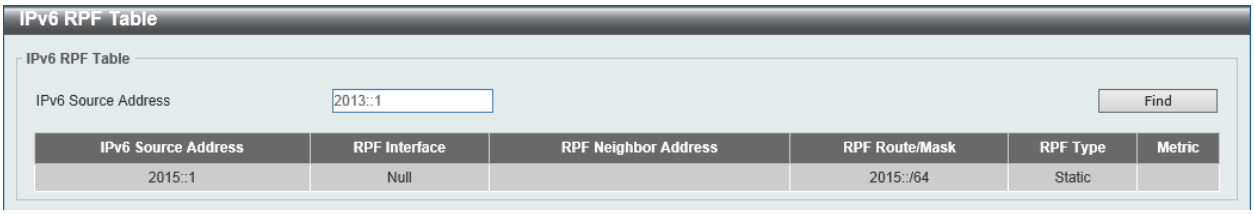



**Figure 6-144 IPv6 RPF Table Window**

The fields that can be configured in **IPv6 RPF Table** are described below:

| Parameter | Description |
|---|---|
| **IPv6 Source Address** | Enter the unicast host's IPv6 address here. |

Click the **Find** button to locate a specific entry based on the information entered.

# BGP

## BGP Global Settings

This window is used to view and configure the Border Gateway Protocol (BGP) feature's global settings.

To view the following window, click **L3 Features > BGP > BGP Global Settings**, as shown below:

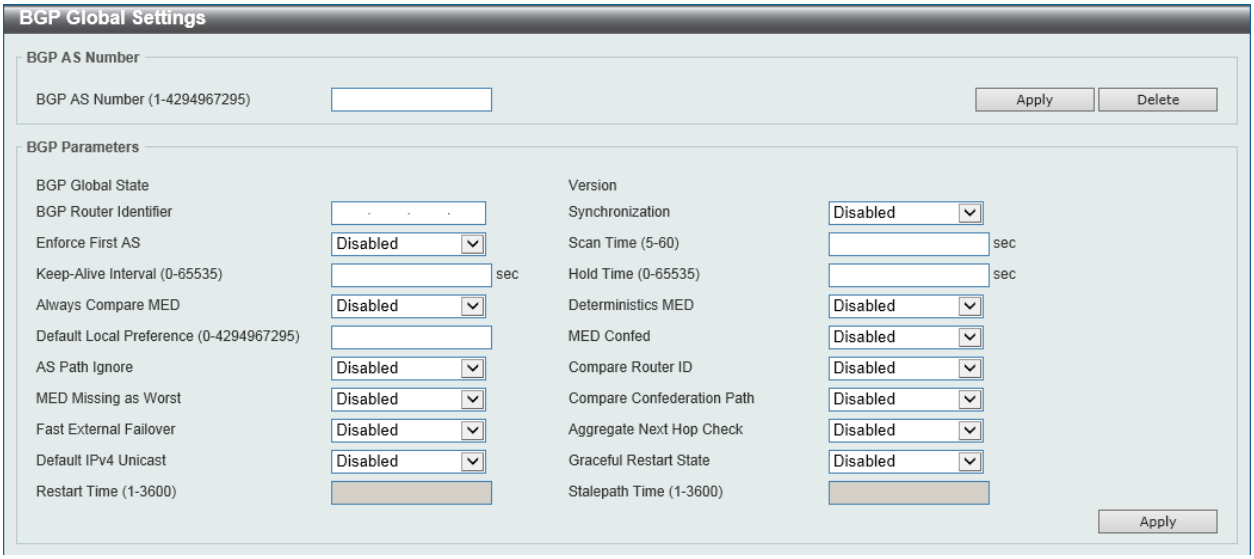



**Figure 6-145 BGP Global Settings Window**

The fields that can be configured in **BGP AS Number** are described below:

| Parameter | Description |
|---|---|
| **BGP AS Number** | Enter the BGP Autonomous System (AS) number here. The range is from 1 and 4294967295. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

The fields that can be configured in **BGP Parameters** are described below:

| Parameter | Description |
|---|---|
| **BGP Router Identifier** | Enter the local BGP router's ID in the IPv4 address format here. The router ID must be a uniquely assigned within the network. |
| **Synchronization** | Select to enable or disable the synchronization feature here. When synchronization is enabled, the BGP speaker will not advertise a route to an external neighbor unless the route is a local route or the BGP speaker has learned the route by IGP. |
| **Enforce First AS** | Select to enable or disable the enforce first AS feature here. Use this feature to enforce that the routes received from an eBGP peer must have the peer's AS number as the first AS in the AS path. This feature is used to avoid the local router from spoofing by a misconfigured peer. |
| **Scan Time** | Enter the BGP scan timer value here. The range is from 5 to 60 seconds. By default, this value is 60 seconds. When the router is enabled for scanning the next hop of BGP routes, the router will |

| Parameter | Description |
|---|---|
| | periodically check whether there is a route to reach the next hop in the routing table. |
| **Keep-alive Interval** | Enter the keep-alive interval value here. This is used to send keep-alive messages to BGP peers. The range is from 0 to 65535 seconds. By default, this value is 60 seconds. |
| **Hold Time** | Enter the hold-time value here. This is the length of the timeout value of the keep-alive message. The software will declare a BGP peer dead after the timeout. The range is from 0 to 65535 seconds. By default, this value is 180 seconds. |
| **Always Compare MED** | Select to enable or disable the always compare Multi Exit Discriminator (MED) feature here. This feature is used to configure the MED in best path selection for paths that are advertised from neighbors in either the same or different autonomous systems. |
| **Deterministics MED** | Select to enable or disable the deterministics MED feature here. This feature is used to include the MED value between all paths received from within the same autonomous system in the selection of the best route selection. |
| **Default Local Preference** | Enter the default local preference value here to apply to the routes received by this router. The range of is from 0 to 4294967295. By default, this value is 100. The local preference number is used to control the preferred exit point from the local AS to the same destination network. The local preference will be sent with the route advertised to the iBGP peers. If an external route is both reachable via the local router and an iBGP peer router, the local preference value determines the preferred exit point to reach the external route. |
| **MED Confed** | Select to enable or disable the MED confederation feature here. This feature is used to configure a BGP routing process to compare the MED between paths learned from confederation peers. |
| **AS Path Ignore** | Select to enable or disable the AS path ignore feature here. This feature is used to ignore the AS path as a discriminating factor in selection of the best path. |
| **Compare Router ID** | Select to enable or disable the compare router ID feature here. This feature is used to compare the router ID when comparing paths that have identical comparing factors. |
| **MED Missing AS Worst** | Select to enable or disable the MED missing AS worst feature here. This feature is used to configure the router to assign a infinite value to the route if it is missing an MED. |
| **Compare Confederation Path** | Select to enable or disable the compare confederation path feature here. This feature is used to configure a BGP routing process to compare the confederation AS path length of the routes received. |
| **Fast External Failover** | Select to enable or disable the fast external fail-over feature here. This feature is used to immediately reset an external BGP peering session if the link directly connected to the peer goes down. |
| **Aggregate Next Hop Check** | Select to enable or disable the aggregate next hop check feature here. This feature is used to enable the checking of the next hop of the BGP aggregated routes. Only the routes with the same next hop attribute can be aggregated if the BGP aggregate next hop check is enabled. |
| **Default IPv4 Unicast** | Select to enable or disable the default IPv4 unicast feature here. This feature is used to enable the exchange of IPv4 unicast routing information. |
| **Graceful Restart State** | Select to enable or disable the graceful restart state here. This feature is used to enable the BGP graceful restart capabilities for all BGP |

| Parameter | Description |
|---|---|
| | neighbors. |
| **Restart Time** | Enter the maximum time needed for neighbors to restart here. The range is from 1 to 3600 seconds. By default, this value is 120 seconds. |
| **Stalepath Time** | Enter the maximum time to retain stale paths from restarting neighbors here. The range is from 1 to 3600 seconds. By default, this value is 360 seconds. |

Click the **Apply** button to accept the changes made.

# BGP Aggregate Address Settings

This window is used to view and configure the BGP feature's aggregate address settings. Route aggregation is a mechanism used to reduce the number of routing entries. Use this window to create an aggregate entry. The aggregated route will be created in the routing table if there is any more specific route entry than the aggregated route and the characteristic of the aggregated route is the combined characteristic of the more specific routes. The aggregated route is sent as coming from the local AS. The atomic aggregation flag is set to indicate that the AS path information of the more specific route information might be lost from the aggregated entry.

To view the following window, click **L3 Features > BGP > BGP Aggregate Address Settings**, as shown below:


**Figure 6-146 BGP Aggregate Address Settings Window**

The fields that can be configured in **BGP Aggregate Address Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast** and **IPv4 VRF**.<br>After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **IP Network Address** | Enter the starting and ending network IP addresses in the spaces provided here. Selecting the **Summary Only** option specifies to filter those routes that are more specific than the aggregated route. Selecting the **AS Set** option specifies to generate autonomous system set path information. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

After clicking the **Please Select** button, the following page will appear.

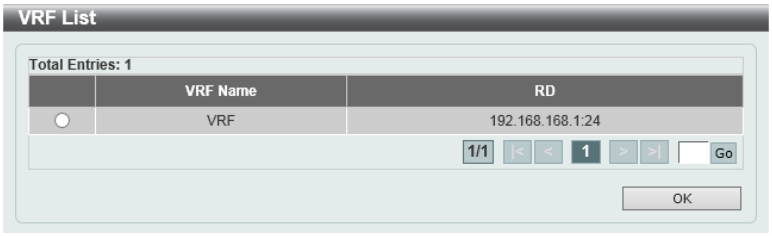



**Figure 6-147 BGP Aggregate Address Settings (Please Select) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# BGP Network Settings

This window is used to view and configure the BGP network settings. The network is added in the routing table and will be advertised to the external neighbor peer. BGP networks can be learned from connected routes, from dynamic routing, and from static route sources.

Use this window to specify a network as local to this autonomous system and adds it to the BGP routing table. For exterior protocols the network command controls which networks are advertised. Interior protocols use the network command to determine where to send updates.

To view the following window, click **L3 Features > BGP > BGP Network Settings**, as shown below:

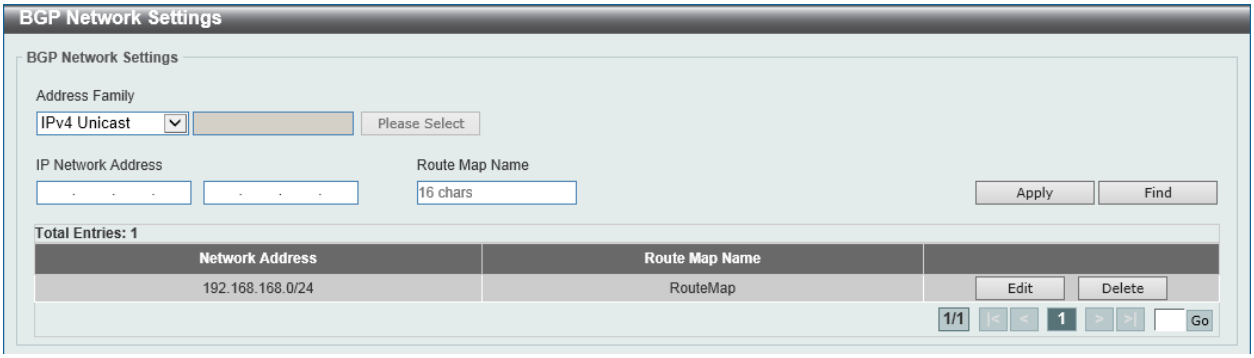



**Figure 6-148 BGP Network Settings Window**

The fields that can be configured in **BGP Network Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast** and **IPv4 VRF**.<br>After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **IP Network Address** | Enter the starting and ending IP network addresses here that BGP will advertise. |

| Parameter | Description |
|---|---|
| **Route Map Name** | Enter the route map's name here. The configured network must be permitted by the specified route map to be advertised. This name can be up to 16 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

After clicking the **Edit** button, the following page will appear.


**Figure 6-149 BGP Network Settings (Edit) Window**

The fields that can be configured in the table are described below:

| Parameter | Description |
|---|---|
| **Route Map Name** | Enter the route map's name here. This name can be up to 16 characters long. |

Click the **Apply** button to accept the changes made.

# BGP Route Redistribution Settings

This window is used to view and configure the BGP route's redistribution settings.

To view the following window, click **L3 Features > BGP > BGP Route Redistribution Settings**, as shown below:

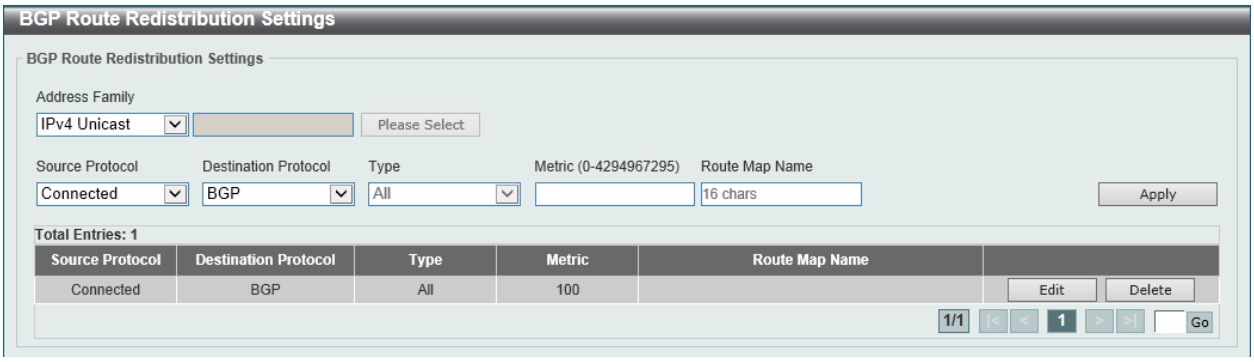



**Figure 6-150 BGP Route Redistribution Settings Window**

The fields that can be configured in **BGP Route Redistribution Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast** and **IPv4 VRF**.<br>After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Source Protocol** | Select the source protocol that will be redistributed to BGP here. Options to choose from are **Connected**, **Static**, **RIP**, **OSPF**, and **ISIS**. |
| **Destination Protocol** | This field specifies the destination protocol which is **BGP**. |
| **Type** | After selecting **OSPF** as the source protocol the OSPF type can be selected here. Options to choose from are **All**, **External**, **Internal+E1**, **Internal+E2**, **Internal**, **External Type-1**, and **External Type-2**.<br>• **All:** Specifies to redistribute both OSPF AS-internal and OSPF AS-external routes to BGP.<br>• **External:** Specifies to redistribute only the OSPF AS-external routes, including type-1 and type-2 routes.<br>• **Internal+E1:** Specifies to redistribute only the OSPF AS-external type-1 and OSPF AS-internal routes.<br>• **Internal+E2:** Specifies to redistribute only the OSPF AS-external type-2 and OSPF AS-internal routes.<br>• **Internal:** Specifies to redistribute only the OSPF AS-internal routes.<br>• **External Type-1:** Specifies to redistribute only the OSPF AS-external type-1 routes.<br>• **External Type-2:** Specifies to redistribute only the OSPF AS-external type-2 routes. |
| **Metric** | Enter the BGP metric value for the redistributed routes here. The range is from 0 to 4294967295. |
| **Route Map Name** | Enter the route map's name here used to filter the networks to be redistributed. If not specified, all networks are redistributed. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

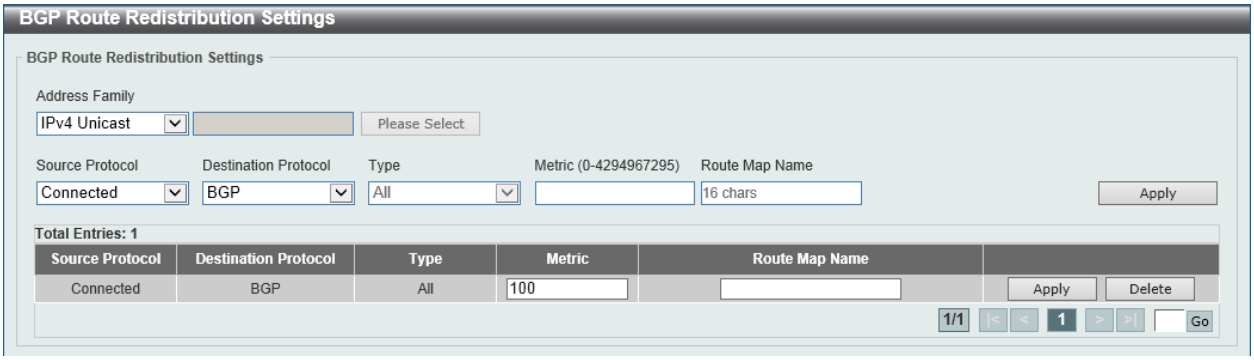



**Figure 6-151 BGP Route Redistribution Settings (Edit) Window**

The fields that can be configured in the table are described below:

| Parameter | Description |
|---|---|
| **Metric** | Enter the BGP metric value for the redistributed routes here. The range is from 0 to 4294967295. |
| **Route Map Name** | Enter the route map's name here used to filter the networks to be redistributed. If not specified, all networks are redistributed. |

Click the **Apply** button to accept the changes made.

# BGP Route Preference Settings

This window is used to view and configure the BGP route's preference settings.

To view the following window, click **L3 Features > BGP > BGP Route Preference Settings**, as shown below:


**Figure 6-152 BGP Route Preference Settings Window**

The fields that can be configured in **BGP Route Preference Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast** and **IPv4 VRF**.<br>After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Distance EBGP** | Enter the distance value for routes learned from external peers here. The range is from 1 to 255. By default, this value is 70. |
| **Distance IBGP** | Enter the distance value for routes learned from internal peers here. The range is from 1 to 255. By default, this value is 130. |

Click the **Apply** button to accept the changes made.

# BGP Dampening Settings

This window is used to view and configure the BGP dampening settings. The purpose of this feature is to eliminate the advertising of the unstable routes and thus to avoid unstable of the network caused by flapping routes.

When a prefix is removed or is added, BGP increases the penalty of the route by 1000. When the attribute of a received route has changes, BGP increases the penalty of the route by 500.

Supposed that half-life is configured as 15 min, re-use is 800, and suppress is 1500.

When a route flaps (from up to down), 1000 is added to the penalty of the route. Since the penalty is smaller than the suppress value, the route works normally. A withdraw message (an update message) is sent to the neighbors.

As the half-life timer expired, the penalty of the route becomes 500. If another flaps occur, the penalty of the route keep being increased. If it is larger than the suppress value, then the route will be dampened. BGP will not advertise message for the dampened route.

As the time passed, the penalty of the route decreased. If the penalty of the route falls below the re-use threshold, the route will be restored as a normal route and update message will be sent for the route.

If a route map is configured but the route map doesn't exist, it acts as all routes are enabled for dampening.

To view the following window, click **L3 Features > BGP > BGP Dampening Settings**, as shown below:

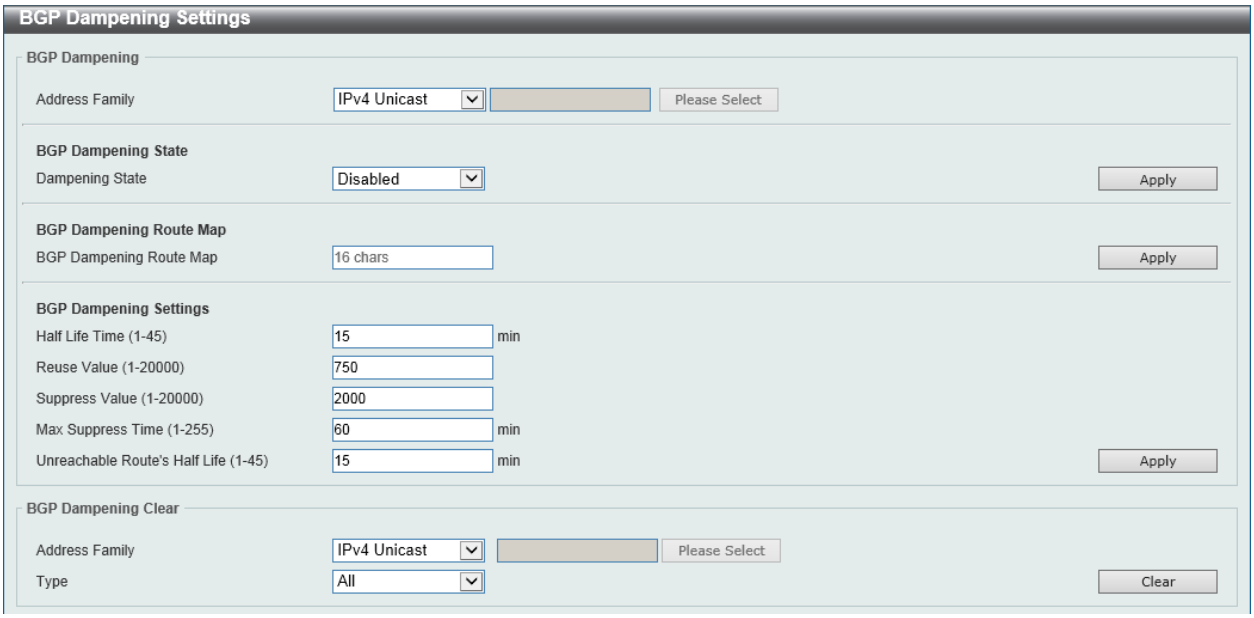



**Figure 6-153 BGP Dampening Settings Window**

The fields that can be configured in **BGP Dampening** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast** and **IPv4 VRF**.<br>After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **BGP Dampening State** are described below:

| Parameter | Description |
|---|---|
| **Dampening State** | Select to enable or disable the BGP dampening feature here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **BGP Dampening Route Map** are described below:

| Parameter | Description |
|---|---|
| **BGP Dampening Route Map** | Enter the BGP dampening route map's name here. This name can be up to 16 characters long |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **BGP Dampening Settings** are described below:

| Parameter | Description |
|---|---|
| **Half Life Time** | Enter the half-life time value here after which the accumulated penalty of the route is decreased by half. The range is from 1 to 45 minutes. By default, this value is 15 minutes. |
| **Reuse Value** | Enter re-use value here. When the penalty is decreased and falls below the reuse threshold, the route will be re-entered in the routing table as a normal route. The range is from 1 to 20000. By default, this value is 750. |
| **Suppress Value** | Enter the suppress value here. When the penalty is increased and crosses the suppress threshold, the route will become a dampening route and will not be advertised. The range is from 1 to 20000 By default, this value is 2000. |
| **Max Suppress Time** | Enter the maximum suppress time value here that a route can be in the dampened state. The range is from 1 to 255 minutes. By default, this value is 4 times the half-life value, which is 60 minutes. |
| **Unreachable Route's Half Life** | Enter the unreachable route's half-life time value here after which the penalty of the unreachable routes will be down; by half. The range is from 1 to 45 minutes. By default, this value is 15 minutes. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **BGP Dampening Clear** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast** and **IPv4 VRF**.<br>After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Type** | Select the source type that will be cleared here. Options to choose from are **All**, **IP Address**, and **Network Address**.<br>After select the **IP Address** option, enter the IP address of the route that will be cleared in the space provided.<br>After select the **Network Address** option, enter the starting and ending IP addresses of the routes that will be cleared in the spaces provided. |

Click the **Clear** button to clear the entries based on the information specified.

# BGP Dampening Dampened Paths Table

This window is used to display BGP dampening path information.

To view the following window, click **L3 Features > BGP > BGP Dampening Dampened Paths Table**, as shown below:

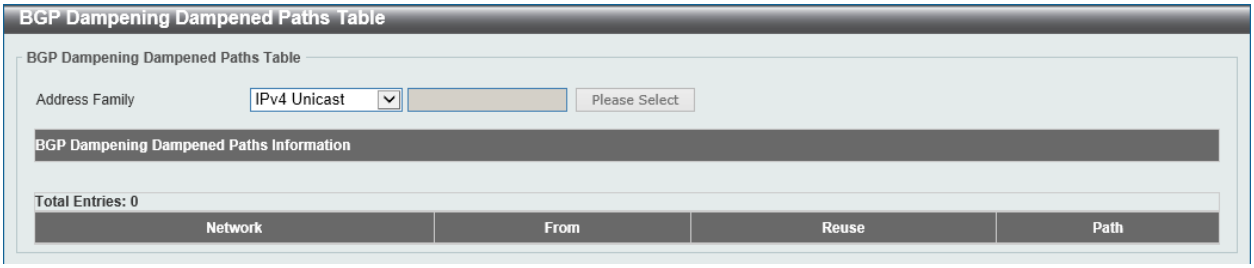



**Figure 6-154 BGP Dampening Dampened Paths Table Window**

The fields that can be configured in **BGP Dampening Dampened Paths Table** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast** and **IPv4 VRF**.<br>After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |

# BGP Dampening Flap Statistics Table

This window is used to view and clear BGP dampening flap statistics information.

To view the following window, click **L3 Features > BGP > BGP Dampening Flap Statistics Table**, as shown below:

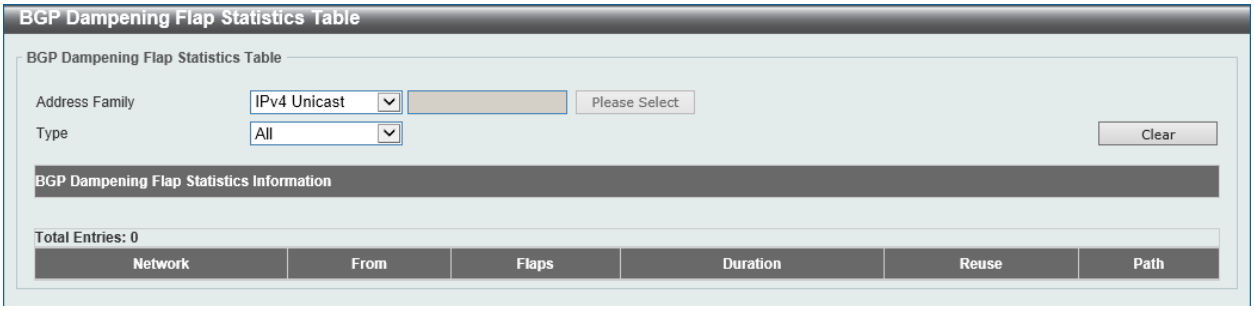



**Figure 6-155 BGP Dampening Flap Statistics Table Window**

The fields that can be configured in **BGP Dampening Flap Statistics Table** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast** and **IPv4 VRF**.<br>After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Type** | Select the source type that will be cleared here. Options to choose from are **All**, **IP Address**, and **Network Address**.<br>After select the **IP Address** option, enter the IP address of the route that will be cleared in the space provided.<br>After select the **Network Address** option, enter the starting and ending IP addresses of the routes that will be cleared in the spaces |

| Parameter | Description |
|---|---|
| | provided. |

Click the **Clear** button to clear the entries based on the information specified.

# BGP Reflector Settings

This window is used to view and configure the BGP reflector settings. In a large scale BGP network, route reflection is a mechanism used to reduce the needs of fully mesh of iBGP sessions. With route reflection, an autonomous system can be partitioned into a number of clusters; each cluster is formed by the route reflector and its client. The connection between clusters is still fully meshed. However, in a cluster, the reflector needs to maintain connections with all clients, but the client does not need to maintain connections with other clients. The route reflector is responsible to reflect routes received from one client to other clients.

Each cluster is distinguished by a cluster ID. The cluster ID configured on the route reflector is the ID of the cluster. When cluster ID is not configured on the route reflector, the router ID of the reflector will be the cluster ID.

To view the following window, click **L3 Features > BGP > BGP Reflector Settings**, as shown below:

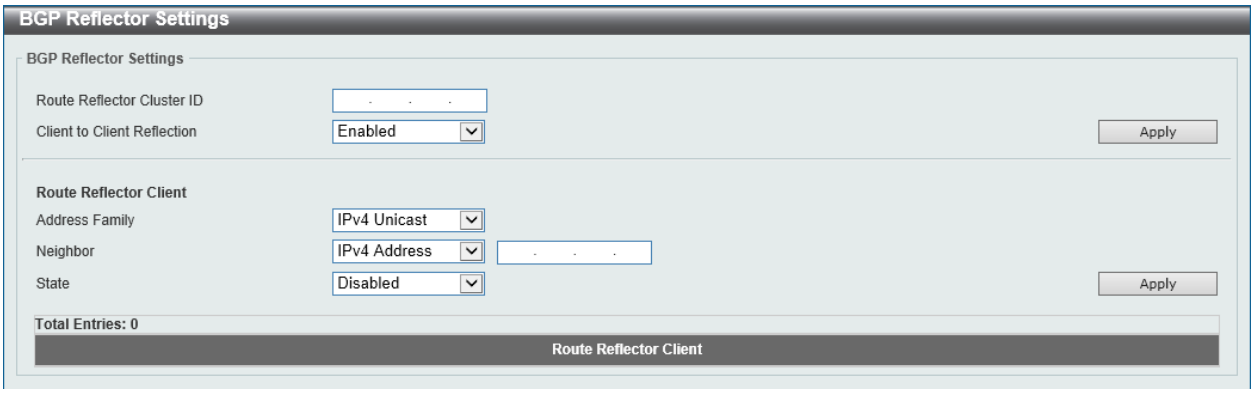



**Figure 6-156 BGP Reflector Settings Window**

The fields that can be configured in **BGP Reflector Settings** are described below:

| Parameter | Description |
|---|---|
| **Route Reflector Cluster ID** | Enter the BGP route's reflector cluster ID in the IPv4 address format here. The local router ID of the route reflector is used as the cluster ID when no ID is specified. |
| **Client to Client Reflection** | Select to enable or disable the client-to-client reflection feature here. This feature is used on the route reflector to enable reflection of routes received from the clients to other clients. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Route Reflector Client** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family that will be used in this configuration here. Options to choose from are **IPv4 Unicast** and **VPNv4**. |
| **Neighbor** | Select the neighbor option here. Options to choose from are **IPv4 Address** and **Peer Group**. After selecting the **IPv4 Address** option, enter the IP address of the neighboring router in the space provided. After selecting the **Peer Group** option, enter the peer group's name in |

| Parameter | Description |
|---|---|
| | the space provided that will act as the route reflector client. |
| **State** | Select to enable or disable the BGP route reflector client feature for neighbors here. |

Click the **Apply** button to accept the changes made.

# BGP Confederation Settings

This window is used to view and configure the BGP confederation settings.

To view the following window, click **L3 Features > BGP > BGP Confederation Settings**, as shown below:

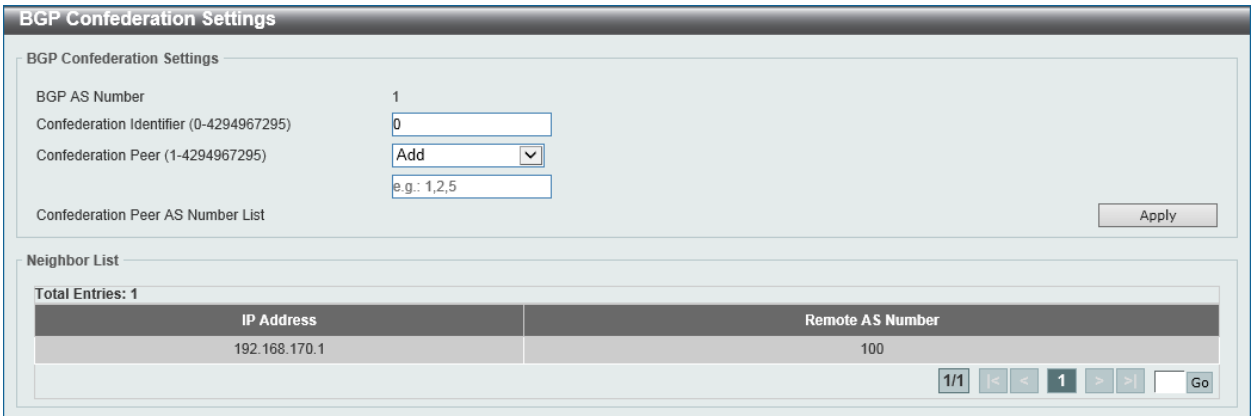



**Figure 6-157 BGP Confederation Settings Window**

The fields that can be configured in **BGP Confederation Settings** are described below:

| Parameter | Description |
|---|---|
| **Confederation Identifier** | Enter the BGP Autonomous System (AS) number here. The range is from 1 and 4294967295. |
| **Confederation Peer** | Select the Add option and enter the BGP peer's ID numbers to add new BGP confederation peers to the group.<br>Select the Delete option and enter the BGP peer's ID numbers to delete BGP confederation peers from the group.<br>The range is from 1 to 4294967295. |

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# BGP AS Path Access List Settings

This window is used to view and configure the BGP Autonomous System's (AS) path access list settings.

To view the following window, click **L3 Features > BGP > BGP AS Path Access List Settings**, as shown below:

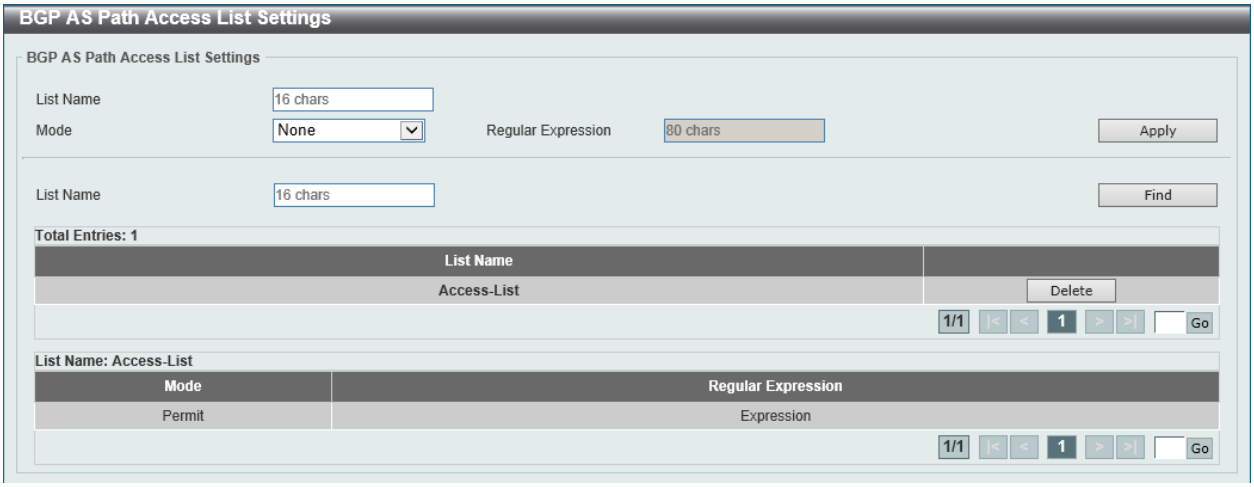



**Figure 6-158 BGP AS Path Access List Settings Window**

The fields that can be configured in **BGP AS Path Access List Settings** are described below:

| Parameter | Description |
|---|---|
| **List Name** | Enter the access list's name here that will be used in the AS path configuration. This name can be up to 16 characters long. |
| **Mode** | Select the mode here. Options to choose from are **Permit**, **Deny**, and **None**. |
| **Regular Expression** | After selecting the **Permit** or **Deny** options, enter the regular expression for the matching pattern here. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# BGP Community List Settings

This window is used to view and configure the BGP feature's community list settings. The community attribute is used for implementing policy routing. It is an optional, transitive attribute and facilitates transfer of local policies through different autonomous systems. A community attribute is represented by a 32 bits integer. If no community value is associated with a path, by default, the Internet community is associated with the path.

A community list can contain multiple rule entries, either as a deny entry or a permit entry. Use the window to define a community list rule entry.

A community list can be either a standard community list or an expanded community list. The rule entry defined in a standard community list contains a string formed by a number of communities, separated by space. The rule entry defined in an expanded community list contains a regular expression.

To view the following window, click **L3 Features > BGP > BGP Community List Settings**, as shown below:

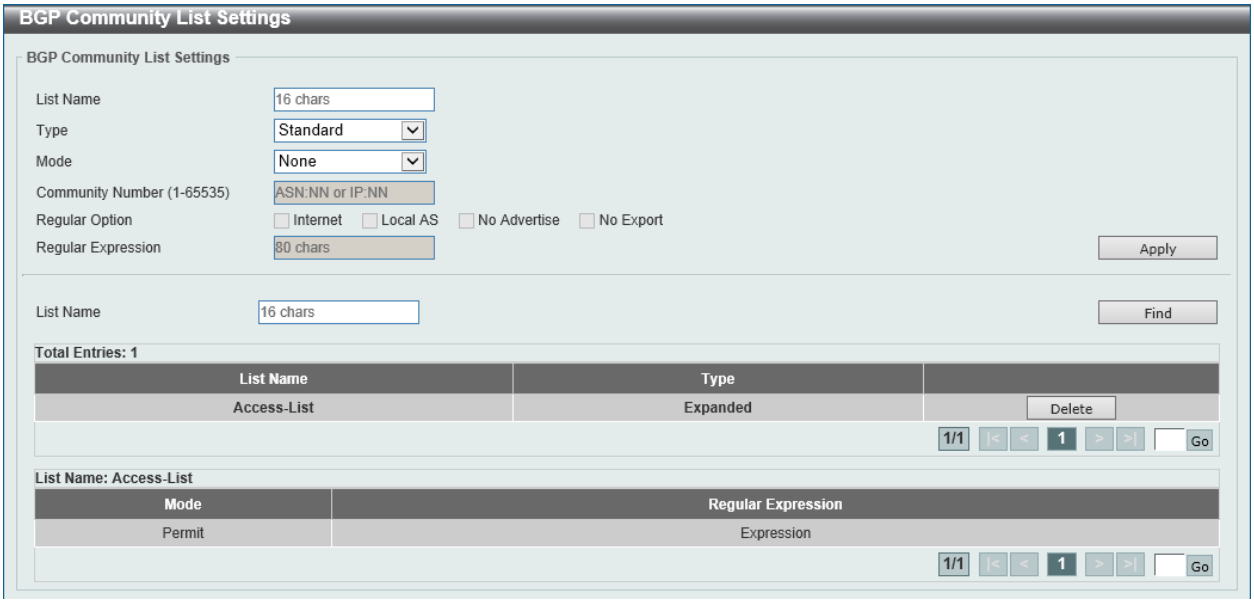



**Figure 6-159 BGP Community List Settings Window**

The fields that can be configured in **BGP Community List Settings** are described below:

| Parameter | Description |
|---|---|
| **List Name** | Enter the access list's name here that will be used in the BGP community list configuration. This name can be up to 16 characters long. |
| **Type** | Select the access list's type here. Options to choose from are **Standard** and **Expanded**. |
| **Mode** | Select the mode here. Options to choose from are **Permit**, **Deny**, and **None**. |
| **Community Number** | After selecting the **Standard** option as the type and the **Permit** or **Deny** options as the mode, enter the community is a 32-bits integer here. It can be a user-specified number represented by AA:NN, where AA (AS number) is the upper part of the word and NN (community number, user-specified) is the lower part of the word. Multiple numbers (separated by comma) can be specified. |
| **Regular Option** | After selecting the **Standard** option as the type and the **Permit** or **Deny** options as the mode, select the regular option here. Options to choose from are **Internet**, **Local AS**, **No Advertise**, and **No Export**.<br>• **Internet:** Specifies routes free to be advertised to all peers.<br>• **Local-AS:** Specifies not to send out of the local AS or sub-autonomous system of a confederation.<br>• **No Advertise:** Specifies not to advertise the route to other BGP peers.<br>• **No Export:** Specifies not advertise to external peers. |
| **Regular Expression** | After selecting the **Expanded** option as the type and the **Permit** or **Deny** options as the mode, enter the regular expression for the matching pattern here. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# BGP Extended Community List Settings

This window is used to view and configure the BGP feature's extended community list settings. The extended community attribute is used for implementing policy routing. It is an optional, transitive attribute and facilitates transfer of local policies through different autonomous systems. All the names of the standard extended community list and expanded extended community list must not be the same.

BGP extended community attributes exchanged between BGP peers are controlled by the neighbor send-community command. If permit rules exist in an extended community list, routes with extended community that does not match any rule in the list will be denied. If there are no rules or only deny rules to be configured in the extended community list, all routes will be denied.

To view the following window, click **L3 Features > BGP > BGP Extended Community List Settings**, as shown below:

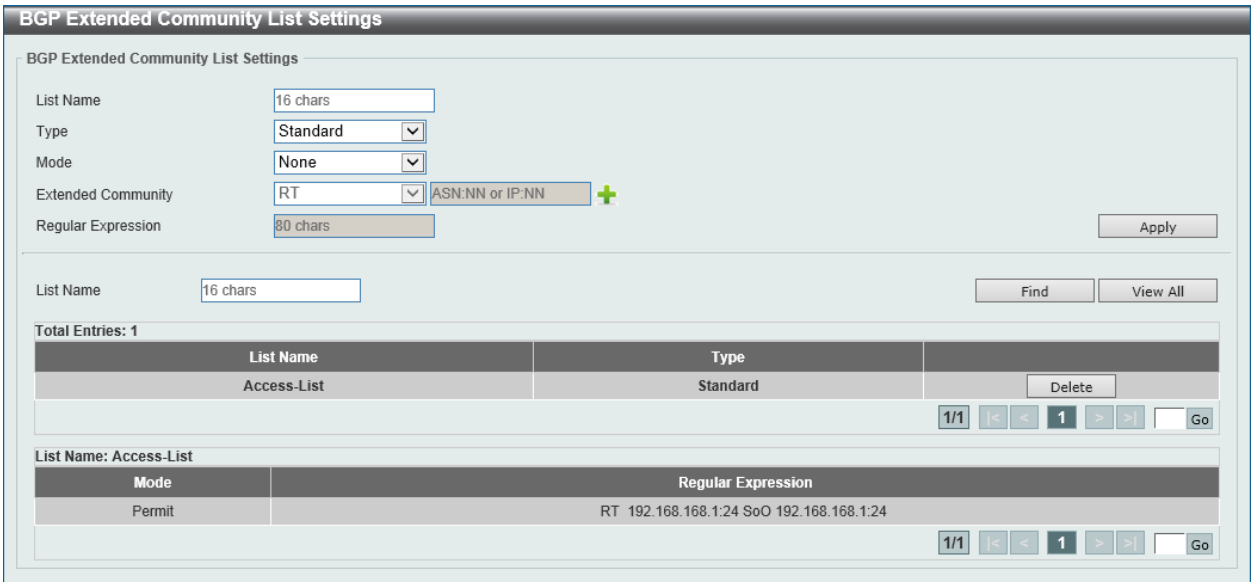



**Figure 6-160 BGP Extended Community List Settings Window**

The fields that can be configured in **BGP Extended Community List Settings** are described below:

| Parameter | Description |
|---|---|
| **List Name** | Enter the access list's name here that will be used in the BGP extended community list configuration. This name can be up to 16 characters long. |
| **Type** | Select the access list's type here. Options to choose from are **Standard** and **Expanded**. |
| **Mode** | Select the mode here. Options to choose from are **Permit**, **Deny**, and **None**. |
| **Extended Community** | After selecting the **Standard** option as the type and the **Permit** or **Deny** options as the mode, select and enter the extended community string here. Options to choose from are **RT** and **SoO**. The extended community string can be in the following format:<br>• **IP Address:Number** - The IP address should be a global IP address that is assigned to the user and the number is assigned from a numbering space that is administered by the user. The number's range is from 1 to 65535.<br>• **AS Number:Number** - The AS Number should be a public AS Number (Both 2-bytes AS number and 4-bytes AS number works) that is assigned to the user and the number is assigned |

| Parameter | Description |
|---|---|
| | from a numbering space that is administered by the user. The number's range is from 1 to 4294967295 for 2-bytes AS number and 1 to 65535 for 4-bytes AS number. |
| **Regular Expression** | After selecting the **Expanded** option as the type and the **Permit** or **Deny** options as the mode, enter the regular expression that is used to specify a pattern to match against an input string here. This string can be up to 80 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# BGP Clear Settings

This window is used to initiate a hard reset or a soft reset for a BGP session. If a soft reset is applied to an outbound session, the router will re-transmit all the routes previously advertised to the specified neighbor to refresh the routing entries in the neighbor peer. If a soft reset is applied to an inbound session, the session will not be terminated but the local inbound routing table will be cleared and need to be rebuilt.

If the soft reconfiguration inbound is enabled, then the routing table can be rebuilt based on the stored route updates information. If the soft reconfiguration inbound is disabled, then the local router will send the route refresh request to the neighbor to ask for the route refresh.

Whenever the following settings are changed, applied to inbound sessions, the inbound routing table can be reconfigured by the inbound soft reset.

- BGP-related access lists
- BGP-related weights
- BGP-related prefix lists
- BGP-related route maps

When the inbound session is soft reset with the prefix filter option, if the capability ORF prefix list is enabled, in the receive mode, the local BGP will notify the remote neighbor to send the updated prefix filter.

To view the following window, click **L3 Features > BGP > BGP Clear Settings**, as shown below:

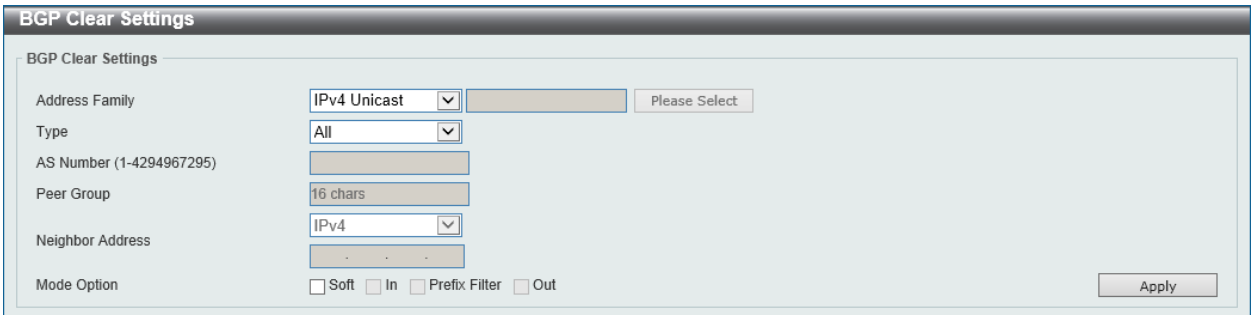



**Figure 6-161 BGP Clear Settings Window**

The fields that can be configured in **BGP Clear Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **IPv4 VRF**, and **VPNv4**. |

| Parameter | Description |
|---|---|
| | After selecting the **IPv4 VRF** option, enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Type** | Select the type here. Options to choose from are **All**, **AS Number**, **Peer Group**, **Neighbor Address**, and **External**. |
| **AS Number** | After selecting the **AS Number** option as the type, enter the BGP Autonomous System's (AS) number here. The range is from 1 and 4294967295. Sessions with peers in the specified AS will be reset. |
| **Peer Group** | After selecting the **Peer Group** option as the type, enter the peer group's name here. This name can be up to 16 characters long. Sessions with peers in the specified peer group will be reset. |
| **Neighbor Address** | After selecting the **Neighbor Address** option as the type, select the neighbor address type (which is **IPv4**) and enter the BGP neighbor's address in the space provided. Sessions with peers in the specified neighbor session will be reset. |
| **Mode Option** | Select the mode option here. Options to choose from are **Soft**, **In**, **Prefix Filter**, and **Out**.<br>• **Soft:** Specifies to issue a soft reset without tearing down the session.<br>• **In:** Specifies to issue the inbound reconfiguration. If neither in nor out is specified, both inbound and outbound sessions are reconfigured.<br>• **Prefix Filter:** Specifies to clear the existing outbound route filter (ORF) prefix list to trigger a new route refresh to update the ORF prefix list from the peer router.<br>• **Out:** Specifies to issue the outbound reconfiguration. If neither in nor out is specified, both inbound and outbound sessions are reconfigured. |

Click the **Apply** button to accept the changes made.

# BGP Summary Table

This window is used to find and display BGP summary information.

To view the following window, click **L3 Features > BGP > BGP Summary Table**, as shown below:

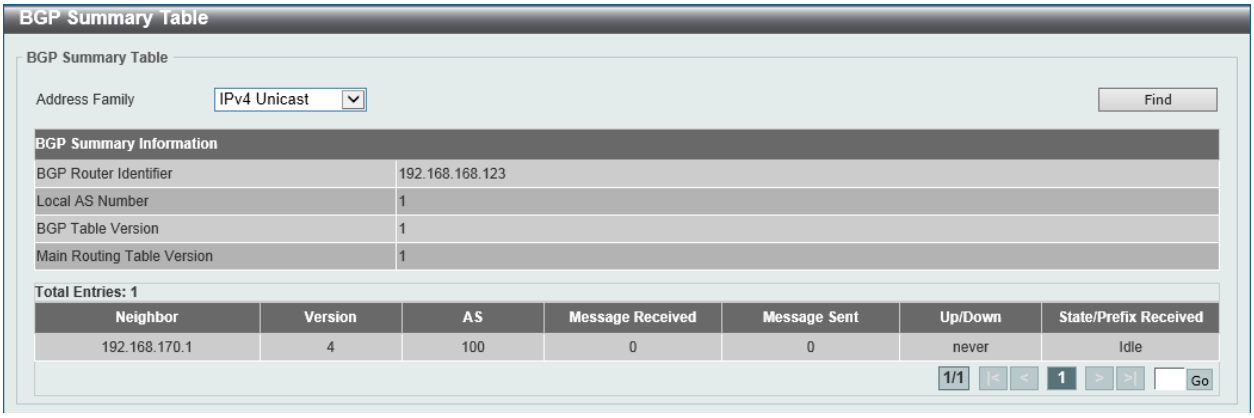



**Figure 6-162 BGP Summary Table Window**

The fields that can be configured in **BGP Summary Table** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **VPNv4 All**, **VPNv4 RD**, and **VPNv4 VRF**. The type of address family determines the routing table that is displayed.<br>• **IPv4 Unicast:** Specifies to display summary information related to the IPv4 unicast address family.<br>• **VPNv4 All:** Specifies to display summary information for all VPNv4 address families.<br>• **VPNv4 RD:** Specifies to display summary information associated with the VPNv4 RD. Enter the VPNv4 RD string used in this display here.<br>• **VPNv4 VRF:** Specifies to display summary information related to the VRF family. Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |

Click the **Find** button to locate a specific entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# BGP Routing Table

This window is used to display the BGP routing table.

To view the following window, click **L3 Features > BGP > BGP Routing Table**, as shown below:


**Figure 6-163 BGP Routing Table Window**

The fields that can be configured in **BGP Routing Table** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **VPNv4 All**, **VPNv4 RD**, and **VPNv4 VRF**. The type of address family determines the routing table that is displayed.<br>• **IPv4 Unicast:** Specifies to display the BGP routing table related to the IPv4 unicast address family.<br>• **VPNv4 All:** Specifies to display the BGP routing table for all VPNv4 address families.<br>• **VPNv4 RD:** Specifies to display the BGP routing table associated with the VPNv4 RD. Enter the VPNv4 RD string used in this display here.<br>• **VPNv4 VRF:** Specifies to display the BGP routing table related to the VRF family. Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new |

| Parameter | Description |
|---|---|
| | window to select and use a configured VRF instance from the list. |
| **Type** | Select the type of BGP routing information that will be displayed here. Option to choose from are **IP Address**, **Network**, **Route Map**, **CIDR Only**, **Community**, **Community List**, **Filter List**, **Inconsistent AS**, and **Quote Regexp**. After each selection the window changes and a list of new parameters can be specified. We'll discuss this below. |

After clicking the **IP Address** option and the **Type**, the following page will appear.


**Figure 6-164 BGP Routing Table (Type, IP Address) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **IP Address** | Enter the IPv4 address to display only a particular network in the BGP routing table. |

Click the **Find** button to generate a display based on the information entered/selected.

After clicking the **Network** option and the **Type**, the following page will appear.

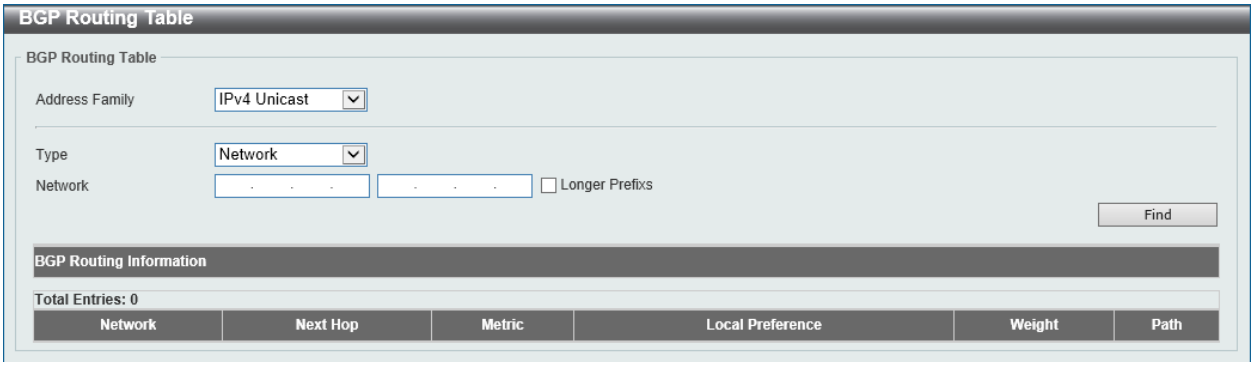



**Figure 6-165 BGP Routing Table (Type, Network) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Network** | Enter the starting and ending IPv4 addresses in the range to be displayed in the BGP routing table. Selecting the **Longer Prefixes** option specifies to display the specified route and all more specific routes. |

Click the **Find** button to generate a display based on the information entered/selected.

After clicking the **Route Map** option and the **Type**, the following page will appear.

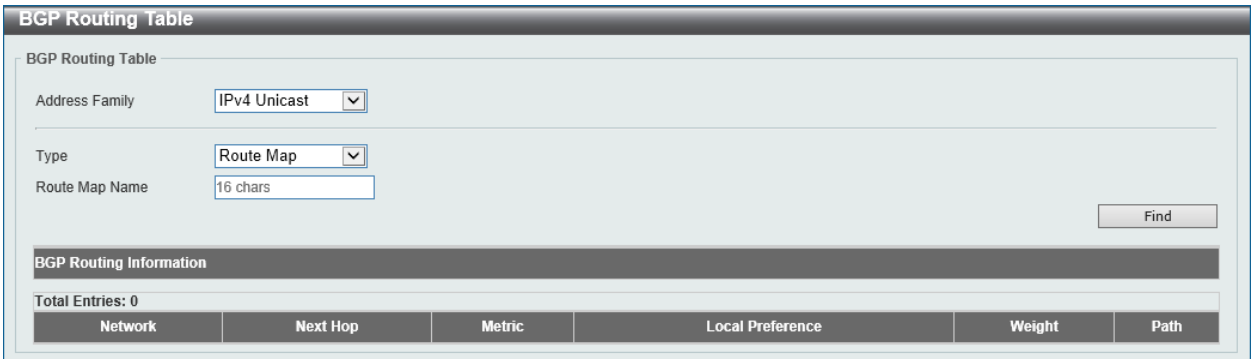



**Figure 6-166 BGP Routing Table (Type, Route Map) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Route Map Name** | Enter the route map's name used in this display here. This name can be up to 16 characters long. |

Click the **Find** button to generate a display based on the information entered/selected.

After clicking the **CDIR Only** option and the **Type**, the following page will appear.


**Figure 6-167 BGP Routing Table (Type, CDIR Only) Window**

This option is used to display the Classless Inter-Domain Routing (CIDR) routes.

Click the **Find** button to generate a display based on the information entered/selected.

After clicking the **Community** option and the **Type**, the following page will appear.

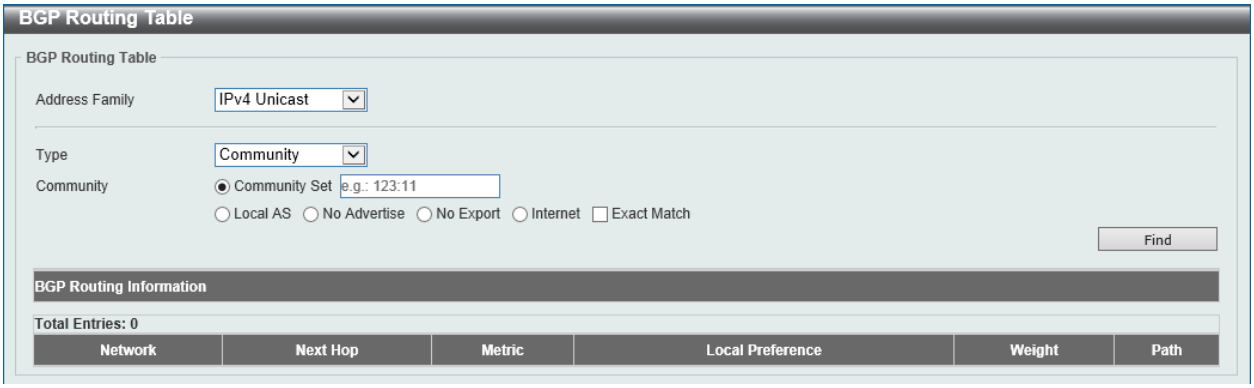



**Figure 6-168 BGP Routing Table (Type, Community) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Community Set** | Enter the community (32-bit integer) here. It can be a user-specified number represented by AA:NN, where AA (AS number) is the upper part of the word and NN (community number, user-specified) is the lower part of the word. Multiple numbers (separated by space) can be specified. |
| **Local AS** | Selecting this option specifies to display routes not sent out of the local AS or sub-autonomous system of a confederation. |
| **No Advertise** | Selecting this option specifies to display routes not advertised as the route to other BGP peers. |
| **No Export** | Selecting this option specifies to display routes not advertised to external peers. |
| **Internet** | Selecting this option specifies to display routes free to be advertised to all peers. |
| **Exact Match** | Selecting this option specifies that an exact match is required. All of the communities and only those communities specified must be present. |

Click the **Find** button to generate a display based on the information entered/selected.

After clicking the **Community List** option and the **Type**, the following page will appear.

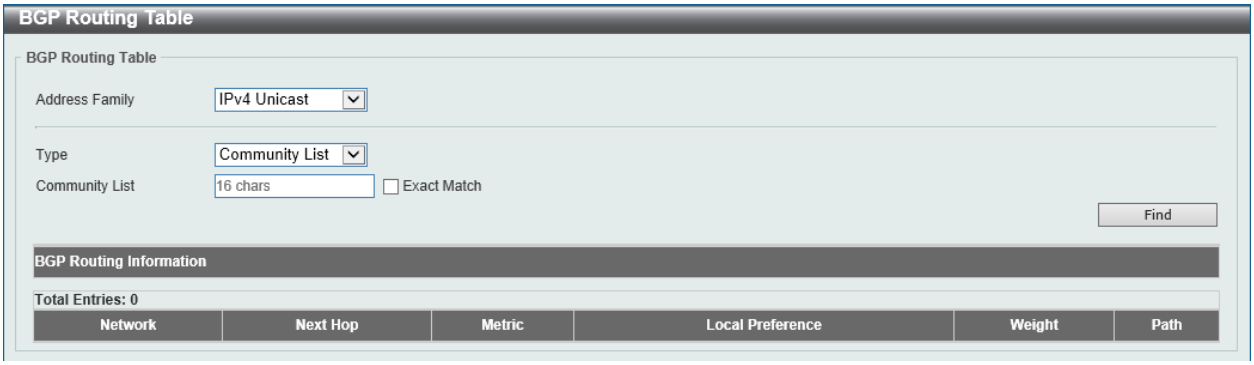



**Figure 6-169 BGP Routing Table (Type, Community List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Community List** | Enter the community list's name here. This name can be up to 16 characters long. |
| **Exact Match** | Selecting this option specifies to display only routes that are an exact match. |

Click the **Find** button to generate a display based on the information entered/selected.

After clicking the **Filter List** option and the **Type**, the following page will appear.


**Figure 6-170 BGP Routing Table (Type, Filter List) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Filter List Name** | Enter the AS path's access list name here to only display routes that match this access list. This name can be up to 16 characters long. |

Click the **Find** button to generate a display based on the information entered/selected.

After clicking the **Inconsistent AS** option and the **Type**, the following page will appear.


**Figure 6-171 BGP Routing Table (Type, Inconsistent AS) Window**

This option is used to display the routes which have the same prefix and different AS path origins.

Click the **Find** button to generate a display based on the information entered/selected.

After clicking the **Quote Regexp** option and the **Type**, the following page will appear.


**Figure 6-172 BGP Routing Table (Type, Quote Regexp) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Regexp** | Enter regular expression used here. This is used to display routes matching the AS path regular expression. This string can be up to 80 characters long. |

Click the **Find** button to generate a display based on the information entered/selected.

# BGP Labels Table

This window is used to find and display the BGP private labels of the routes, which are assigned from MPLS.

To view the following window, click **L3 Features > BGP > BGP Labels Table**, as shown below:

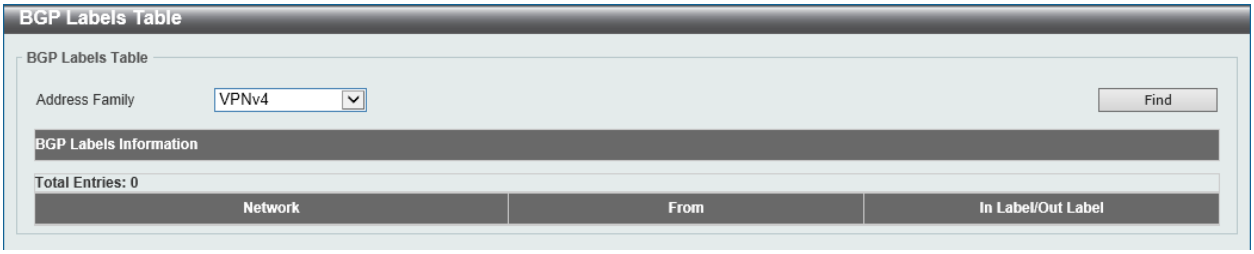



**Figure 6-173 BGP Labels Table Window**

The fields that can be configured in **BGP Labels Table** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **VPNv4**, **VPNv4 RD**, and **VPNv4 VRF**.<br>• **VPNv4:** Specifies to display all the VPNv4 routes labels.<br>• **VPNv4 RD:** Specifies to display the VPNv4 routes labels associated with the VPNv4 RD. Enter the VPNv4 RD string used in this display here.<br>• **VPNv4 VRF:** Specifies to display the VPNv4 routes labels related to the VRF family. Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |

Click the **Find** button to locate a specific entry based on the information entered.

# BGP Neighbor

## Neighbor

This window is used to view and configure the BGP neighbor settings.

To view the following window, click **L3 Features > BGP > BGP Neighbor > Neighbor**, as shown below:

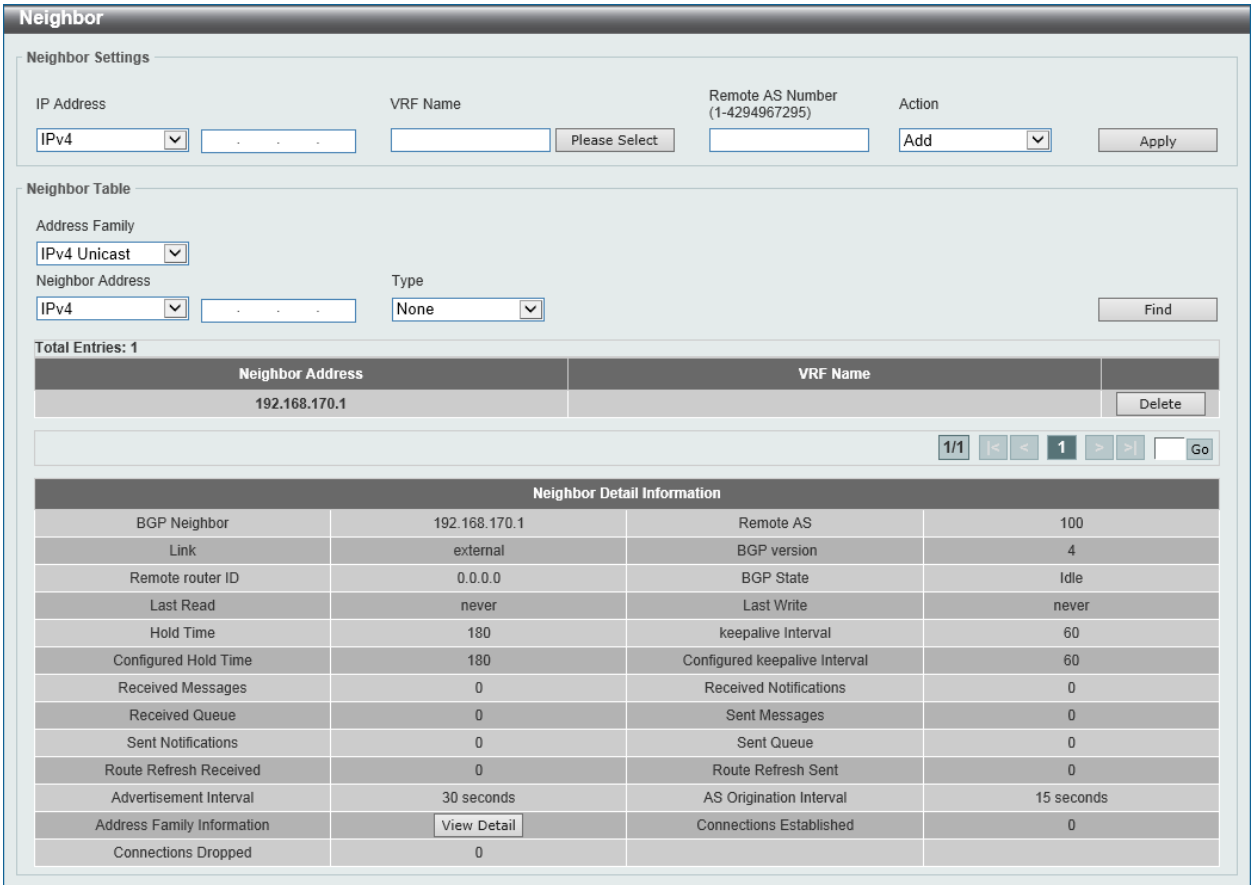



**Figure 6-174 Neighbor Window**

The fields that can be configured in **Neighbor Settings** are described below:

| Parameter | Description |
|---|---|
| **IP Address** | Select **IPv4** and enter the IPv4 address of the neighbor peer here. |
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Remote AS Number** | Enter the remote BGP neighbor's AS number here. The range is from 1 and 4294967295. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Neighbor Table** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **VPNv4 All**, **VPNv4 RD**, and **VPNv4 VRF**.<br>• **IPv4 Unicast:** Specifies to display information related to the IPv4 unicast address family.<br>• **VPNv4 All:** Specifies to display information for all VPNv4 address families.<br>• **VPNv4 RD:** Specifies to display information associated with the VPNv4 RD. Enter the VPNv4 RD string used in this display here.<br>• **VPNv4 VRF:** Specifies to display information related to the VRF family. Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Neighbor Address** | Select **IPv4** and enter the IPv4 address of the neighbor peer here. |
| **Type** | Select the additional type of information to find and display here. Options to choose from are **None**, **Advertised Routes**, **Received Routes**, **Routes**, and **Received Prefix Filter**.<br>• **None:** Specifies to display no additional information.<br>• **Advertised Routes:** Specifies to display the routes advertised to a BGP neighbor.<br>• **Received Routes:** Specifies to display the routes received from a BGP neighbor.<br>• **Routes:** Specifies to display the routes that are received and accepted from a neighbor. The accepted routes are a subset of the received routes.<br>• **Received Prefix Filter:** Specifies to display the prefix-list received from the specified neighbor. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **View Detail** button to view more detailed information associated with the address family.

After clicking the **View Detail** button, the following page will appear.

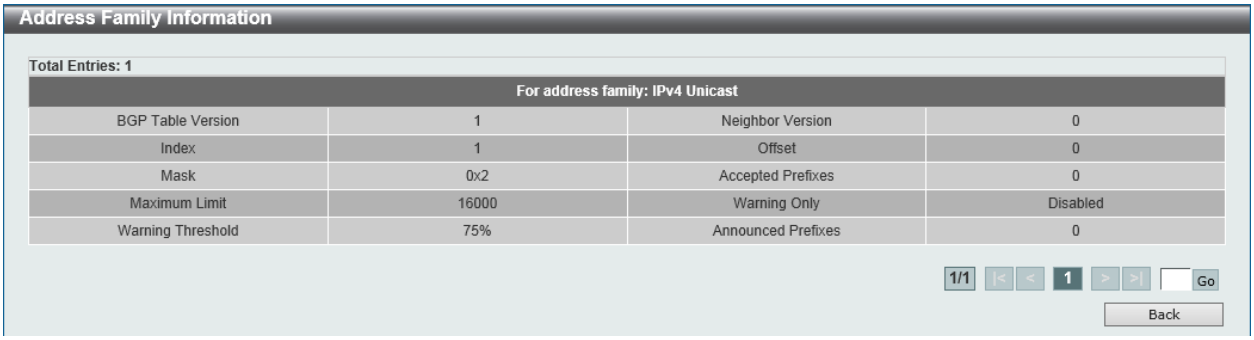



**Figure 6-175 Neighbor (View Detail) Window**

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Back** button to return to the previous window.

# Peer Group

This window is used to view and configure BGP neighbor peer group settings.

To view the following window, click **L3 Features > BGP > BGP Neighbor > Peer Group**, as shown below:

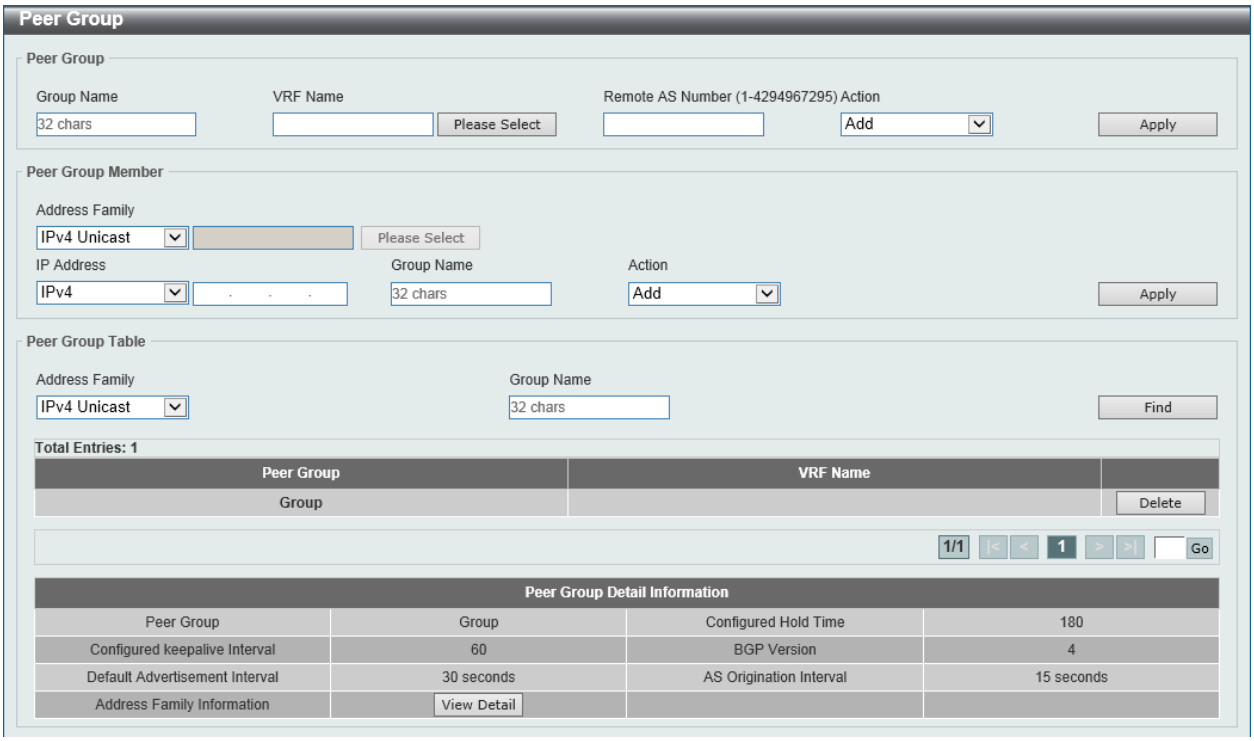



**Figure 6-176 Peer Group Window**

The fields that can be configured in **Peer Group** are described below:

| Parameter | Description |
|---|---|
| **Group Name** | Enter the BGP peer group's name here. This name can be up to 32 characters long. |
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Remote AS Number** | Enter the remote BGP neighbor's AS number here. The range is from 1 and 4294967295. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Peer Group Member** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **IPv4 VRF**, and **VPNv4**.<br>• **IPv4 Unicast:** Select to use the IPv4 unicast family here.<br>• **IPv4 VRF:** Select and enter the IPv4 VRF instance's name that will be used here. This name can be up to 12 characters long. |

| Parameter | Description |
|---|---|
| | Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list.<br>• **VPNv4:** Select to use the VPNv4 address family here. |
| **IP Address** | Select **IPv4** and enter the IPv4 address of the neighbor peer here. |
| **Group Name** | Enter the BGP peer group's name here. This name can be up to 32 characters long. |
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Peer Group Table** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **VPNv4 All**, **VPNv4 RD**, and **VPNv4 VRF**.<br>• **IPv4 Unicast:** Specifies to display information related to the IPv4 unicast address family.<br>• **VPNv4 All:** Specifies to display information for all VPNv4 address families.<br>• **VPNv4 RD:** Specifies to display information associated with the VPNv4 RD. Enter the VPNv4 RD string used in this display here.<br>• **VPNv4 VRF:** Specifies to display information related to the VRF family. Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Group Name** | Enter the BGP peer group's name here. This name can be up to 32 characters long. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **View Detail** button to view more detailed information associated with the address family.

After clicking the **View Detail** button, the following page will appear.

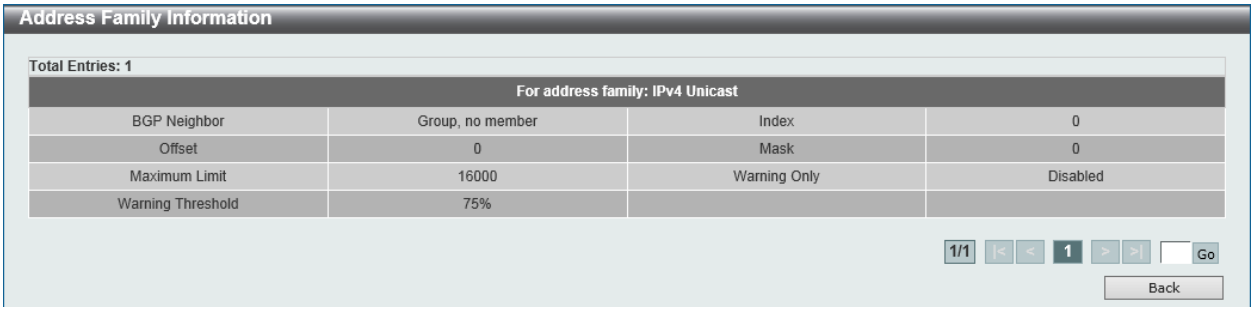



**Figure 6-177 Peer Group (View Detail) Window**

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Back** button to return to the previous window.

## Neighbor Activate

This window is used to activate the exchange of routing information with a specified BGP neighbor.

To view the following window, click **L3 Features > BGP > BGP Neighbor > Neighbor Activate**, as shown below:

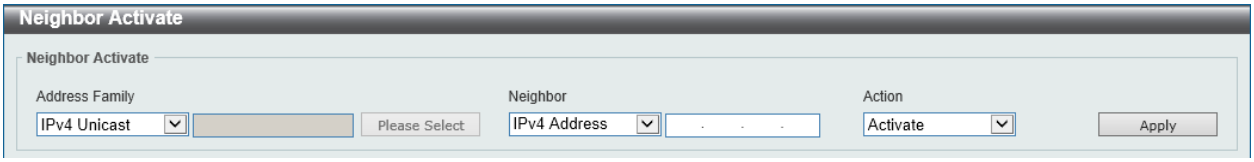



**Figure 6-178 Neighbor Activate Window**

The fields that can be configured in **Neighbor Activate** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **IPv4 VRF**, and **VPNv4**.<br>• **IPv4 Unicast:** Select to use the IPv4 unicast family here.<br>• **IPv4 VRF:** Select and enter the IPv4 VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list.<br>• **VPNv4:** Select to use the VPNv4 address family here. |
| **Neighbor** | There are two neighbor options here, **IPv4 Address** and **Peer Group**.<br>Select the **IPv4 Address** option and enter the IP address of the neighbor peer here.<br>Select the **Peer Group** option and enter the BGP peer group's name here. This name can be up to 32 characters long. |
| **Action** | Select **Activate** to activate the exchange of routing information with a specified BGP neighbor.<br>Select **No Activate** to deactivate the exchange with the specified BGP neighbor. |

Click the **Apply** button to accept the changes made.

## Neighbor Shutdown

This window is used to enable or disable a BGP neighbor or a peer group. Active session for the specified neighbor or active session for all members of the peer group will be terminated. When a session is shutdown, all the associated routing information will be removed.

To view the following window, click **L3 Features > BGP > BGP Neighbor > Neighbor Shutdown**, as shown below:

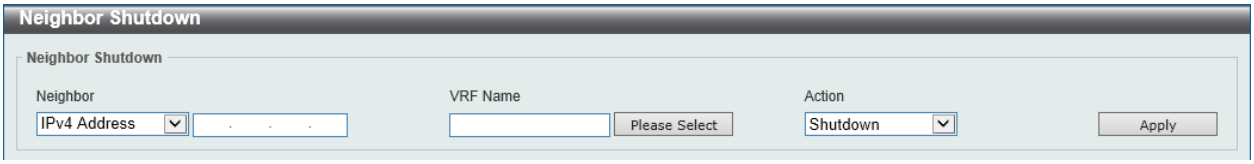



**Figure 6-179 Neighbor Shutdown Window**

The fields that can be configured in **Neighbor Shutdown** are described below:

| Parameter | Description |
|---|---|
| **Neighbor** | There are two neighbor options here, **IPv4 Address** and **Peer Group**.<br>Select the **IPv4 Address** option and enter the IP address of the neighbor peer here.<br>Select the **Peer Group** option and enter the BGP peer group's name here. This name can be up to 32 characters long. |
| **VRF Name** | Enter the VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |
| **Action** | Select **Shutdown** to disable the BGP neighbor or peer group.<br>Select **No Shutdown** to re-enable the BGP neighbor or peer group. |

Click the **Apply** button to accept the changes made.

After clicking the **Please Select** button, the following page will appear.

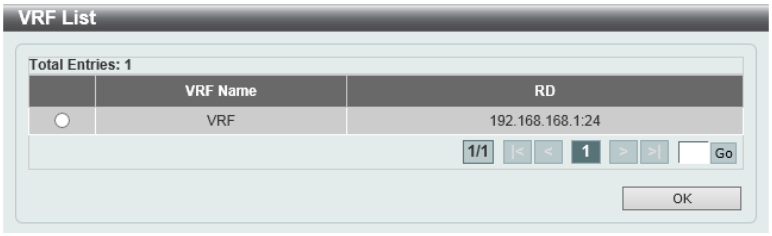



**Figure 6-180 Neighbor Shutdown (Please Select) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## Neighbor Map Settings

This window is used to view and configure the BGP neighbor's map settings.

To view the following window, click **L3 Features > BGP > BGP Neighbor > Neighbor Map Settings**, as shown below:

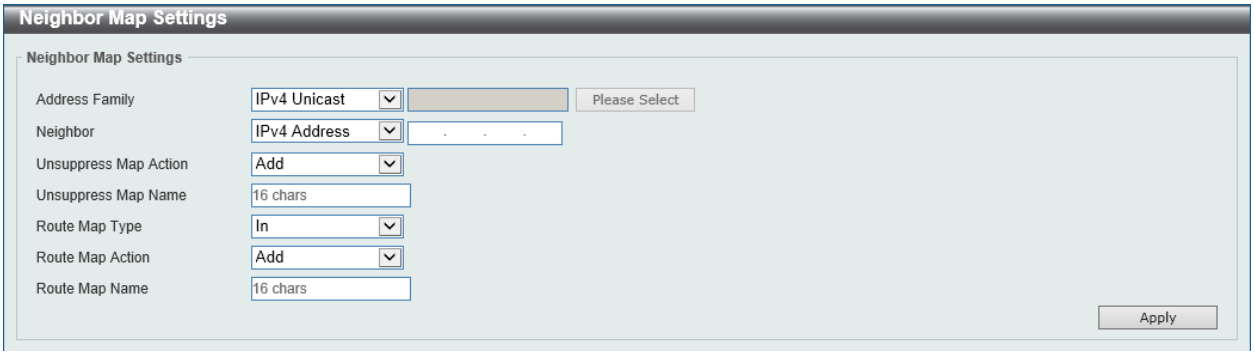



**Figure 6-181 Neighbor Map Settings Window**

The fields that can be configured in **Neighbor Map Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **IPv4 VRF**, and **VPNv4**.<br>• **IPv4 Unicast:** Select to use the IPv4 unicast family here.<br>• **IPv4 VRF:** Select and enter the IPv4 VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list.<br>• **VPNv4:** Select to use the VPNv4 address family here. |
| **Neighbor** | There are two neighbor options here, **IPv4 Address** and **Peer Group**.<br>Select the **IPv4 Address** option and enter the IP address of the neighbor peer here.<br>Select the **Peer Group** option and enter the BGP peer group's name here. This name can be up to 32 characters long. |
| **Unsuppress Map Action** | Select **Add** to add the unsuppressed route map.<br>Select **Delete** to delete the unsuppressed route map. |
| **Unsuppress Map Name** | Enter the unsuppress map rule's name here. This name can be up to 16 characters long. |
| **Route Map Type** | Select the route map type here. Options to choose from are **In** and **Out**.<br>• **In:** Specifies that the route map is applied to paths advertised from the neighbor.<br>• **Out:** Specifies that the route map is applied to the paths advertised to the neighbor. |
| **Route Map Action** | Select **Add** to add the route map.<br>Select **Delete** to delete the route map. |
| **Route Map Name** | Enter the BGP neighbor's route map name here. This name can be up to 16 characters long. |

Click the **Apply** button to accept the changes made.

## Neighbor Filter Settings

This window is used to view and configure the BGP neighbor's filter settings. The filter list feature is used to set up a BGP filter for the exchange of routing information with the specified neighbor. The prefix list feature is used to prevent the distribution of the Border Gateway Protocol (BGP) neighbor information as specified in a prefix list, a Connectionless Network Service (CLNS) filter expression, or a CLNS filter set.

Use the BGP Outbound Route Filtering (ORF) capability to reduce the number of prefixes exchanged with the peer. Typically, the feature must be configured in pair on the local router and the remote router. The function can operate in one direction or in both directions. When it operates in one direction, the prefix list used as for the ingress filtering on one router will be sent to the peer router and act as the egress prefix list filtering applied to routes to be sent out from the peer router. The first router should be configured as send mode and the peer router should be configured as receive mode.

To view the following window, click **L3 Features > BGP > BGP Neighbor > Neighbor Filter Settings**, as shown below:

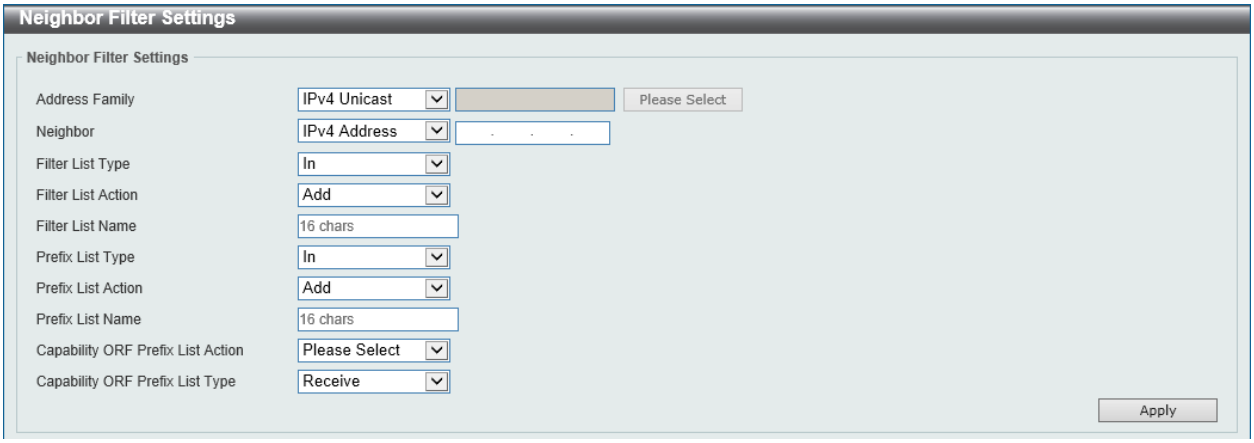



**Figure 6-182 Neighbor Filter Settings Window**

The fields that can be configured in **Neighbor Filter Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **IPv4 VRF**, and **VPNv4**.<br>• **IPv4 Unicast:** Select to use the IPv4 unicast family here.<br>• **IPv4 VRF:** Select and enter the IPv4 VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list.<br>• **VPNv4:** Select to use the VPNv4 address family here. |
| **Neighbor** | There are two neighbor options here, **IPv4 Address** and **Peer Group**.<br>Select the **IPv4 Address** option and enter the IP address of the neighbor peer here.<br>Select the **Peer Group** option and enter the BGP peer group's name here. This name can be up to 32 characters long. |
| **Filter List Type** | Select the filter list type here. Options to choose from are **In** and **Out**.<br>• **In:** Specifies to apply the check for access lists in the ingress direction.<br>• **Out:** Specifies to apply the check for access lists in the egress direction. |
| **Filter List Action** | Select **Add** to add a new filter list entry based in the information entered.<br>Select **Delete** to delete a filter list entry based in the information entered. |
| **Filter List Name** | Enter the filter list's name here. This name can be up to 16 characters long. |
| **Prefix List Type** | Select the prefix list type here. Options to choose from are **In** and **Out**.<br>• **In:** Specifies the filter list applied to paths advertised from the neighbor.<br>• **Out:** Specifies the filter list applied to paths to be advertised to the neighbor. |
| **Prefix List Action** | Select **Add** to add a new prefix list entry based in the information entered.<br>Select **Delete** to delete a prefix list entry based in the information entered. |

| Parameter | Description |
|---|---|
| **Prefix List Name** | Enter the prefix list's name here. This name can be up to 16 characters long. |
| **Capability ORF Prefix List Action** | Select to enable or disable the capability ORF prefix list action here. |
| **Capability ORF Prefix List Type** | Select the capability ORF prefix list type here. Options to choose from are **Receive**, **Send**, and **Both**. |

Click the **Apply** button to accept the changes made.

## Neighbor Maximum Prefix Settings

This window is used to view and configure the BGP neighbor feature's maximum prefix settings. This feature is used to specify the maximum number of prefixes that can be accepted from a neighbor.

To view the following window, click **L3 Features > BGP > BGP Neighbor > Neighbor Maximum Prefix Settings**, as shown below:

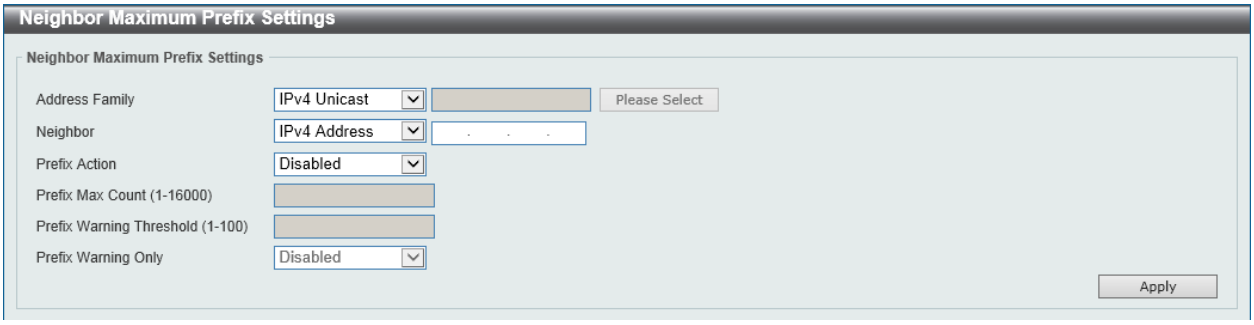



**Figure 6-183 Neighbor Maximum Prefix Settings Window**

The fields that can be configured in **Neighbor Maximum Prefix Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **IPv4 VRF**, and **VPNv4**.<br>• **IPv4 Unicast:** Select to use the IPv4 unicast family here.<br>• **IPv4 VRF:** Select and enter the IPv4 VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list.<br>• **VPNv4:** Select to use the VPNv4 address family here. |
| **Neighbor** | There are two neighbor options here, **IPv4 Address** and **Peer Group**.<br>Select the **IPv4 Address** option and enter the IP address of the neighbor peer here.<br>Select the **Peer Group** option and enter the BGP peer group's name here. This name can be up to 32 characters long. |
| **Prefix Action** | Select to enable or disable the prefix action here. |
| **Prefix Max Count** | Enter the maximum number of prefixes acceptable from the specified neighbor here. The range is from 1 and 16000. By default, this value is 16000. |
| **Prefix Warning Threshold** | Enter the percentage value of the maximum prefix limit to generate a warning message here. The range is from 1 to 100 percent. By default, this value is 75 percent. |

| Parameter | Description |
|---|---|
| **Prefix Warning Only** | Select to enable or disable the prefix warning feature here. This specifies only to generate a system log message when the threshold is exceeded. If not specified, the peering session will be terminated when the threshold is exceeded. |

Click the **Apply** button to accept the changes made.

## Neighbor General Settings

This window is used to view and configure the BGP neighbor's general settings.

To view the following window, click **L3 Features > BGP > BGP Neighbor > Neighbor General Settings**, as shown below:

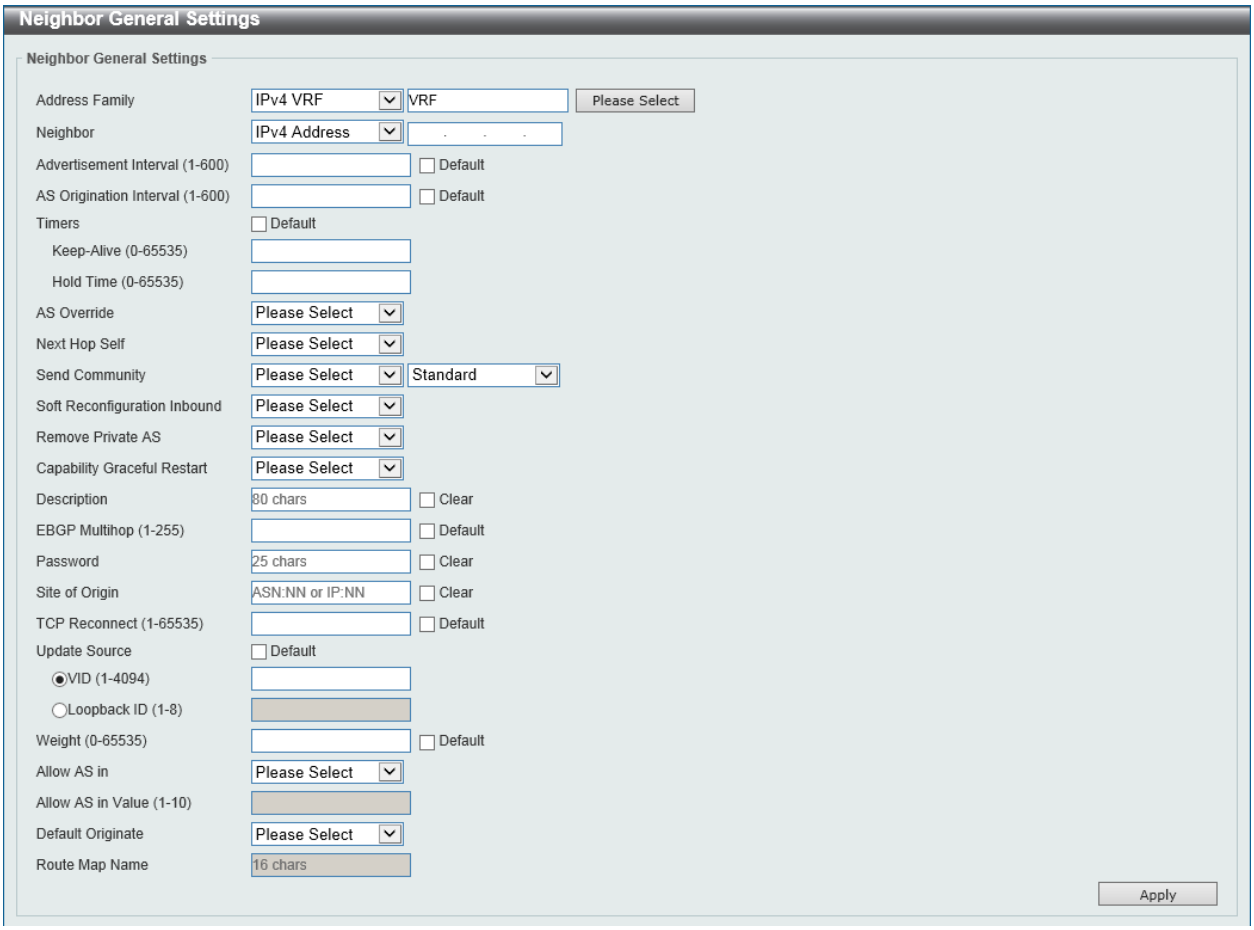



**Figure 6-184 Neighbor General Settings Window**

The fields that can be configured in **Neighbor General Settings** are described below:

| Parameter | Description |
|---|---|
| **Address Family** | Select the address family used here. Options to choose from are **IPv4 Unicast**, **IPv4 VRF**, and **VPNv4**.<br>• **IPv4 Unicast:** Select to use the IPv4 unicast family here.<br>• **IPv4 VRF:** Select and enter the IPv4 VRF instance's name that will be used here. This name can be up to 12 characters long. Alternatively, click the **Please Select** button to open a new window to select and use a configured VRF instance from the list. |

| Parameter | Description |
|---|---|
| | • **VPNv4:** Select to use the VPNv4 address family here. |
| **Neighbor** | There are two neighbor options here, **IPv4 Address** and **Peer Group**.<br>Select the **IPv4 Address** option and enter the IP address of the neighbor peer here.<br>Select the **Peer Group** option and enter the BGP peer group's name here. This name can be up to 32 characters long. |
| **Advertisement Interval** | Enter the advertisement interval value between the sending of update messages here. The range is from 0 and 600 seconds. By default, this value is 30 seconds for external peers and 5 seconds for internal peers. If a BGP peer group is specified, all the members of the peer group will inherit the setting configured here. |
| **AS Origination Interval** | Enter the AS origination interval value between the sending of AS origination routing update messages here. The range is from 1 and 600 seconds. By default, this value is 15 seconds. |
| **Timers** | Select the **Default** option here to use the default keep-alive and hold-time values. |
| **Keep-Alive** | Enter the keep-alive value for sending keep-alive messages to the specified peer here. The range is from 0 to 65535 seconds. By default, this value is 60 seconds. |
| **Hold Time** | Enter the hold-time value here to declare a pear dead if the keep-alive messages is timeout. The range is from 0 to 65535 seconds. By default, this value is 180 seconds. |
| **Next Hop Self** | Select to enable or disable the next hop self feature here. This feature is used to configure the router as the next hop for a BGP-speaking neighbor or peer-group. |
| **Send Community** | Select to enable or disable the send community feature here. This feature is used to specify to send the specified type of community attributes to a BGP neighbor.<br>• **Standard:** Specifies to send or not to send the standard community.<br>• **Extended:** Specifies to send or not to send the extended community.<br>• **Both:** Specifies to send or not to send both standard and extended community. |
| **Soft Reconfiguration Inbound** | Select to enable or disable the soft reconfiguration inbound feature here. This feature is used to enable the storing of the route information update from the neighbor peer. |
| **Remove Private AS** | Select to enable or disable the remove private AS feature here. This feature is used to remove private autonomous system numbers in the AS path list of the outbound update routes. |
| **Capability Graceful Restart** | Select to enable or disable the capability graceful restart feature here. This feature is used to configure the router to advertise the graceful restart capability to the neighbors. |
| **Description** | Enter the description string that will be used describe the BGP neighbor here. This string can be up to 80 characters long. If a BGP peer group is used, then all the members of the peer group will inherit this description. Select the **Clear** button to clear this description from the BGP neighbor or BGP peer group. |
| **EBGP Multihop** | Enter the eBGP multi-hop value here. This feature is used to allow the router to establish a BGP session with an eBGP peer that is not directly connected to the local peer. The range is from 1 to 255. Select |

| Parameter | Description |
|---|---|
| | the **Default** option to use the default value. |
| **Password** | Enter the BGP neighbor or peer group's clear text password here. The password is used when the TCP connection between BGP neighbors is established. This password can be up to 25 characters long. Select the **Clear** button to clear the password configured. |
| **TCP Reconnect** | Enter the TCP reconnect value here. If the TCP connection to the neighbor fails, BGP will try another TCP connection to the neighbor after the TCP reconnect time. The range is from 1 and 65535 seconds. Select the **Default** option to use the default value, which is 120 seconds. |
| **Update Source** | Select the **Default** option to use the default update source settings. |
| **VID** | Enter the VLAN ID of the interface that will be used here. The range is from 1 to 4094. |
| **Loopback** | Enter the loopback interface's ID that will be used here. The range is from 1 to 8. |
| **Weight** | Enter the weight value here. The BGP weight is an attribute that is assigned by the local router to affect the best path selection on the local router. Use this option to specify the weight to be associated the routes learned from the specified neighbor. The route with highest weight will be chosen as the preferred route. Weight is an attribute which is specified in the ingress direction, and is not an attribute to be advertised with route. It is used to specify preference to routes received from a neighbor over another neighbor. The range is from 0 to 65535. Select the **Default** option to use the default value, which is 0 for routes received from a BGP peer and 32768 for routes sourced by the local route. |
| **Allow AS in** | Select to enable or disable the AS allow feature here. This feature is used to enable routers to allow their own AS appearing in the received BGP update packets. |
| **Allow AS in Value** | Enter the maximum number of local AS, allowed to appear in the AS-path attribute of update packets here. The range is from 1 to 10. If no number is entered, the default value of 3 times is used. |
| **Default Originate** | Select to enable or disable the default originate feature here. Use this feature to inject the default route to a BGP neighbor. The injection of a default route does not require the presence of 0.0.0.0 in the routing table. When the route map is specified, the default route will not be injected unless there is a route in the routing table that is permitted by the route map. If a route map is configured but the route map doesn't exist, it acts as if the route map is not specified. |
| **Route Map Name** | Enter the route map's name here. This name can be up to 16 characters long. |

Click the **Apply** button to accept the changes made.

After clicking the **Please Select** button, the following page will appear.

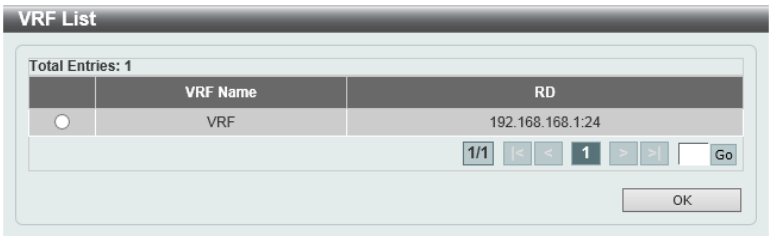



**Figure 6-185 Neighbor General Settings (Please Select) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VRF** | Select the VRF instance from the list that will be used here. |

Click the **OK** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# IP Route Filter

## IP Prefix List

This window is used to view and configure the IP route filter's prefix list settings.

To view the following window, click **L3 Features > IP Route Filter > IP Prefix List**, as shown below:

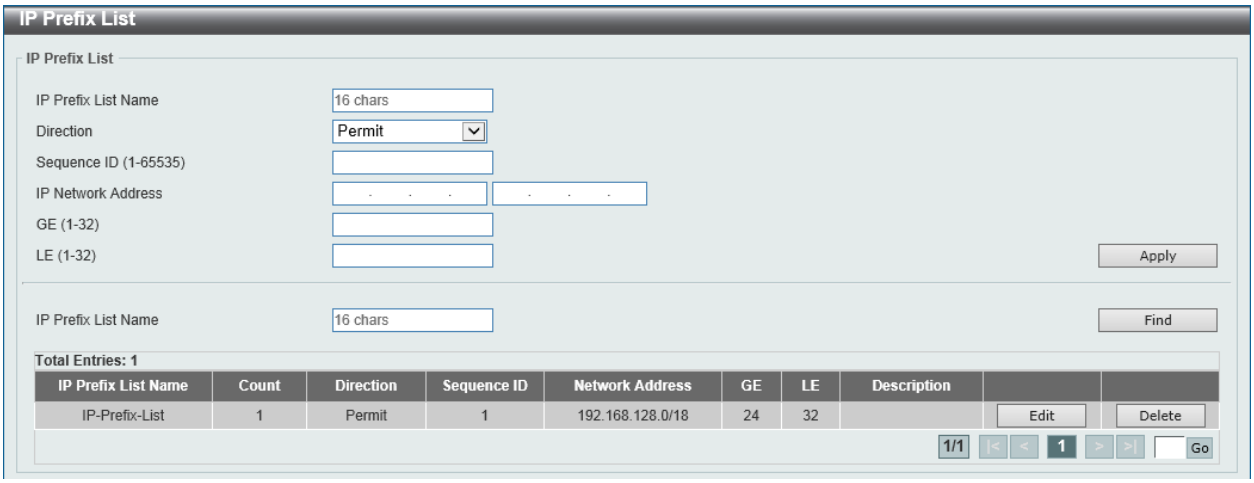



**Figure 6-186 IP Prefix List Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **IP Prefix List Name** | Enter the IP prefix list's name here. This name can be up to 16 characters long. |
| **Direction** | Select the direction for this rule here. Options to choose from are **Permit** and **Deny**.<br>• **Permit:** Specifies that routes that match the rule entry are permitted.<br>• **Deny:** Specifies that routes that match the rule entry are denied. |

| Parameter | Description |
|---|---|
| **Sequence ID** | Enter the sequence ID for this rule here. The range is from 1 to 65535. |
| **IP Network Address** | Enter the starting and ending IPv4 addresses in the range used here. |
| **GE** | Enter the minimum prefix length of the route that can be matched here. The range is from 1 to 32. |
| **LE** | Enter the maximum prefix length of the route that can be matched here. The range is from 1 to 32. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# Route Map

This window is used to view and configure the route map's settings.

To view the following window, click **L3 Features > IP Route Filter > Route Map**, as shown below:

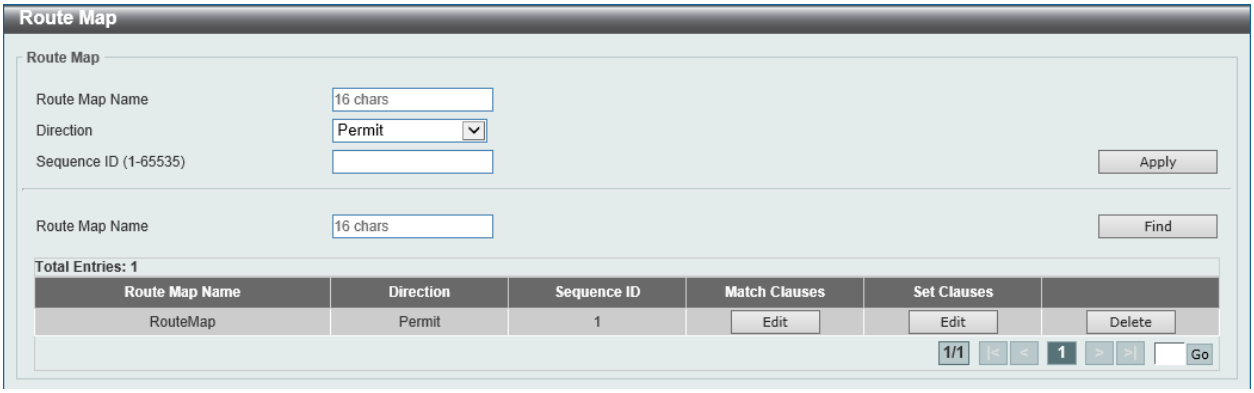



**Figure 6-187 Route Map Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Route Map Name** | Enter the route map's name here. This name can be up to 16 characters long. |
| **Direction** | Select the direction for this rule here. Options to choose from are **Permit** and **Deny**.<br>• **Permit:** Specifies that routes that match the rule entry are permitted.<br>• **Deny:** Specifies that routes that match the rule entry are denied. |
| **Sequence ID** | Enter the sequence ID for this rule here. The range is from 1 to 65535. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button in the **Match Clauses** column, the following page will appear.

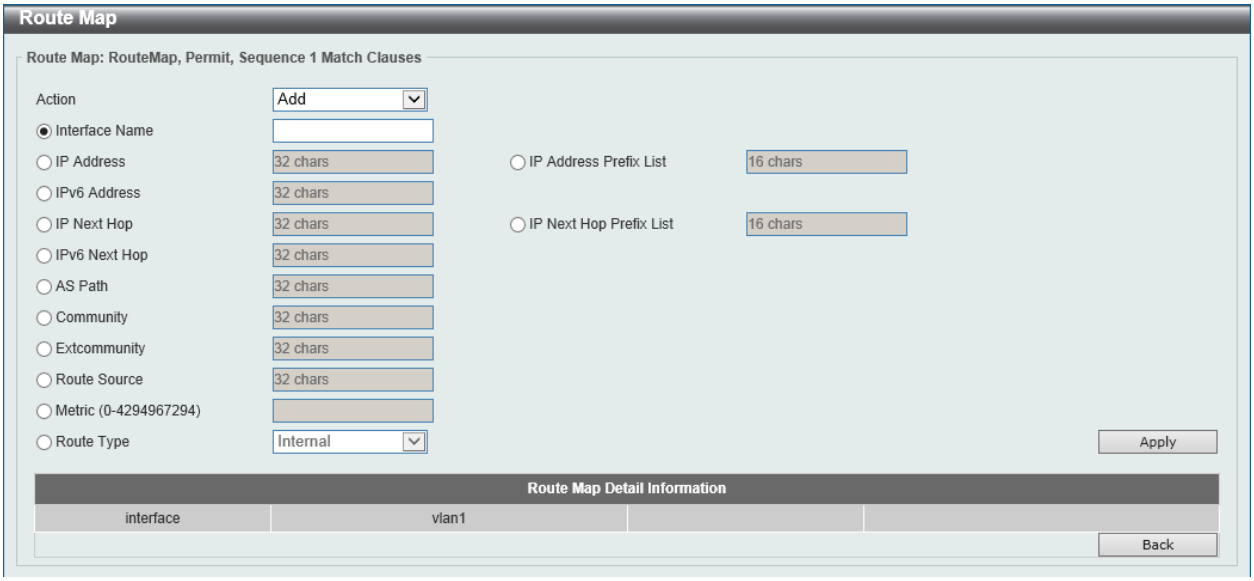



**Figure 6-188 Route Map (Match Clauses, Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |
| **Interface Name** | Select and enter the interface's name that will be used here. This option is used to define a clause to match the route's outgoing interface. |
| **IP Address** | Select and enter the standard or extended IP access list's name here. This option is used to define a clause to match the route based on the standard or extended IP access list. |
| **IP Address Prefix List** | Select and enter the IP prefix list's name here. This option is used to define a clause to match the route based on the IP prefix list. |
| **IPv6 Address** | Select and enter the standard or extended IPv6 access list's name here. This option is used to define a clause to match the route based on the standard or extended IPv6 access list. |
| **IP Next Hop** | Select and enter the standard IP access list's name here. This option is used to define a clause to match the route's next hop based on the standard IP access list. |
| **IP Next Hop Prefix List** | Select and enter the next hop IP prefix list's name here. This option is used to define a clause to match the route's next hop based on the next hop IP prefix list. |
| **IPv6 Next Hop** | Select and enter the standard IPv6 access list's name here. This option is used to define a clause to match the route's next hop based on the standard IPv6 access list. |
| **AS Path** | Select and enter the standard or extended IP/IPv6 access list's name here. This option is used to define a clause to match the route's AS path based on the standard or extended IP/IPv6 access list. |
| **Community** | Select and enter the standard or extended IP/IPv6 access list's name here. This option is used to define a clause to match the route's |

| Parameter | Description |
|---|---|
| | community based on the standard or extended IP/IPv6 access list. |
| **Extcommunity** | Select and enter the standard or extended IP/IPv6 access list's name here. This option is used to define a clause to match the route's extended community based on the standard or extended IP/IPv6 access list. |
| **Route Source** | Select and enter the standard or extended IP/IPv6 access list's name here. This option is used to define a clause to match the route's source based on the standard or extended IP/IPv6 access list. |
| **Metric** | Select and enter the metric value of the route here. The range is from 0 to 4294967294. This option is used to define a clause to match the route's metric. |
| **Route Type** | Select the route type here. Options to choose from are **Internal**, **External**, **External Type-1**, and **External Type-2**.<br>• **Internal:** Specifies the intra-area and inter-area routes of Open Shortest Path First (OSPF).<br>• **External:** Specifies the autonomous system's external route of OSPF. If the type-1 and type-2 options are not specified, type-1 and type-2 external routes are included.<br>• **External Type-1:** Specifies the type-1 external route of OSPF.<br>• **External Type-2:** Specifies the type-2 external route of OSPF. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

After clicking the **Edit** button in the **Set Clauses** column, the following page will appear.

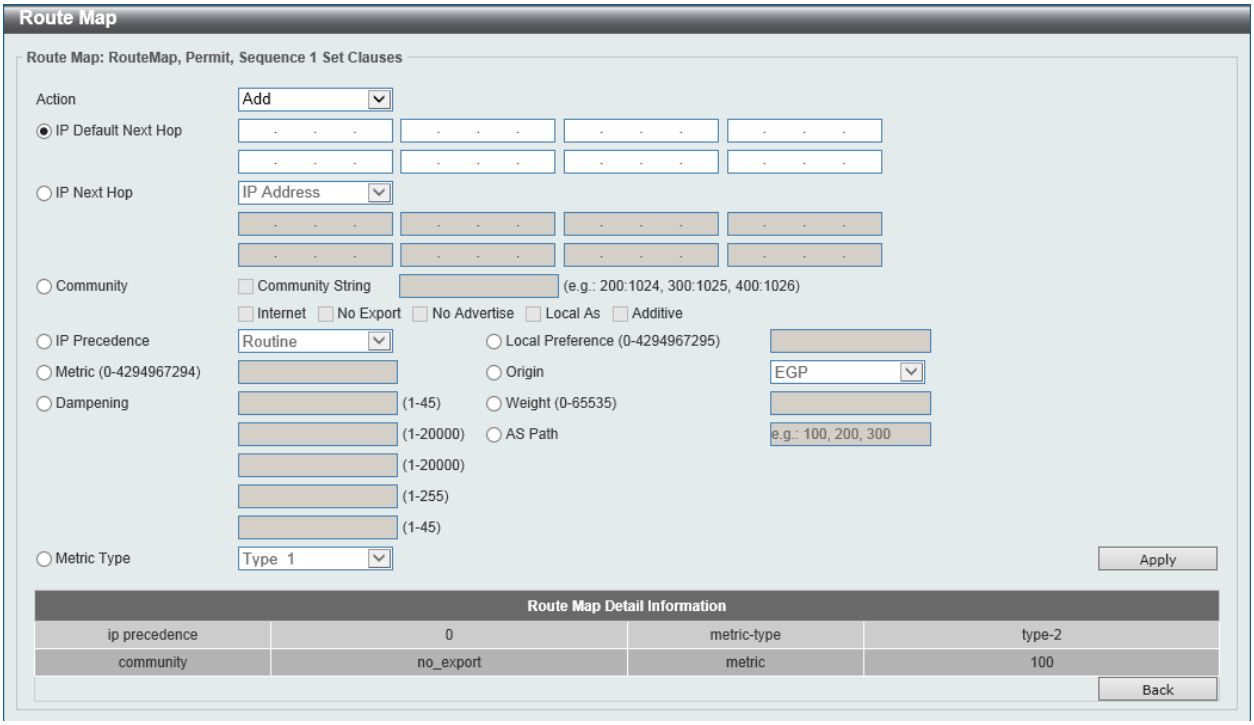



**Figure 6-189 Route Map (Set Clauses, Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Action** | Select **Add** to add a new entry based in the information entered.<br>Select **Delete** to delete an entry based in the information entered. |
| **IP Default Next Hop** | Enter the default next-hop IP addresses in the spaces provided that will be used to route the packet. This feature can be used to specify multiple default next hop routers. If default next hops are already configured, the default next hops configured later will be added to the default next hop list. When the first default next hop router specified is down, the next default next hop router specified is tried in turn to route the packet. Up to 8 default next-hop IP addresses can be entered. |
| **IP Next Hop** | Select the IP next hop type here. This feature is used to configure the next-hop router to route the packet that passes the match clauses of the configured route map sequence. Options to choose from are **IP Address**, **Peer Address**, and **Recursive**.<br>• **IP Address:** Specifies the IP addresses of the next-hops to route the packet. Enter the next-hop IP addresses in the spaces provided here. Up to 8 next-hop IP addresses can be entered.<br>• **Peer Address:** Specifies the BGP peer address as the next-hop.<br>• **Recursive:** Specifies the IP address of the recursive as the next-hop router. Enter the recursive next-hop IP address in the space provided here. |
| **Community** | Select the community option here that will be used in the set match rule. Options to choose from are **Community String**, **Internet**, **No Export**, **No Advertise**, **Local AS**, and **Additive**.<br>• **Community String:** Select and enter the community string here. It can be a user-specified number represented by AA:NN, where AA (AS number) is the upper part of the word and NN (community number, user-specified) is the lower part of the word. Multiple numbers (separated by comma) can be specified.<br>• **Internet:** Specifies routes free to be advertised to all peers.<br>• **No Export:** Specifies not to advertise to external peers.<br>• **No Advertise:** Specifies not to advertise the route to other BGP peers.<br>• **Local AS:** Specifies not to send out of the local AS or sub autonomous system of a confederation.<br>• **Additive:** Specifies to add the specified community to the existing communities. |
| **IP Precedence** | Select the IP precedence option here. Options to choose from are **Routine**, **Priority**, **Immediate**, **Flash**, **Flash Override**, **Critical**, **Internet**, and **Network**. Use this feature to set the precedence value in the IP header. This option only takes effect when policy routing involves the IPv4 packet. |
| **Local Preference** | Select and enter the local preference value here that will be used in the modification. The range is from 0 to 4294967295. |
| **Metric** | Select and enter the metric value here that will be used in the modification. The range is from 0 to 4294967294. |
| **Origin** | Select the origin option here that will be used in the modification. Options to choose from are **EGP**, **IGP**, and **Incomplete**.<br>• **IGP:** Specifies that the prefix is originated from an Interior Gateway Protocol.<br>• **EGP:** Specifies that the prefix is originated from an Exterior Gateway Protocol.<br>• **Incomplete:** Specifies that the prefix is originated from an unknown source. |
| **Dampening** | Select and enter the dampening values here. There are 5 places |

| Parameter | Description |
|---|---|
| | where we can enter value here. They are listed below in order from top to bottom:<br>• **Half-Life:** Enter the half-life time value here after which the penalty of the reachable routes is decreased by half. The range is from 1 to 45 minutes.<br>• **Re-Use:** Enter the re-use value here. This specifies that if the penalty of a route is lower than this value, the route is unsuppressed. The range is 1 to 20000.<br>• **Suppress:** Enter the suppress value here. This specifies that if the penalty of a route is higher than this value, the route is suppressed. The range is from 1 to 20000.<br>• **Maximum Suppress Time:** Enter the maximum suppress time value here that a route can be suppressed. The range is from 1 to 255 minutes.<br>• **Unreachability Half-Life:** Enter the unreachability half-life time value here after which the penalty of the unreachable routes is decreased by half. The range is from 1 to 45 minutes. |
| **Weight** | Select and enter the weight value here that will be used in the modification. The range is from 0 to 65535. |
| **AS Path** | Select and enter the AS path value here that will be used in the modification. |
| **Metric Type** | Select the metric type here that will be used in the modification. Options to choose from are **Type-1** and **Type-2**.<br>• **Type-1:** Specifies to use the OSPF external type-1 metric.<br>• **Type-2:** Specifies to use the OSPF external type-2 metric. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

# Policy Route

This window is used to view and configure the policy route settings.

To view the following window, click **L3 Features > Policy Route**, as shown below:

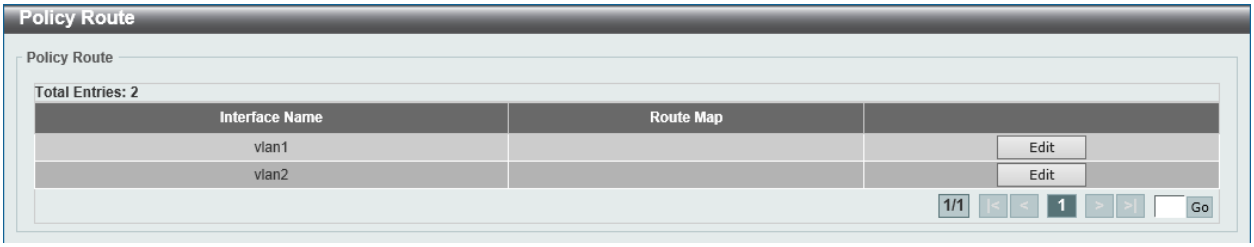



**Figure 6-190 Policy Route Window**

Click the **Edit** button to modify the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

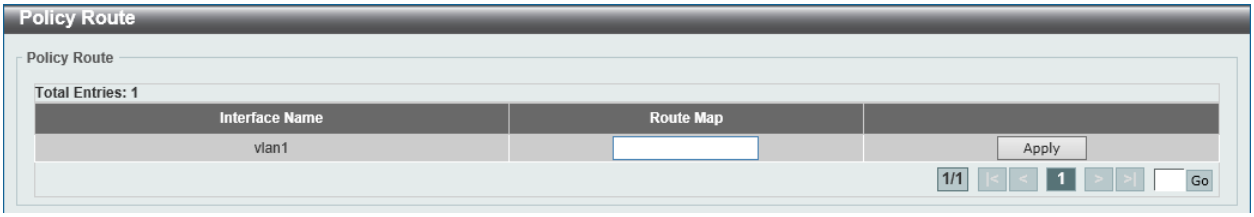



**Figure 6-191 Policy Route (Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Route Map** | Enter the route map's name here that will be used in this policy route entry. |

Click the **Apply** button to accept the changes made.

# VRRP Settings

This window is used to view and configure the Virtual Router Redundancy Protocol (VRRP) feature's settings. All routers in the same VRRP group must be configured with the same virtual router ID and IP address.

A virtual router group is represented by a virtual router ID. The IP address of the virtual router is the default router configured on hosts. The virtual router's IP address can be a real address configured on the routers, or an unused IP address. If the virtual router address is a real IP address, the router that has this IP address is the IP address owner.

A master will be elected in a group of routers that supports the same virtual routers. Others are the backup routers. The master is responsible for forwarding the packets that are sent to the virtual router.

To view the following window, click **L3 Features > VRRP Settings**, as shown below:

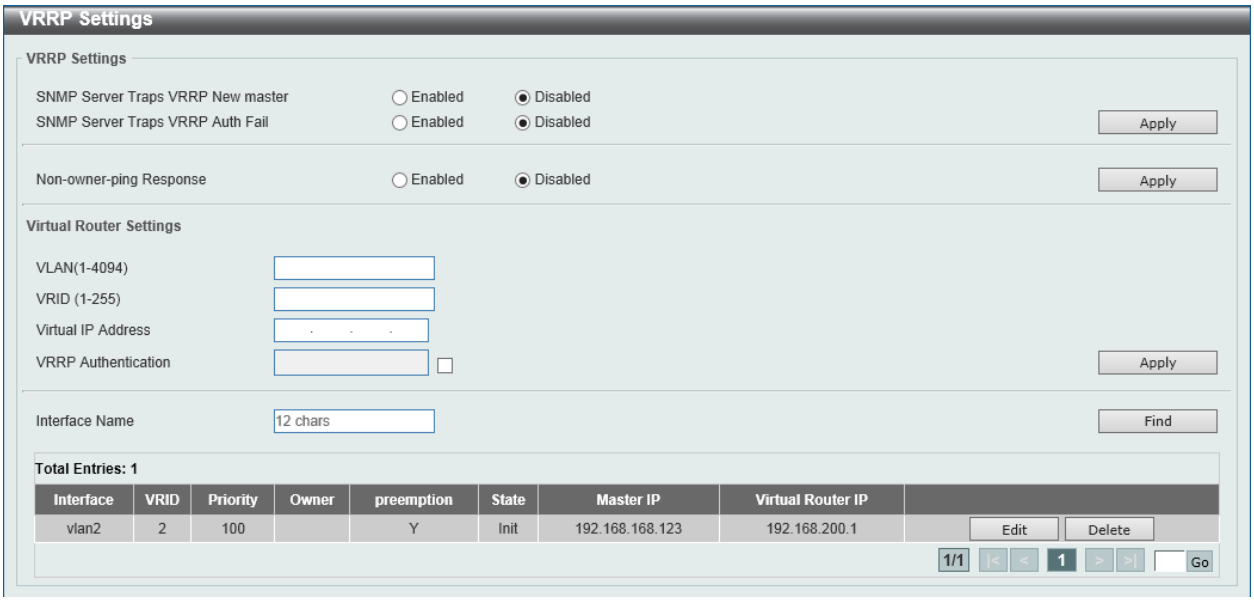



**Figure 6-192 VRRP Settings Window**

The fields that can be configured in **VRRP Settings** are described below:

| Parameter | Description |
|---|---|
| **SNMP Server Traps VRRP New master** | Select to enable or disable the SNMP server traps feature for the new VRRP master. If enabled, once the device has transitioned to the master state, a trap will be sent out. |
| **SNMP Server Traps VRRP Auth Fail** | Select to enable or disable the SNMP server traps feature for authentication failures. If enabled, if a packet has been received from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication type, then a trap will be sent out. |
| **Non-owner-ping Response** | Select to enable or disable the non-owner ping response feature here. This feature is used to enable the virtual router in the master state to respond to ICMP echo requests for an IP address not owned but associated with this virtual router. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Virtual Router Settings** are described below:

| Parameter | Description |
|---|---|
| **VLAN** | Enter the VLAN interface's ID used here. The range is from 1 to 4094. |
| **VRID** | Enter the virtual router's ID used here. This ID is used to identify the virtual router in the VRRP group. The range is from 1 to 255. |
| **Virtual IP Address** | Enter the IPv4 address for the created virtual router group here. |
| **VRRP Authentication** | Select to enable and then enter the plain text authentication password for VRRP authentication on the interface here. This string can be up to 8 characters long. The authentication is applied to all virtual routers on this interface. The devices in the same VRRP group must have the same authentication password. |
| **Interface Name** | Enter the interface's name used here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.


**Figure 6-193 VRRP Settings (Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Advertisement Interval** | Enter the advertisement interval value here. This is the time interval between successive VRRP advertisements by the master router. The range is from 1 to 255 seconds. By default, this value is 1 second. |
| **Preemption** | Select to enable or disable the preemption feature here. This feature is used to allow a router to take over the master role if it has a better priority than the current master. |
| **Priority** | Enter the priority value here. The range is from 1 to 254. |
| **Critical IP Address** | Enter the critical IPv4 address here. If the critical IP is configured on one virtual router, the virtual router cannot be activated when the critical IP address is unreachable. One VRRP group can only track one critical IP. |
| **Shutdown** | Select to enable or disable the shutdown feature here. This feature is used to disable a virtual router on an interface. Avoid the common mistake of shutting down the IP address owner router before shutting down other non-owner routers. |

Click the **Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

# 7. Quality of Service (QoS)

***Basic Settings***
***Advanced Settings***
***QoS PFC***
***WRED***
***ETS***
***QCN***

## Basic Settings

### Port Default CoS

This window is used to view and configure the port's default CoS settings.

To view the following window, click **QoS > Basic Settings > Port Default CoS**, as shown below:

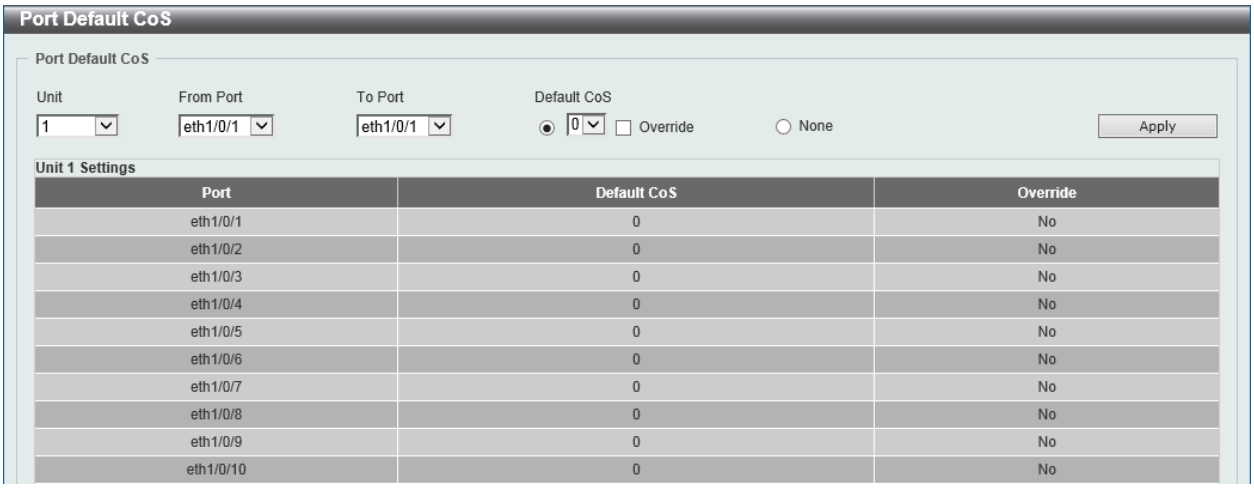



**Figure 7-1 Port Default CoS Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Default CoS** | Select the default CoS option for the port(s) specified here. Options to choose from are 0 to 7. Select the **Override** option to override the CoS of the packets. The default CoS will be applied to all incoming packets, tagged or untagged, received by the port. Select the **None** option to specify that the CoS of the packets will be the packet's CoS if the packets are tagged, and will be the port default CoS if the packet is untagged. |

Click the **Apply** button to accept the changes made.

### Port Scheduler Method

This window is used to view and configure the port scheduler method settings. To view the following window, click **QoS > Basic Settings > Port Scheduler Method**, as shown below:

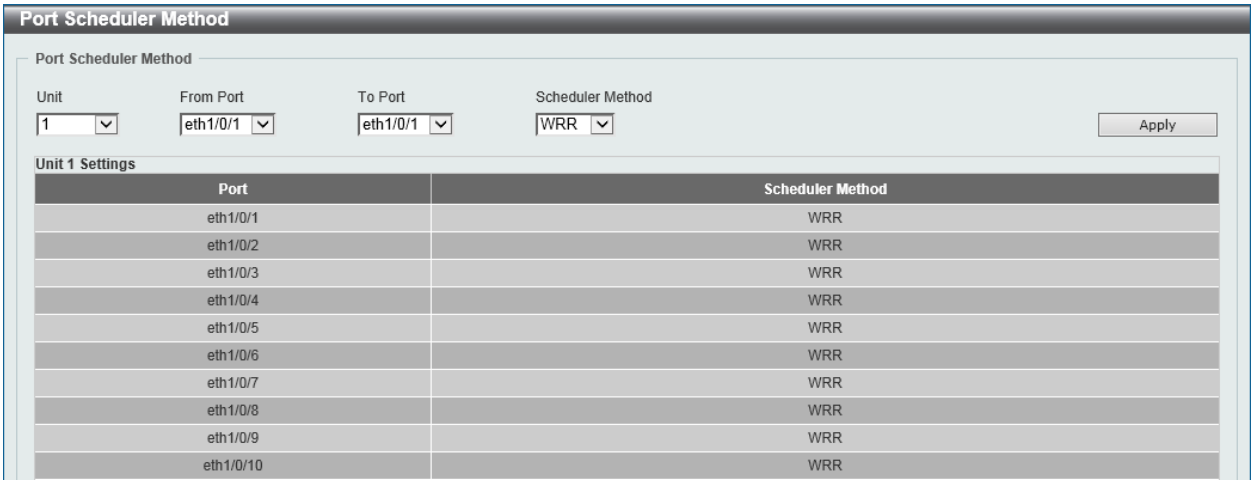



**Figure 7-2 Port Scheduler Method Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Scheduler Method** | Select the scheduler method that will be applied to the specified port(s). Options to choose from are Strict Priority (**SP**), Round-Robin (**RR**), Weighted Round-Robin (**WRR**), Weighted Deficit Round-Robin (**WDRR**), and Enhanced Transmission Selection (**ETS**). By default, the output queue scheduling algorithm is **WRR**.<br>• **Strict Priority (SP)** specifies that all queues use strict priority scheduling. It provides strict priority access to the queues from the highest CoS queue to the lowest.<br>• **Round-Robin (RR)** specifies that all queues use round-robin scheduling. It provides fair access to service a single packet at each queue before moving on to the next one.<br>• **Weighted Round-Robin (WRR)** operates by transmitting permitted packets into the transmit queue in a round robin order. Initially, each queue sets its weight to a configurable weighting. Every time a packet from a higher priority CoS queue is sent, the corresponding weight is subtracted by 1 and the packet in the next lower CoS queue will be serviced. When the weight of a CoS queue reaches zero, the queue will not be serviced until its weight is replenished. When weights of all CoS queues reach 0, the weights get replenished at a time.<br>• **Weighted Deficit Round-Robin (WDRR)** operates by serving an accumulated set of backlogged credits in the transmit queue in a round robin order. Initially, each queue sets its credit counter to a configurable quantum value. Every time a packet from a CoS queue is sent, the size of the packet is subtracted from the corresponding credit counter and the service right is turned over to the next lower CoS queue. When the credit counter drops below 0, the queue is no longer serviced until its credits are replenished. When the credit counters of all CoS queues reaches 0, the credit counters will be replenished at that time. All packets are serviced until their credit counter is zero or negative and the last packet is transmitted completely. When this condition happens, the credits are replenished. When the credits are replenished, a quantum of credits are added to each CoS queue credit counter. The quantum for each CoS queue may be |

| Parameter | Description |
|---|---|
| | different based on the user configuration.<br>To set a CoS queue in the **SP** mode, any higher priority CoS queue must also be in the strict priority mode.<br>• **Enhanced Transmission Selection (ETS)** provides bandwidth allocation on converged links in end stations and bridges in a Data Center Bridging (DCB) environment. Using bandwidth allocations, different traffic classes within different traffic types such as LAN, SAN, IPC and management can be configured to provide bandwidth allocation, low-latency or best effort transmit characteristics. |

Click the **Apply** button to accept the changes made.

# Queue Settings

This window is used to view and configure the queue settings.

To view the following window, click **QoS > Basic Settings > Queue Settings**, as shown below:

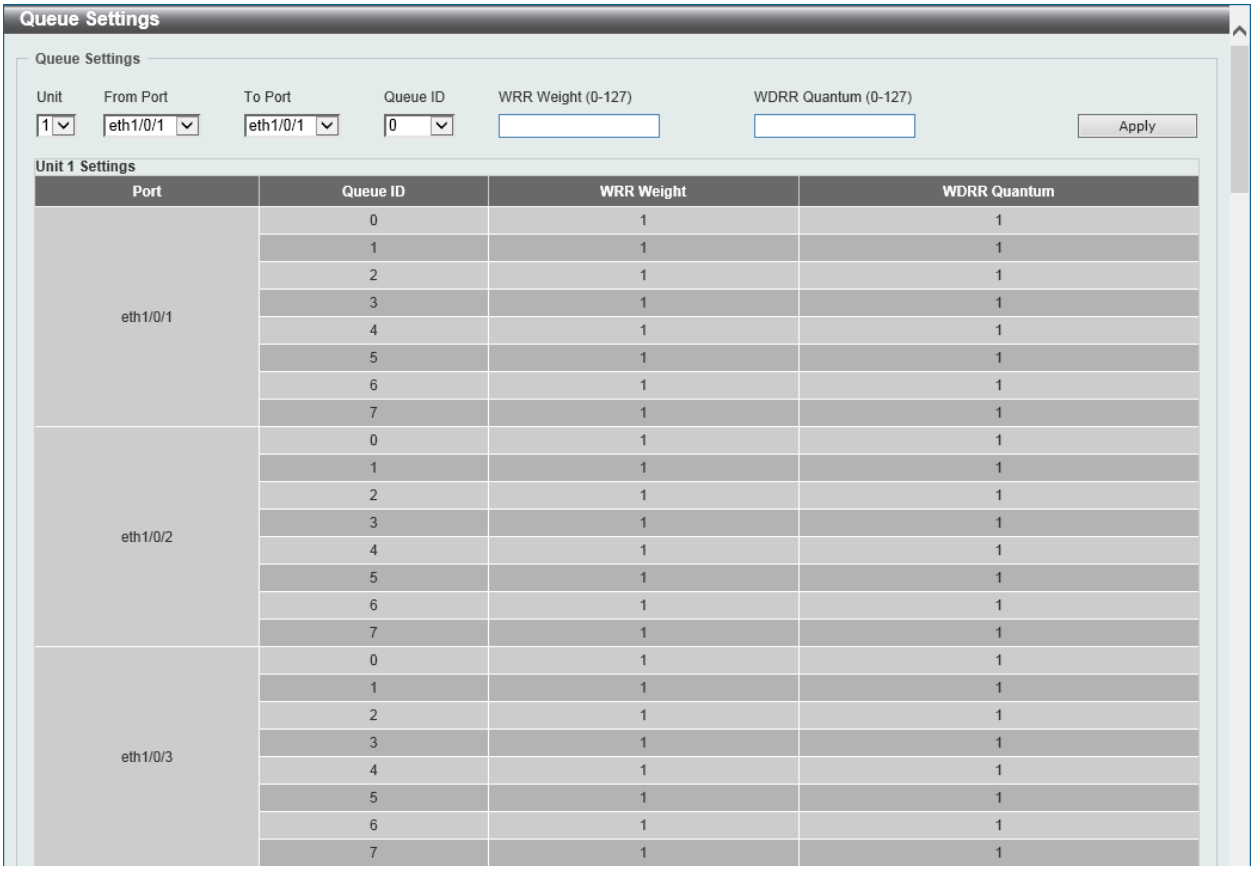



**Figure 7-3 Queue Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Queue ID** | Enter the queue ID value here. This value must be between 0 and 7. |

| Parameter | Description |
|---|---|
| **WRR Weight** | Enter the WRR weight value here. This value must be between 0 and 127. To satisfy the behavior requirements of Expedited Forwarding (EF), the highest queue is always selected by the Per-hop Behavior (PHB) EF and the schedule mode of this queue should be strict priority scheduling. So the weight of the last queue should be zero while the Differentiate Service is supported. |
| **WDRR Quantum** | Enter the WDRR quantum value here. This value must be between 0 and 127. |

Click the **Apply** button to accept the changes made.

# CoS to Queue Mapping

This window is used to view and configure the CoS-to-Queue mapping settings.

To view the following window, click **QoS > Basic Settings > CoS to Queue Mapping**, as shown below:

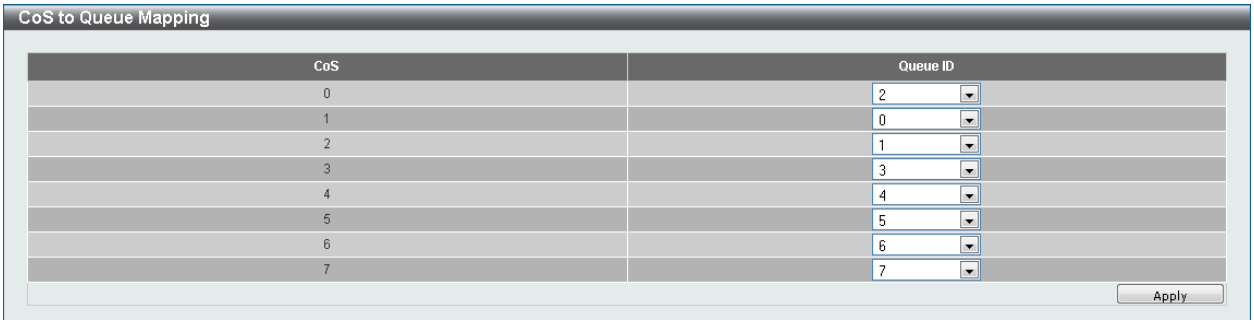



**Figure 7-4 CoS to Queue Mapping Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Queue ID** | Select the queue ID that will be mapped to the corresponding CoS value. Options to choose from are 0 to 7. |

Click the **Apply** button to accept the changes made.

# Port Rate Limiting

This window is used to view and configure the port rate limiting settings.

To view the following window, click **QoS > Basic Settings > Port Rate Limiting**, as shown below:

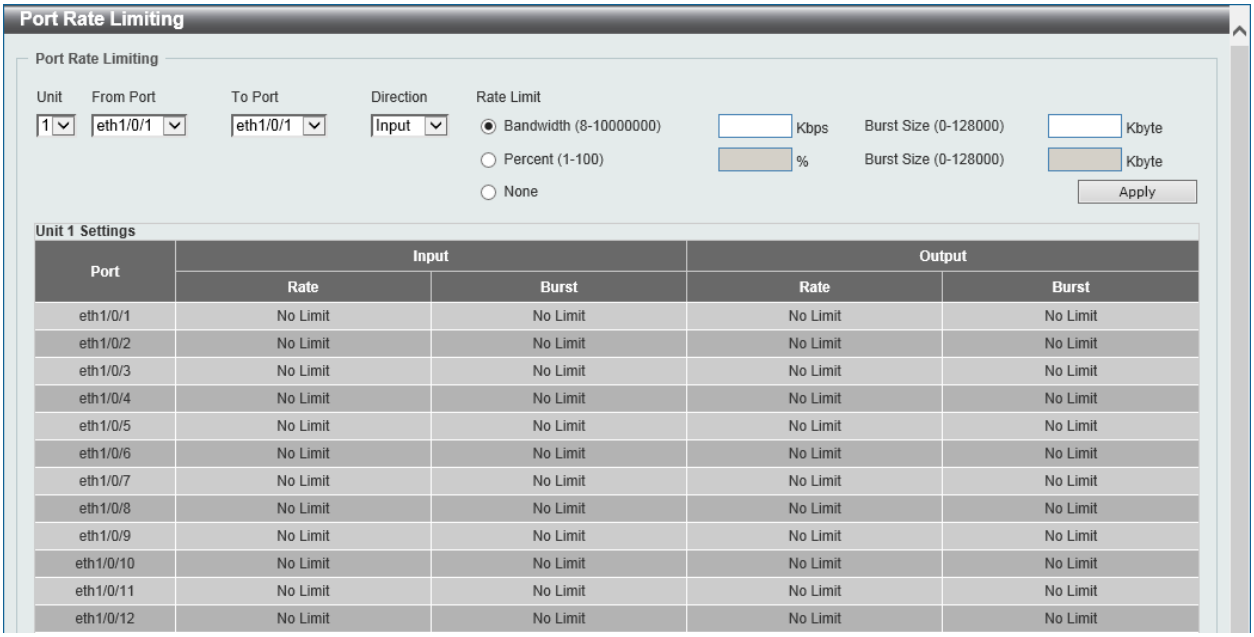



**Figure 7-5 Port Rate Limiting Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Direction** | Select the direction option here. Options to choose from are **Input** and **Output**. When **Input** is selected, the rate limit for ingress packets is configured. When **Output** is selected, the rate limit for egress packets is configured. |
| **Rate Limit** | Select and enter the rate limit value here.<br>• When **Bandwidth** is selected, enter the input/output bandwidth value used in the space provided. This value must be between 8 and 10000000 kbps. Also, enter the **Burst Size** value in the space provided. This value must be between 0 and 128000 kilobytes.<br>• When **Percent** is selected, enter the input/output bandwidth percentage value used in the space provided. This value must be between 1 and 100 percent (%). Also, enter the **Burst Size** value in the space provided. This value must be between 0 and 128000 kilobytes.<br>• Select the **None** option to remove the rate limit on the specified port(s). The specified limitation cannot exceed the maximum speed of the specified interface. For the ingress bandwidth limitation, the ingress will send a pause frame or a flow control frame when the received traffic exceeds the limitation. |

Click the **Apply** button to accept the changes made.

# Queue Rate Limiting

This window is used to view and configure the queue rate limiting settings.

To view the following window, click **QoS > Basic Settings > Queue Rate Limiting**, as shown below:

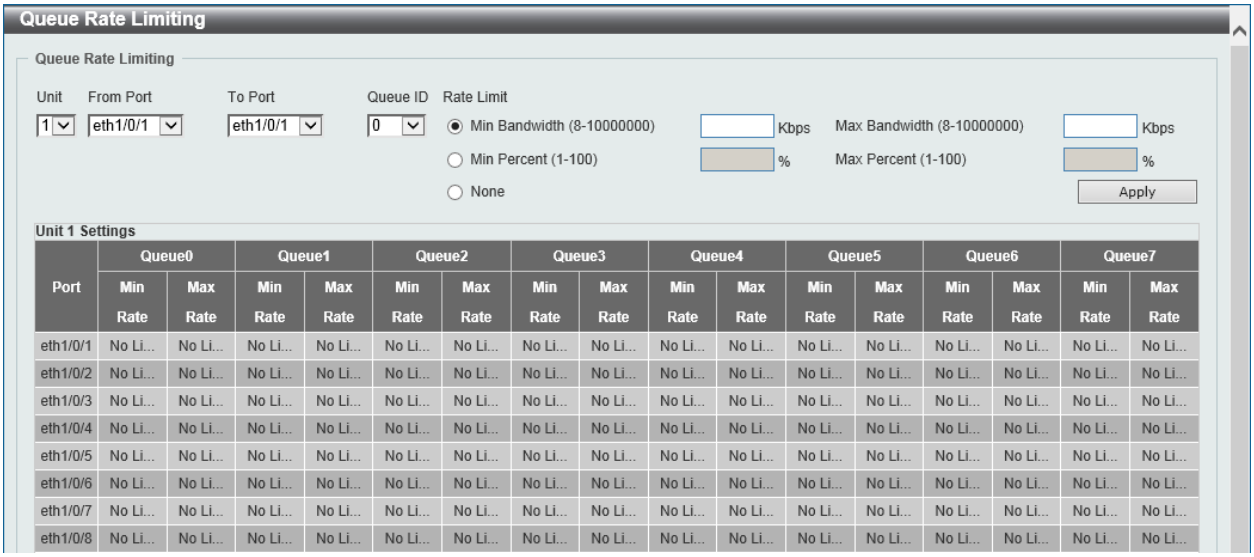



**Figure 7-6 Queue Rate Limiting Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Queue ID** | Select the queue ID that will be configured here. Options to choose from are 0 to 7. |
| **Rate Limit** | Select and enter the queue rate limit settings here.<br>• When the **Min Bandwidth** option is selected, enter the minimum bandwidth rate limit value in the space provided. This value must be between 8 and 10000000 kbps. Also enter the maximum bandwidth (**Max Bandwidth**) rate limit in the space provided. This value must be between 8 and 10000000 kbps.<br>When the minimal bandwidth is configured, the packet transmitted from the queue can be guaranteed. When the maximum bandwidth is configured, packets transmitted from the queue cannot exceed the maximum bandwidth even if the bandwidth is available.<br>When configuring the minimal bandwidth, the aggregate of the configured minimum bandwidth must be less than 75 percent of the interface bandwidth to make sure the configured minimal bandwidth can be guaranteed. It is not necessary to set the minimum guaranteed bandwidth for the highest strict priority queue. This is because the traffic in this queue will be serviced first if the minimal bandwidth of all queues is satisfied.<br>The configuration of this command can only be attached to a physical port but not a port-channel. That is the minimum guaranteed bandwidth of one CoS cannot be used across physical ports.<br>• When the **Min Percent** option is selected, enter the minimum bandwidth percentage value in the space provided. This value must be between 1 and 100 percent (%). Also enter the maximum percentage value (**Max Percent**) in the space provided. This value must be between 1 and 100 percent (%). |

Click the **Apply** button to accept the changes made.

# Advanced Settings

## DSCP Mutation Map

This window is used to view and configure the Differentiated Services Code Point (DSCP) mutation map settings. When a packet is received by an interface, based on a DSCP mutation map, the incoming DSCP can be mutated to another DSCP immediately before any QoS operations. The DSCP mutation is helpful to integrate domains with different DSCP assignments. The DSCP-CoS map and DSCP-color map will still be based on the packet's original DSCP. All the subsequent operations will base on the mutated DSCP.

To view the following window, click **QoS > Advanced Settings > DSCP Mutation Map**, as shown below:

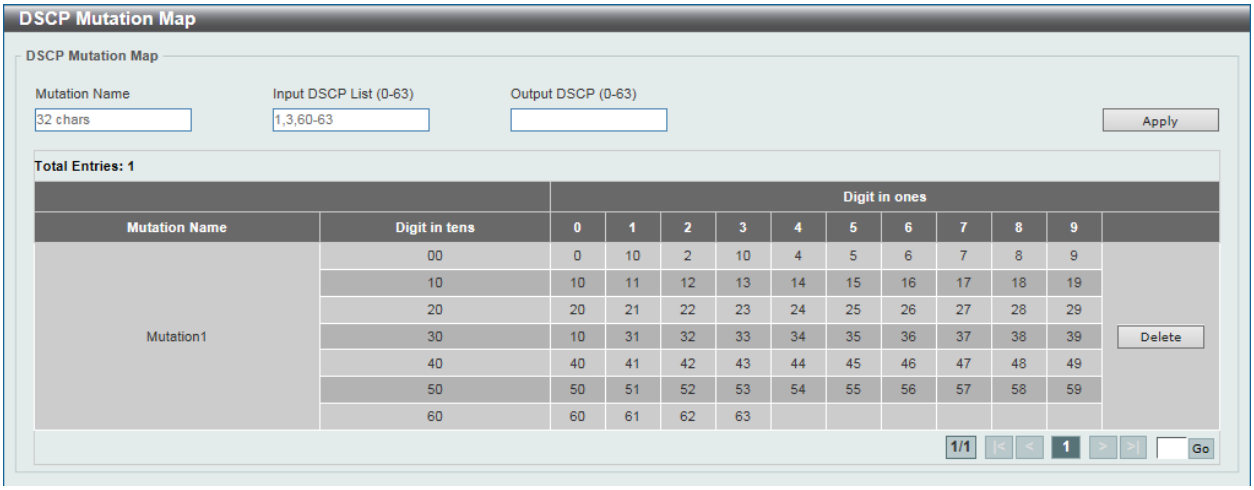



**Figure 7-7 DSCP Mutation Map Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Mutation Name** | Enter the DSCP mutation map name here. This name can be up to 32 characters long. |
| **Input DSCP List** | Enter the input DSCP list value here. This value must be between 0 and 63. |
| **Output DSCP List** | Enter the output DSCP list value here. This value must be between 0 and 63. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

## Port Trust State and Mutation Binding

This window is used to view and configure port trust state and mutation binding settings.

To view the following window, click **QoS > Advanced Settings > Port Trust State and Mutation Binding**, as shown below:

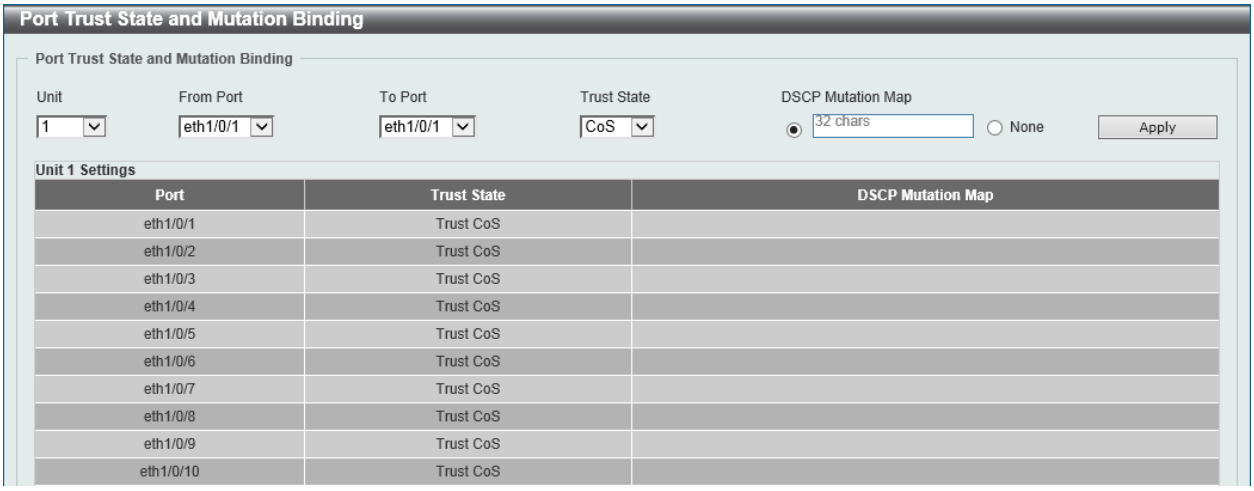



**Figure 7-8 Port Trust State and Mutation Binding Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Trust State** | Select the port trust state option here. Options to choose from are **CoS** and **DSCP**. |
| **DSCP Mutation Map** | Select and enter the DSCP mutation map name used here. This name can be up to 32 characters long. Select the **None** option to not allocate a DSCP mutation map to the port(s). |

Click the **Apply** button to accept the changes made.

# DSCP CoS Mapping

This window is used to view and configure the DSCP CoS mapping settings.

To view the following window, click **QoS > Advanced Settings > DSCP CoS Mapping**, as shown below:


**Figure 7-9 DSCP CoS Mapping Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **CoS** | Select the CoS value to map to the DSCP list. Options to choose from are 0 to 7. |
| **DSCP List** | Enter the DSCP list value to map to the CoS value here. This value must be between 0 and 63. |

Click the **Apply** button to accept the changes made.

# CoS Color Mapping

This window is used to view and configure the CoS color mapping settings.

To view the following window, click **QoS > Advanced Settings > CoS Color Mapping**, as shown below:

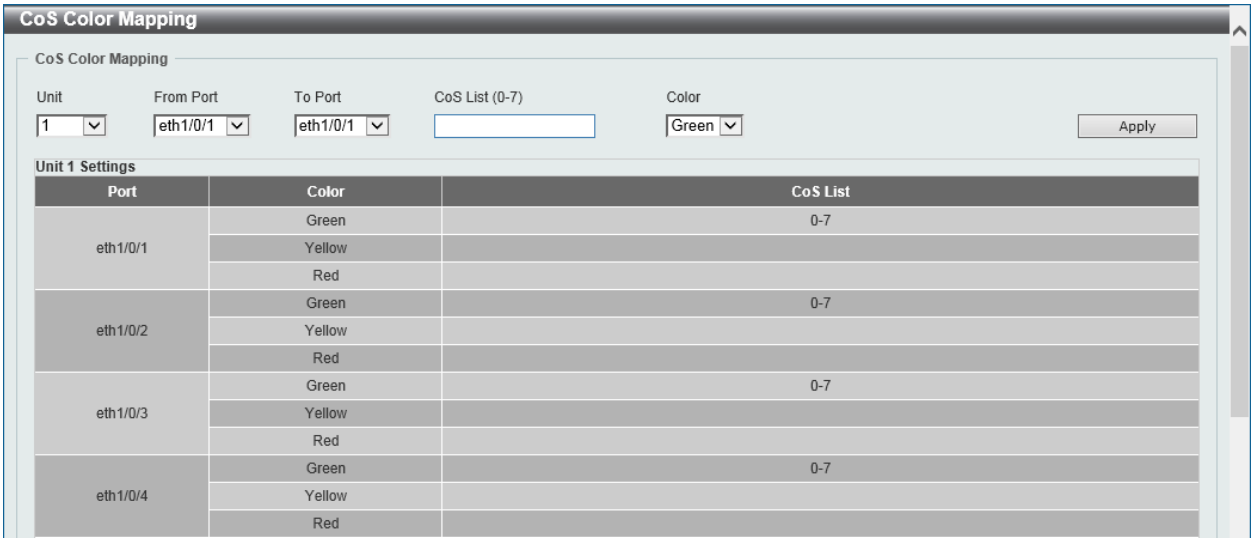



**Figure 7-10 CoS Color Mapping Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **CoS List** | Enter the CoS value that will be mapped to the color. This value must be between 0 and 7. |
| **Color** | Select the color option that will be mapped to the CoS value. Options to choose from are **Green**, **Yellow**, and **Red**. |

Click the **Apply** button to accept the changes made.

# DSCP Color Mapping

This window is used to view and configure the DSCP color mapping settings.

To view the following window, click **QoS > Advanced Settings > DSCP Color Mapping**, as shown below:

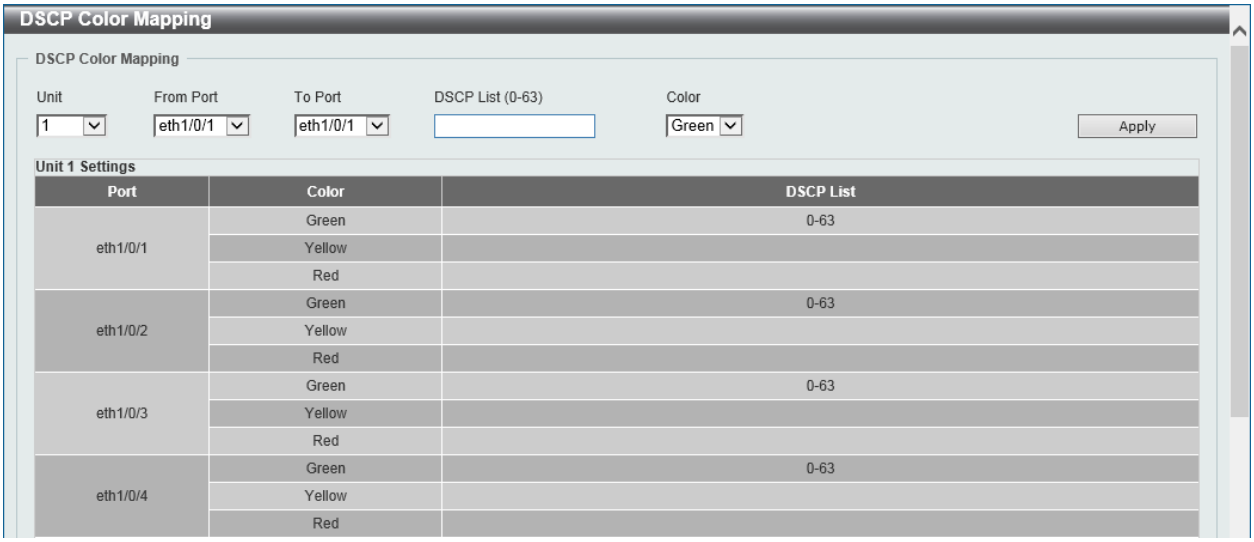



**Figure 7-11 DSCP Color Mapping Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **DSCP List** | Enter the DSCP list value here that will be mapped to a color. This value must be between 0 and 63. |
| **Color** | Select the color option that will be mapped to the DSCP value. Options to choose from are **Green**, **Yellow**, and **Red**. |

Click the **Apply** button to accept the changes made.

# Class Map

This window is used to view and configure the class map settings.

To view the following window, click **QoS > Advanced Settings > Class Map**, as shown below:


**Figure 7-12 Class Map Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Class Map Name** | Enter the class map name here. This name can be up to 32 characters long. |
| **Multiple Match Criteria** | Select the multiple match criteria option here. Options to choose from are **Match All** and **Match Any**. |

Click the **Apply** button to accept the changes made.

Click the **Match** button to configure the specific entry.

Click the **Delete** button to remove the specific entry.

After clicking the **Match** button, the following page will be available.

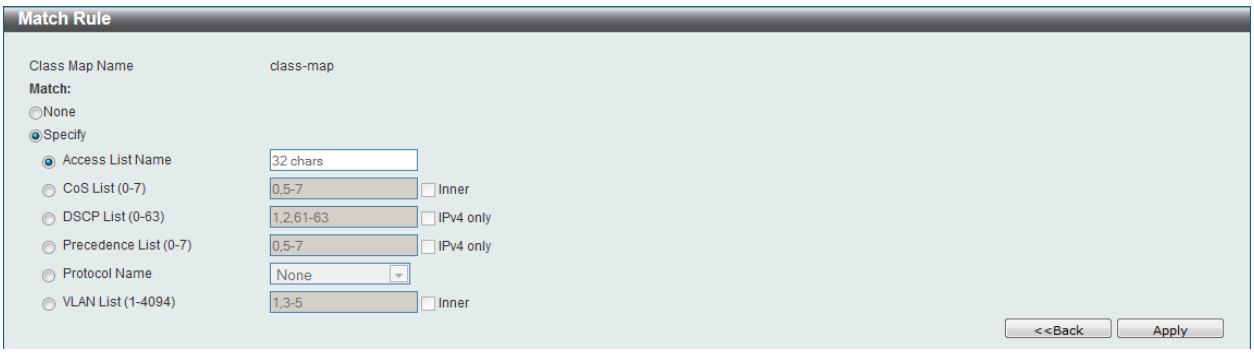



**Figure 7-13 Class Map (Match) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **None** | Select this option to match nothing to this class map. |
| **Specify** | Select the option to match something to this class map. |
| **Access List Name** | Select and enter the access list name that will be matched with this class map here. This name can be up to 32 characters long. |
| **CoS List** | Select and enter the CoS list value that will be matched with this class map here. This value must be between 0 and 7. Tick the **Inner** option to match the inner most CoS of QinQ packets on a Layer 2 class of service (CoS) marking. |
| **DSCP List** | Select and enter the DSCP list value that will be matched with this class map here. This value must be between 0 and 63. Tick the **IPv4 only** option to match IPv4 packets only. If not specified, the match is for both IPv4 and IPv6 packets. |
| **Precedence List** | Select and enter the precedence list value that will be matched with this class map here. This value must be between 0 and 7. Tick the **IPv6 only** option to match IPv6 packets only. If not specified, the match is for both IPv4 and IPv6 packets. For IPv6 packets, the precedence is most three significant bits of traffic class of IPv6 header. |
| **Protocol Name** | Select the protocol name that will be matched with the class map here. Options to choose from are **ARP**, **BGP**, **DHCP**, **DNS**, **EGP**, **FTP**, **IPv4**, **IPv6**, **NetBIOS**, **NFC**, **NTP**, **OSPF**, **PPPOE**, **RIP**, **RSTP**, **SSH**, **Telnet**, and **TFTP**. |
| **VLAN List** | Select and enter the VLAN list value that will be matched with the class map here. This value must be between 1 and 4094. Tick the **Inner** option to match the inner-most VLAN ID in an 802.1Q double tagged frame. |

Click the **Apply** button to accept the changes made.

Click the **<<Back** button to discard the changes made and return to the previous page.

# Aggregate Policer

This window is used to view and configure the aggregate policer settings.

To view the following window, click **QoS > Advanced Settings > Aggregate Policer**, as shown below:

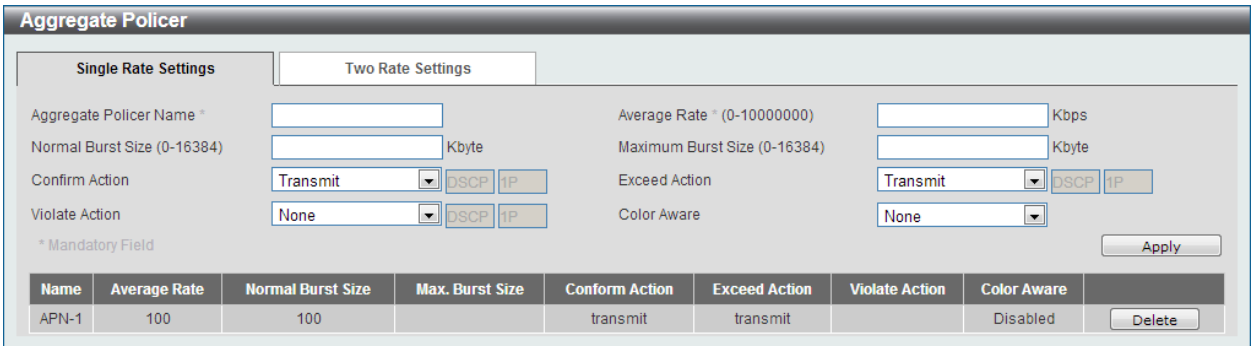



**Figure 7-14 Aggregate Policer (Single Rate Setting) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Aggregate Policer Name** | Enter the aggregate policer's name here. |
| **Average Rate** | Enter the average rate value here. This value must be between 0 and 10000000 kbps. |
| **Normal Burst Size** | Enter the normal burst size value here. This value must be between 0 and 16384 Kbytes. |
| **Maximum Burst Size** | Enter the maximum burst size value here. This value must be between 0 and 16384 Kbytes. |
| **Confirm Action** | Select the confirm action here. The confirm action specifies the action to take on green color packets. If the confirm action is not specified, the default action is to **Transmit**. Options to choose from are **Drop**, **Set-DSCP-Transmit**, **Set-1P-Transmit**, **Transmit**, and **Set-DSCP-1P**.<br>• When selecting the **Drop** option, the packet will be dropped.<br>• When selecting the **Set-DSCP-Transmit** option, enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value.<br>• When selecting the **Set-1P-Transmit** option, enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value.<br>• When selecting the **Set-DSCP-1P** option, enter the IP DSCP and 1P transmit values in the spaces provided.<br>• When selecting the **Transmit** option, packets will be transmitted unaltered. |
| **Exceed Action** | Select the exceed action here. The exceed action specifies the action to take on packets that exceed the rate limit. For a two rate policer, if the exceed action is not specified, the default action is **Drop**. Options to choose from are **Drop**, **Set-DSCP-Transmit**, **Set-1P-Transmit**, **Transmit**, and **Set-DSCP-1P**.<br>• When selecting the **Drop** option, the packet will be dropped.<br>• When selecting the **Set-DSCP-Transmit** option, enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value.<br>• When selecting the **Set-1P-Transmit** option, enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value.<br>• When selecting the **Set-DSCP-1P** option, enter the IP DSCP and 1P transmit values in the spaces provided.<br>• When selecting the **Transmit** option, packets will be transmitted unaltered. |
| **Violate Action** | Select the violate action here. The violate action specifies the action to take on packets that violate the normal and maximum burst sizes for singe rate policing. It specifies the action to take for those packets that did not conform to both CIR and PIR. For a single rate policer, if the violate action is not specified, it will create a single-rate two-color policer. For a two-rate policer, if the violation action is not specified, the default action is equal to the exceed action. Options to choose from are **Drop**, **Set-DSCP-Transmit**, **Set-1P-Transmit**, **Transmit**, and **Set-DSCP-1P**.<br>• When selecting the **Drop** option, the packet will be dropped.<br>• When selecting the **Set-DSCP-Transmit** option, enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value.<br>• When selecting the **Set-1P-Transmit** option, enter the 1P |

| Parameter | Description |
|---|---|
| | transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value.<br>• When selecting the **Set-DSCP-1P** option, enter the IP DSCP and 1P transmit values in the spaces provided.<br>• When selecting the **Transmit** option, packets will be transmitted unaltered. |
| **Color Aware** | Select the color aware option here. Options to choose from are **None** and **Enabled**. When color aware is not specified, the policer works in the color blind mode. When color aware is enabled, the policer works in the color aware mode. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

After selecting the **Two Rate Setting** tab option, at the top of the page, the following page will be available.

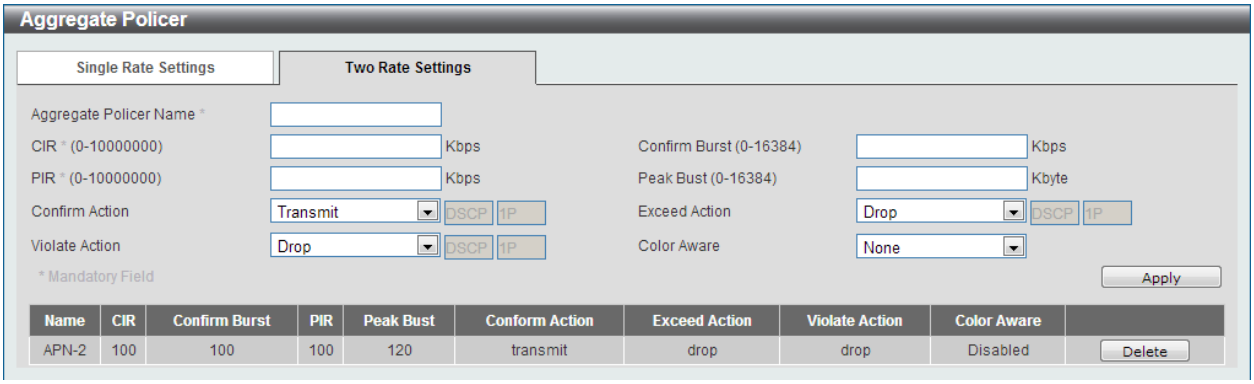



**Figure 7-15 Aggregate Policer (Two Rate Setting) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Aggregate Policer Name** | Enter the aggregate policer's name here. |
| **CIR** | Enter the Committed Information Rate (CIR) value here. This value must be between 0 and 10000000 kbps. The committed packet rate is the first token bucket for the two-rate metering. |
| **Confirm Burst** | Enter the confirm burst value here. This value must be between 0 and 16384 Kbytes. The confirm burst value specifies the burst size for the first token bucket in kbps. |
| **PIR** | Enter the Peak information Rate (PIR) value here. This value must be between 0 and 10000000 kbps. The peak information rate is the second token bucket for the two-rate metering. |
| **Peak Burst** | Enter the peak burst value here. This value must be between 0 and 16384 Kbytes. The peak burst value is the burst size for the second token bucket in kilobytes. |
| **Confirm Action** | Select the confirm action here. The confirm action specifies the action to take on green color packets. If the confirm action is not specified, the default action is to **Transmit**. Options to choose from are **Drop**, **Set-DSCP-Transmit**, **Set-1P-Transmit**, **Transmit**, and **Set-DSCP-1P**.<br>• When selecting the **Drop** option, the packet will be dropped.<br>• When selecting the **Set-DSCP-Transmit** option, enter the IP |

| Parameter | Description |
|---|---|
| | DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value.<br>• When selecting the **Set-1P-Transmit** option, enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value.<br>• When selecting the **Set-DSCP-1P** option, enter the IP DSCP and 1P transmit values in the spaces provided.<br>• When selecting the **Transmit** option, packets will be transmitted unaltered. |
| **Exceed Action** | Select the exceed action here. The exceed action specifies the action to take on packets that exceed the rate limit. For a two rate policer, if the exceed action is not specified, the default action is **Drop**. Options to choose from are **Drop**, **Set-DSCP-Transmit**, **Set-1P-Transmit**, **Transmit**, and **Set-DSCP-1P**.<br>• When selecting the **Drop** option, the packet will be dropped.<br>• When selecting the **Set-DSCP-Transmit** option, enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value.<br>• When selecting the **Set-1P-Transmit** option, enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value.<br>• When selecting the **Set-DSCP-1P** option, enter the IP DSCP and 1P transmit values in the spaces provided.<br>• When selecting the **Transmit** option, packets will be transmitted unaltered. |
| **Violate Action** | Select the violate action here. The violate action specifies the action to take on packets that violate the normal and maximum burst sizes for singe rate policing. It specifies the action to take for those packets that did not conform to both CIR and PIR. For a single rate policer, if the violate action is not specified, it will create a single-rate two-color policer. For a two-rate policer, if the violation action is not specified, the default action is equal to the exceed action. Options to choose from are **Drop**, **Set-DSCP-Transmit**, **Set-1P-Transmit**, **Transmit**, and **Set-DSCP-1P**.<br>• When selecting the **Drop** option, the packet will be dropped.<br>• When selecting the **Set-DSCP-Transmit** option, enter the IP DSCP value in the space provided. This value sets the IP differentiated services code point (DSCP) value and transmits the packet with the new IP DSCP value.<br>• When selecting the **Set-1P-Transmit** option, enter the 1P transmit value in the space provided. This value sets the 802.1p value and transmits the packet with the new value.<br>• When selecting the **Set-DSCP-1P** option, enter the IP DSCP and 1P transmit values in the spaces provided.<br>• When selecting the **Transmit** option, packets will be transmitted unaltered. |
| **Color Aware** | Select the color aware option here. Options to choose from are **None** and **Enabled**. When color aware is not specified, the policer works in the color blind mode. When color aware is enabled, the policer works in the color aware mode. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

# Policy Map

This window is used to view and configure the policy map settings.

To view the following window, click **QoS > Advanced Settings > Policy Map**, as shown below:

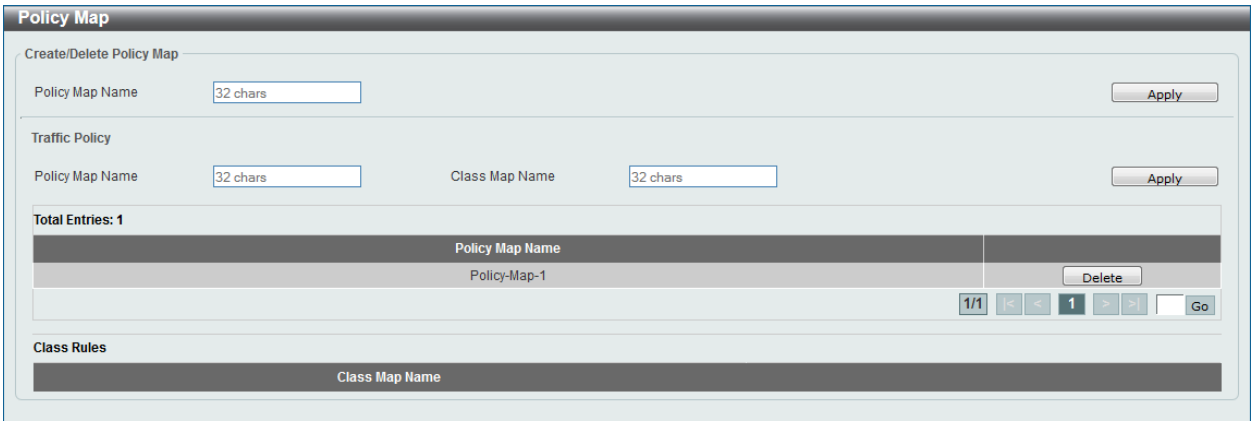



**Figure 7-16 Policy Map Window**

The fields that can be configured for **Create/Delete Policy Map** are described below:

| Parameter | Description |
|---|---|
| **Policy Map Name** | Enter the policy map's name here that will be created or deleted. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured for **Traffic Policy** are described below:

| Parameter | Description |
|---|---|
| **Policy Map Name** | Enter the policy map's name here. This name can be up to 32 characters long. |
| **Class Map Name** | Enter the class map's name here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

# Policy Binding

This window is used to view and configure the policy binding settings.

To view the following window, click **QoS > Advanced Settings > Policy Binding**, as shown below:

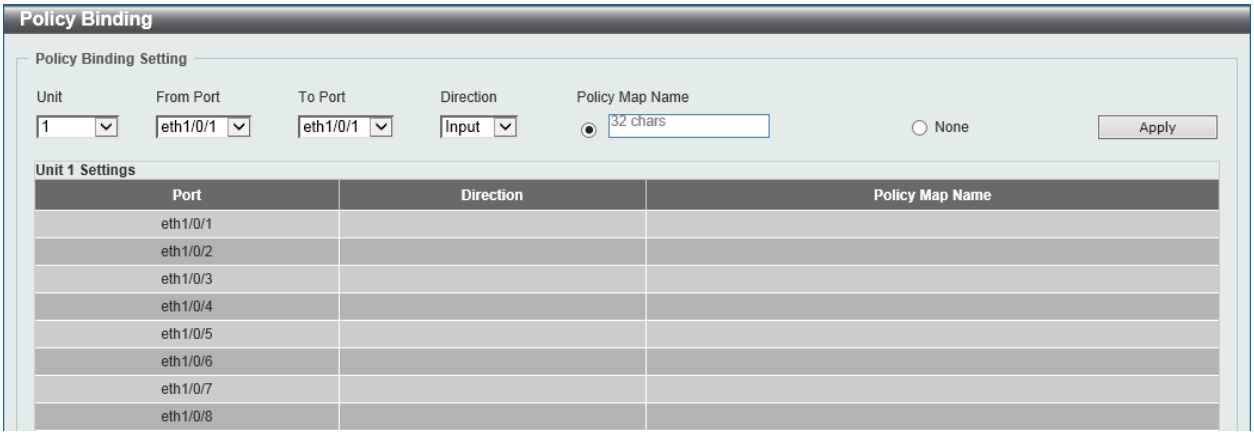



**Figure 7-17 Policy Binding Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Direction** | Select the direction option here. Options to choose from are **Input** and **Output**. Input specified ingress traffic and output specifies egress traffic. |
| **Policy Map Name** | Enter the policy map name here. This name can be up to 32 characters long. Select the **None** option to not tie a policy map to this entry. |

Click the **Apply** button to accept the changes made.

# QoS PFC

## Network QoS Class Map

This window is used to view and configure the network Quality of Service (QoS) feature's Priority-based Flow Control (PFC) class map settings.

To view the following window, click **QoS > QoS PFC > Network QoS Class Map**, as shown below:

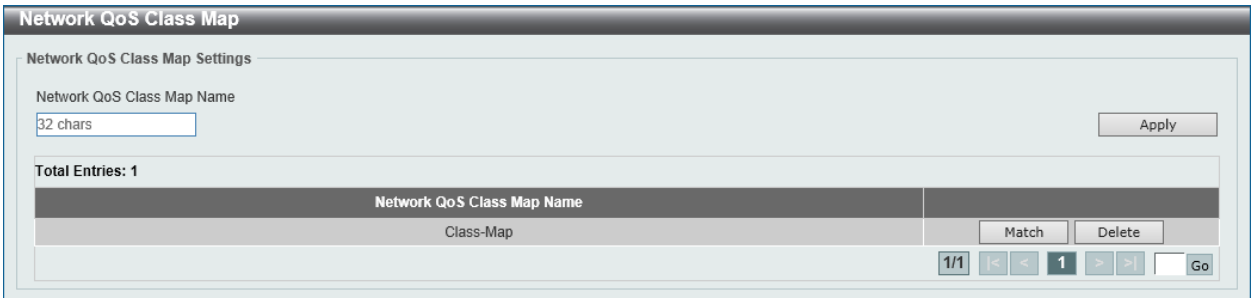



**Figure 7-18 Network QoS Class Map Window**

The fields that can be configured in **Network QoS Class Map Settings** are described below:

| Parameter | Description |
|---|---|
| **Network QoS Class Map Name** | Enter the network QoS class map's name to be associated with a traffic policy here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Match** button to configure the match rule settings for the map name.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Match** button, the following page will appear.

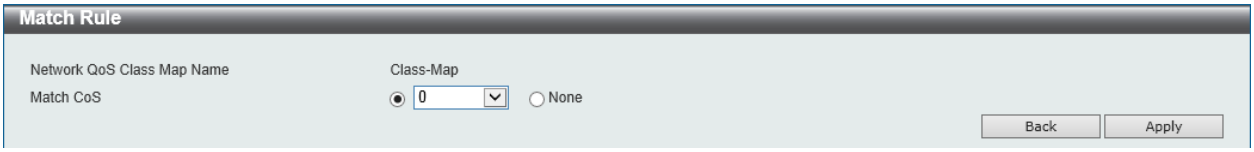



**Figure 7-19 Network QoS Class Map (Match) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Match CoS** | Select the IEEE 802.1Q Class of Service (CoS) value to be matched here. The range is from 0 to 7. When a packet is received, the packet will be given an internal CoS. This internal CoS is used to select the transmit queue based on the CoS to queue map. The CoS queue with a higher number will receive a higher priority. Select to **None** option to disable the matching of CoS values. |

Click the **Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

# Network QoS Policy Map

This window is used to view and configure the network QoS policy map settings.

To view the following window, click **QoS > QoS PFC > Network QoS Policy Map**, as shown below:


**Figure 7-20 Network QoS Policy Map Window**

The fields that can be configured in **Create/Delete Network QoS Policy Map** are described below:

| Parameter | Description |
|---|---|
| **Network QoS Policy Map name** | Enter the network QoS policy map's name here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Traffic Policy** are described below:

| Parameter | Description |
|---|---|
| **Network QoS Policy Map Name** | Enter the network QoS policy map's name here that will be associated with the class map. This name can be up to 32 characters long. |
| **Network QoS Class Map Name** | Enter the network QoS class map's name here that will be associated with the policy map. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

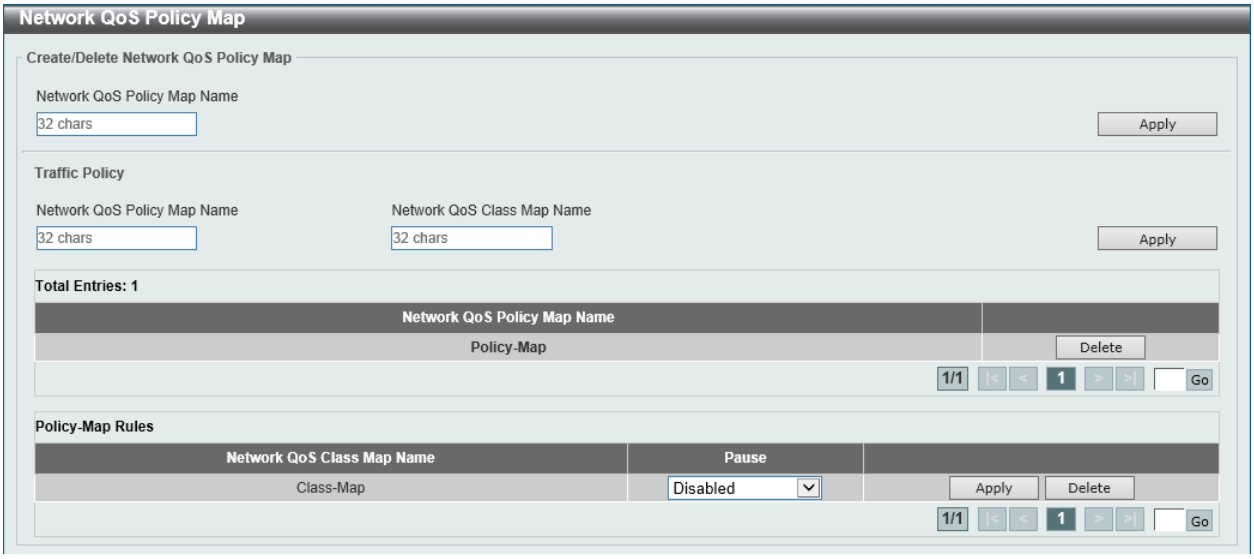



**Figure 7-21 Network QoS Policy Map (Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Pause** | Select to enable or disable the pause feature here. This feature is used to enable PFC on a class referenced in a type network QoS policy map. |

Click the **Apply** button to accept the changes made.

## Network QoS Policy Binding

This window is used to view and configure the network QoS policy's binding settings.

To view the following window, click **QoS > QoS PFC > Network QoS Policy Binding**, as shown below:

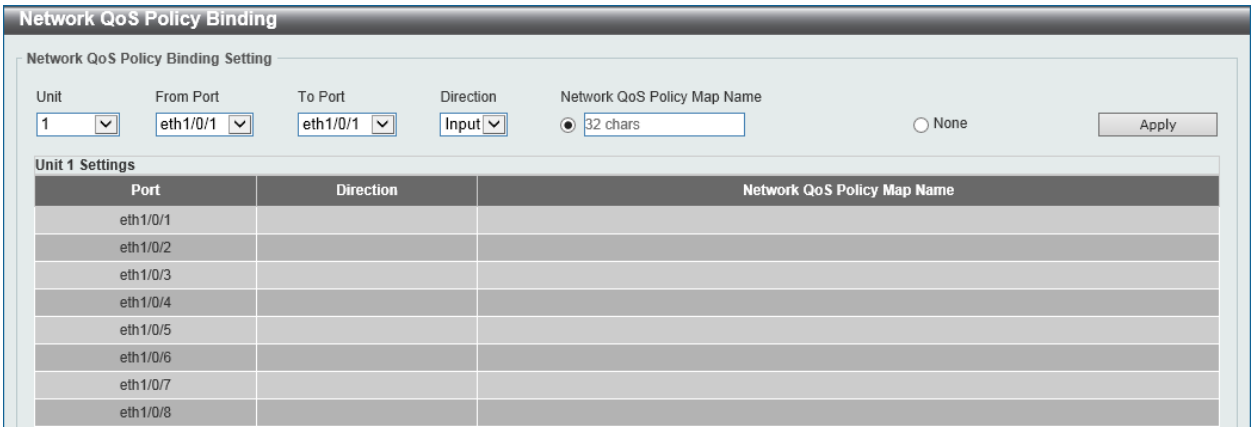



**Figure 7-22 Network QoS Policy Binding Window**

The fields that can be configured in **Network QoS Policy Binding Setting** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Direction** | Select the direction here. Options to choose from are **Input** and **Output**.<br>• **Input:** Specifies to apply the policy map for ingress flow on the interface.<br>• **Output:** Specifies to apply the policy map for egress flow on the interface. |
| **Network QoS Policy Map Name** | Enter the network QoS policy map's name here. This name can be up to 32 characters long. Select the **None** option to not associate this configuration with a network QoS policy map. |

Click the **Apply** button to accept the changes made.

# WRED

## WRED Profile

This window is used to view and configure the Weighted Random Early Detection (WRED) feature's profile settings.

To view the following window, click **QoS > WRED > WRED Profile**, as shown below:

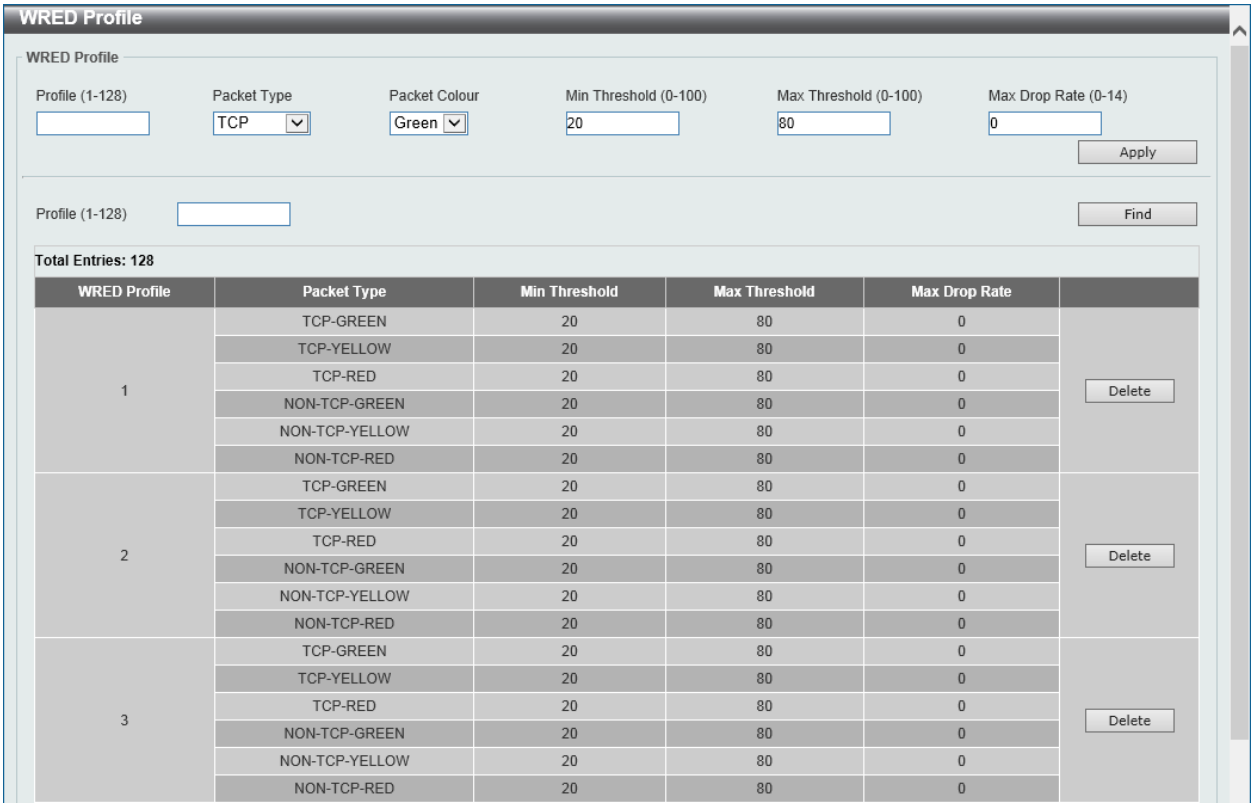



**Figure 7-23 WRED Profile Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Profile** | Enter the WRED profile's ID here. The range is from 1 to 128. |
| **Packet Type** | Select the packet type here. Options to choose from are **TCP** and **Non-TCP**.<br>• **TCP:** Specifies the WRED drop parameters for the TCP packets to be set.<br>• **Non-TCP:** Specifies the WRED drop parameters for non-TCP packets to be set. |
| **Packet Colour** | Select the packet color here. Options to choose from are **Green**, **Yellow**, and **Red**.<br>• **Green:** Specifies the WRED drop parameters for green packets to be set.<br>• **Yellow:** Specifies the WRED drop parameters for yellow packets to be set.<br>• **Red:** Specifies the WRED drop parameters for red packets to be set. |
| **Min Threshold** | Enter the minimum threshold value here that will be used to start WRED dropping. The range is from 0 to 100. |
| **Max Threshold** | Enter the maximum threshold value here over which WRED will drop all packets destined for this queue. The range is from 0 to 100. |
| **Max Drop Rate** | Enter the maximum drop-rate value here. The range is from 0 to 14. This feature specifies the drop probability when the average queue size reaches the maximum threshold. When this value is zero, then the packet will not be dropped or remarked for ECN. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to reset the configuration on the specified entry.

# WRED Queue

This window is used to view and configure the WRED feature's queue settings. WRED drops packets, based on the average queue size exceeding a specific threshold, to indicate congestion. Explicit Congestion Notification (ECN) is an extension to WRED in that ECN marks packets instead of dropping them when the average queue size exceeds a specific threshold value. When configuring the WRED ECN feature, routers and end hosts would use this marking as a signal that the network is congested and slow down sending packets.

To view the following window, click **QoS > WRED > WRED Queue**, as shown below:

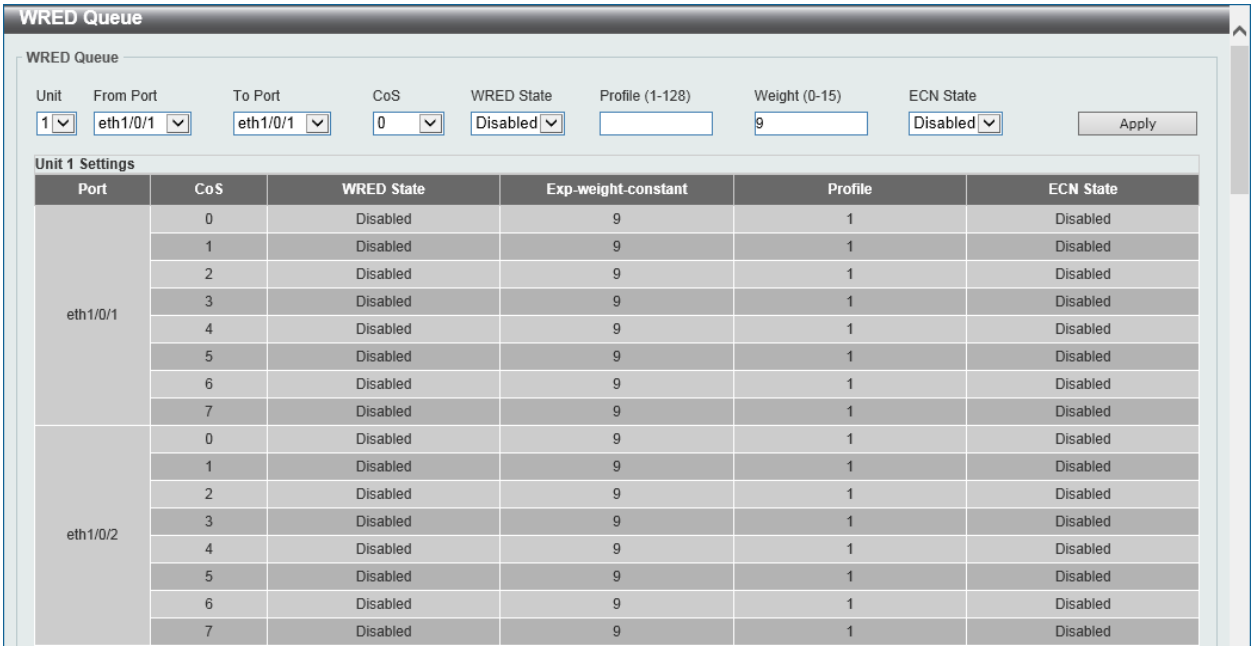



**Figure 7-24 WRED Queue Window**

The fields that can be configured in **WRED Queue** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **CoS** | Select the CoS value here. The range is from 0 to 7. |
| **WRED State** | Select to enable or disable the WRED feature state on the specified port(s) here. |
| **Profile** | Enter the WRED profile's ID here. The range is from 1 to 128. |
| **Weight** | Enter the exponential weight value here. The range is from 0 to 15. This feature is used to configure the WRED exponential weight factor for the average queue size calculation for the queue. |
| **ECN State** | Select to enable or disable the ECN feature on the specified port(s) here. |

Click the **Apply** button to accept the changes made.

## WRED Drop Counter

This window is used to view and clear the WRED feature's drop counter information.

To view the following window, click **QoS > WRED > WRED Drop Counter**, as shown below:

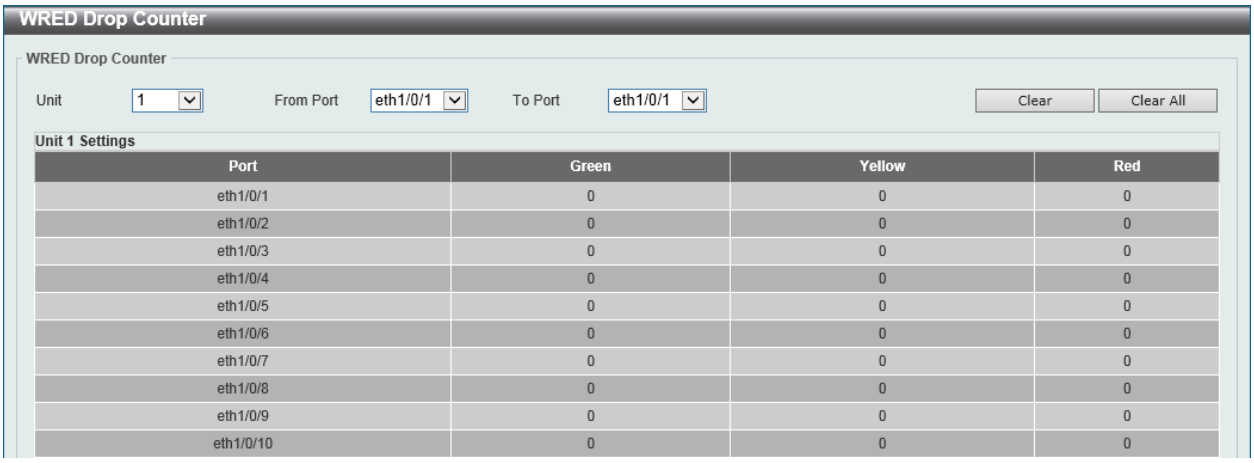



**Figure 7-25 WRED Drop Counter Window**

The fields that can be configured in **WRED Drop Counter** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Clear** button to clear the counter information based on the selections made.

Click the **Clear All** button to clear the counter information associated with all entries.

# ETS

## ETS Port Settings

This window is used to view and configure the Enhanced Transmission Selection (ETS) willing mode for the Data Center Bridging Exchange Protocol (DCBX) on the specified interface(s).

To view the following window, click **QoS > ETS > ETS Port Settings**, as shown below:


**Figure 7-26 ETS Port Settings Window**

The fields that can be configured in **ETS Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **ETS Willing** | Select to enable or disable the ETS willing mode for DCBX on the specified port(s). This indicates that the interface is willing to accept configurations from the remote switch. DCBX is used by DCB devices to exchange configuration information with directly connected peers. The protocol may also be used for misconfiguration detection and for configuration of the peer. The willing mode indicates that the local port has been administratively configured to accept configurations from the remote device. |

Click the **Apply** button to accept the changes made.

Click the **Admin Info** button to view ETS administrative information associated with the port.

Click the **Operational Info** button to view ETS operational information associated with the port.

After clicking the **Admin Info** button, the following page will appear.

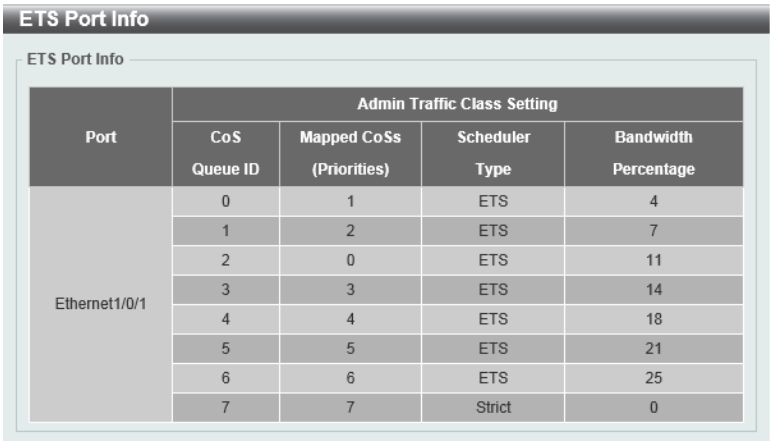



**Figure 7-27 ETS Port Settings (Admin Info) Window**

# ETS Recommend Settings

This window is used to view and configure the ETS recommended settings on the specified interface. These settings will be translated to a DCBX ETS recommendation TLV. The TLV is encoded into each LLDP message and may be transmitted by a system in order to indicate a recommendation on how ETS should be configured.

To view the following window, click **QoS > ETS > ETS Recommended Settings**, as shown below:

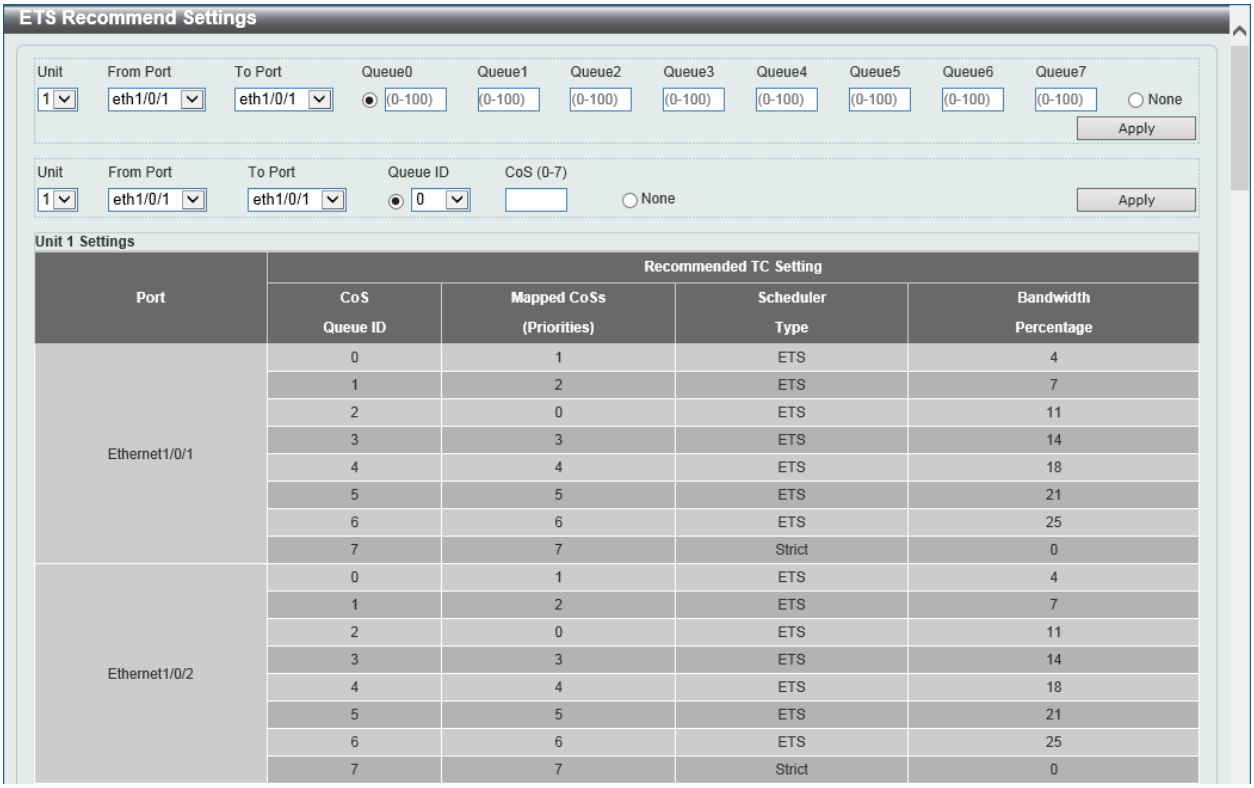



**Figure 7-28 ETS Recommend Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Queue 1 ~ Queue 7** | Select and enter the recommended bandwidth for traffic classes 0 to 7 here that will be associated with the selected port(s). It is required to specify 8 values for traffic class 0 to 7 respectively. The sum of the bandwidth assigned to a given port is required at all times to be equal to 100. An operation that attempts to change the bandwidth where the sum is not 100 will be rejected. The range is from 0 to 100 percent. The value of zero stands for strict priority mode. Select the **None** option to disable this feature on the specified port(s). |
| **Queue ID** | Select the queue ID (traffic class ID) that will be associated with the port(s) here. The range is from 0 to 7. |
| **CoS** | Enter the CoS value that will be associated with the selected port(s) here. The range is from 0 to 7. Select the **None** option to disable this feature on the specified port(s) |

Click the **Apply** button to accept the changes made.

# QCN

## QCN CNPV Status

This window is used to view and configure the Quantized Congestion Notification (QCN) Congestion Notification Priority Value (CNPV) status on this switch.

QCN is a form of end-to-end congestion management defined in IEEE 802.1.Qau. The purpose of QCN is to ensure that congestion is controlled from the sending device to the receiving device in a dynamic fashion that can deal with changing bottlenecks.

When an IEEE 802.1p priority is assigned as a CNPV globally, the CNPV configuration for all interfaces will be created with a default value. When a priority is deleted from CNPV, the CNPV configuration for all interfaces will be deleted.

To view the following window, click **QoS > QCN > QCN CNPV Status**, as shown below:

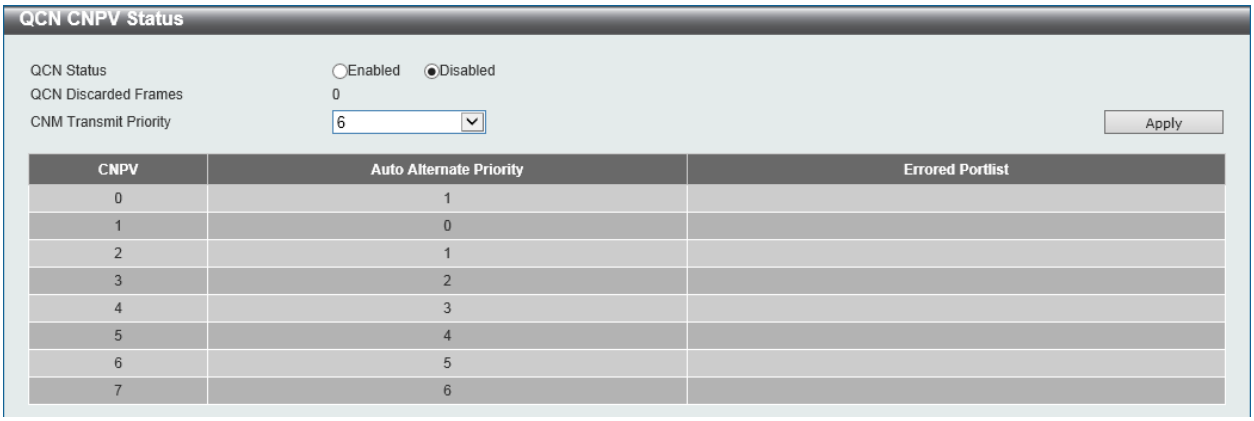



**Figure 7-29 QCN CNPV Status Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **QCN Status** | Select to globally enable or disable the QCN feature here. |
| **CNM Transmit Priority** | Select the IEEE 802.1p priority value for all Congestion Notification Messages (CNMs) here. The range is from 0 to 7. By default, this value is 6. |

Click the **Apply** button to accept the changes made.

# QCN CNPV Settings

This window is used to view and configure the QCN feature's CNPV settings.

To view the following window, click **QoS > QCN > QCN CNPV Settings**, as shown below:

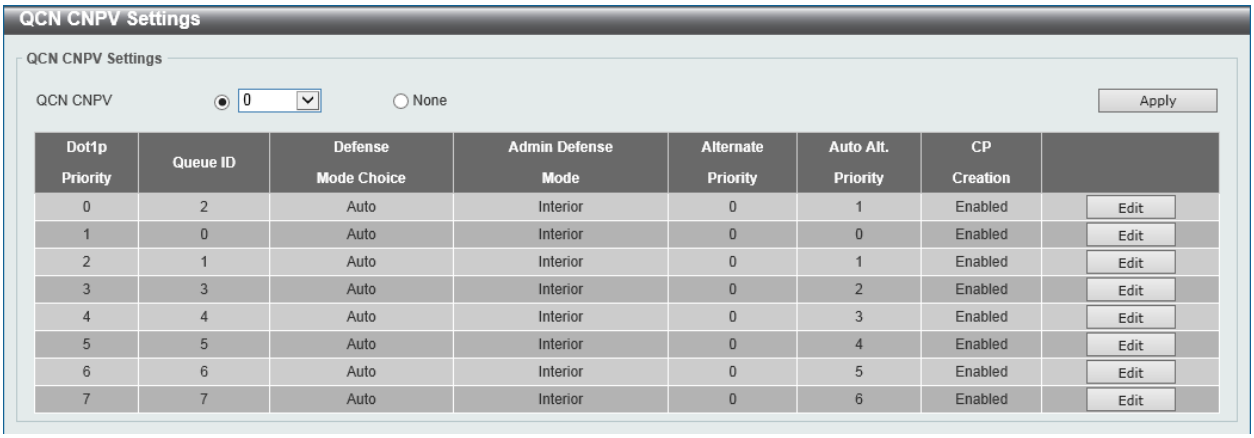



**Figure 7-30 QCN CNPV Settings Window**

The fields that can be configured in **QCN CNPV Settings** are described below:

| Parameter | Description |
|---|---|
| **QCN CNPV** | Select the IEEE 802.1p priority value to be the Congestion Notification Priority Value (CNPV) here. The range is from 0 to 7. Select the **None** option to use the default value. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the specified entry.

After clicking the **Edit** button, the following page will appear.

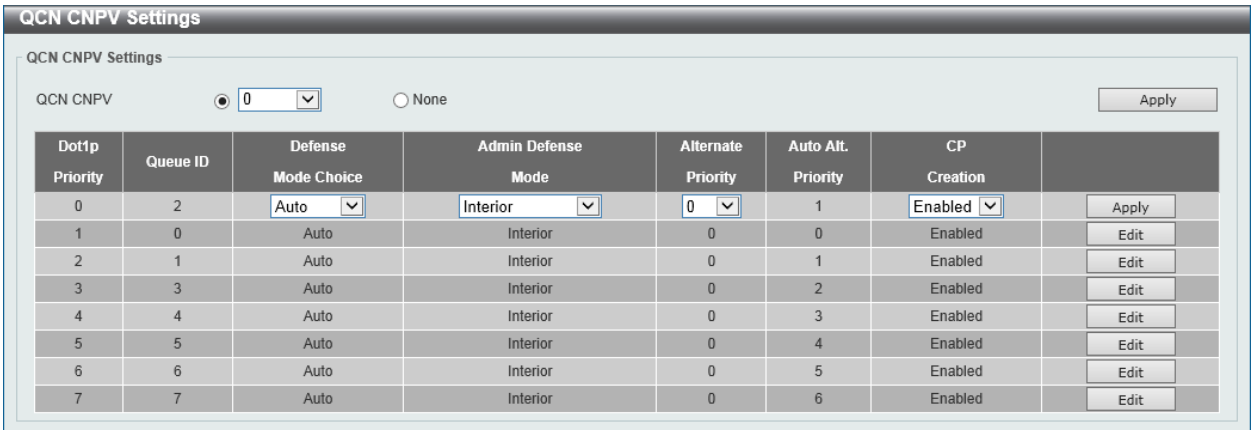



**Figure 7-31 QCN CNPV Settings (Edit) Window**

The fields that can be configured in the table are described below:

| Parameter | Description |
|---|---|
| **Defense Mode Choice** | Select the defense mode choice here. Options to choose from are **Admin** and **Auto**. By default, this option is **Auto**.<br>• **Admin:** Specifies that the default CND defense mode and alternate priority are specified by administrator.<br>• **Auto:** Specifies that the default CND defense mode and alternate priority are controlled automatically. |
| **Admin Defense Mode** | Select the admin defense mode here. Options to choose from are **Disabled**, **Interior**, **Interior-ready**, and **Edge**. By default, this option is **Interior**.<br>• **Disable:** Specifies that the congestion notification capability is administratively disabled for this priority.<br>• **Interior:** Specifies that the priority parameter of the frame input is not remapped to or from this priority and the frames are transmitted without a CN-TAG.<br>• **Interior-ready:** Specifies that the priority parameter of the frame input is not remapped to or from this priority and the CN-TAGs won't be stripped when transmitting the frames.<br>• **Edge:** Specifies that the priority parameter of the frame input at this priority is remapped to an alternate value. Frames at other priorities are not remapped to this priority and the frames are transmitted without a CN-TAG. |
| **Alternate Priority** | Select the alternate priority value here. This specifies a priority value to which this priority value is to be remapped when the receiving frame with an 802.1p priority equal to the specified CNPV at Edge port. The range is from 0 to 7. |
| **CP Creation** | Select to enable or disable the CP creation feature here. |

Click the **Apply** button to accept the changes made.

# QCN CNPV Interface Settings

This window is used to view and configure the QCN CNPV interface settings.

To view the following window, click **QoS > QCN > QCN CNPV Interface Settings**, as shown below:

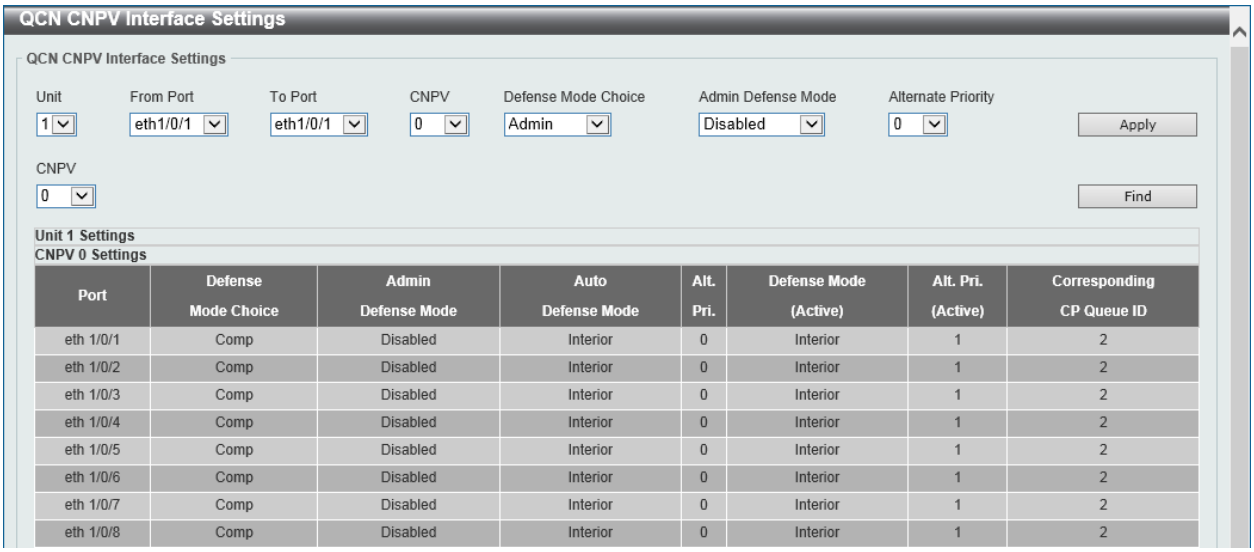



**Figure 7-32 QCN CNPV Interface Settings Window**

The fields that can be configured in **QCN CNPV Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **CNPV** | Select the CNPV value that will be used on the specified port(s) here. The range is from 0 to 7. |
| **Defense Mode Choice** | Select the defense mode choice that will be used on the specified port(s) here. Options to choose from are **Admin**, **Auto**, and **Comp**.<br>• **Admin:** Specifies that the default CND defense mode and alternate priority are specified by administrator.<br>• **Auto:** Specifies that the default CND defense mode and alternate priority are controlled automatically.<br>• **Comp:** Specifies that the default CND defense mode and alternate priority are determined by global setting. This is the default option. |
| **Admin Defense Mode** | Select the admin defense mode that will be used on the specified port(s) here. Option to choose from are **Disabled**, **Interior**, **Interior-ready**, and **Edge**.<br>• **Disable:** Specifies that the congestion notification capability is administratively disabled for this priority. This is the default option.<br>• **Interior:** Specifies that the priority parameter of frame input is not remapped to or from this priority and the frames are transmitted without a CN-TAG.<br>• **Interior-ready:** Specifies that the priority parameter of frame input is not remapped to or from this priority and the CN-TAGs won't be stripped off when transmitting the frames. |

| Parameter | Description |
|---|---|
| | • **Edge:** Specifies that the priority parameter of frame input at this priority is remapped to an alternate value. Frames at other priorities are not remapped to this priority and the frames are transmitted without a CN-TAG. |
| **Alternate Priority** | Select the alternate priority value that will be used on the specified port(s) here. The range is from 0 to 7. |
| **CNPV** | Select the CNPV value that will be used in the search here. The range is from 0 to 7. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

# QCN CNPV Interface Simple

This window is used to display the simple QCN configuration and status for each CNPV.

To view the following window, click **QoS > QCN > QCN CNPV Interface Simple**, as shown below:

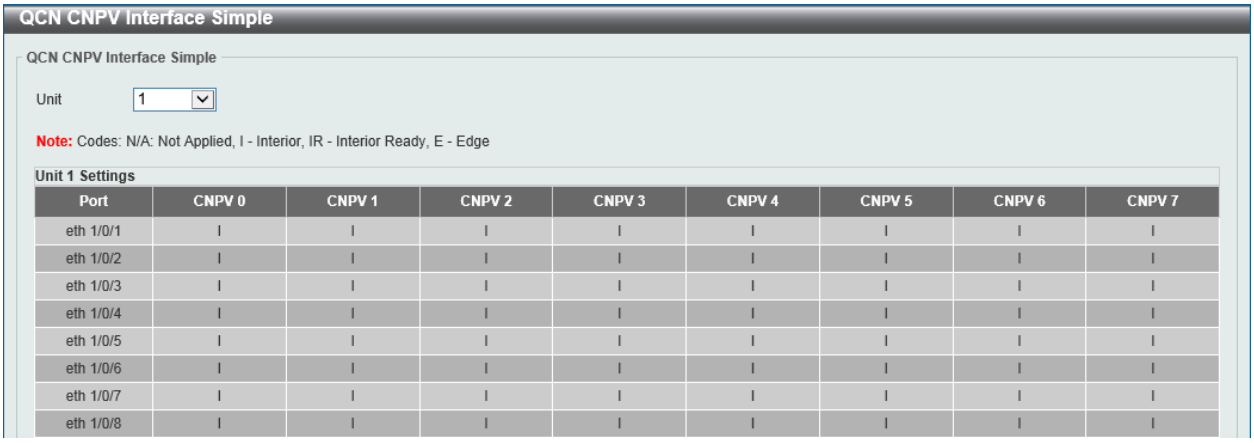



**Figure 7-33 QCN CNPV Interface Simple Window**

The fields that can be configured in **QCN CNPV Interface Simple** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |

# QCN CP Interface Settings

This window is used to view and configure the QCN Congestion Point (CP) interface settings.

To view the following window, click **QoS > QCN > QCN CP Interface Settings**, as shown below:

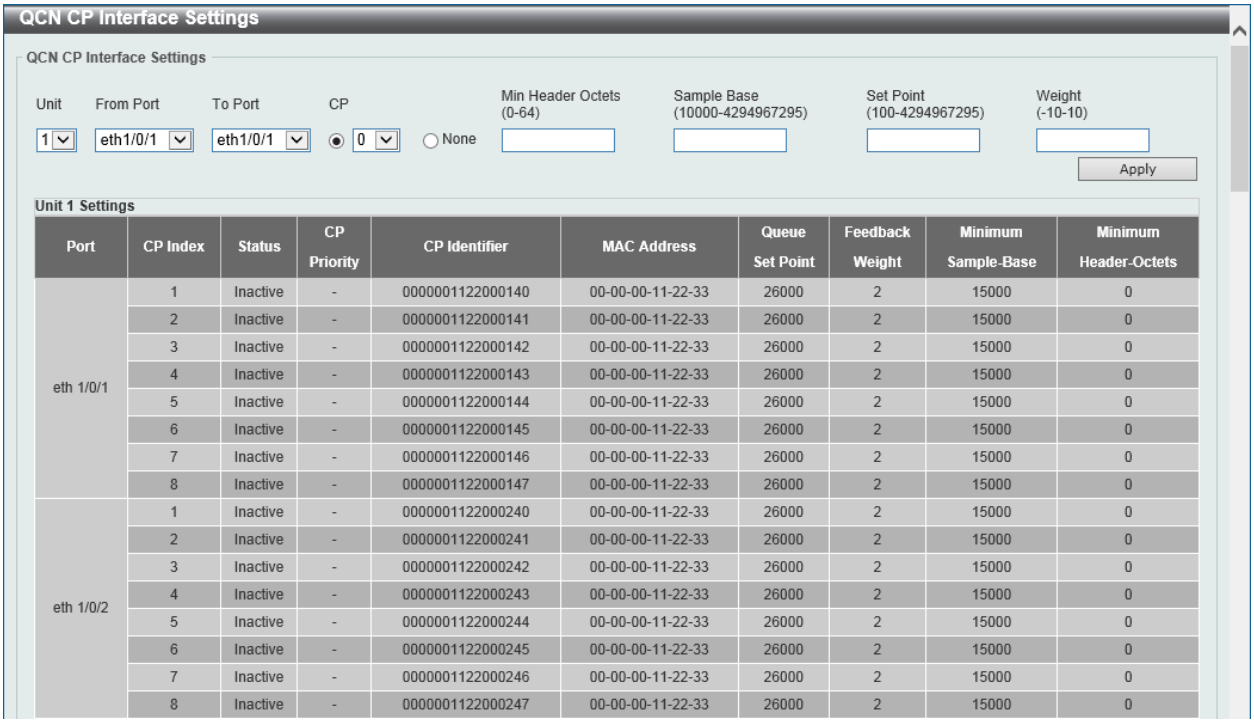



**Figure 7-34 QCN CP Interface Settings Window**

The fields that can be configured in **QCN CP Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **CP** | Select the queue ID that the Congestion Point (CP) is attached to here. The relation between the queue ID and CP is one-to-one. The CP is specified by the queue ID to which the CP is attached to. The range is from 0 to 7. Select the None option to use the default settings on the specified port(s). |
| **Min Header Octets** | Enter the minimum number of octets to be returned in a CNM from the data frame that triggered transmission of the CNM here. The range is from 0 to 64. By default, this value is 0. |
| **Sample Base** | Enter the minimum number of octets to queue in the CP's queue between transmissions of CNMs here. The range is from 10000 to 4294967295 octets. By default, this value is 15000 octets. |
| **Set Point** | Enter the set point value (*cpQSp*) in octets for the queue managed by this CP here. Congestion Notification Messages are transmitted to the sources of the frames queued in this CP's queue in order to keep the total number of octets stored in the queue at this set point. The range is from 100 to 4294967295 octets. By default, this value is 26000 octets. |
| **Weight** | Enter the weight change in the queue length in the calculation of the *cpFb* which is used to determine the value of the Quantized Feedback here. The weight *cpW* is equal to two to the power of this value. Thus, setting the variable to -1, means the *cpW* is equal to a half. The range is from -10 to 10. By default, this value is 2 to the power of 1. |

Click the **Apply** button to accept the changes made.

# QCN CP Counters

This window is used to view and clear the QCN CP counters.

To view the following window, click **QoS > QCN > QCN CP Counters**, as shown below:

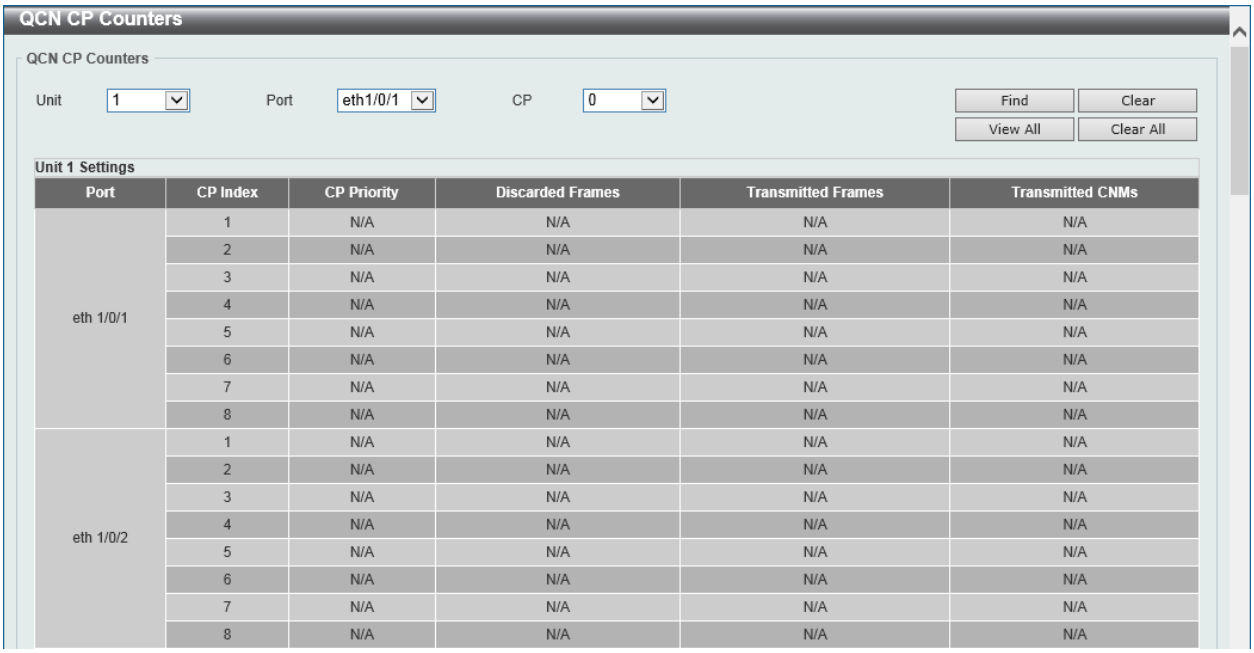



**Figure 7-35 QCN CP Counters Window**

The fields that can be configured in **CAN CP Counters** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **Port** | Select the port that will be used here. |
| **CP** | Select the queue ID (same as the outbound queue ID) to specify which Congestion Point (CP) to clear counters. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the counter information based on the information specified.

Click the **View All** button to display all the entries.

Click the **Clear All** button to clear the counter information associated with all entries.

# QCN CPID Table

This window is used to display the relationship between the CP identifier, interface, and CP index.

To view the following window, click **QoS > QCN > QCN CPID Table**, as shown below:

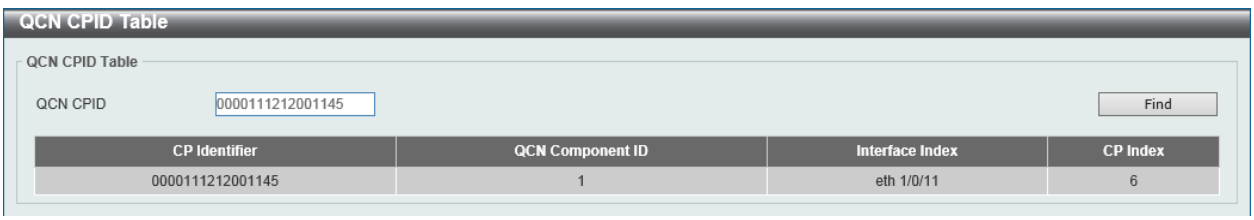



**Figure 7-36 QCN CPID Table Window**

The fields that can be configured in **QCN CPID Table** are described below:

| Parameter | Description |
|---|---|
| **QCN CPID** | Enter the Congestion Point Identifier (CPID) to get the corresponding interface ID and CP index. This ID is 16 hexadecimal digits long. |

Click the **Find** button to locate a specific entry based on the information entered.

# 8. Access Control List (ACL)

***ACL Configuration Wizard***
***ACL Access List***
***ACL Interface Access Group***
***ACL VLAN Access Map***
***ACL VLAN Filter***
***CPU ACL***

## ACL Configuration Wizard

This window is used to guide the user to create a new ACL access list or configure an existing ACL access list.

### Step 1 - Create/Update

To view the following window, click **ACL > ACL Configuration Wizard**, as shown below:

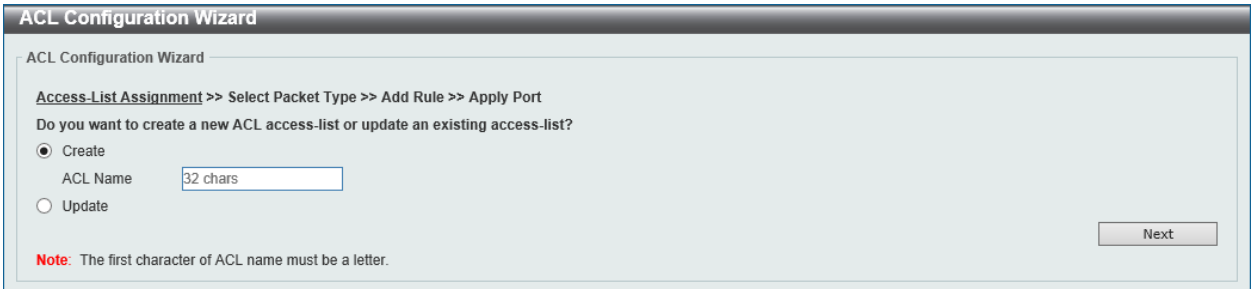



**Figure 8-1 ACL Configuration Wizard (Create) Window**

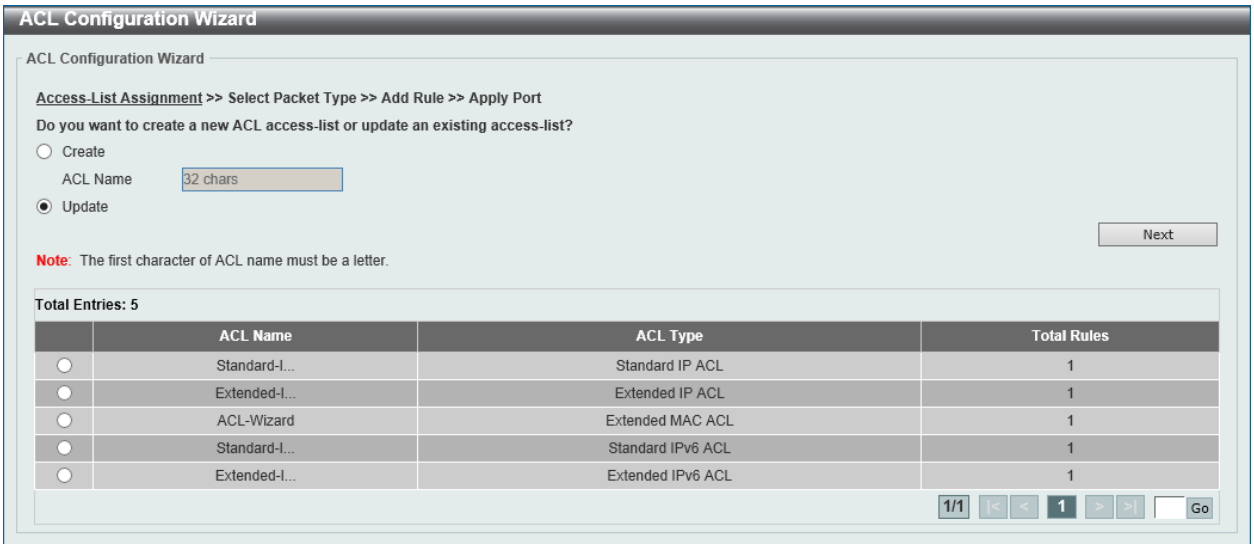



**Figure 8-2 ACL Configuration Wizard (Update) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Create** | Select this option to create a new ACL access list using the |

| Parameter | Description |
|---|---|
| | configuration wizard. |
| **ACL Name** | Enter the new ACL's name here. This name can be up to 32 characters long. |
| **Update** | Select this option to update an existing ACL access list. Select the existing ACL in the table to process with the update. |

Click the **Next** button to continue.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## Step 2 - Select Packet Type

After clicking the **Next** button, the following window will appear.

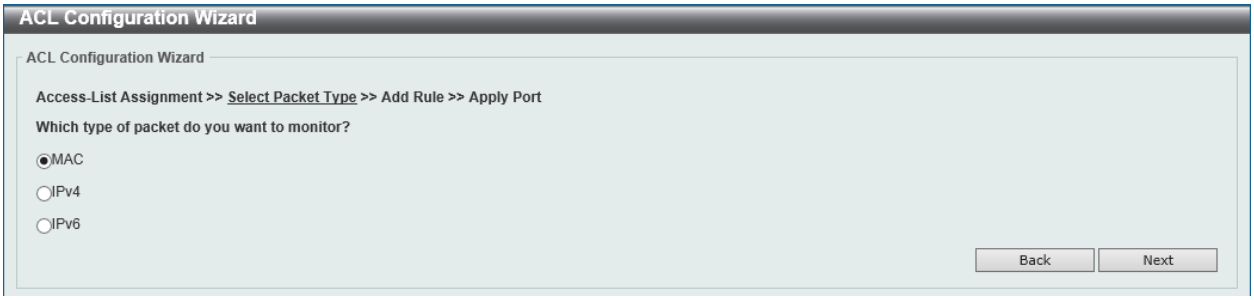



**Figure 8-3 ACL Configuration Wizard (Create, Packet Type) Window**

The fields that can be configured in **Select Packet Type** are described below:

| Parameter | Description |
|---|---|
| **MAC** | Select to create/update a MAC ACL. |
| **IPv4** | Select to create/update an IPv4 ACL. |
| **IPv6** | Select to create/update an IPv6 ACL. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Step 3 - Add Rule

### MAC

After clicking the **MAC** radio button and the **Next** button, the following window will appear.

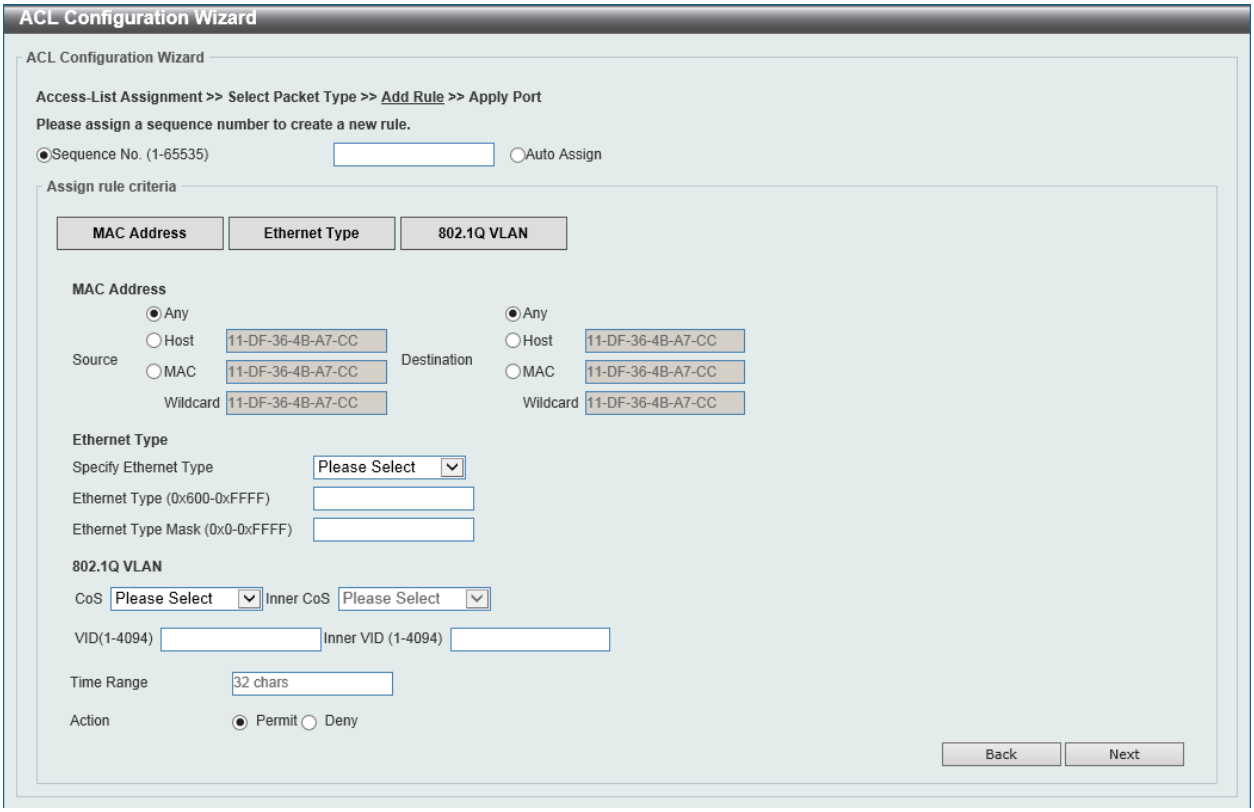



**Figure 8-4 ACL Configuration Wizard (Create, Packet Type, MAC) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. Select **Auto Assign** to automatically generate an ACL rule number for this entry. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **MAC**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **MAC**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **Specify Ethernet Type** | Select the Ethernet type option here. Options to choose from are **aarp**, **appletalk**, **decent-iv**, **etype-6000**, **etype-8042**, **lat**, **lavc-sca**, **mop-console**, **mop-dump**, **vines-echo**, **vines-ip**, **xns-idp**, and **arp**. |
| **Ethernet Type** | Enter the Ethernet type hexadecimal value here. This value must be between 0x600 and 0xFFFF. When any Ethernet type profile is selected in the **Specify Ethernet Type** drop-down list, the appropriate hexadecimal value will automatically be entered. |
| **Ethernet Type Mask** | Enter the Ethernet type mask hexadecimal value here. This value must |

| Parameter | Description |
|---|---|
| | be between 0x0 and 0xFFFF. When any Ethernet type profile is selected in the **Specify Ethernet Type** drop-down list, the appropriate hexadecimal value will automatically be entered. |
| **CoS** | Select the CoS value used here. This value is between **0** and **7**. |
| **Inner CoS** | After selecting the COS value, select the inner CoS value used here. This value is between **0** and **7**. |
| **VID** | Enter the VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## IPv4

After clicking the **IPv4** radio button and the **Next** button, the following window will appear.

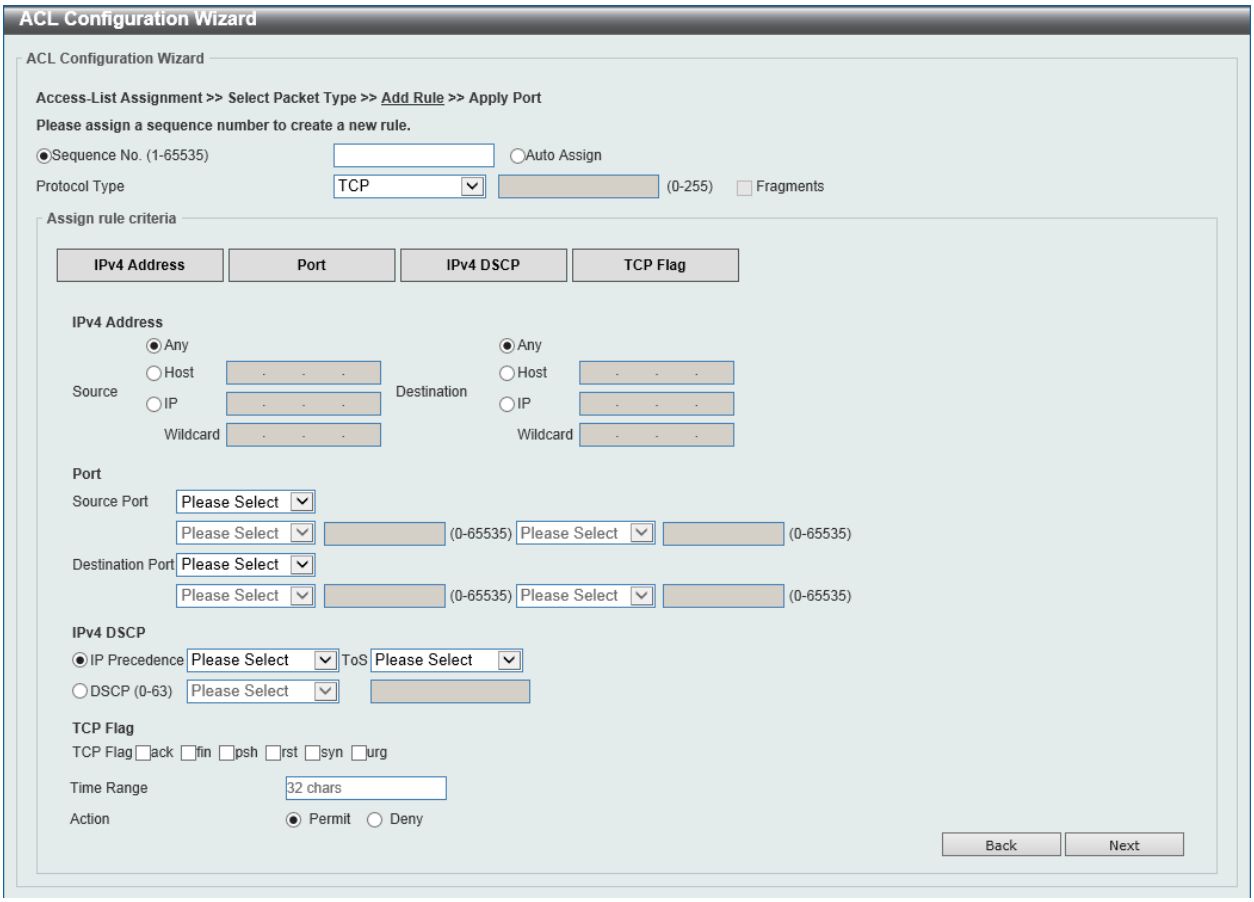



**Figure 8-5 ACL Configuration Wizard (Create, Packet Type, IPv4) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. Select **Auto Assign** to automatically generate an ACL rule number for this entry. |
| **Protocol Type** | Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **EIGRP**, **ESP**, **GRE**, **IGMP**, **OSPF**, **PIM**, **VRRP**, **IP-in-IP**, **PCP**, **Protocol ID**, and **None**. |
| **Protocol** | When available, enter the Protocol ID value in the space provided. This value must be between 0 and 255. |
| **Fragments** | When available, select the **Fragments** option to include packet fragment filtering. |

## Protocol Type - TCP

After selecting the **TCP** option as the **Protocol Type**, the following section will appear.

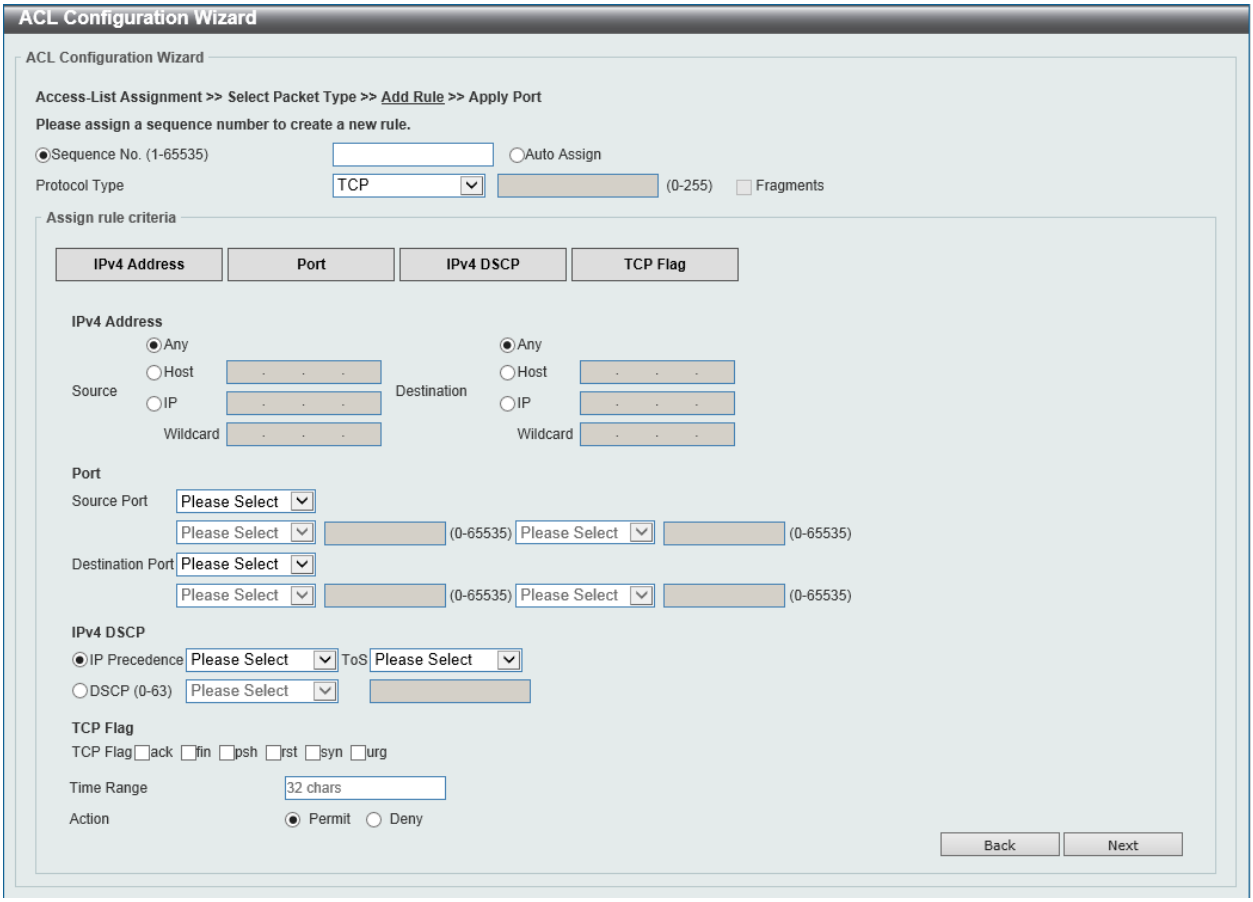



**Figure 8-6 ACL Configuration Wizard (Create, Packet Type, IPv4, TCP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard |

| Parameter | Description |
|---|---|
| | bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **TCP Flag** | Tick the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - UDP

After selecting the **UDP** option as the **Protocol Type**, the following section will appear.

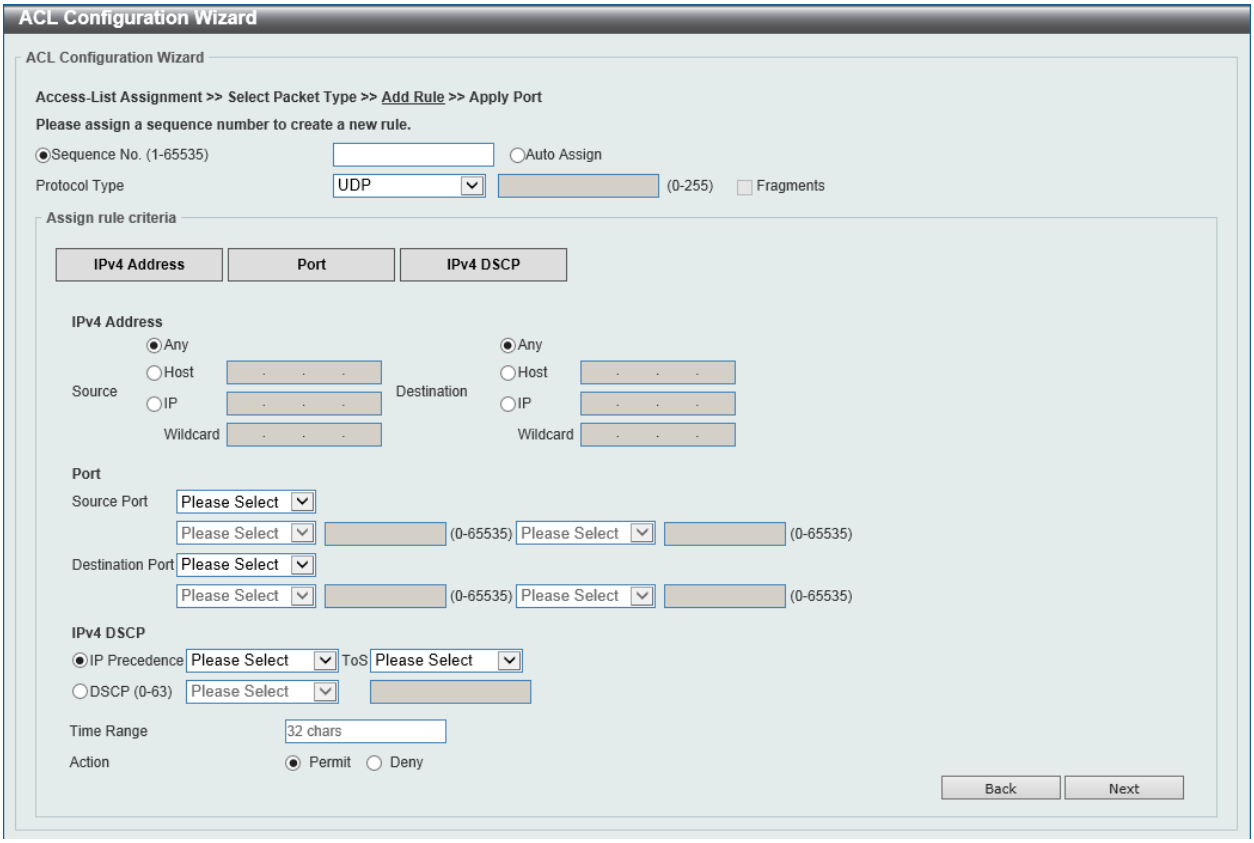



**Figure 8-7 ACL Configuration Wizard (Create, Packet Type, IPv4, UDP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |

| Parameter | Description |
|---|---|
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - ICMP

After selecting the **ICMP** option as the **Protocol Type**, the following section will appear.

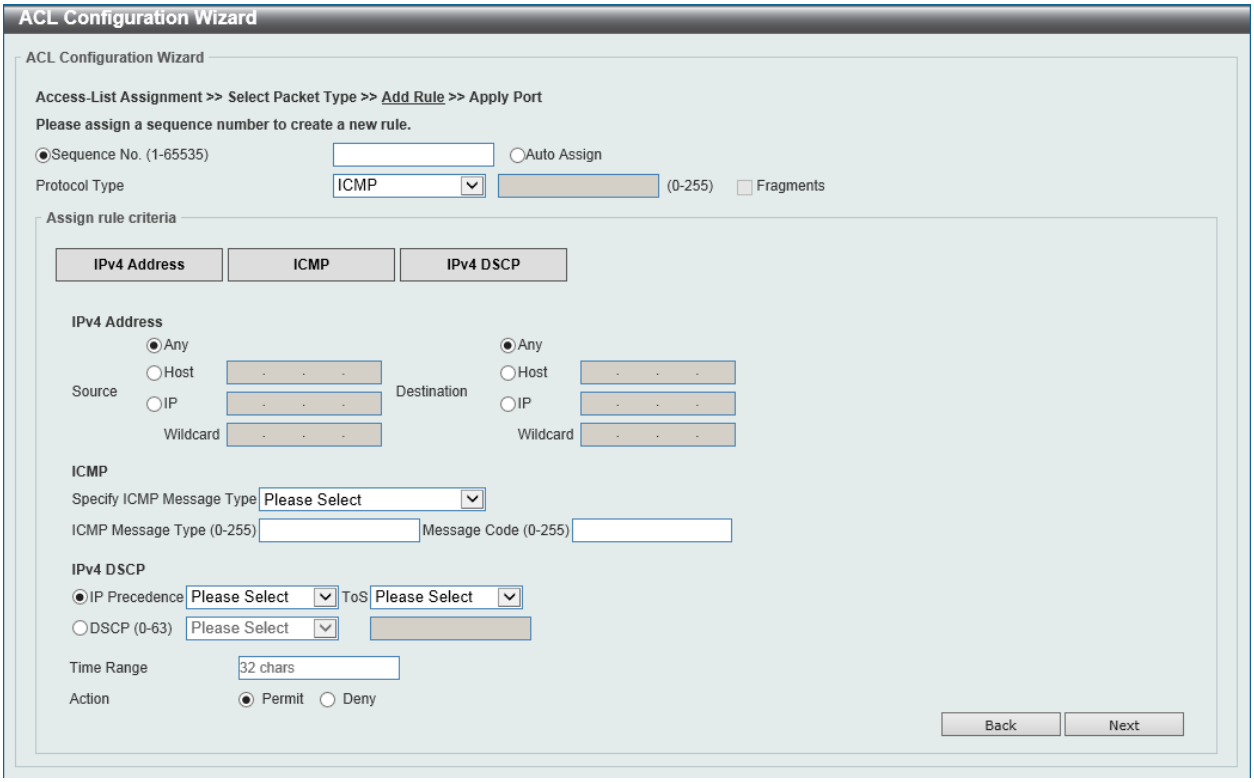



**Figure 8-8 ACL Configuration Wizard (Create, Packet Type, IPv4, ICMP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Specify ICMP Message Type** | Select the ICMP message type used here. |
| **ICMP Message Type** | When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **Message Code** | When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |

| Parameter | Description |
|---|---|
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - EIGRP

After selecting the **EIGRP** option as the **Protocol Type**, the following section will appear.

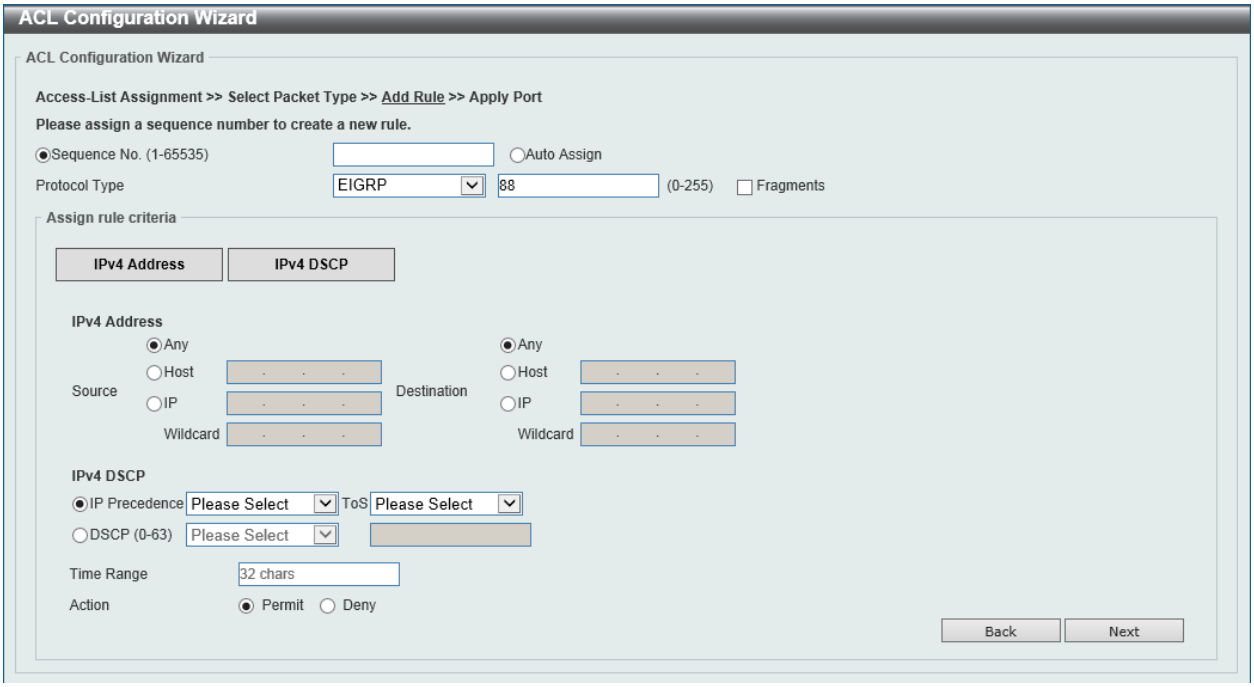



**Figure 8-9 ACL Configuration Wizard (Create, Packet Type, IPv4, EIGRP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any |

| Parameter | Description |
|---|---|
| | destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - ESP

After selecting the **ESP** option as the **Protocol Type**, the following section will appear.

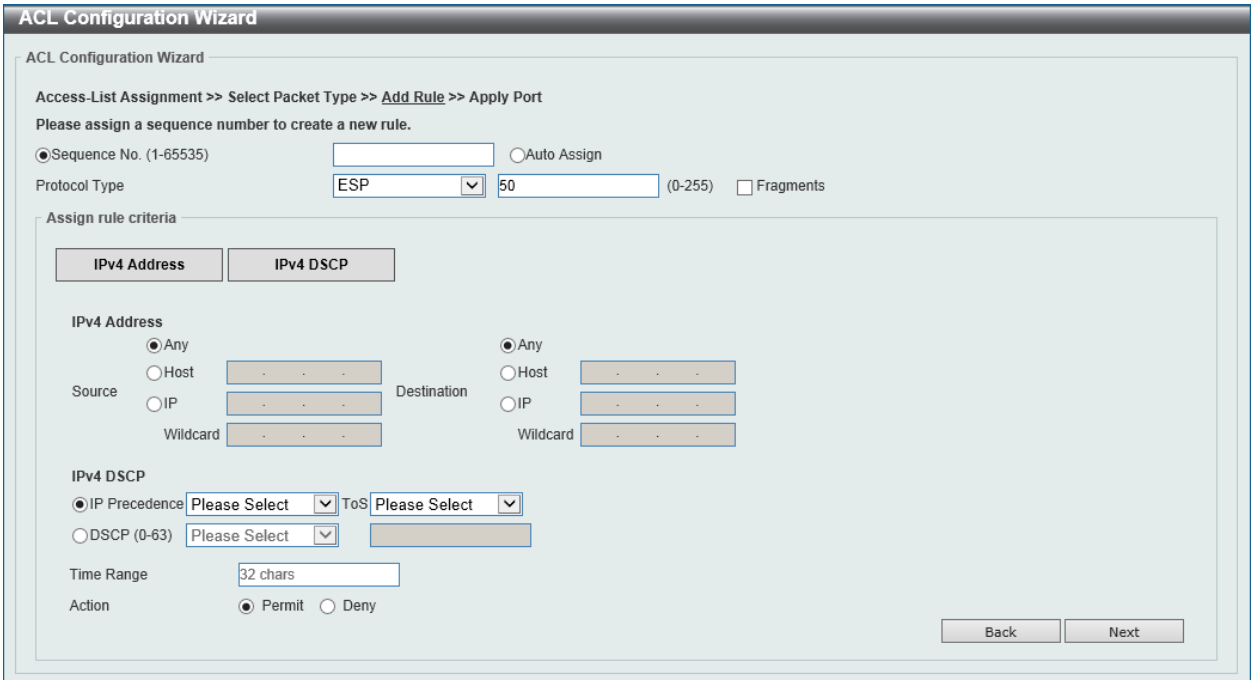



**Figure 8-10 ACL Configuration Wizard (Create, Packet Type, IPv4, ESP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from |

| Parameter | Description |
|---|---|
| | are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - GRE

After selecting the **GRE** option as the **Protocol Type**, the following section will appear.

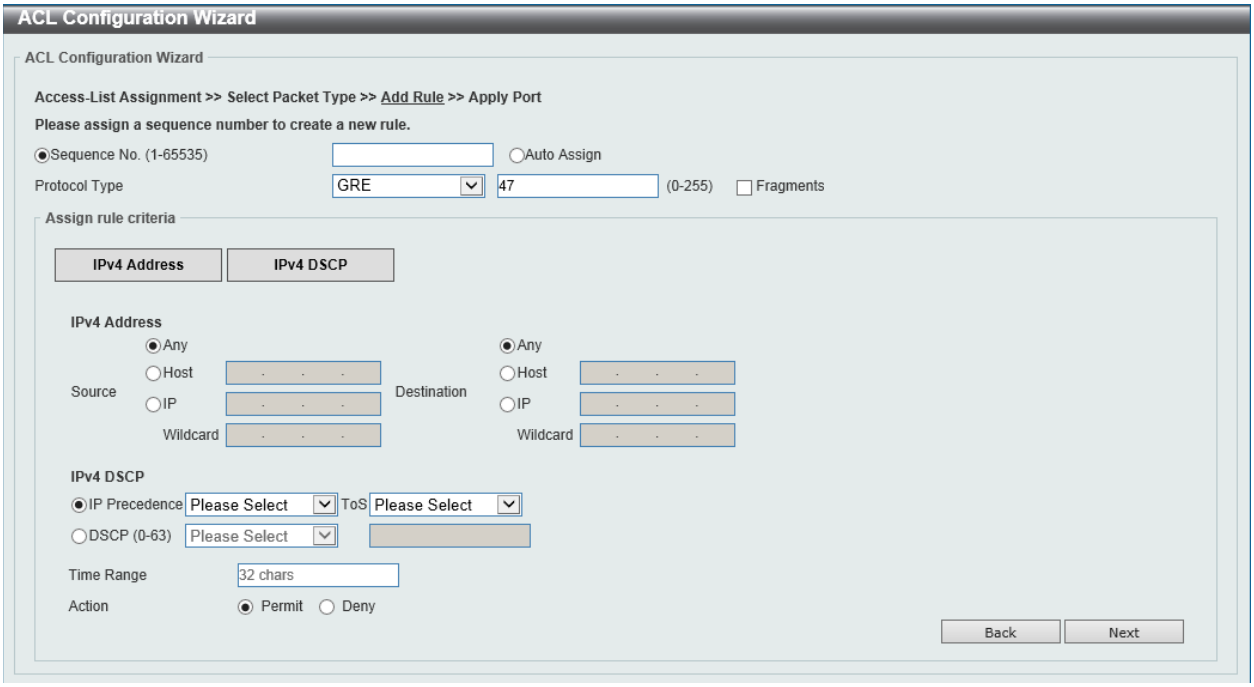



**Figure 8-11 ACL Configuration Wizard (Create, Packet Type, IPv4, GRE) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - IGMP

After selecting the **IGMP** option as the **Protocol Type**, the following section will appear.

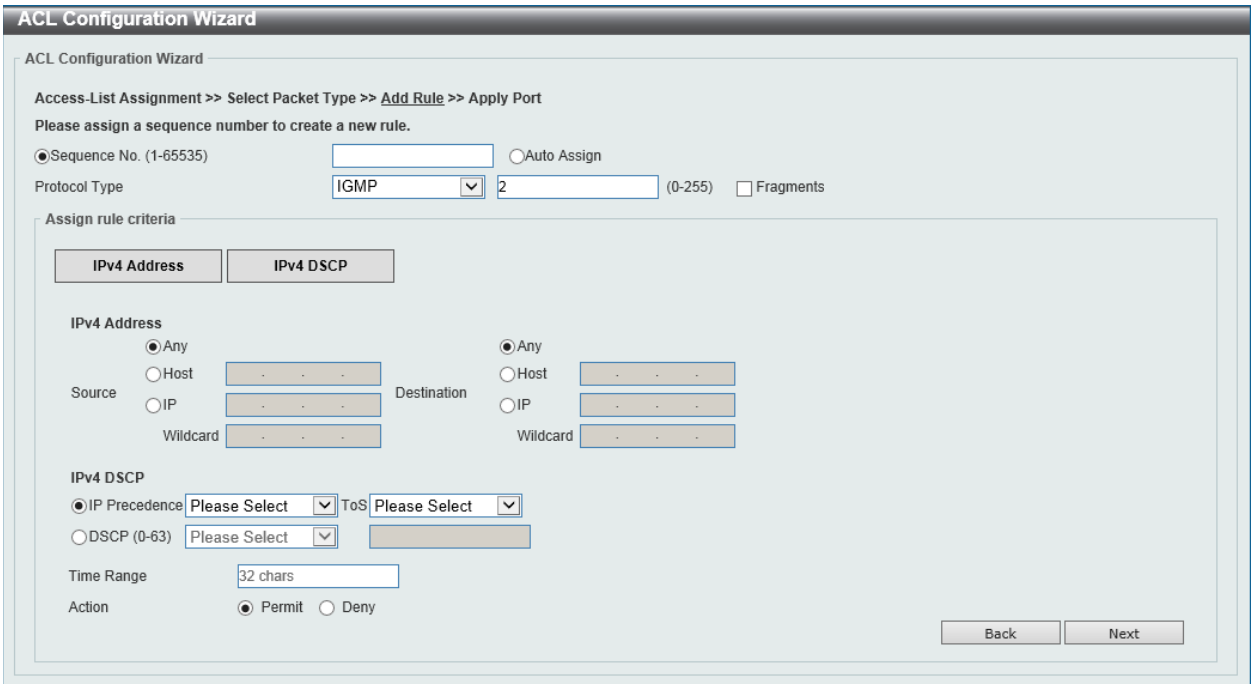



**Figure 8-12 ACL Configuration Wizard (Create, Packet Type, IPv4, IGMP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-** |

| Parameter | Description |
|---|---|
| | **throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - OSPF

After selecting the **OSPF** option as the **Protocol Type**, the following section will appear.

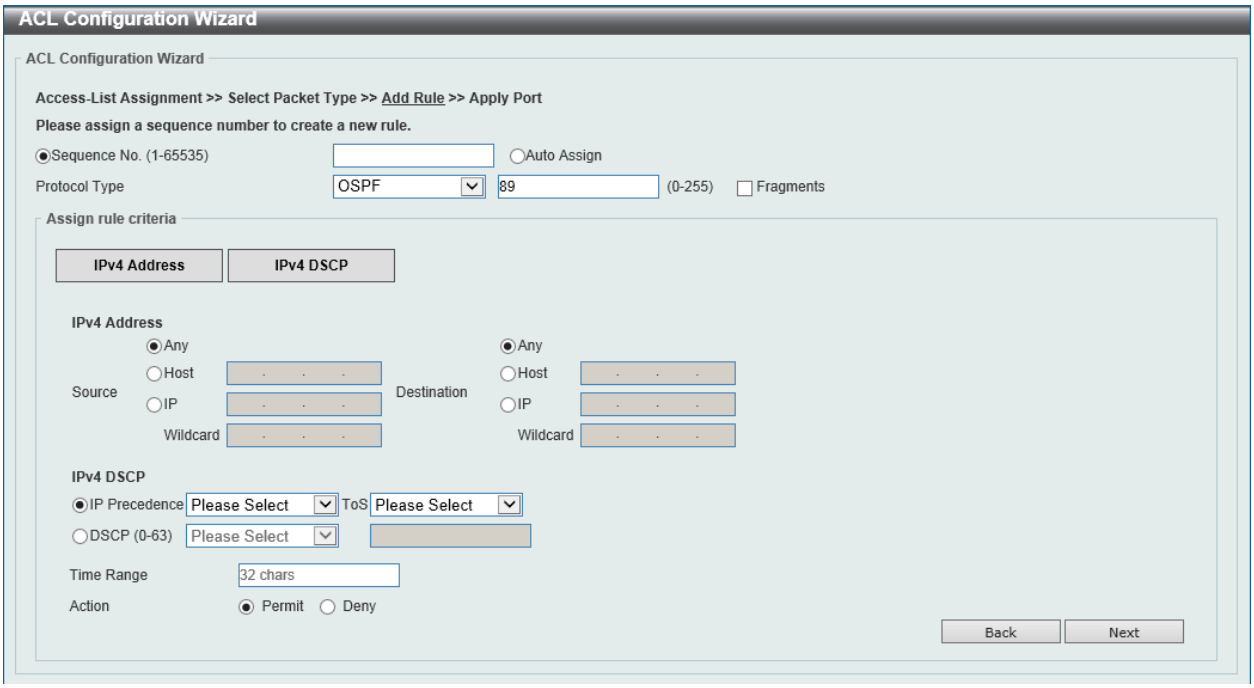



**Figure 8-13 ACL Configuration Wizard (Create, Packet Type, IPv4, OSPF) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will |

| Parameter | Description |
|---|---|
| | also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - PIM

After selecting the **PIM** option as the **Protocol Type**, the following section will appear.

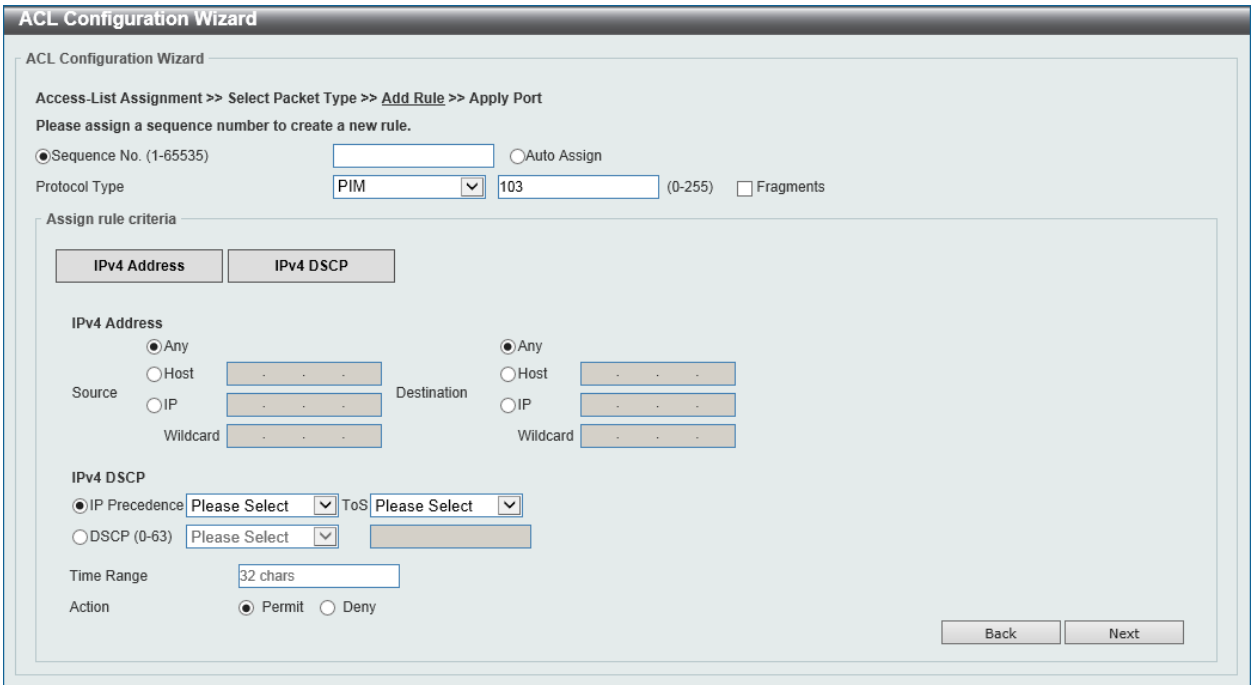



**Figure 8-14 ACL Configuration Wizard (Create, Packet Type, IPv4, PIM) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. |

| Parameter | Description |
|---|---|
| | When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - VRRP

After selecting the **VRRP** option as the **Protocol Type**, the following section will appear.

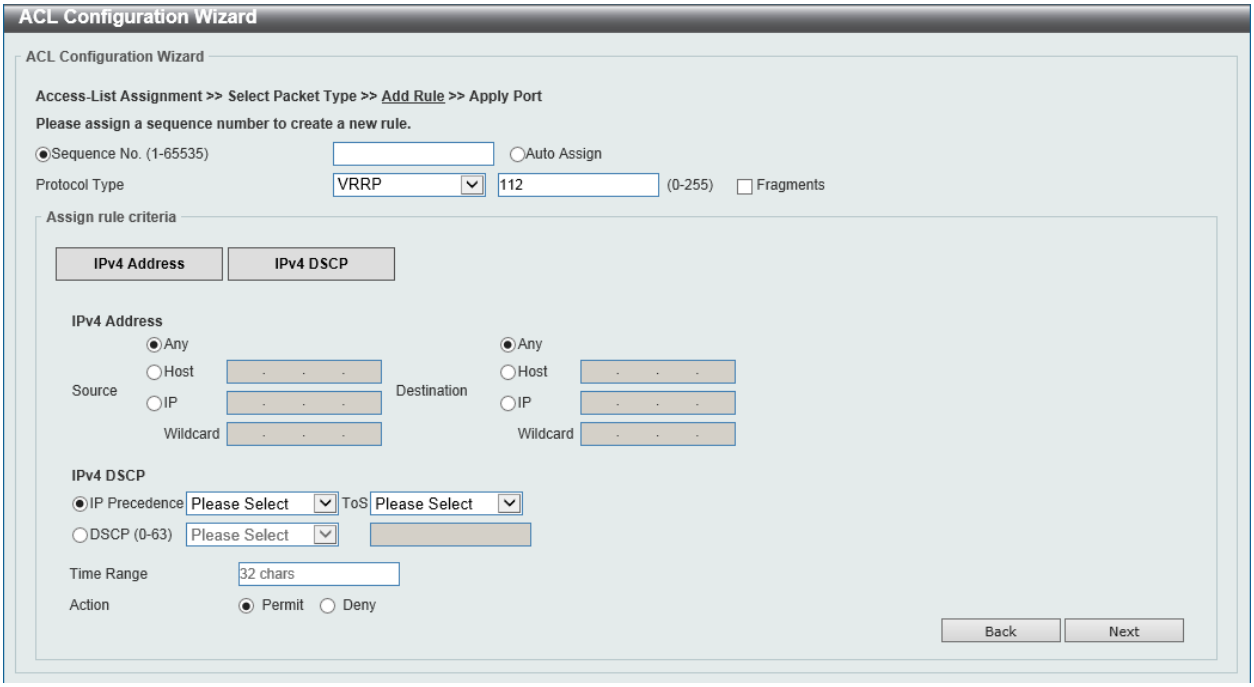



**Figure 8-15 ACL Configuration Wizard (Create, Packet Type, IPv4, VRRP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - IP-in-IP

After selecting the **IP-in-IP** option as the **Protocol Type**, the following section will appear.

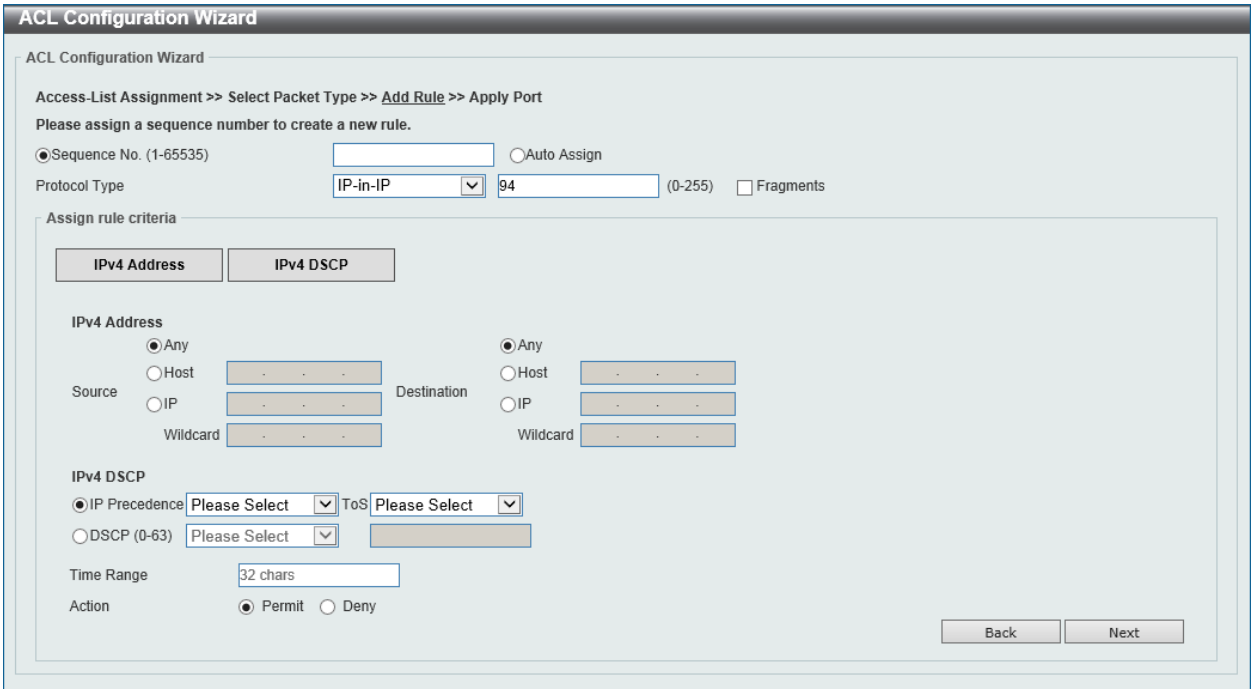



**Figure 8-16 ACL Configuration Wizard (Create, Packet Type, IPv4, IP-in-IP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - PCP

After selecting the **PCP** option as the **Protocol Type**, the following section will appear.

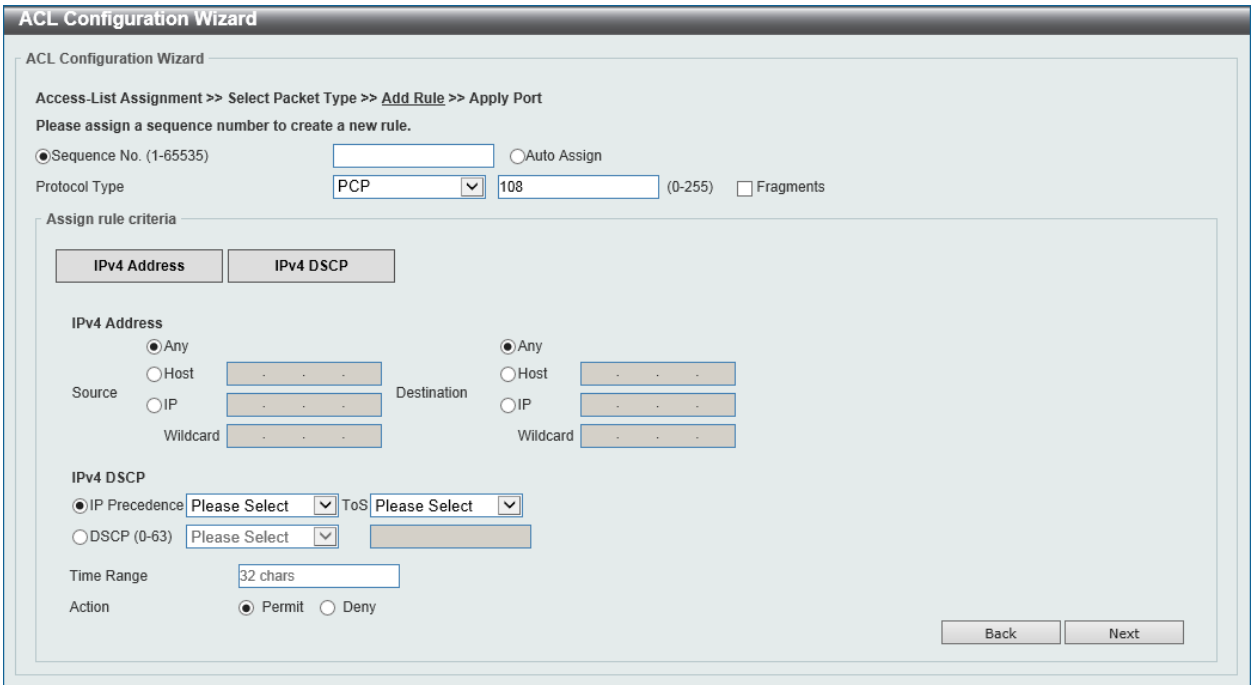



**Figure 8-17 ACL Configuration Wizard (Create, Packet Type, IPv4, PCP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-** |

| Parameter | Description |
|---|---|
| | **throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - Protocol ID

After selecting the **Protocol ID** option as the **Protocol Type**, the following section will appear.

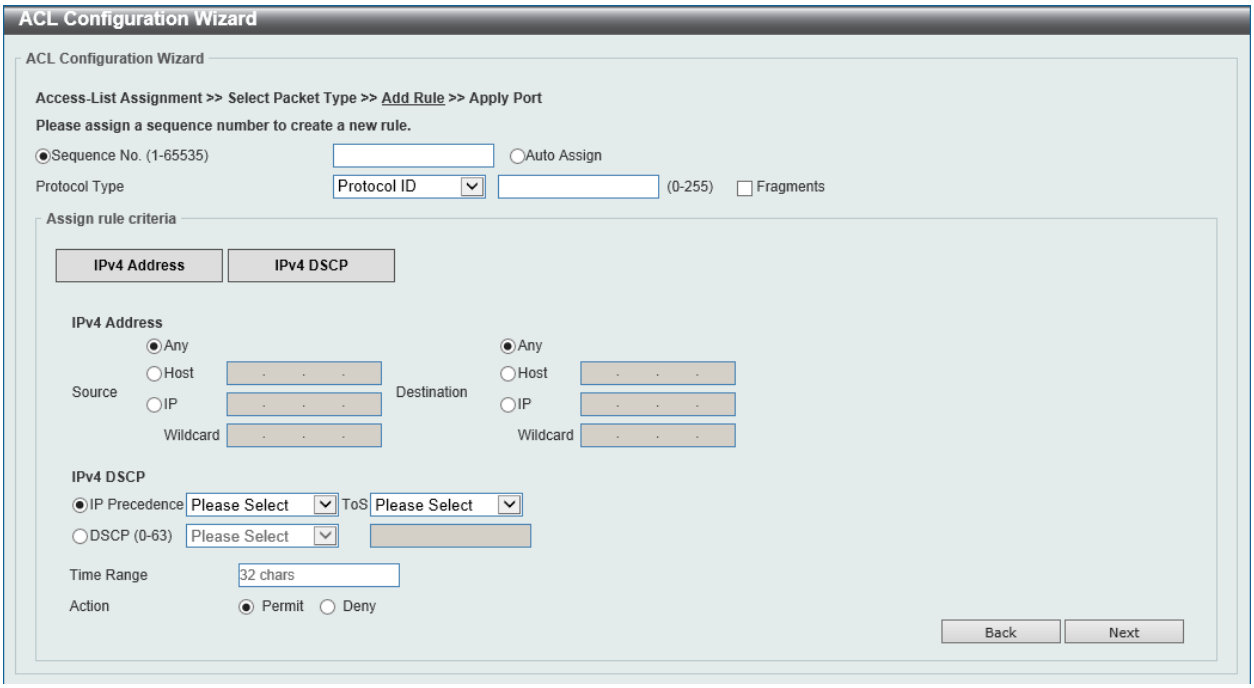



**Figure 8-18 ACL Configuration Wizard (Create, Packet Type, IPv4, Protocol ID) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will |

| Parameter | Description |
|---|---|
| | also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - None

After selecting the **None** option as the **Protocol Type**, the following section will appear.

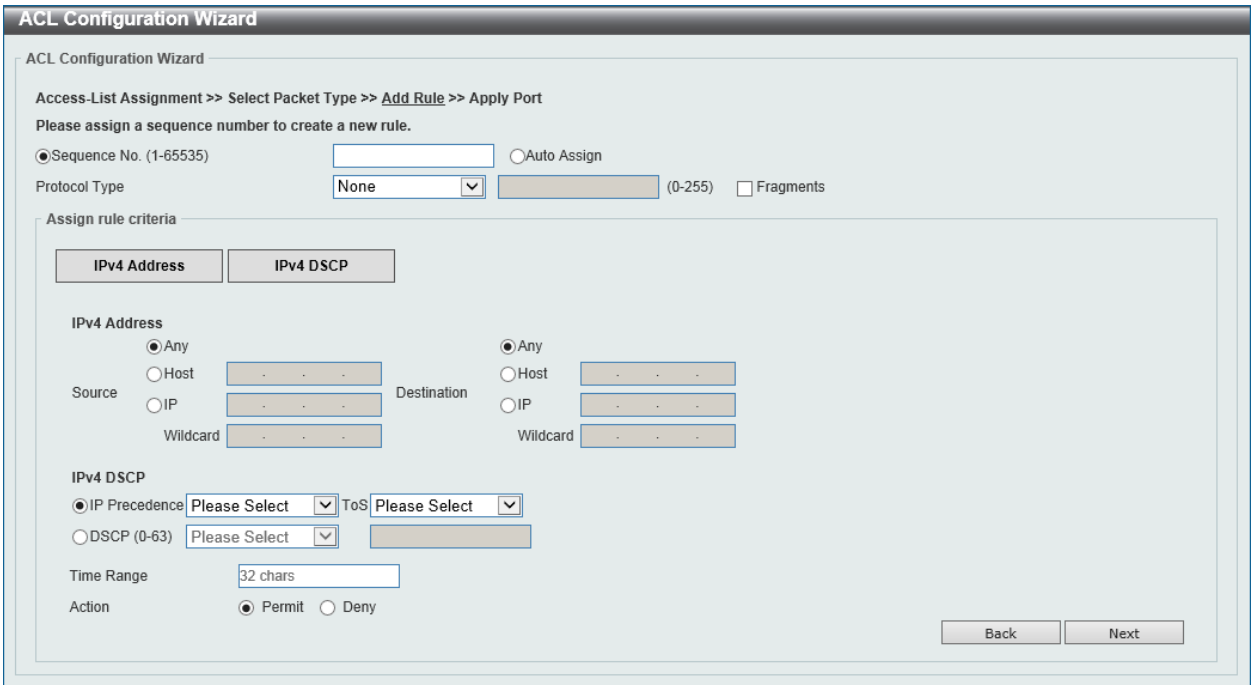



**Figure 8-19 ACL Configuration Wizard (Create, Packet Type, IPv4, None) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. |

| Parameter | Description |
|---|---|
| | When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IP**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. |
| **ToS** | After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## IPv6

After clicking the **IPv6** radio button and the **Next** button, the following window will appear.

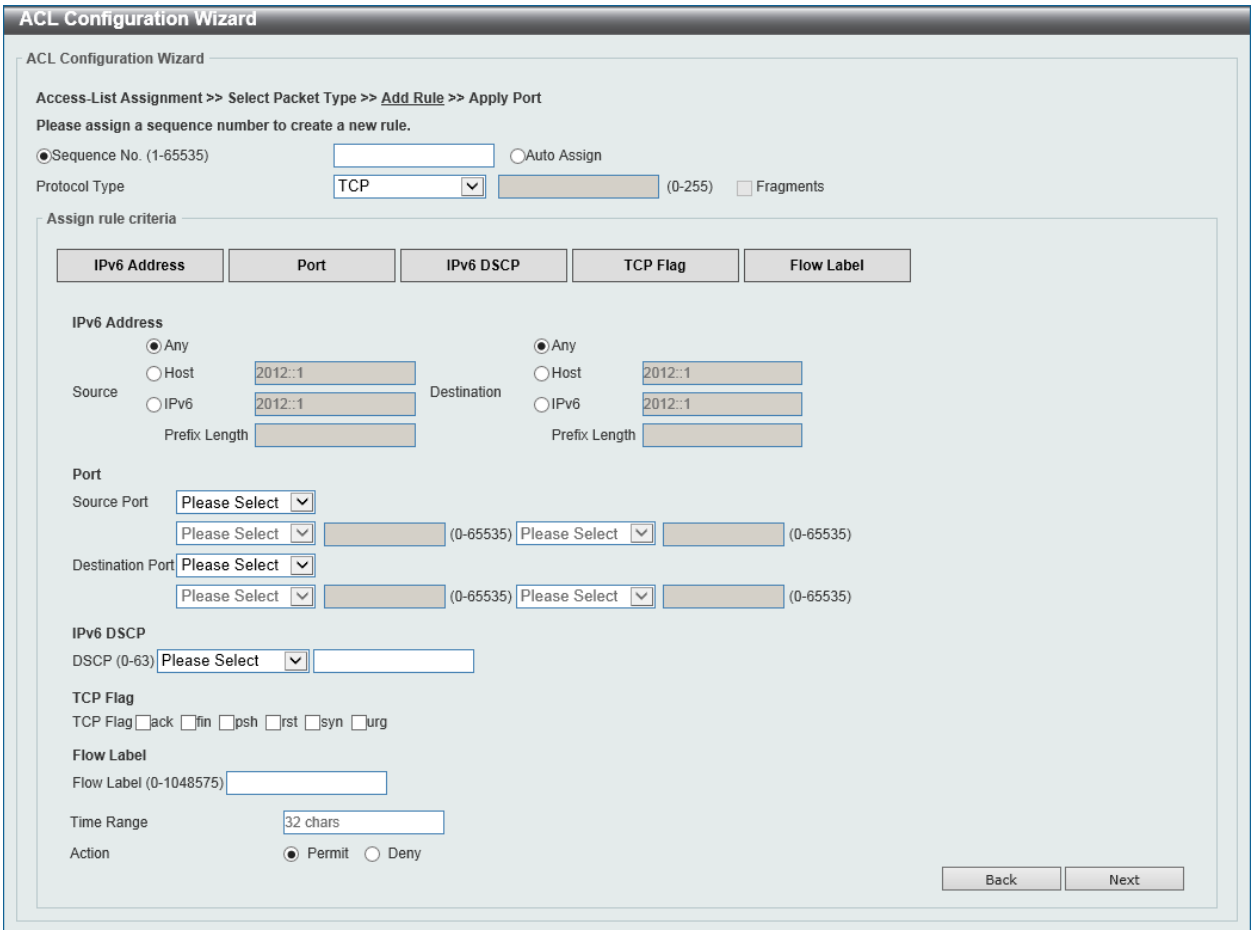



**Figure 8-20 ACL Configuration Wizard (Create, Packet Type, IPv6) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. Select **Auto Assign** to automatically generate an ACL rule number for this entry. |
| **Protocol Type** | Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **Protocol ID**, **ESP**, **PCP**, **SCTP**, and **None**. |
| **Protocol** | When available, enter the Protocol ID value in the space provided. This value must be between 0 and 255. |
| **Fragments** | When available, select the **Fragments** option to include packet fragment filtering. |

### Protocol Type - TCP

After selecting the **TCP** option as the **Protocol Type**, the following section will appear.

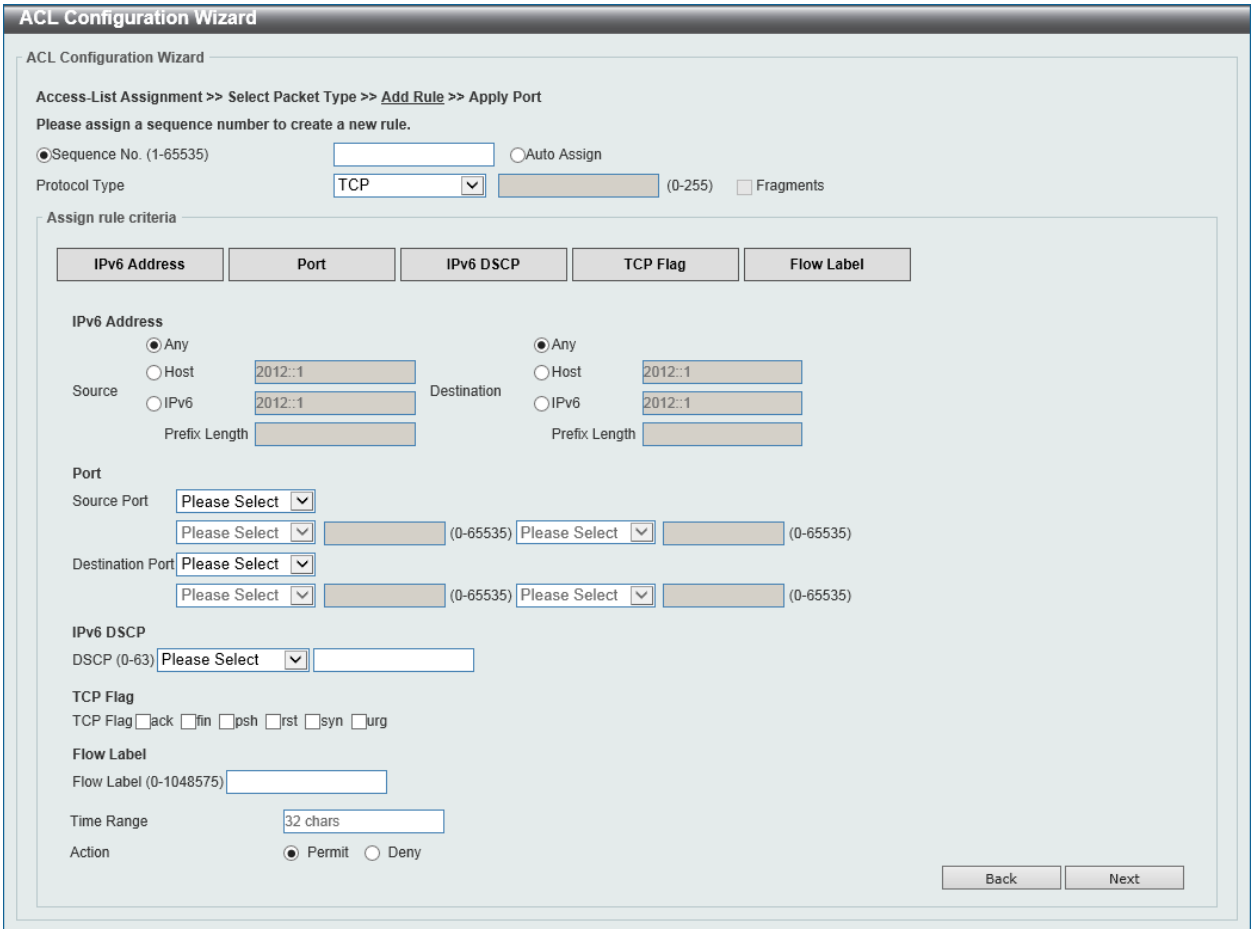



**Figure 8-21 ACL Configuration Wizard (Create, Packet Type, IPv6, TCP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the |

| Parameter | Description |
|---|---|
| | port number(s) is/are not available in the drop-down list. |
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **TCP Flag** | Tick the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

### Protocol Type - UDP

After selecting the **UDP** option as the **Protocol Type**, the following section will appear.

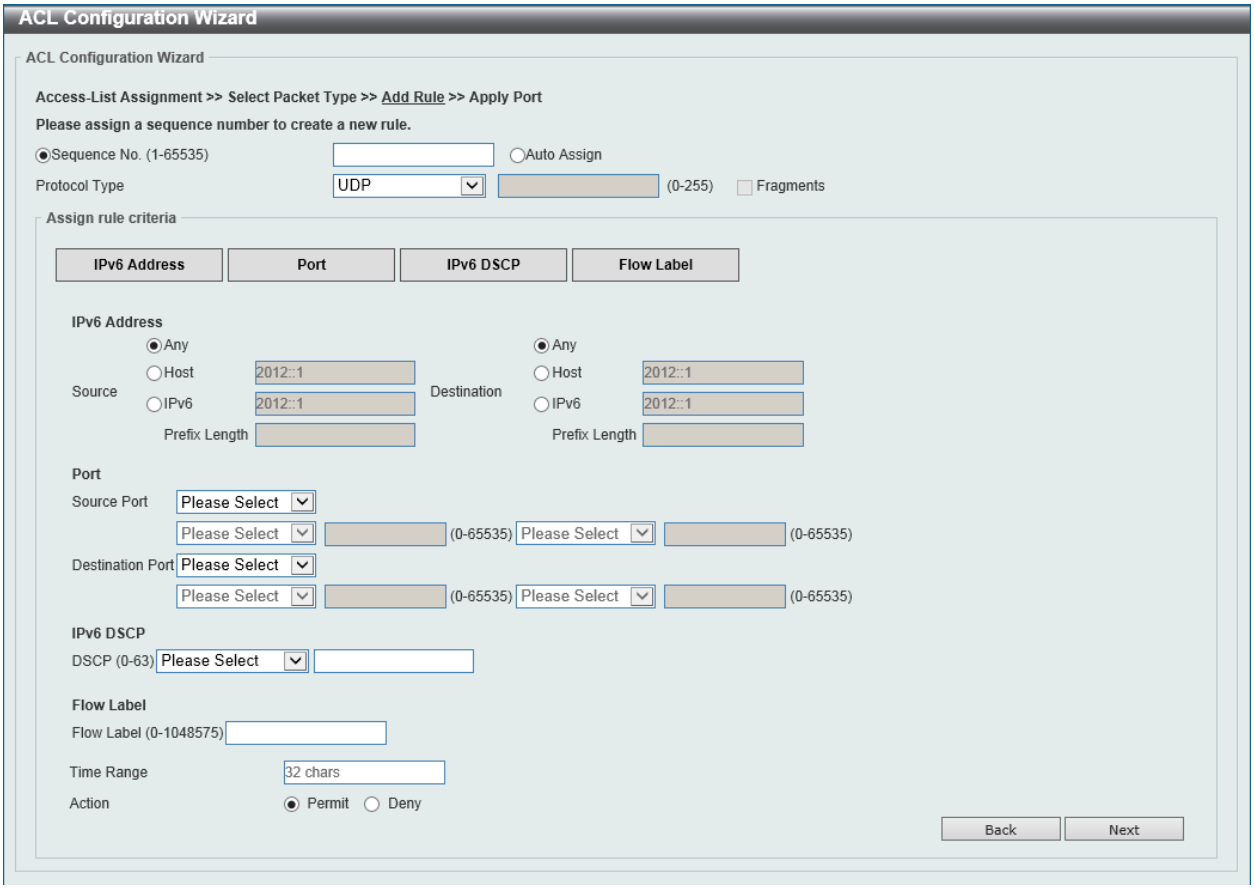



**Figure 8-22 ACL Configuration Wizard (Create, Packet Type, IPv6, UDP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |

| Parameter | Description |
|---|---|
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - ICMP

After selecting the **ICMP** option as the **Protocol Type**, the following section will appear.

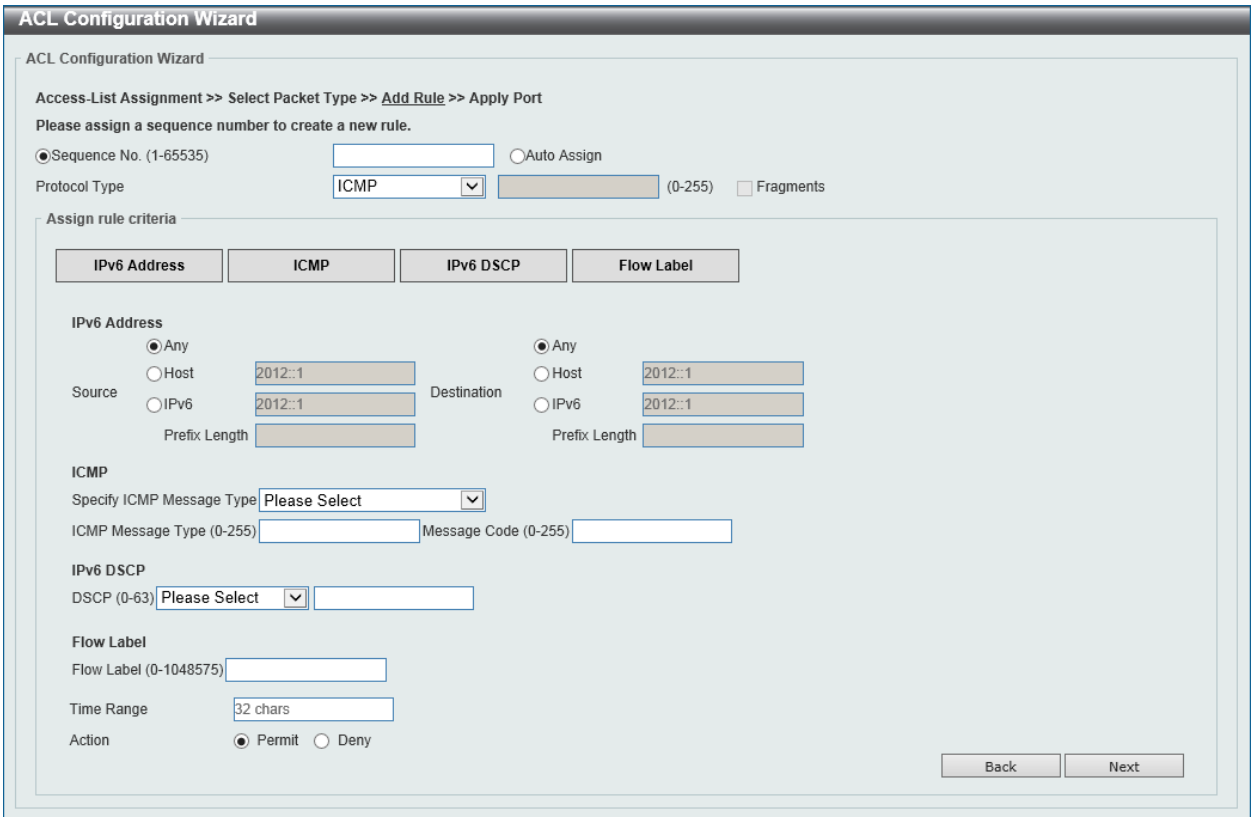



**Figure 8-23 ACL Configuration Wizard (Create, Packet Type, IPv6, ICMP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **Specify ICMP Message Type** | Select the ICMP message type used here. |
| **ICMP Message Type** | When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **Message Code** | When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - Protocol ID

After selecting the **Protocol ID** option as the **Protocol Type**, the following section will appear.

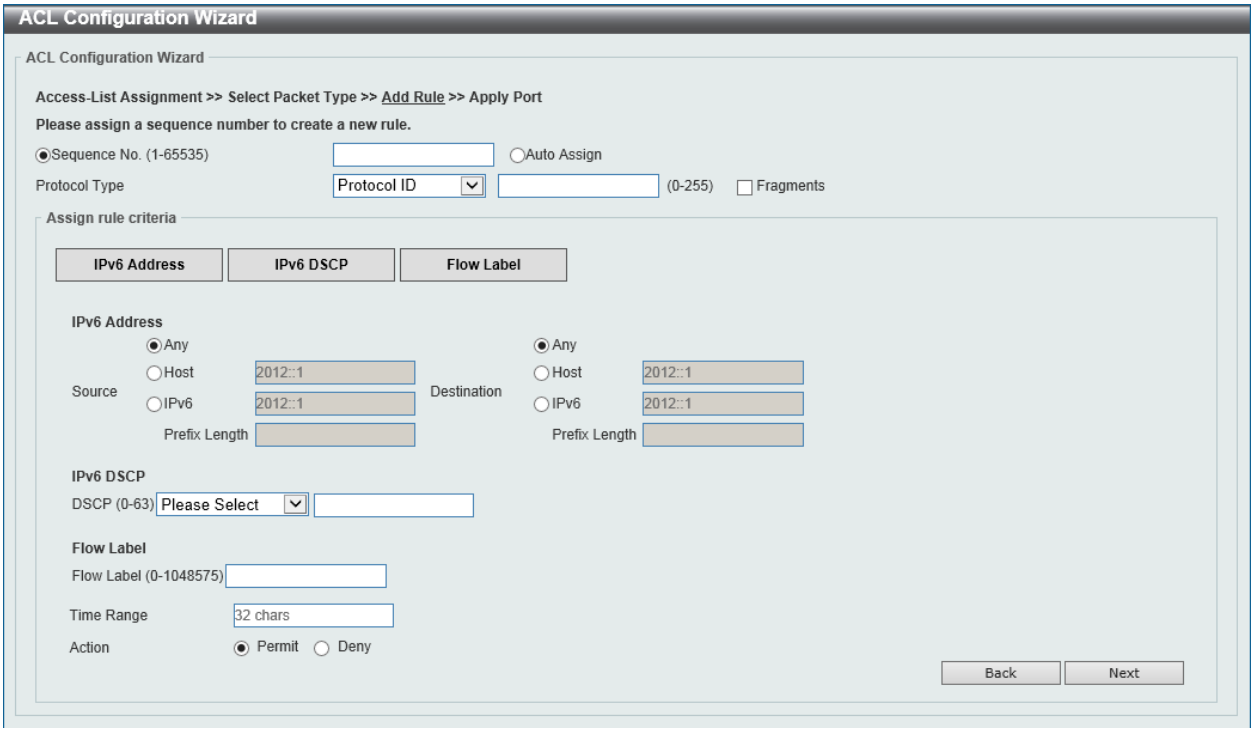



**Figure 8-24 ACL Configuration Wizard (Create, Packet Type, IPv6, Protocol ID) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - ESP

After selecting the **ESP** option as the **Protocol Type**, the following section will appear.

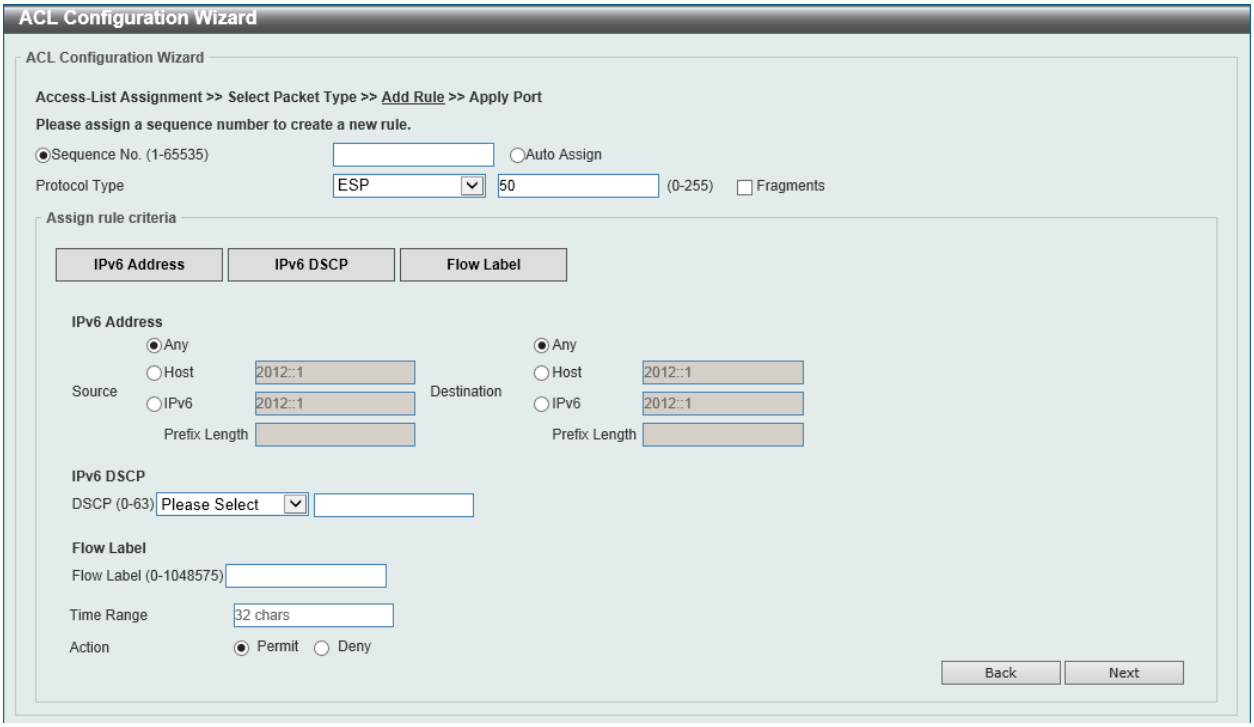



**Figure 8-25 ACL Configuration Wizard (Create, Packet Type, IPv6, ESP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - PCP

After selecting the **PCP** option as the **Protocol Type**, the following section will appear.

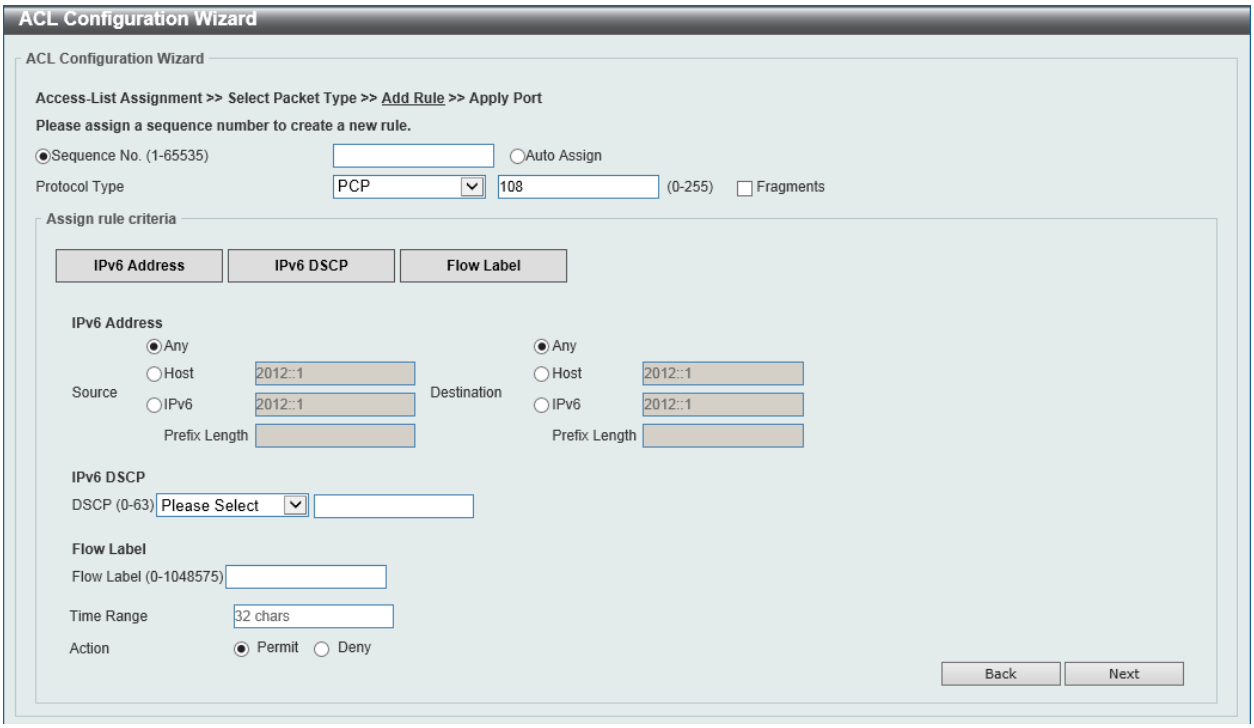



**Figure 8-26 ACL Configuration Wizard (Create, Packet Type, IPv6, PCP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - SCTP

After selecting the **SCTP** option as the **Protocol Type**, the following section will appear.

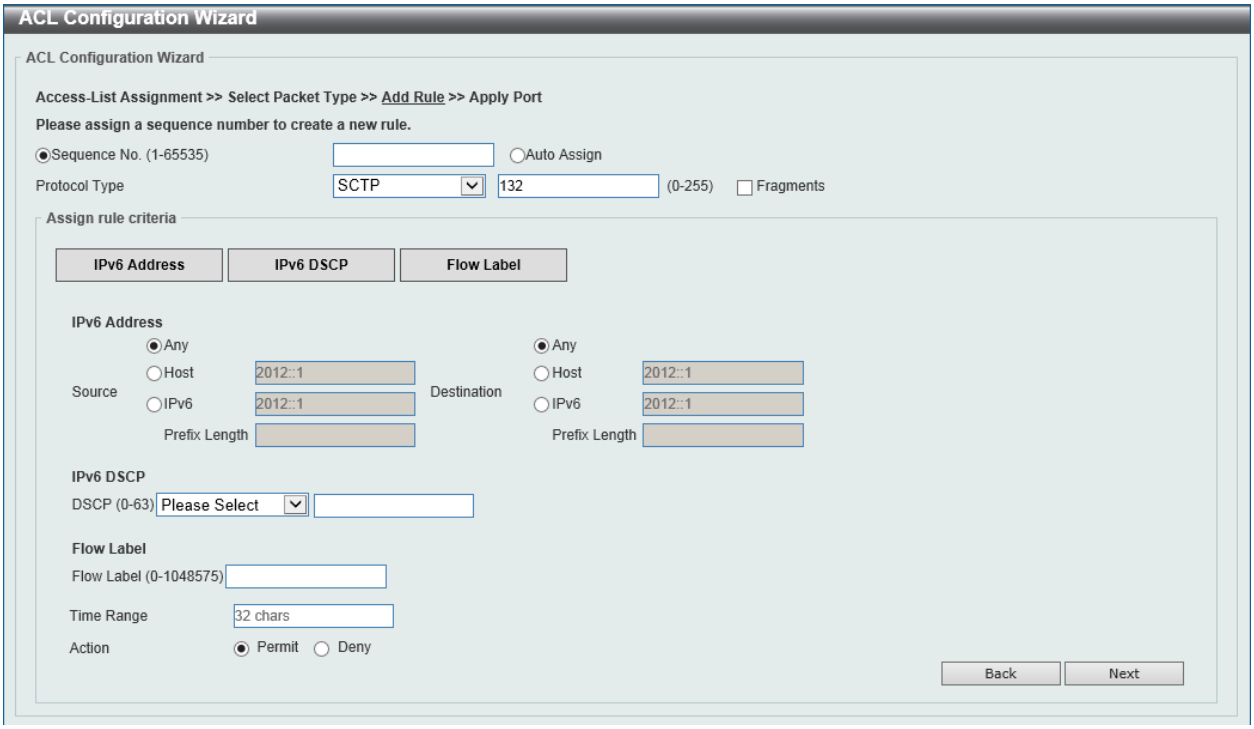



**Figure 8-27 ACL Configuration Wizard (Create, Packet Type, IPv6, SCTP) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Protocol Type - None

After selecting the **None** option as the **Protocol Type**, the following section will appear.

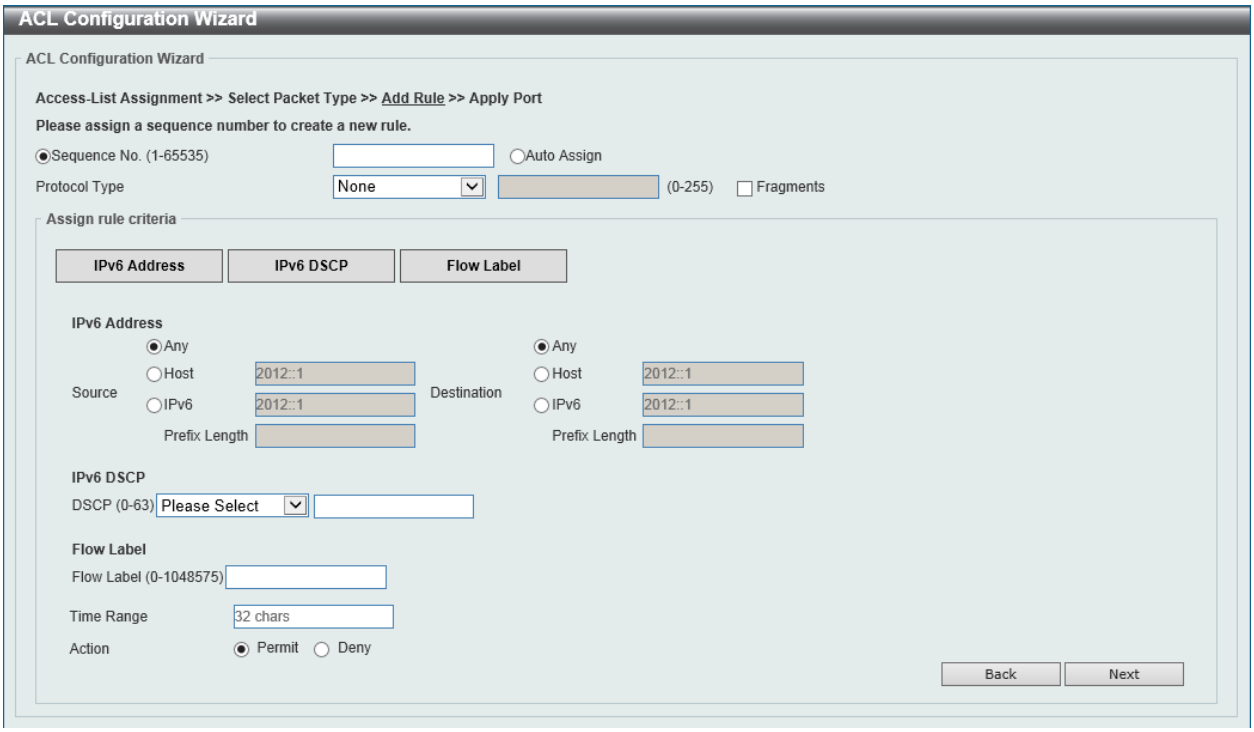



**Figure 8-28 ACL Configuration Wizard (Create, Packet Type, IPv6, None) Window**

The fields that can be configured in **Assign rule criteria** are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, and **IPv6**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the name of the time range to associate with this ACL rule. |
| **Action** | Select the action that this rule will take here. Options to choose from |

| Parameter | Description |
|---|---|
| | are **Permit** and **Deny**. |

Click the **Back** button to return to the previous window.

Click the **Next** button to continue.

## Step 4 - Apply Port

After clicking the **Next** button, the following window will appear.

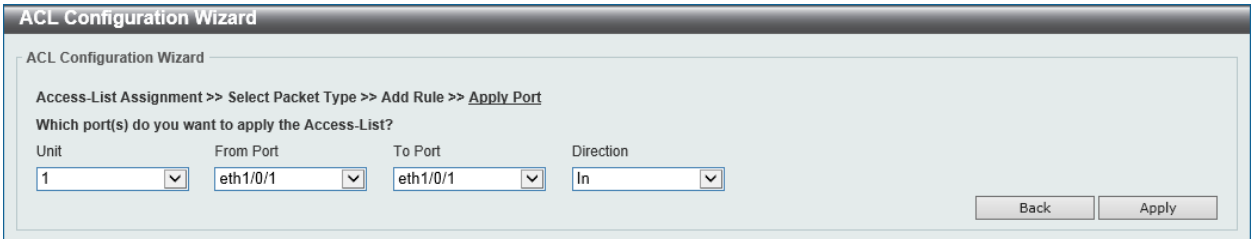



**Figure 8-29 ACL Configuration Wizard (Create, Port) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Direction** | Select the direction here. Options to choose from are **In** and **Out**. |

Click the **Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

# ACL Access List

This window is used to view and configure the ACL access list settings.

To view the following window, click **ACL > ACL Access List**, as shown below:

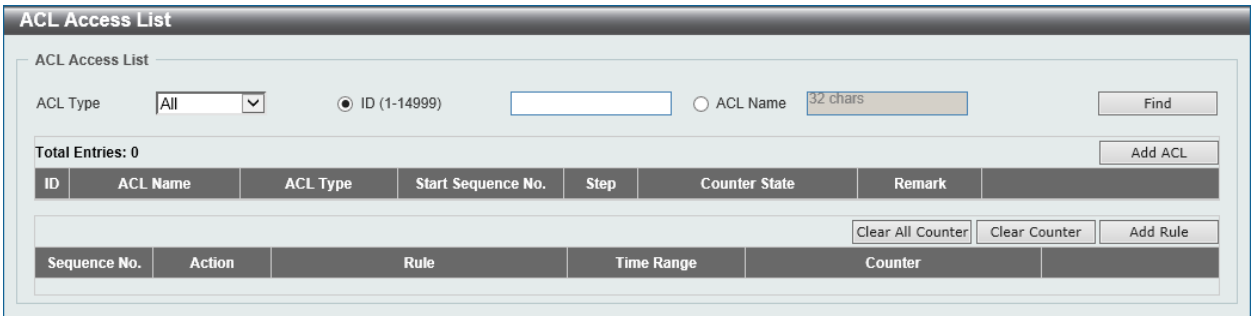



**Figure 8-30 ACL Access List Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type to find here. Options to choose from are **All**, **IP** |

| Parameter | Description |
|---|---|
| | **ACL**, **IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ID** | Select and enter the access list's ID here. The range is from 1 to 14999. |
| **ACL Name** | Select and enter the access list's name here. This name can be up to 32 characters long. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Add ACL** button to create a new ACL.

Click the **Clear All Counter** button to clear all the counter information displayed.

Click the **Clear Counter** button to clear the counter information for the rule displayed.

Click the **Add Rule** button to create an ACL rule for the ACL selected.

## Standard IP ACL

After clicking the **Add ACL** button, users can create a new ACL, as shown below:

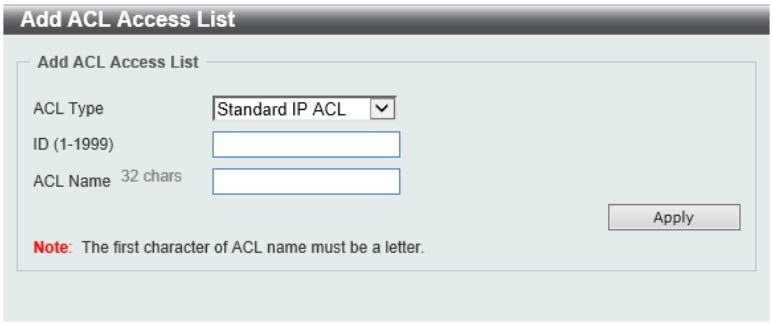



**Figure 8-31 Standard IP ACL (Add ACL) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type here. For this section we'll select the **Standard IP ACL** option. |
| **ID** | Enter the access list's ID here. The range from 1 to 1999. |
| **ACL Name** | Enter the ACL's name here. This name can be up to 32 characters long. |

Click the **Apply** button to create the new ACL.

After creating a **Standard IP ACL**, the newly created **Standard IP ACL** will be displayed in the ACL display table, as shown below:

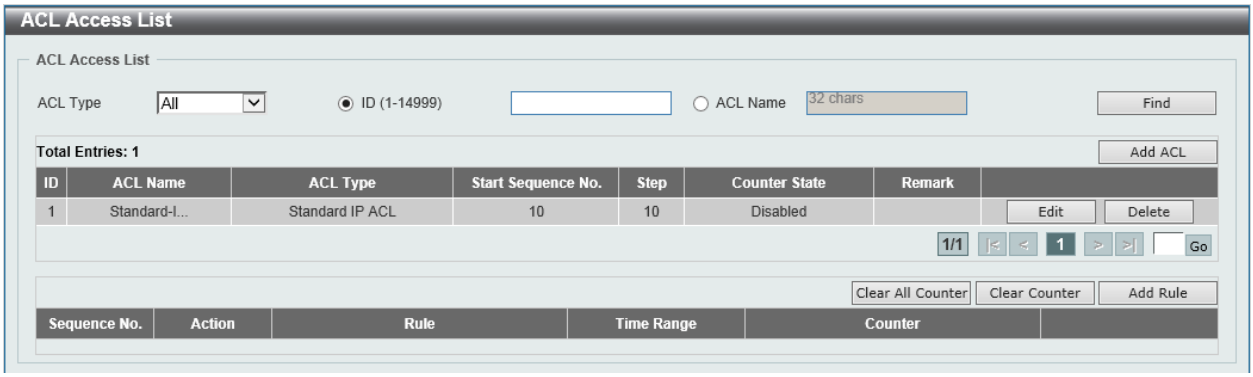



**Figure 8-32 Standard IP ACL (Main) Window**

Click the **Edit** button to re-configure the specific ACL.

Click the **Delete** button to remove the specific ACL.

To add an ACL rule in the ACL, select it (the ACL will toggle to the bold font), and click the **Add Rule** button.

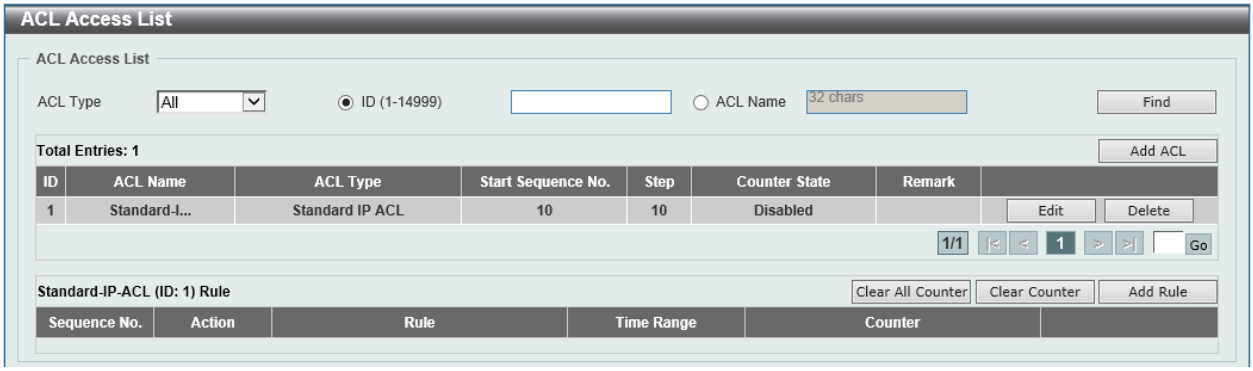



**Figure 8-33 Standard IP ACL (Selected) Window**

After selecting the ACL and clicking the **Add Rule** button, users can configure the new ACL rule, in the selected ACL, as shown below:

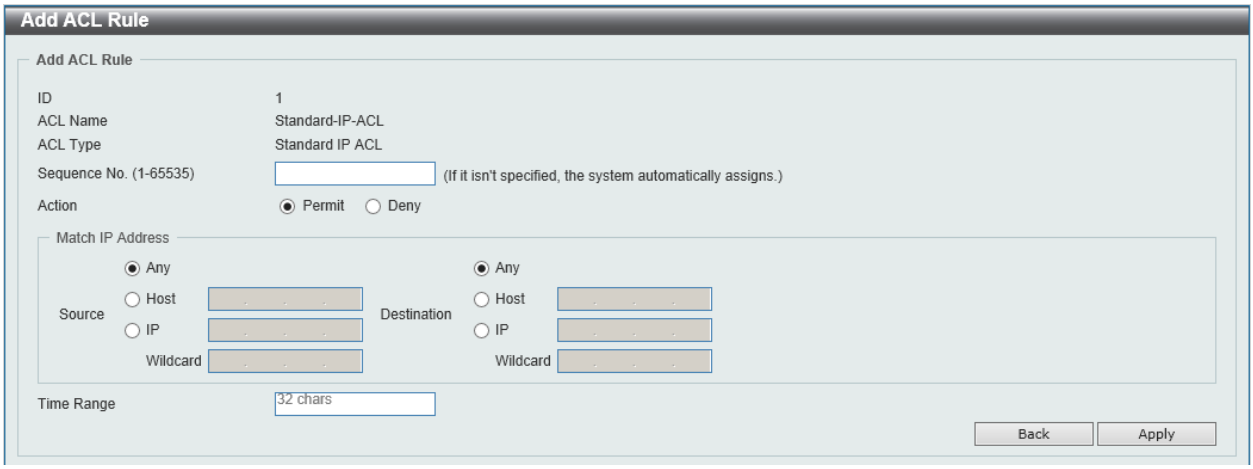



**Figure 8-34 Standard IP ACL (Add Rule) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Time Range** | Enter the time range profile's name that will be associated with this ACL rule here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

To enable the **Counter State** option or to enter a **Remark** for the ACL, click the **Edit** button, next to the specific ACL (found in the ACL table).

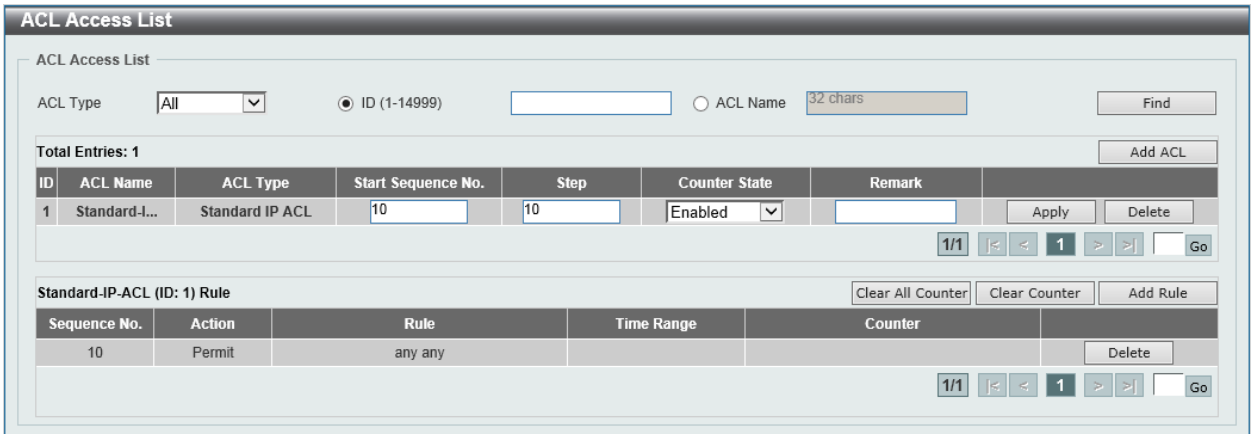



**Figure 8-35 Standard IP ACL (Counter State Enabled) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Start Sequence No.** | Enter the start sequence number here. |
| **Stop** | Enter the stop sequence number here. |
| **Counter State** | Select to enable or disable the counter state option here. |

| Parameter | Description |
|---|---|
| **Remark** | Enter an optional remark that will be associated with this ACL here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

To view the list of rules, that are associated with an ACL, select the ACL (found in the ACL table). The rule of ACL rules, connected to the selected ACL, will be displayed in the ACL rule table, as shown below:

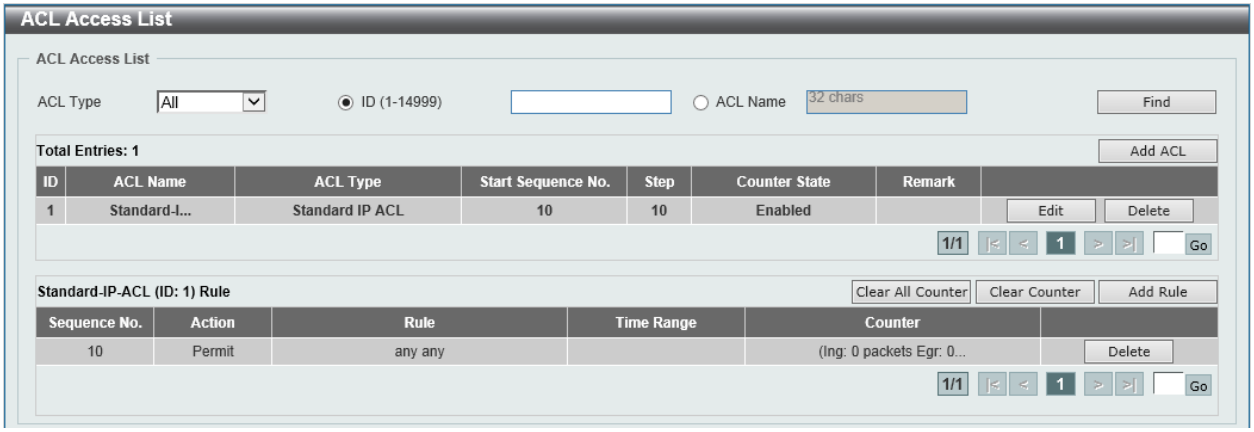



**Figure 8-36 Standard IP ACL (Rule Display) Window**

Click the **Delete** button to remove the specific ACL rule.

# Extended IP ACL

After clicking the **Add ACL** button, users can create a new ACL, as shown below:

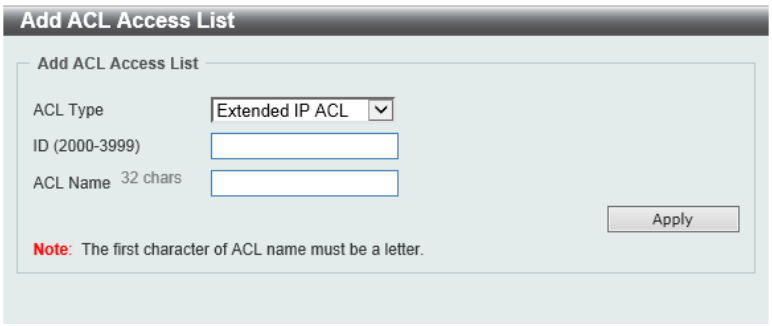



**Figure 8-37 Extended IP ACL (Add ACL) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type here. For this section we'll select the **Extended IP ACL** option. |
| **ID** | Enter the access list's ID here. The range from 2000 to 3999. |
| **ACL Name** | Enter the ACL's name here. This name can be up to 32 characters long. |

Click the **Apply** button to create the new ACL.

After creating an **Extended IP ACL**, the newly created **Extended IP ACL** will be displayed in the ACL display table, as shown below:

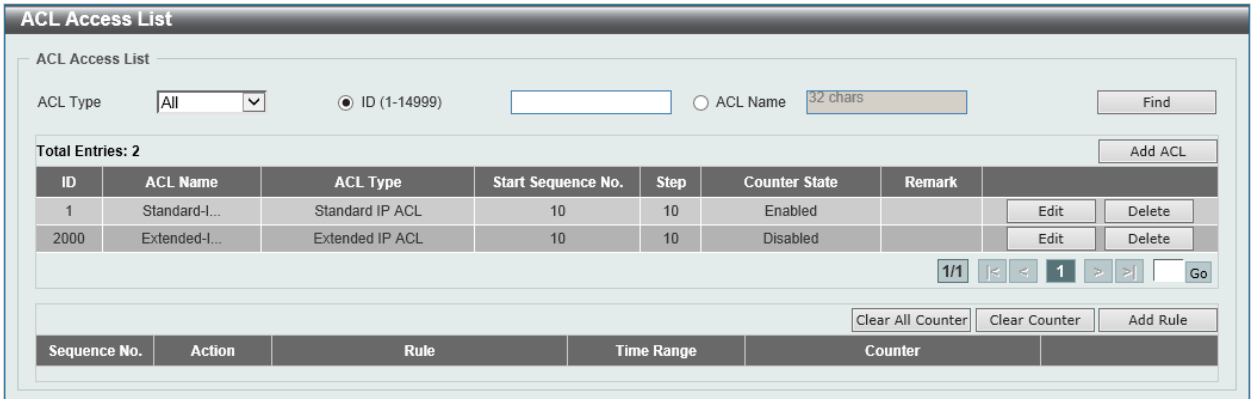



**Figure 8-38 Extended IP ACL (Main) Window**

Click the **Edit** button to re-configure the specific ACL.

Click the **Delete** button to remove the specific ACL.

To add an ACL rule in the ACL, select it (the ACL will toggle to the bold font), and click on the **Add Rule** button.

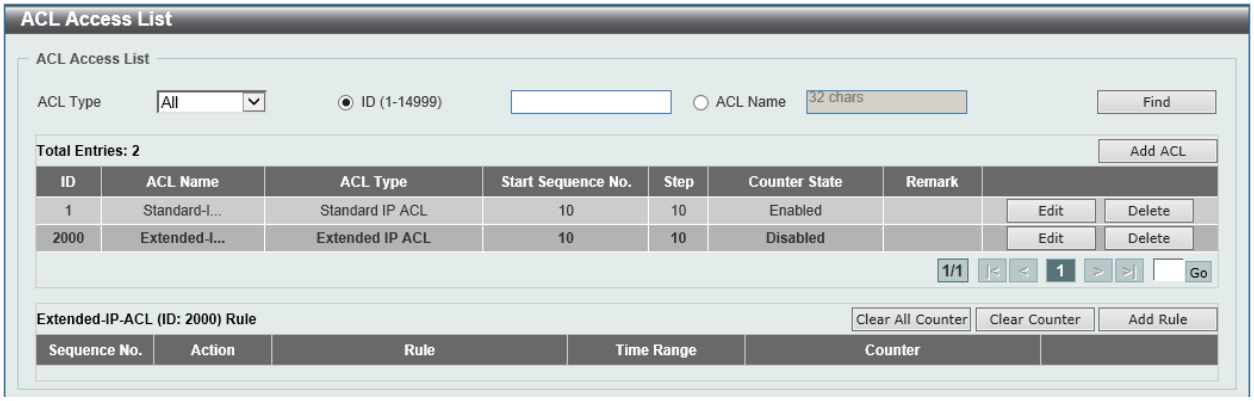



**Figure 8-39 Extended IP ACL (Selected) Window**

After selecting the ACL and clicking the **Add Rule** button, users can configure the new ACL rule, in the selected ACL, as shown below:

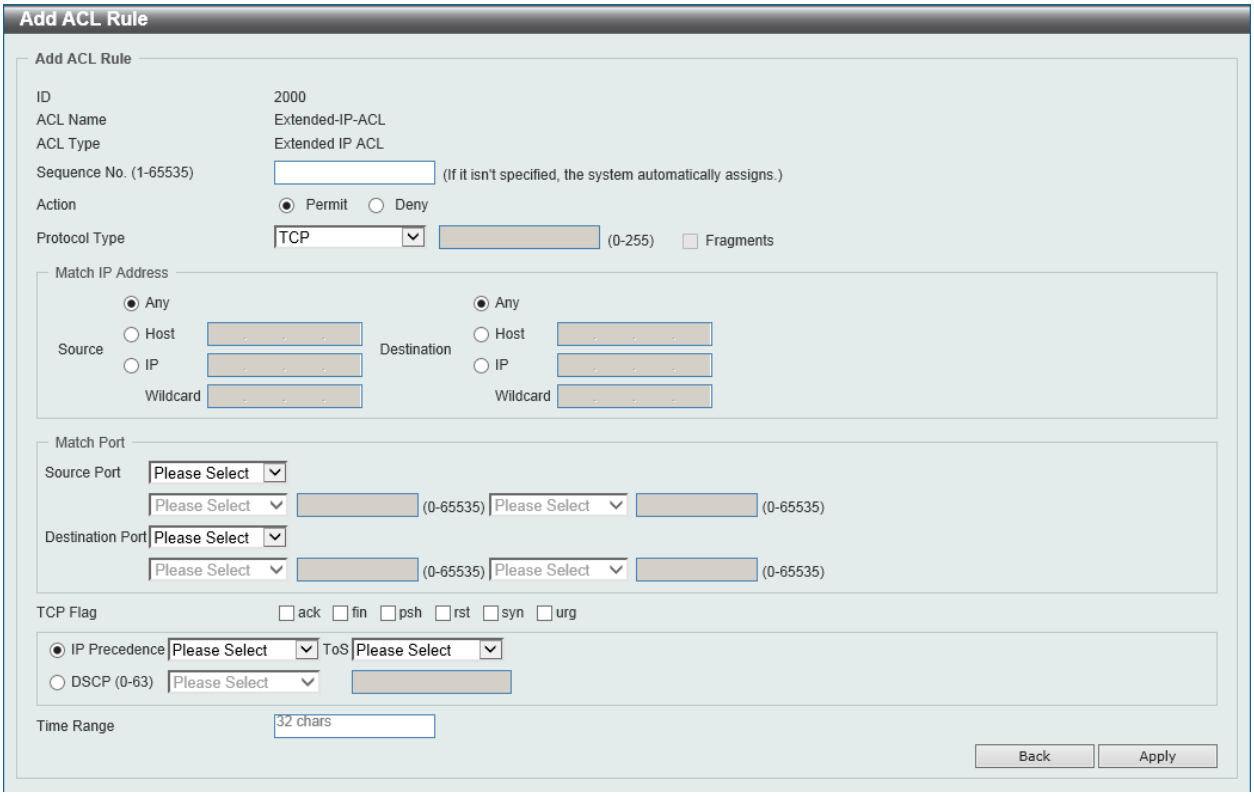



**Figure 8-40 Extended IP ACL (Add Rule) Window**

This is a dynamic page. Every selection made in the **Protocol Type** option will change the bottom part of this page.

The **fixed** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |
| **Protocol Type** | Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **EIGRP**, **ESP**, **GRE**, **IGMP**, **OSPF**, **PIM**, **VRRP**, **IP-in-IP**, **PCP**, **Protocol ID**, and **None**. |

After selecting the **TCP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

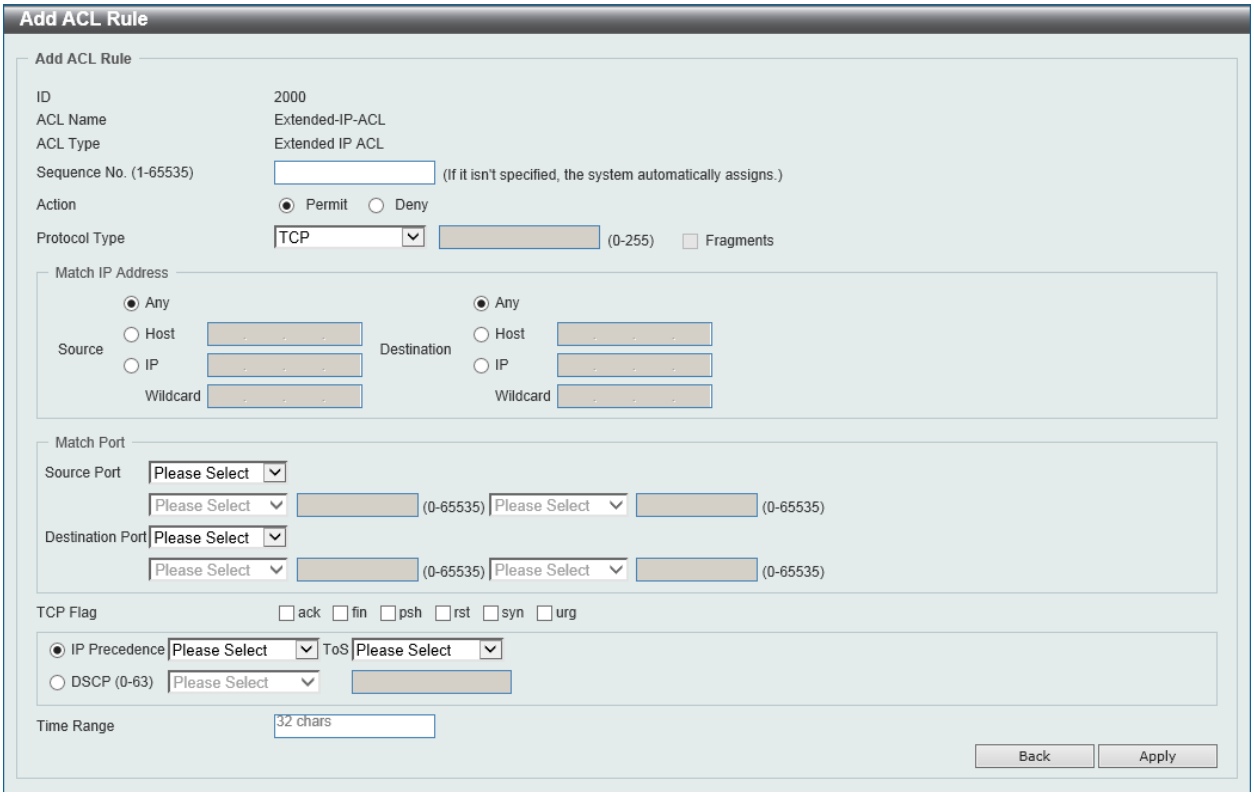



**Figure 8-41 Extended IP ACL (Add Rule) TCP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |

| Parameter | Description |
|---|---|
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **TCP Flag** | Tick the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **UDP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

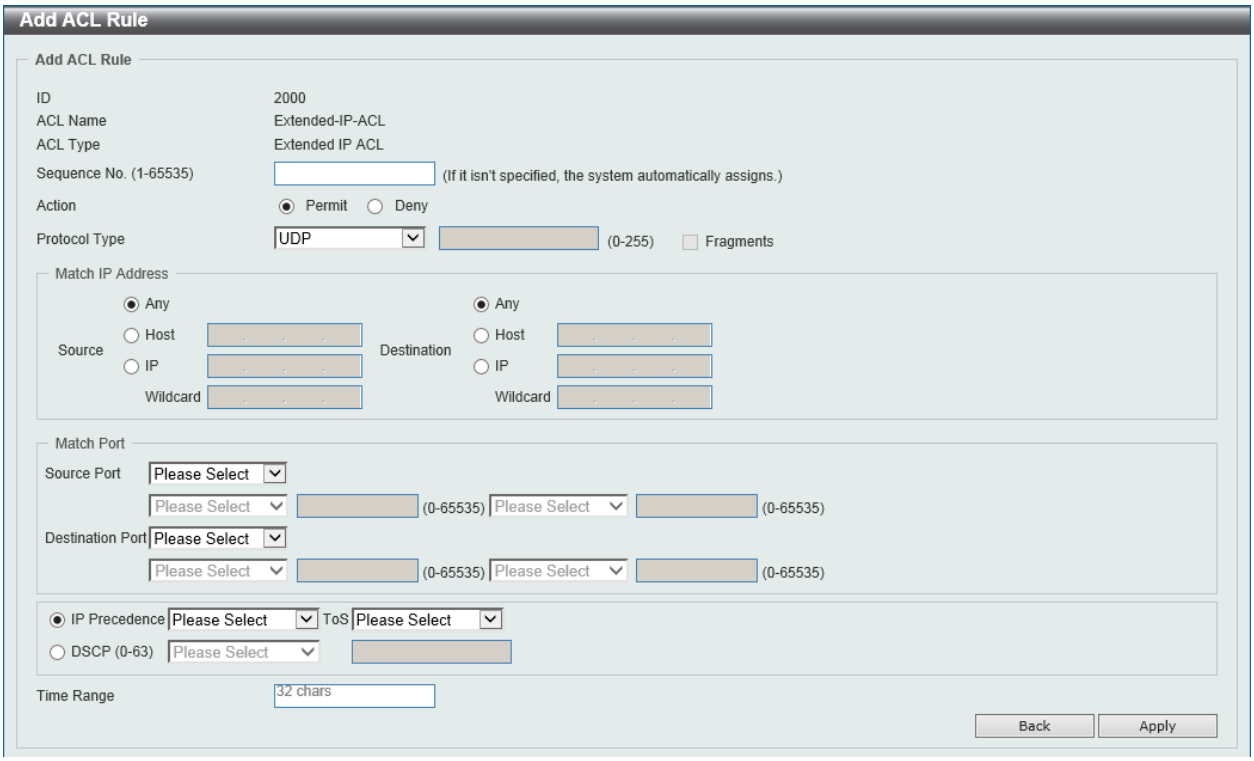



**Figure 8-42 Extended IP ACL (Add Rule) UDP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **ICMP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

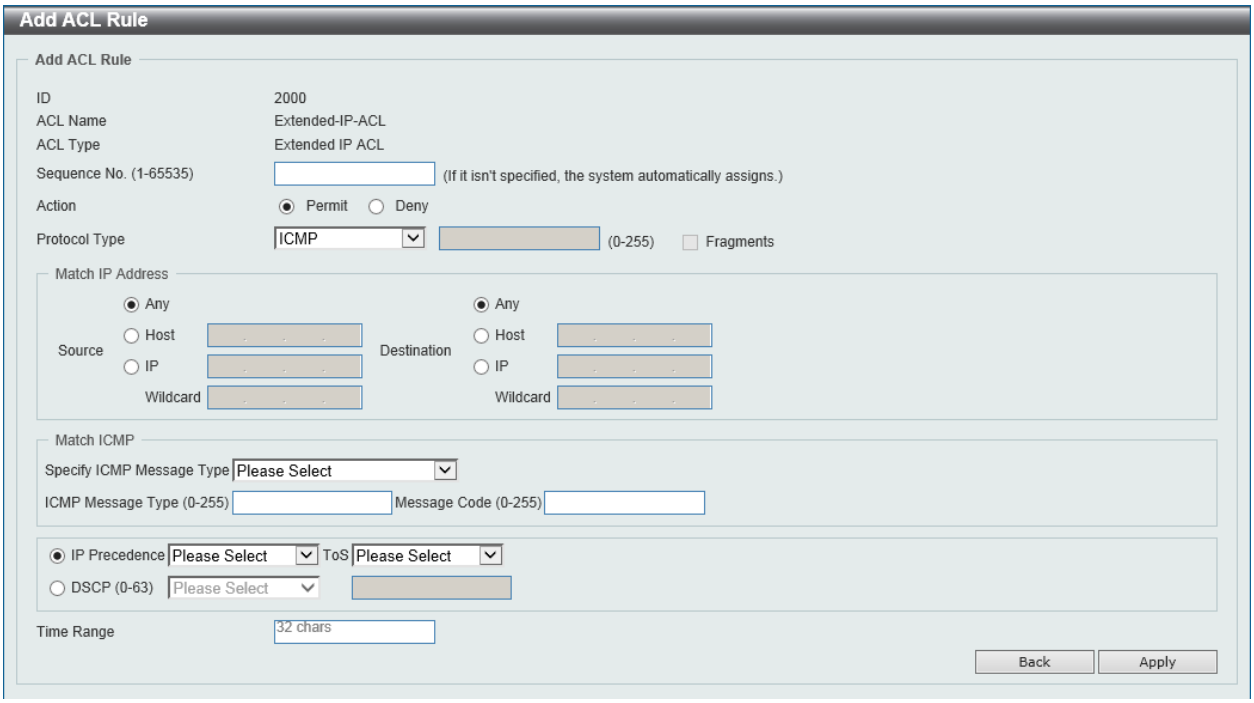



**Figure 8-43 Extended IP ACL (Add Rule) ICMP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Specify ICMP Message Type** | Select the ICMP message type used here. |
| **ICMP Message Type** | When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **Message Code** | When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, |

| Parameter | Description |
|---|---|
| | **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **EIGRP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

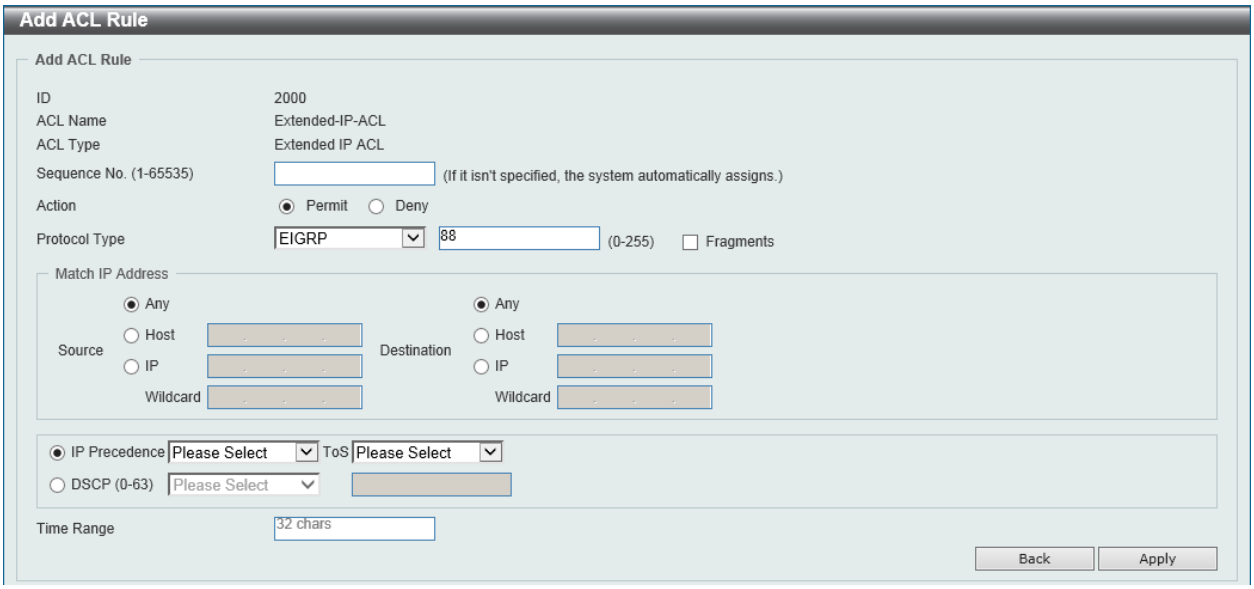



**Figure 8-44 Extended IP ACL (Add Rule) EIGRP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination |

| Parameter | Description |
|---|---|
| | IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **ESP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

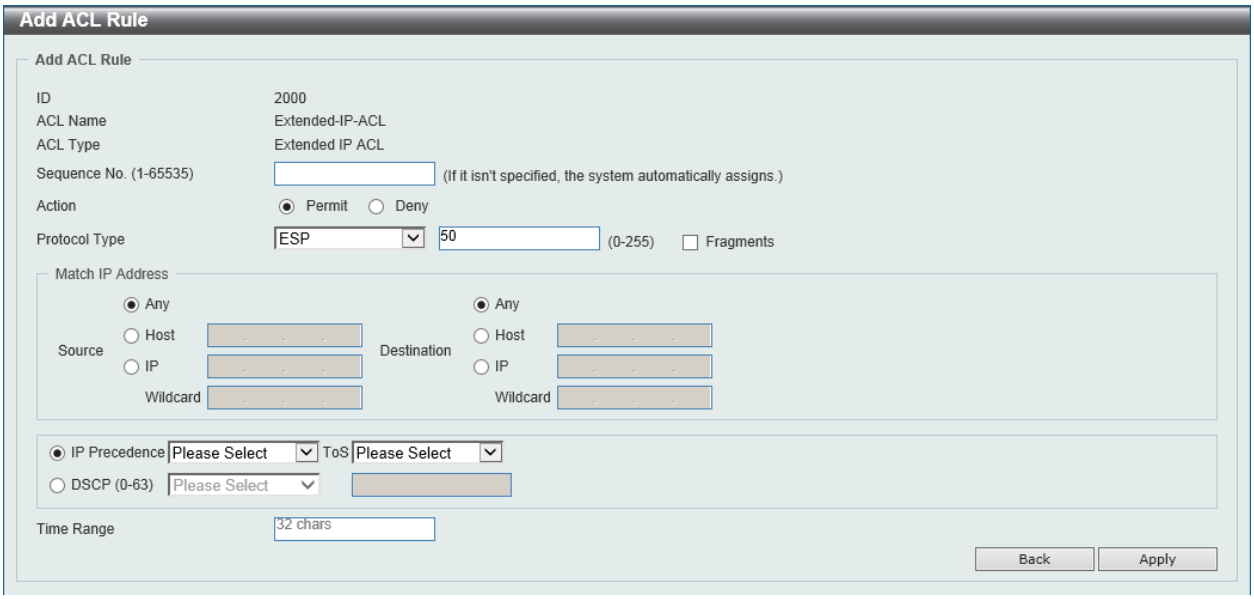



**Figure 8-45 Extended IP ACL (Add Rule) ESP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |

| Parameter | Description |
|---|---|
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **GRE** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

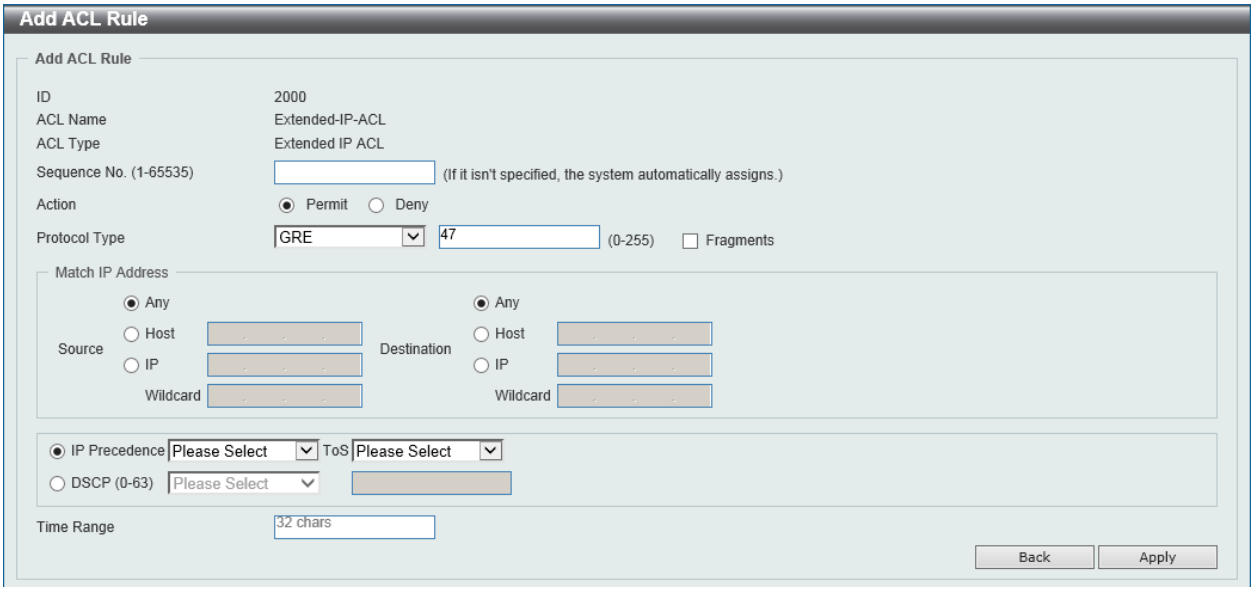



**Figure 8-46 Extended IP ACL (Add Rule) GRE Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this |

| Parameter | Description |
|---|---|
| | rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **IGMP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

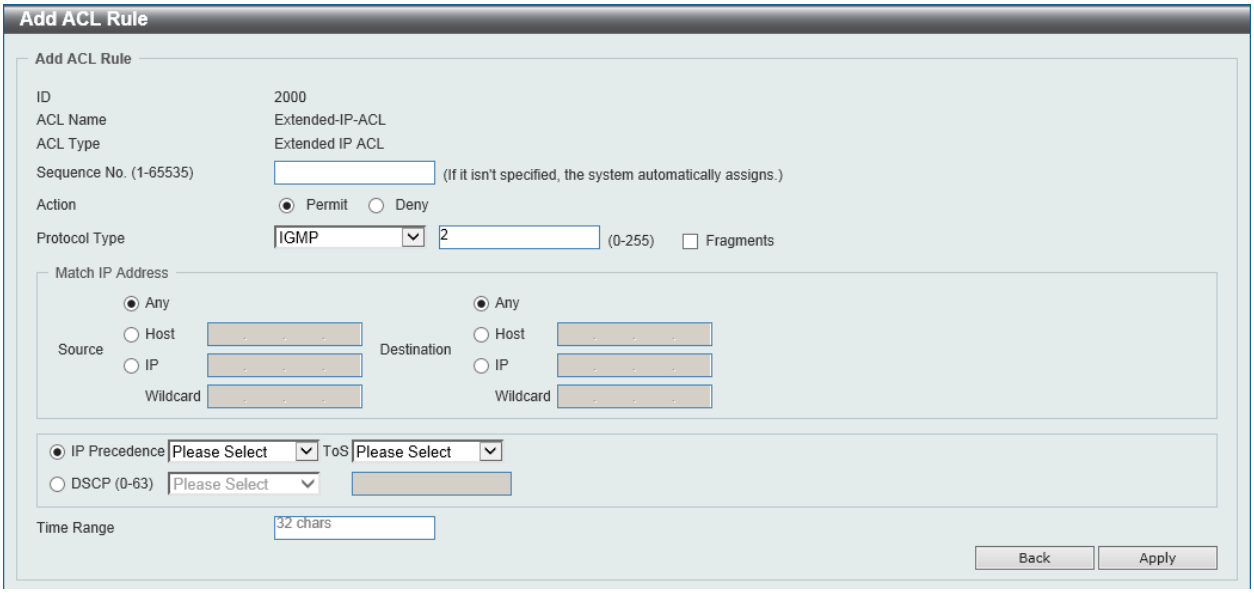



**Figure 8-47 Extended IP ACL (Add Rule) IGMP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **OSPF** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

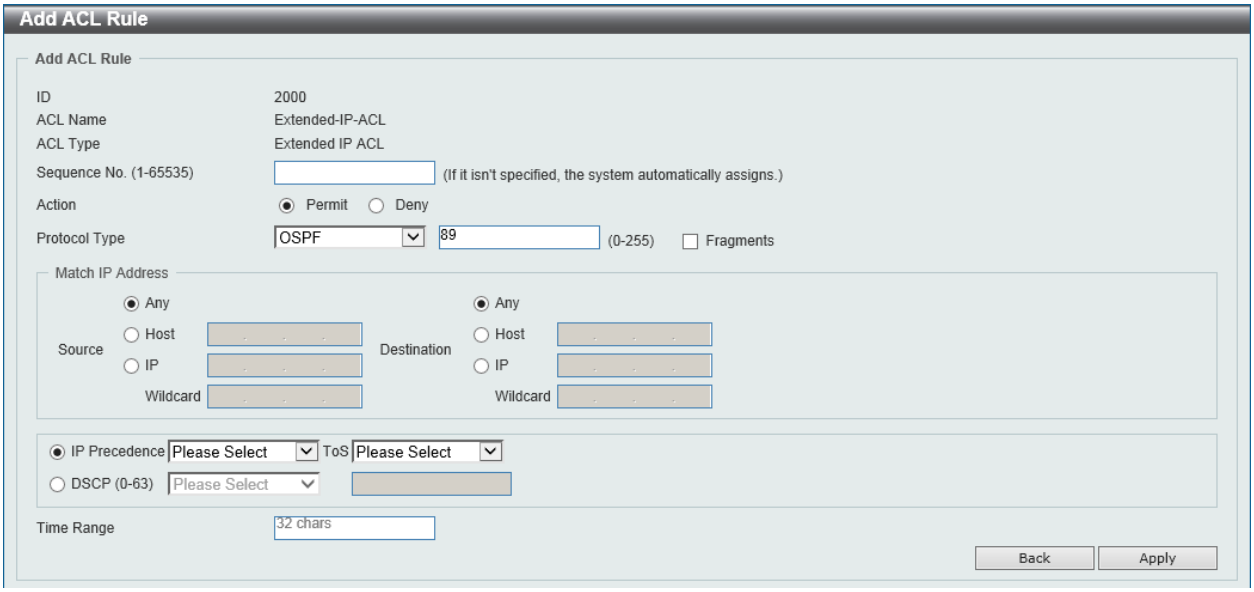



**Figure 8-48 Extended IP ACL (Add Rule) OSPF Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **PIM** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

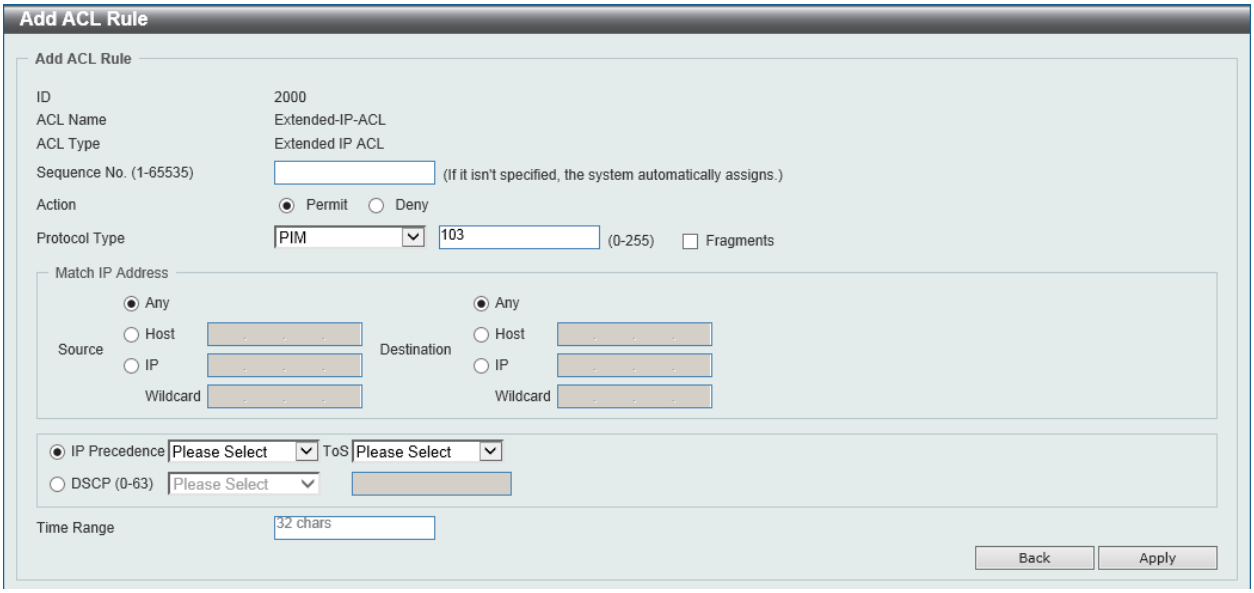



**Figure 8-49 Extended IP ACL (Add Rule) PIM Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **VRRP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

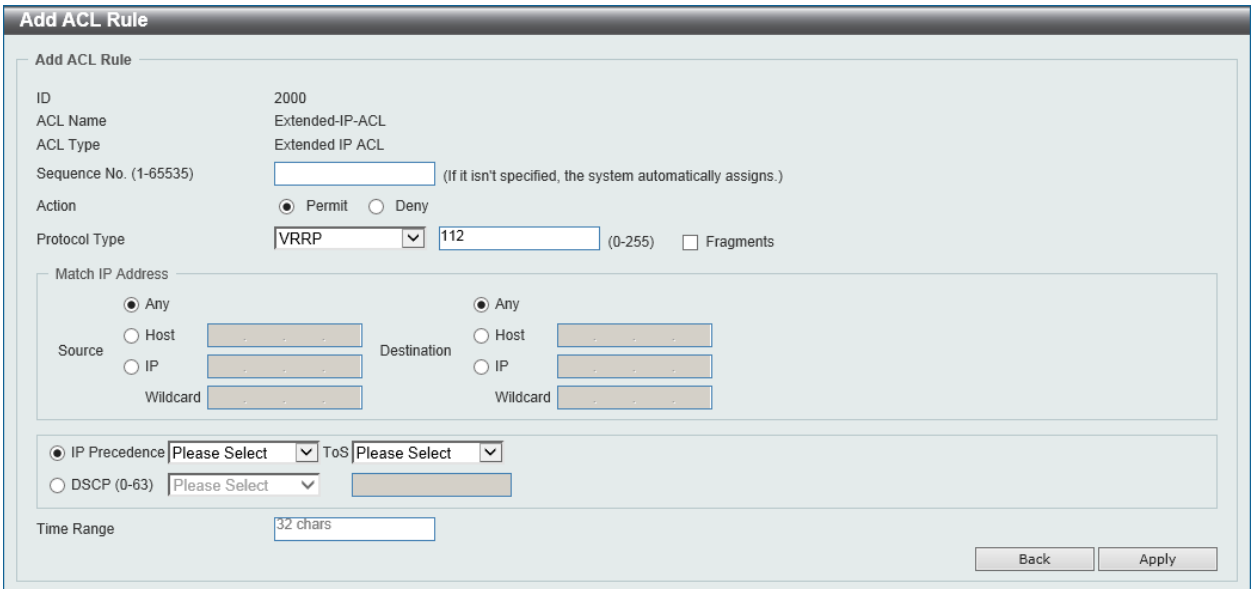



**Figure 8-50 Extended IP ACL (Add Rule) VRRP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be |

| Parameter | Description |
|---|---|
| | between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **IP-in-IP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

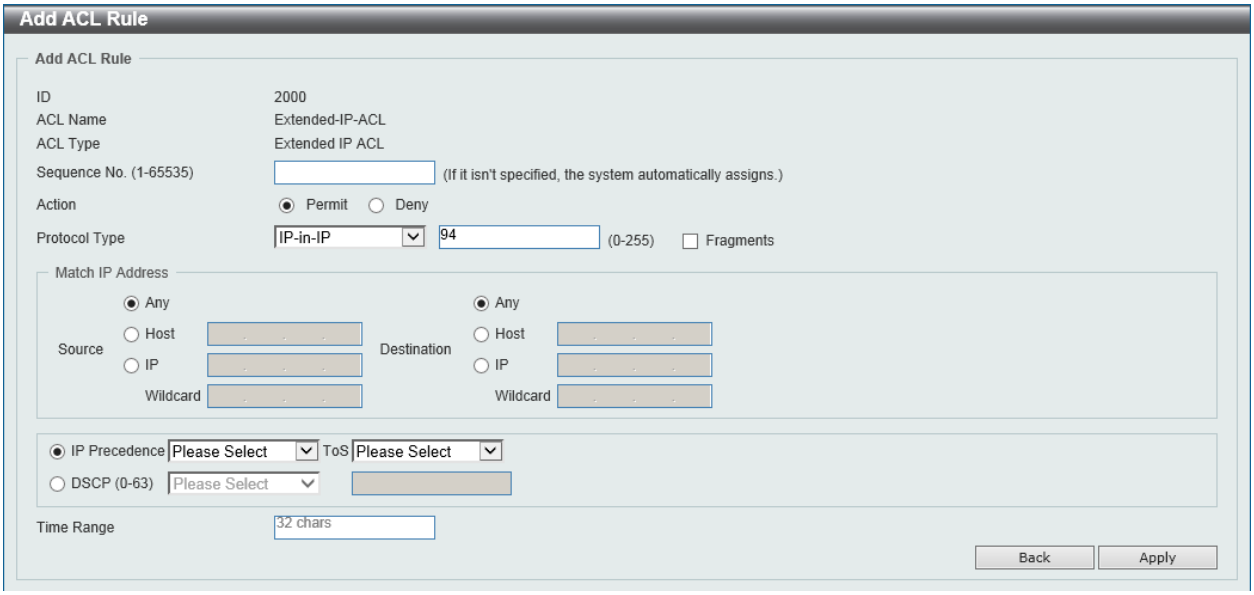



**Figure 8-51 Extended IP ACL (Add Rule) IP-in-IP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-** |

| Parameter | Description |
|---|---|
| | **cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **PCP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

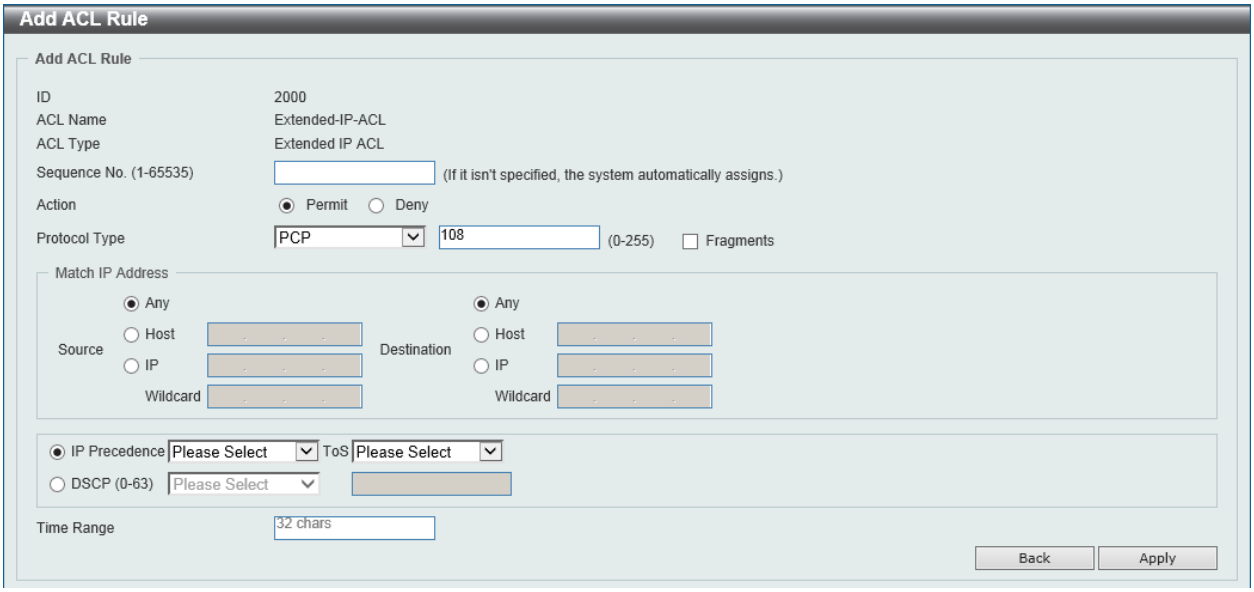



**Figure 8-52 Extended IP ACL (Add Rule) PCP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |

| Parameter | Description |
|---|---|
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **Protocol ID** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

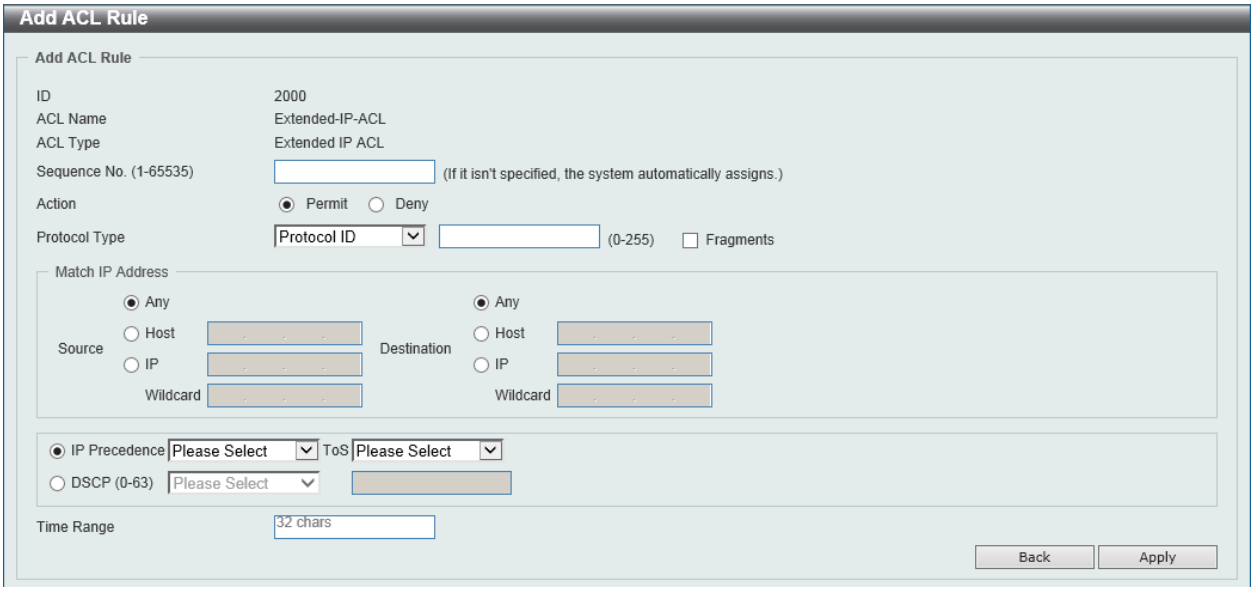



**Figure 8-53 Extended IP ACL (Add Rule) Protocol ID Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Protocol** | Enter the Protocol ID value in the space provided. This value must be between 0 and 255. |
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose |

| Parameter | Description |
|---|---|
| | from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **None** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

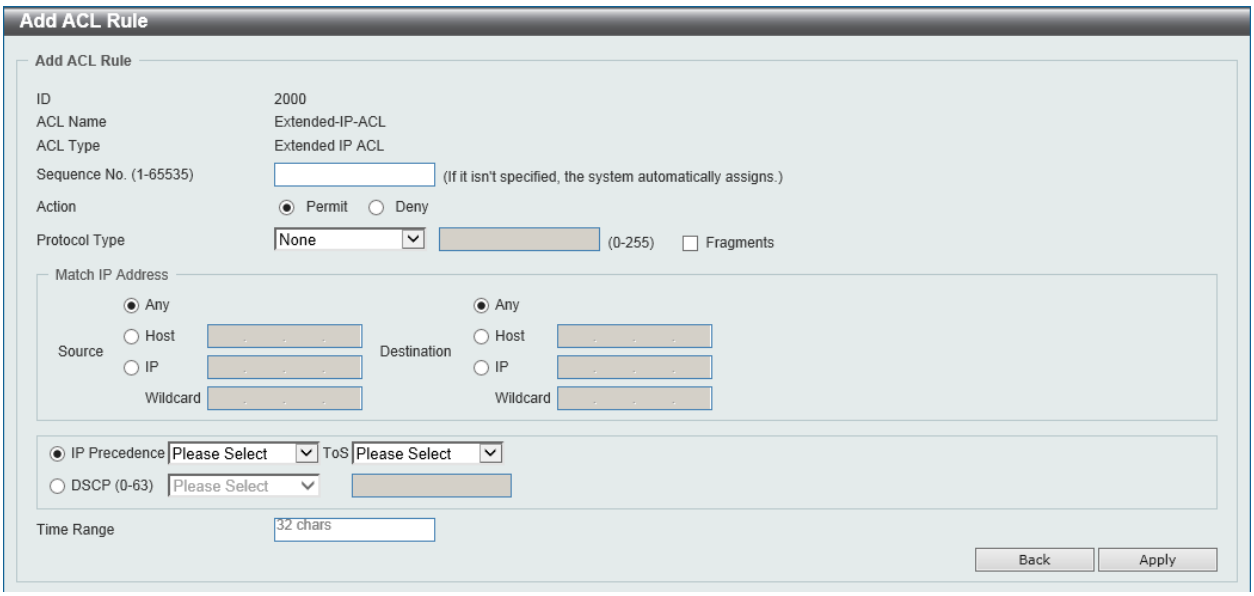



**Figure 8-54 Extended IP ACL (Add Rule) None Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP |

| Parameter | Description |
|---|---|
| | address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

To enable the **Counter State** option or to enter a **Remark** for the ACL, click the **Edit** button, next to the specific ACL (found in the ACL table).

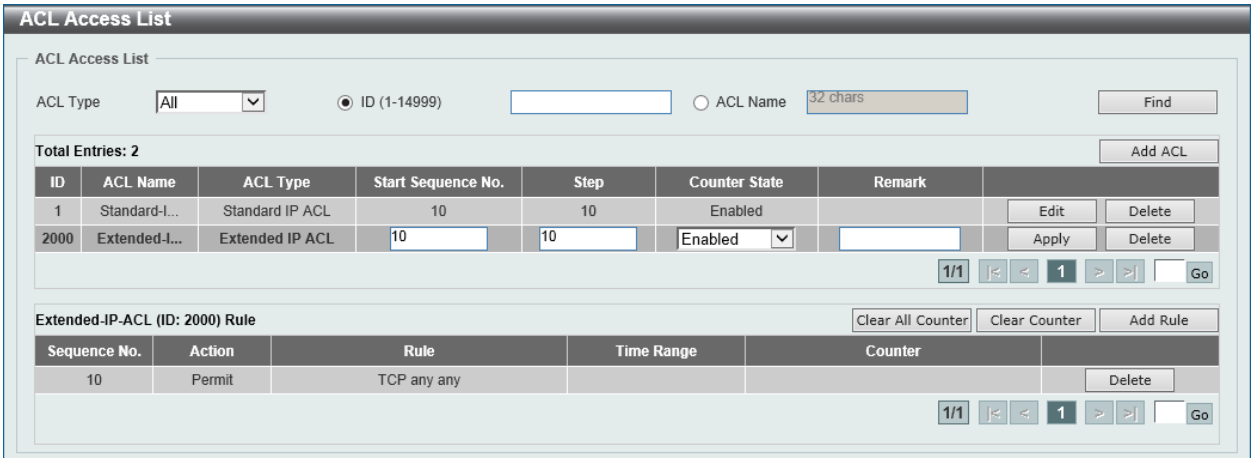



**Figure 8-55 Extended IP ACL (Counter State Enabled) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Start Sequence No.** | Enter the start sequence number here. |

| Parameter | Description |
|---|---|
| **Stop** | Enter the stop sequence number here. |
| **Counter State** | Select to enable or disable the counter state option here. |
| **Remark** | Enter an optional remark that will be associated with this ACL here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

To view the list of rules, that are associated with an ACL, select the ACL (found in the ACL table). The rule of ACL rules, connected to the selected ACL, will be displayed in the ACL rule table, as shown below:

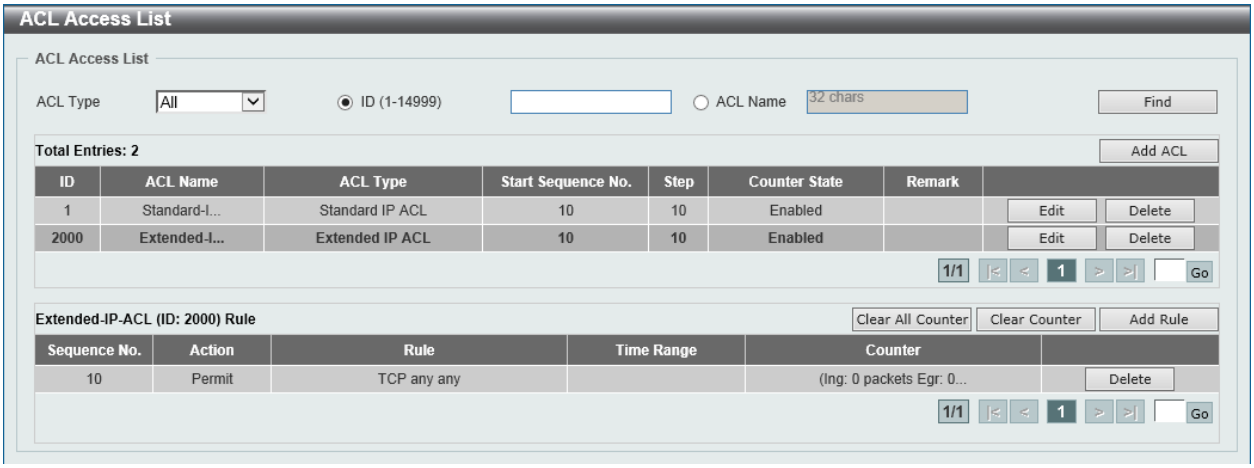



**Figure 8-56 Extended IP ACL (Rule Display) Window**

Click the **Delete** button to remove the specific ACL rule.

# Standard IPv6 ACL

After clicking the **Add ACL** button, users can create a new ACL, as shown below:

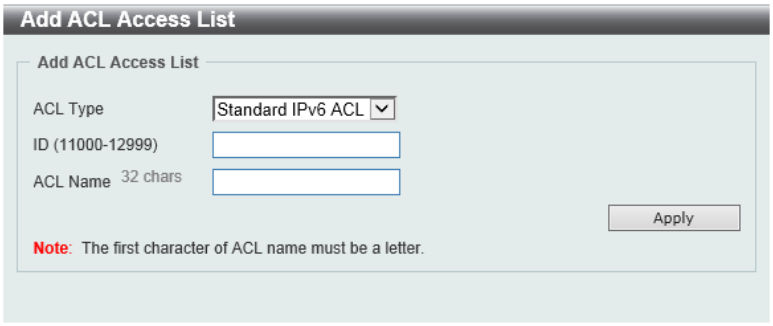



**Figure 8-57 Standard IPv6 ACL (Add ACL) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type here. For this section we'll select the **Standard IPv6 ACL** option. |
| **ID** | Enter the access list's ID here. The range from 11000 to 12999. |

| Parameter | Description |
|---|---|
| **ACL Name** | Enter the ACL's name here. This name can be up to 32 characters long. |

Click the **Apply** button to create the new ACL.

After creating a **Standard IPv6 ACL**, the newly created **Standard IPv6 ACL** will be displayed in the ACL display table, as shown below:

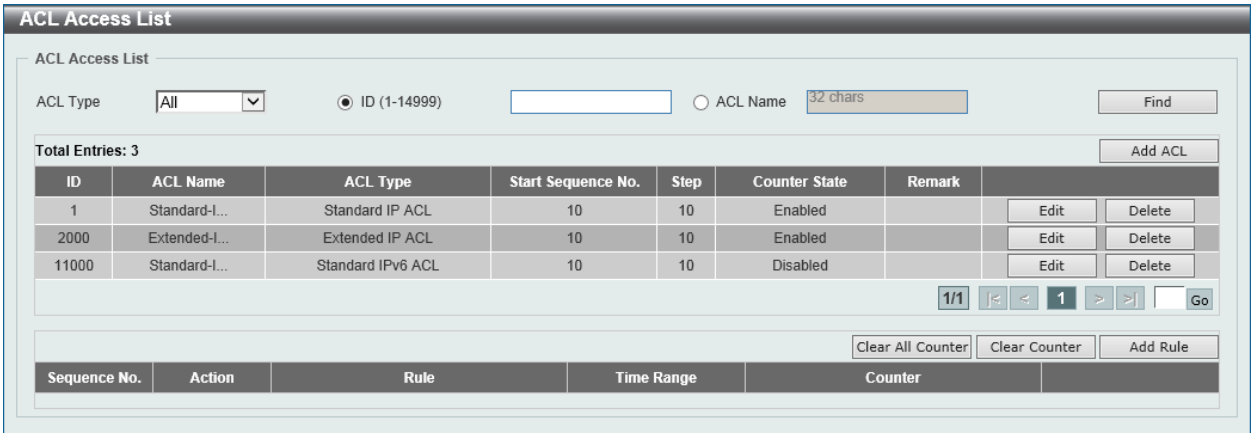



**Figure 8-58 Standard IPv6 ACL (Main) Window**

Click the **Edit** button to re-configure the specific ACL.

Click the **Delete** button to remove the specific ACL.

To add an ACL rule in the ACL, select it (the ACL will toggle to the bold font), and click on the **Add Rule** button.

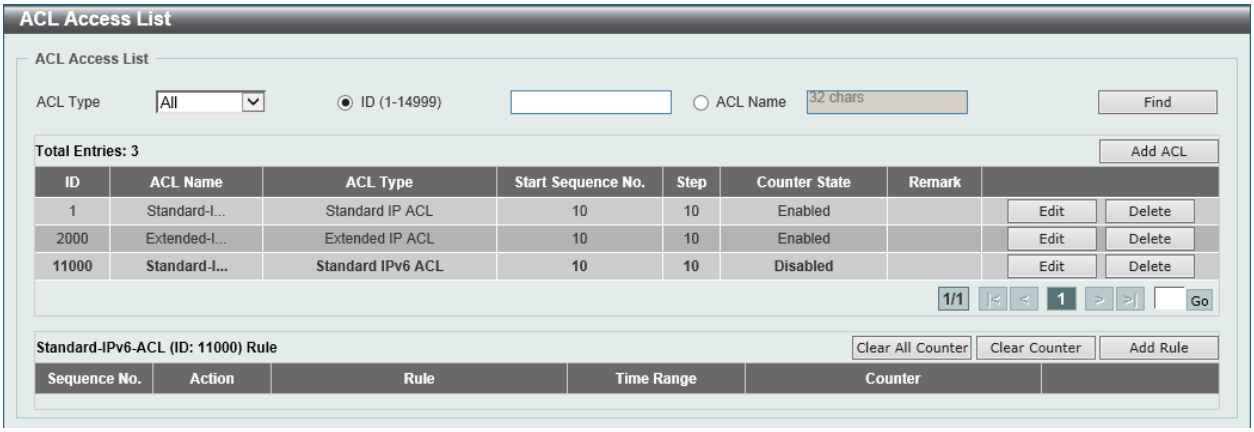



**Figure 8-59 Standard IPv6 ACL (Selected) Window**

After selecting the ACL and clicking the **Add Rule** button, users can configure the new ACL rule, in the selected ACL, as shown below:

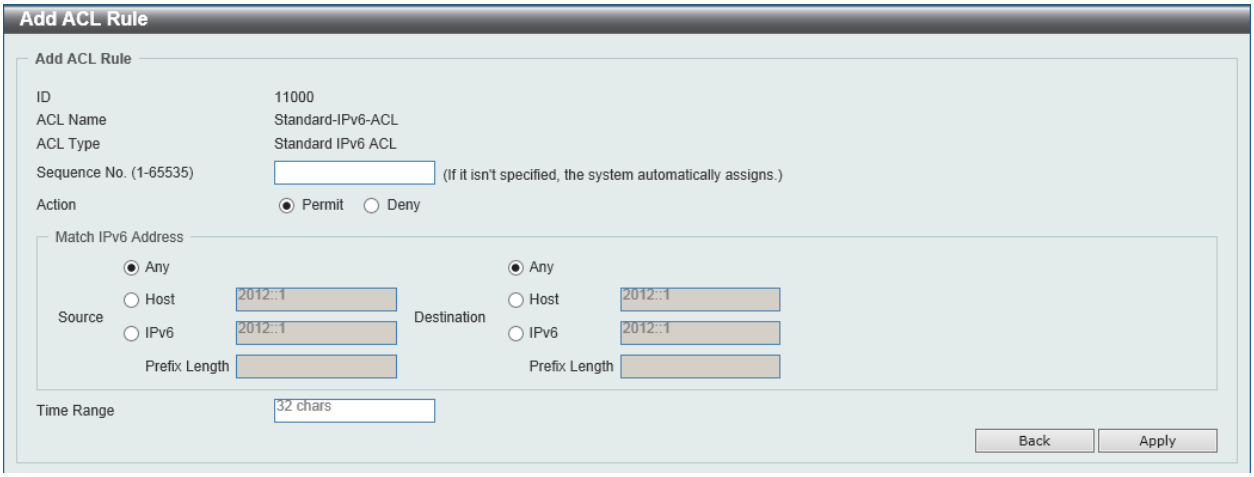



**Figure 8-60 Standard IPv6 ACL (Add Rule) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

To enable the **Counter State** option or to enter a **Remark** for the ACL, click the **Edit** button, next to the specific ACL (found in the ACL table).

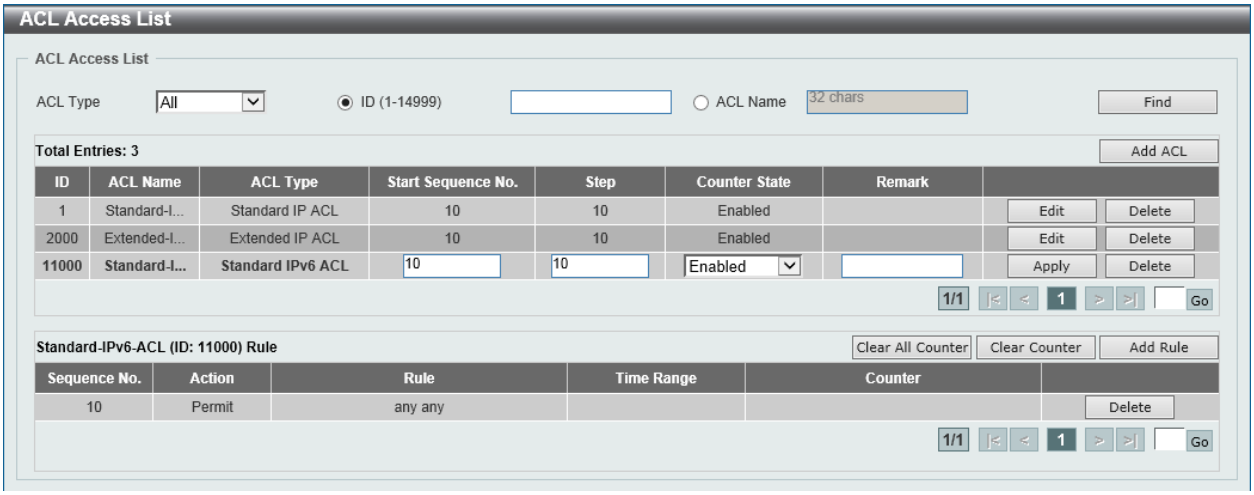



**Figure 8-61 Standard IPv6 ACL (Counter State Enabled) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Start Sequence No.** | Enter the start sequence number here. |
| **Stop** | Enter the stop sequence number here. |
| **Counter State** | Select to enable or disable the counter state option here. |
| **Remark** | Enter an optional remark that will be associated with this ACL here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

To view the list of rules, that are associated with an ACL, select the ACL (found in the ACL table). The rule of ACL rules, connected to the selected ACL, will be displayed in the ACL rule table, as shown below:

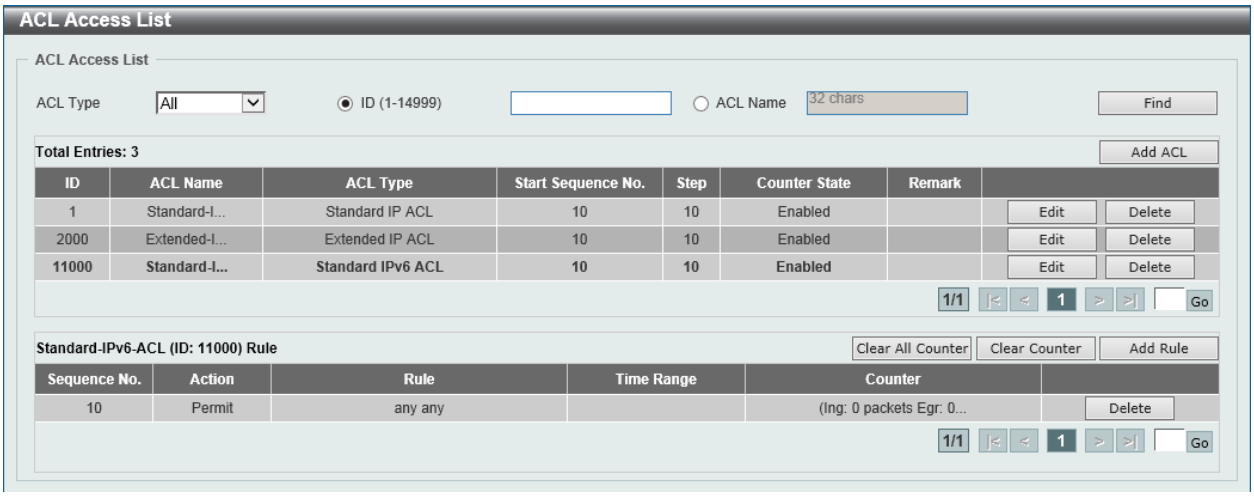



**Figure 8-62 Standard IPv6 ACL (Rule Display) Window**

Click the **Delete** button to remove the specific ACL rule.

# Extended IPv6 ACL

After clicking the **Add ACL** button, users can create a new ACL, as shown below:

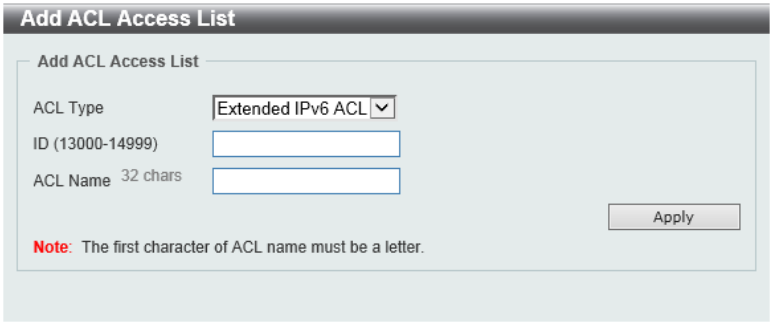



**Figure 8-63 Extended IPv6 ACL (Add ACL) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type here. For this section we'll select the **Extended IPv6 ACL** option. |
| **ID** | Enter the access list's ID here. The range from 13000 to 14999. |
| **ACL Name** | Enter the ACL's name here. This name can be up to 32 characters long. |

Click the **Apply** button to create the new ACL.

After creating an **Extended IPv6 ACL**, the newly created **Extended IPv6 ACL** will be displayed in the ACL display table, as shown below:

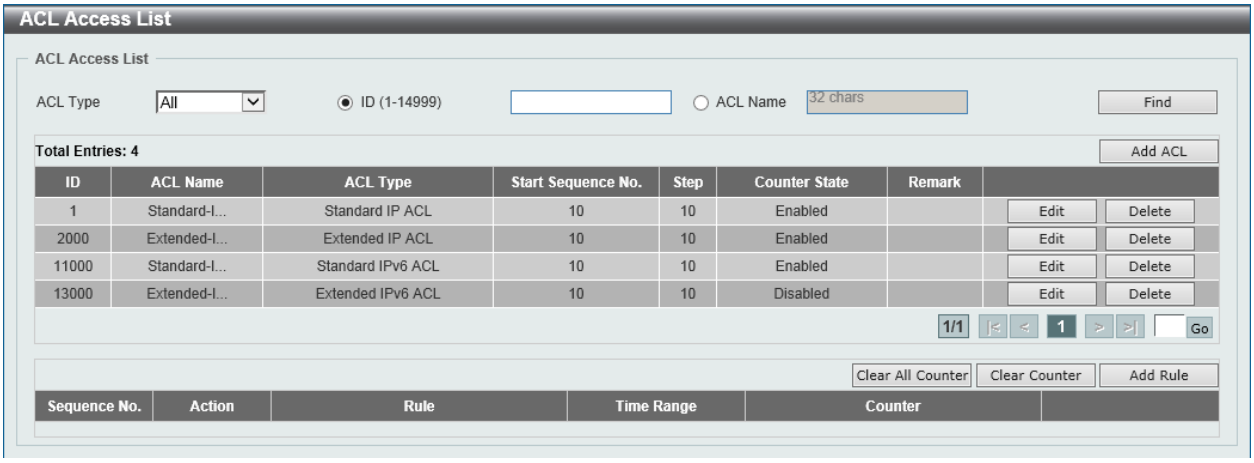



**Figure 8-64 Extended IPv6 ACL (Main) Window**

Click the **Edit** button to re-configure the specific ACL.

Click the **Delete** button to remove the specific ACL.

To add an ACL rule in the ACL, select it (the ACL will toggle to the bold font), and click on the **Add Rule** button.

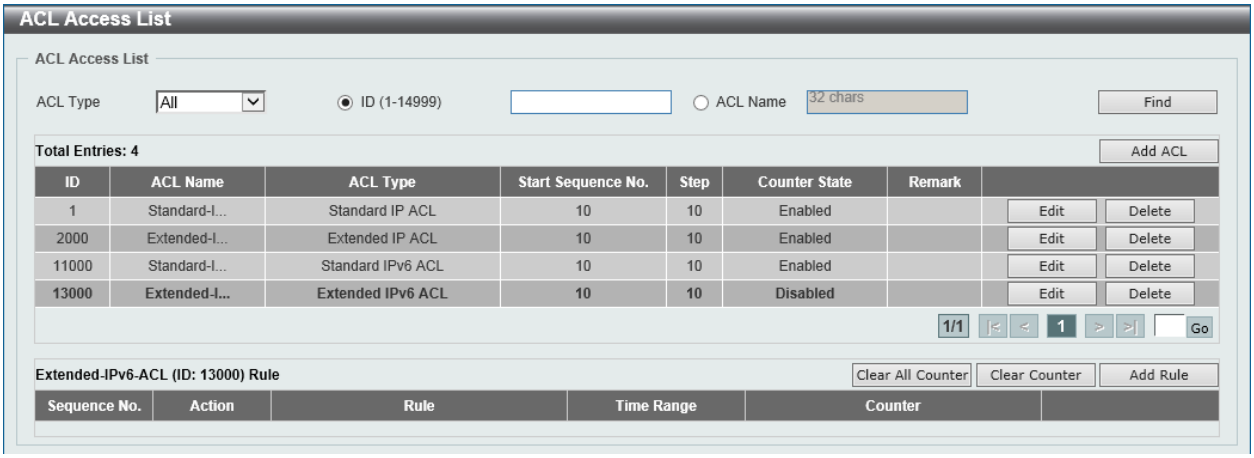



**Figure 8-65 Extended IPv6 ACL (Selected) Window**

After selecting the ACL and clicking the **Add Rule** button, users can configure the new ACL rule, in the selected ACL, as shown below:

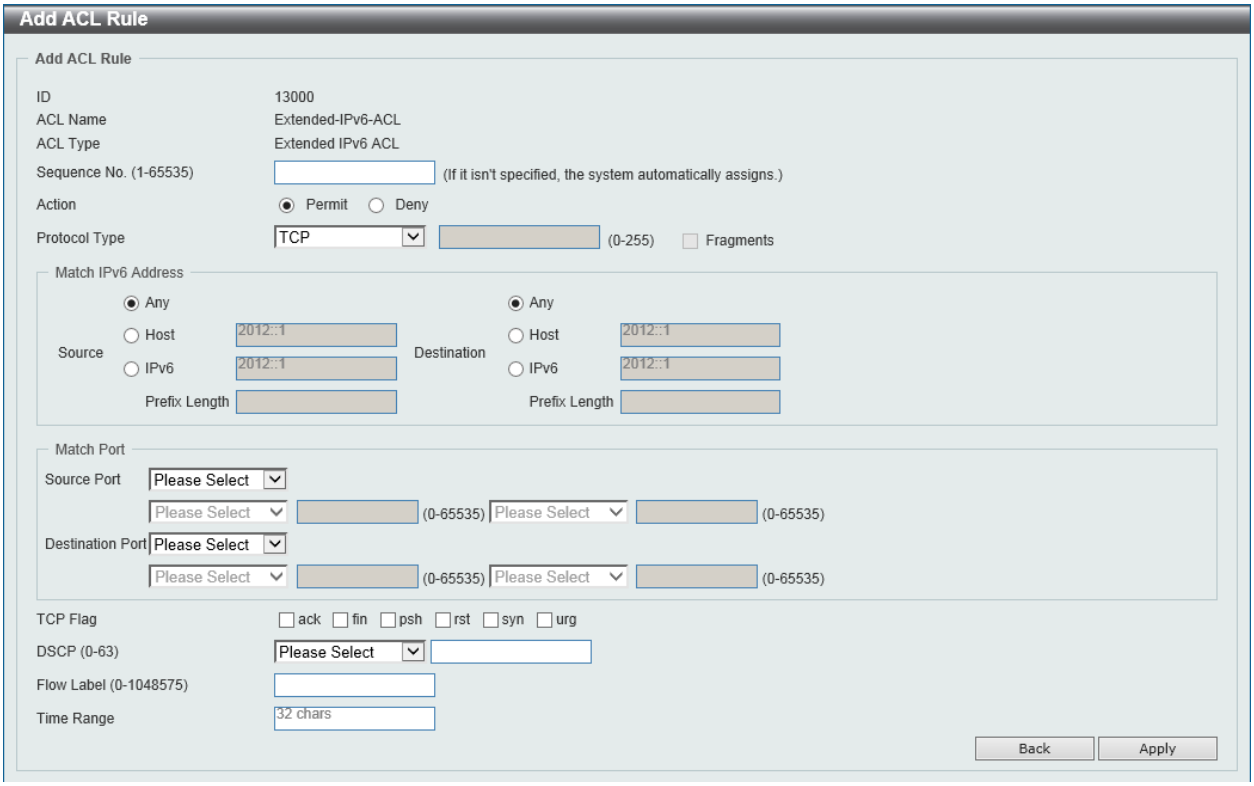



**Figure 8-66 Extended IPv6 ACL (Add Rule) Window**

This is a dynamic page. Every selection made in the **Protocol Type** option will change the bottom part of this page.

The **fixed** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry. |

| Parameter | Description |
|---|---|
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |
| **Protocol Type** | Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **Protocol ID**, **ESP**, **PCP**, **SCTP**, and **None**. |

After selecting the **TCP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

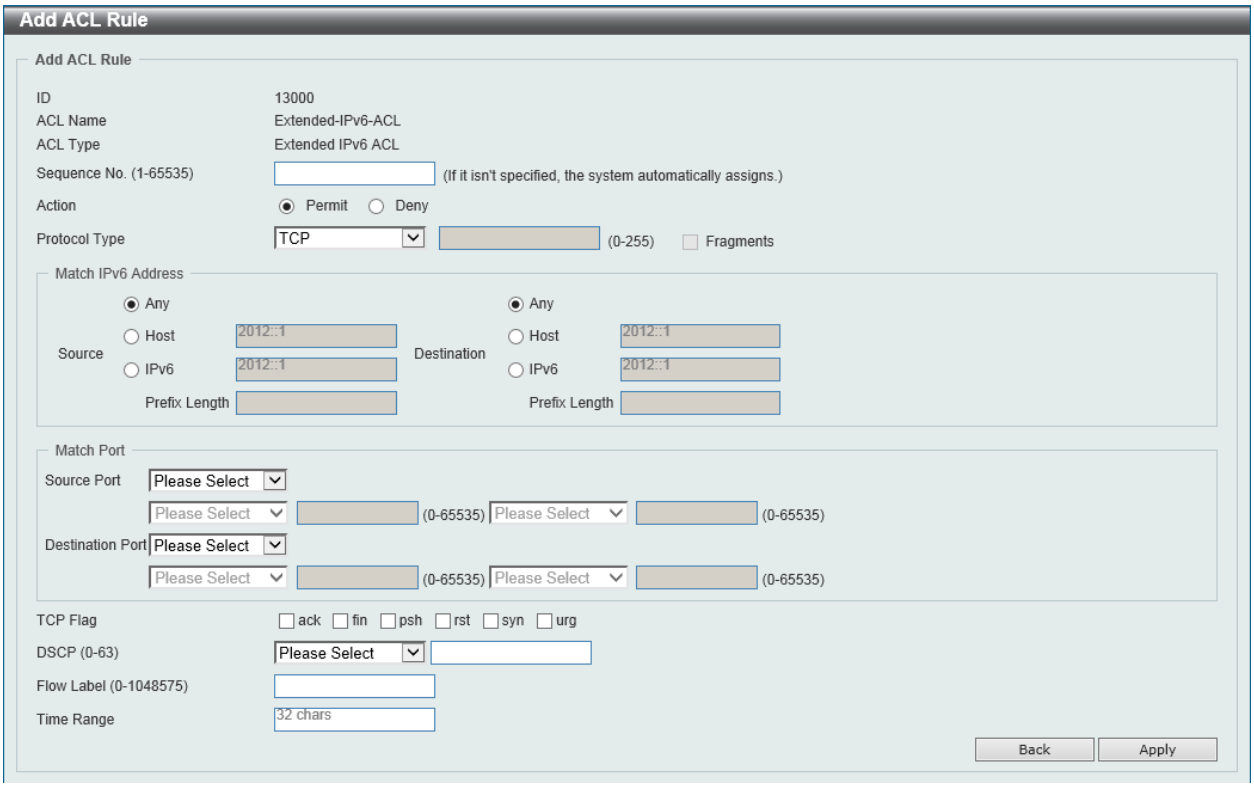



**Figure 8-67 Extended IPv6 ACL (Add Rule) TCP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific |

| Parameter | Description |
|---|---|
| | selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **TCP Flag** | Tick the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **UDP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

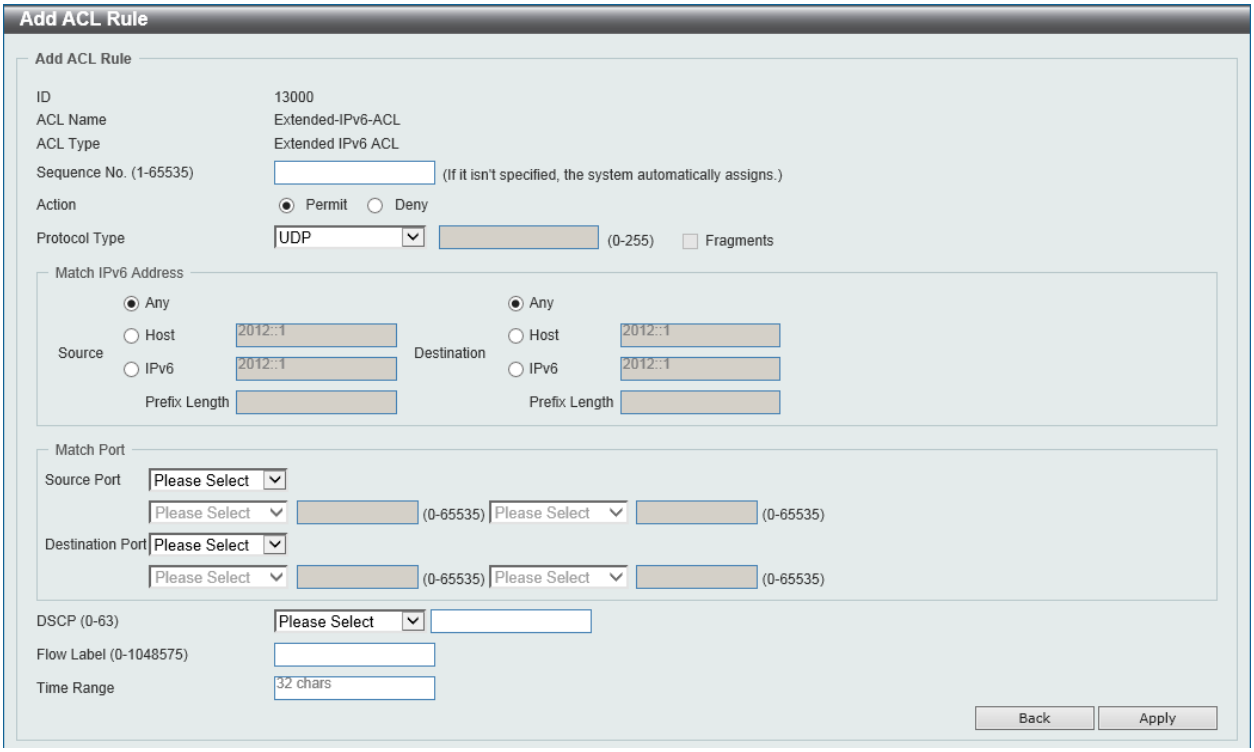



**Figure 8-68 Extended IPv6 ACL (Add Rule) UDP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** |

| Parameter | Description |
|---|---|
| | option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **ICMP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

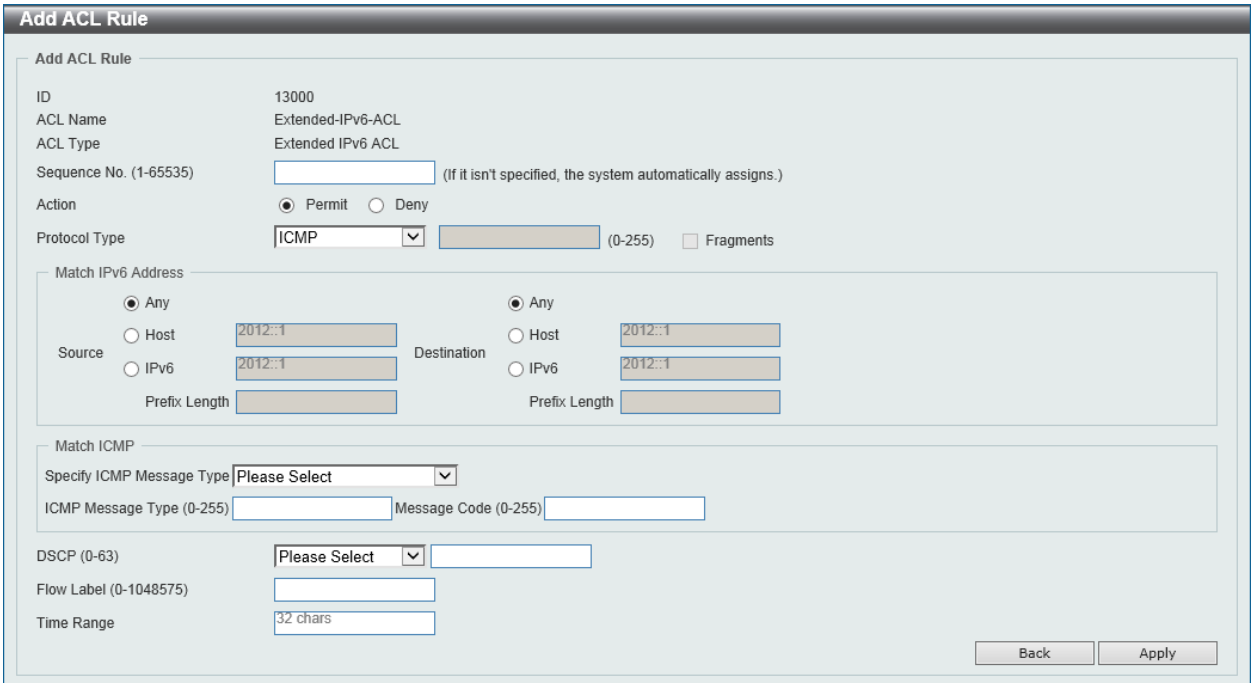



**Figure 8-69 Extended IPv6 ACL (Add Rule) ICMP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is |

| Parameter | Description |
|---|---|
| | selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **Specify ICMP Message Type** | Select the ICMP message type used here. |
| **ICMP Message Type** | When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **Message Code** | When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **Protocol ID** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

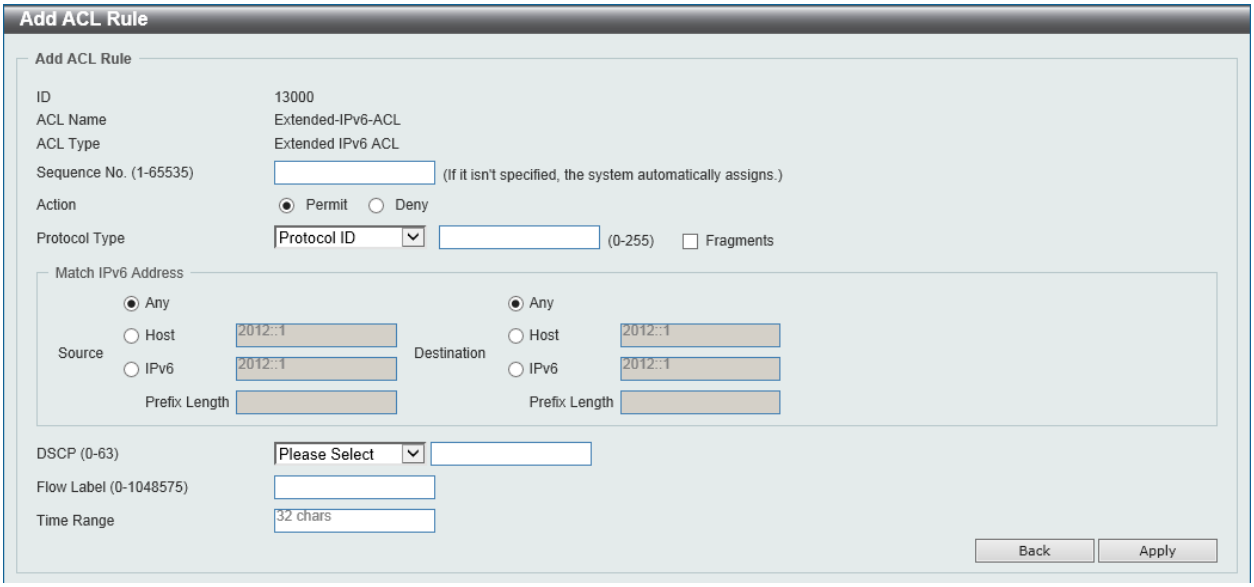



**Figure 8-70 Extended IPv6 ACL (Add Rule) Protocol ID Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Protocol** | Enter the Protocol ID value used here. This value must be between 0 and 255. |
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is |

| Parameter | Description |
|---|---|
| | selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **ESP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

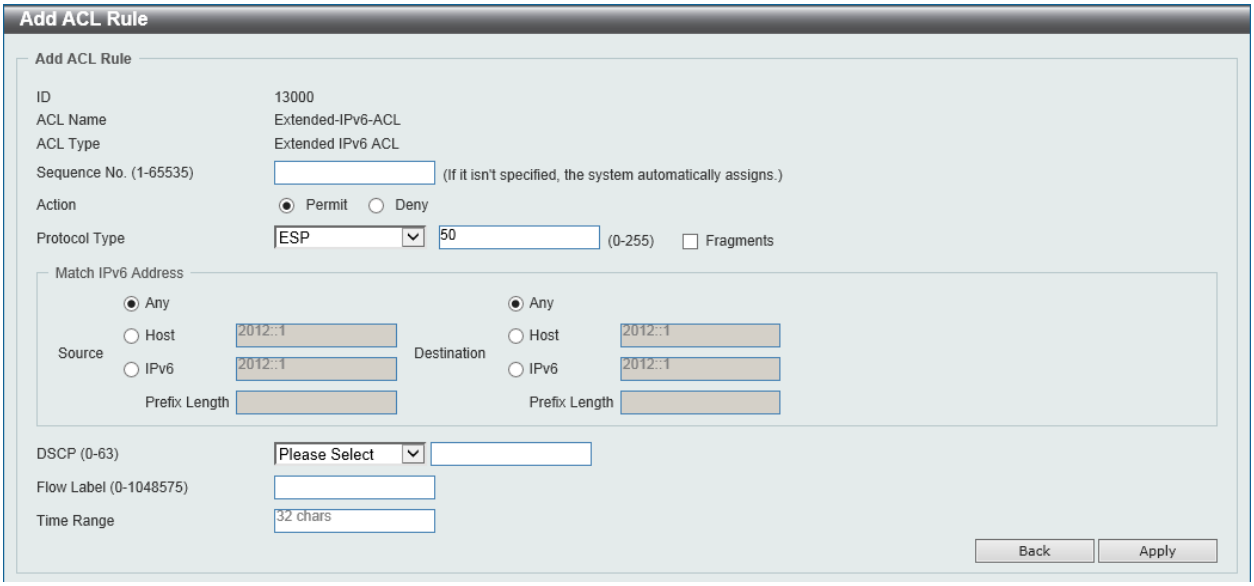



**Figure 8-71 Extended IPv6 ACL (Add Rule) ESP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 |

| Parameter | Description |
|---|---|
| | address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **PCP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

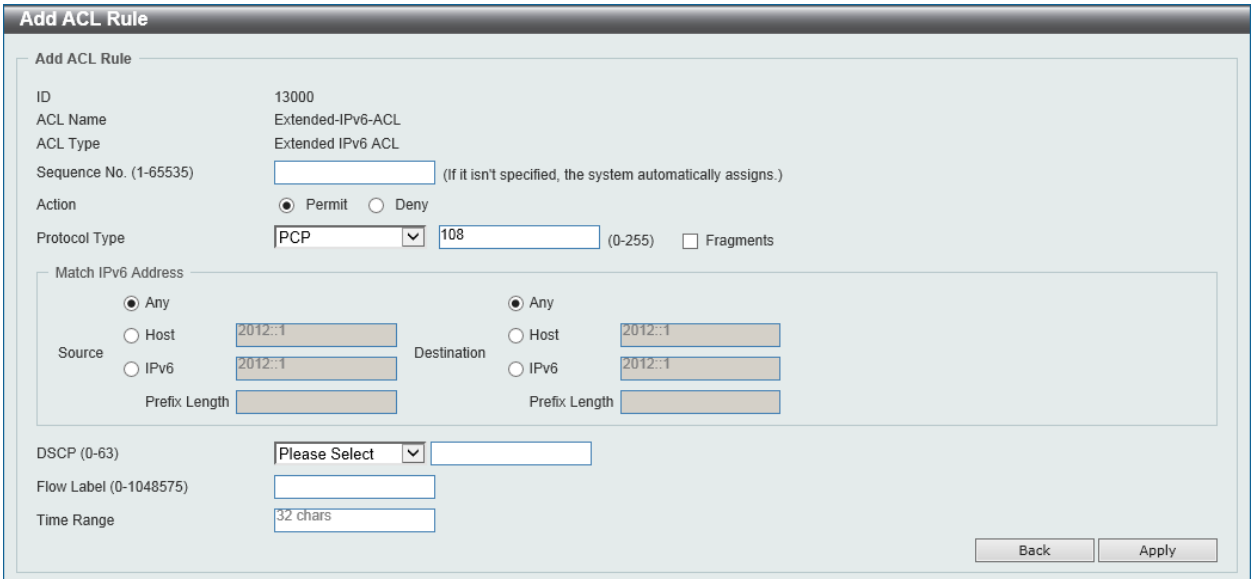



**Figure 8-72 Extended IPv6 ACL (Add Rule) PCP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any destination traffic will be evaluated according to the |

| Parameter | Description |
|---|---|
| | conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **SCTP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

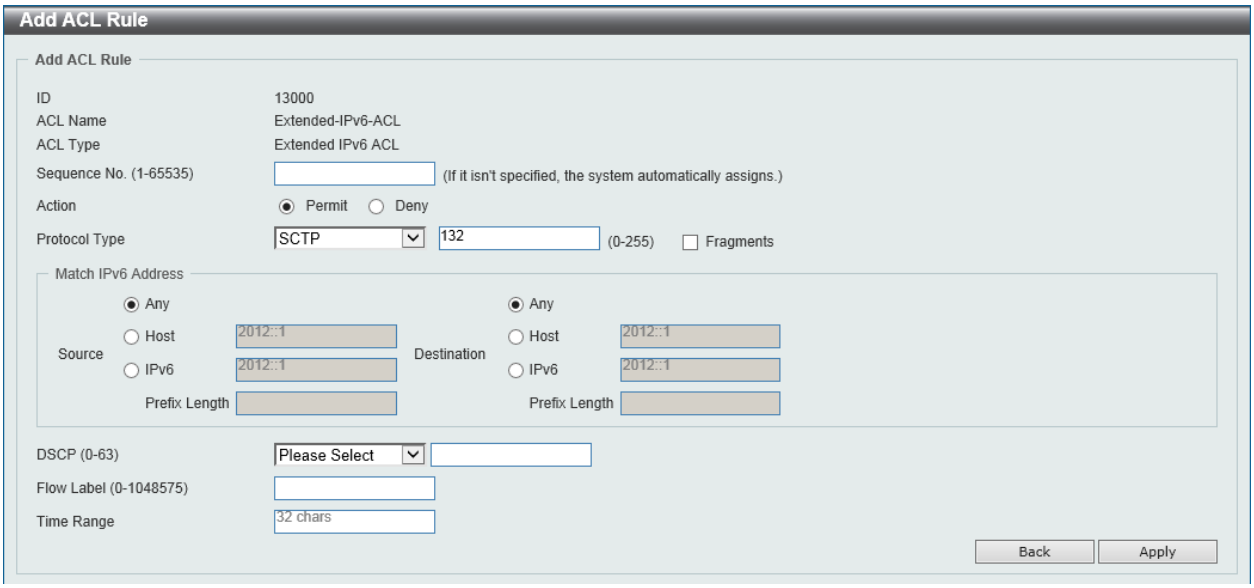



**Figure 8-73 Extended IPv6 ACL (Add Rule) SCTP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces |

| Parameter | Description |
|---|---|
| | provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **None** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

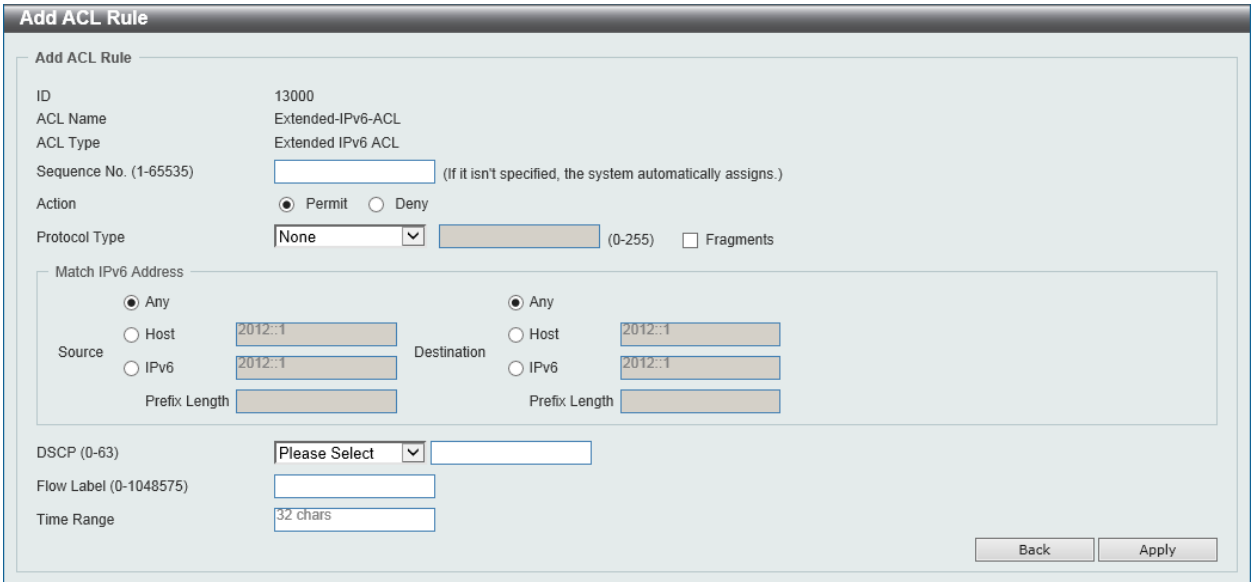



**Figure 8-74 Extended IPv6 ACL (Add Rule) None Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the source IPv6 address and prefix length value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IPv6**, and **Prefix Length**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IPv6 address here. When the **IPv6** option is selected, the **Prefix Length** option will also be available. Enter the destination IPv6 address and prefix length value in the spaces provided. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |

| Parameter | Description |
|---|---|
| **Flow Label** | Enter the flow label value here. This value must be between 0 and 1048575. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

To enable the **Counter State** option or to enter a **Remark** for the ACL, click the **Edit** button, next to the specific ACL (found in the ACL table).

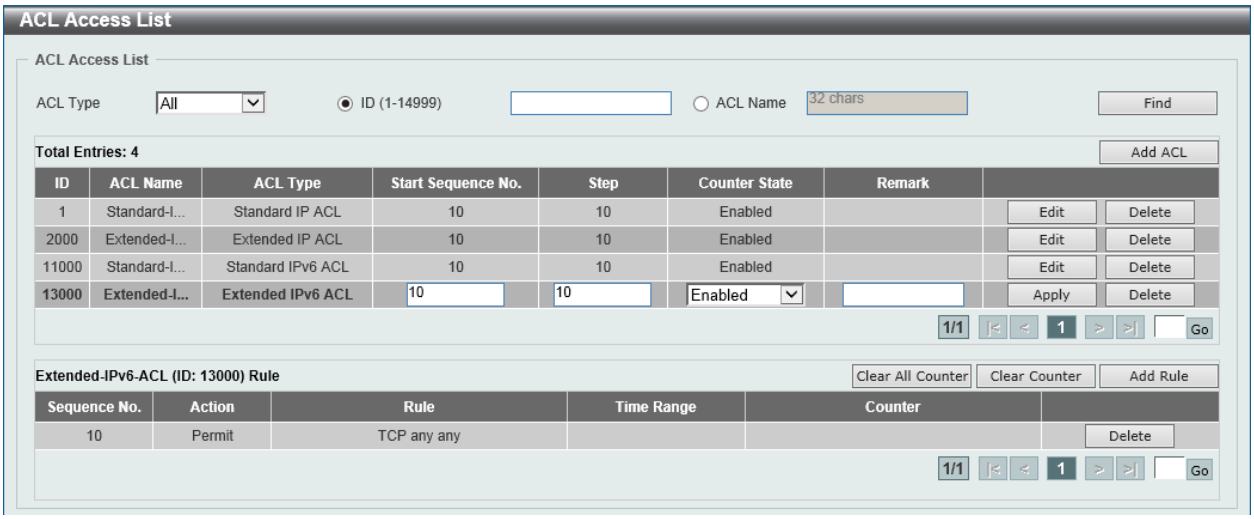



**Figure 8-75 Extended IPv6 ACL (Counter State Enabled) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Start Sequence No.** | Enter the start sequence number here. |
| **Stop** | Enter the stop sequence number here. |
| **Counter State** | Select to enable or disable the counter state option here. |
| **Remark** | Enter an optional remark that will be associated with this ACL here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

To view the list of rules, that are associated with an ACL, select the ACL (found in the ACL table). The rule of ACL rules, connected to the selected ACL, will be displayed in the ACL rule table, as shown below:

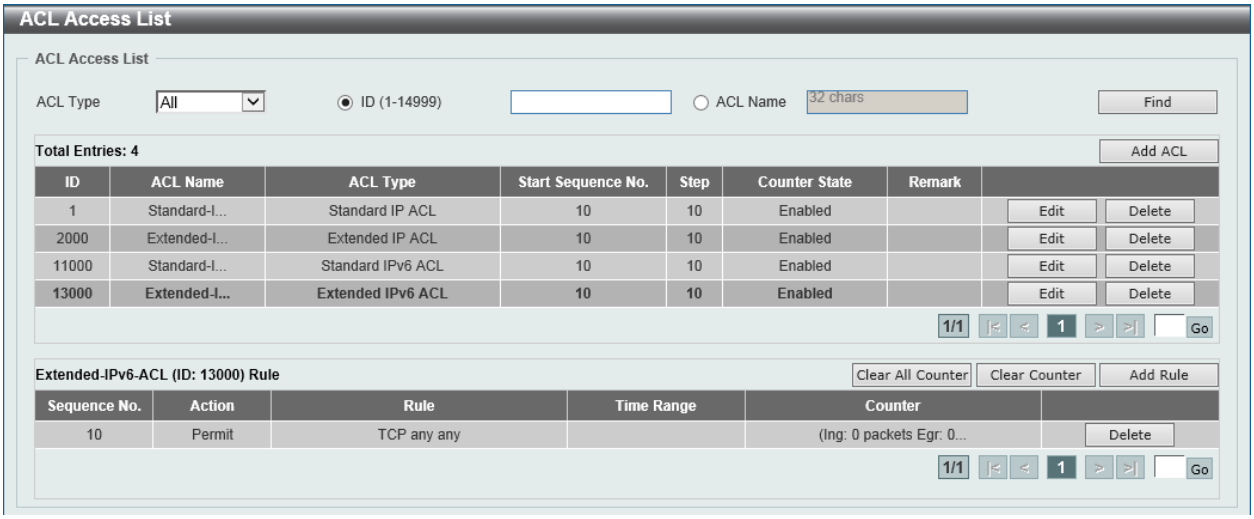



**Figure 8-76 Extended IPv6 ACL (Rule Display) Window**

Click the **Delete** button to remove the specific ACL rule.

# Extended MAC ACL

After clicking the **Add ACL** button, users can create a new ACL, as shown below:

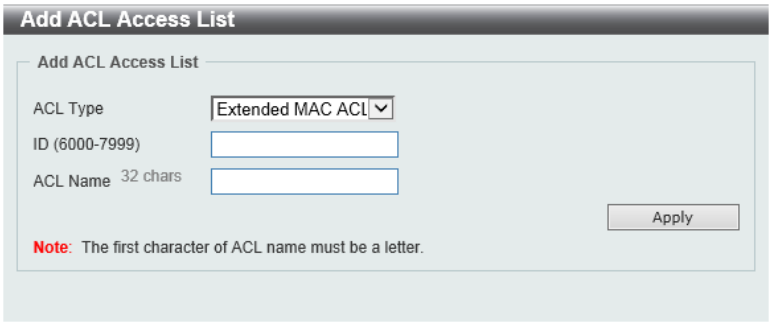



**Figure 8-77 Extended MAC ACL (Add ACL) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type here. For this section we'll select the **Extended MAC ACL** option. |
| **ID** | Enter the access list's ID here. The range from 6000 to 7999. |
| **ACL Name** | Enter the ACL's name here. This name can be up to 32 characters long. |

Click the **Apply** button to create the new ACL.

After creating an **Extended MAC ACL**, the newly created **Extended MAC ACL** will be displayed in the ACL display table, as shown below:

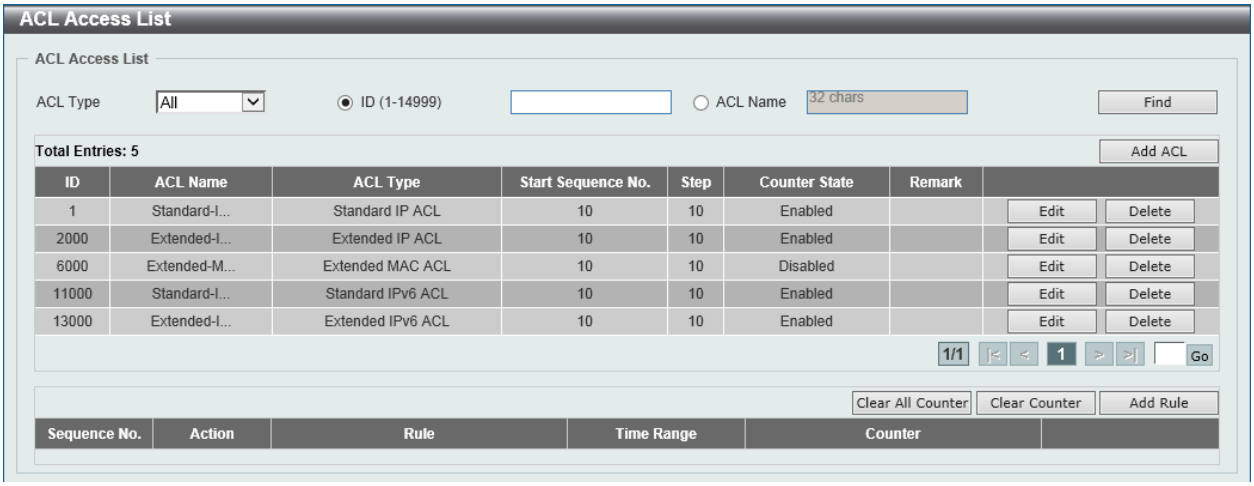



**Figure 8-78 Extended MAC ACL (Main) Window**

Click the **Edit** button to re-configure the specific ACL.

Click the **Delete** button to remove the specific ACL.

To add an ACL rule in the ACL, select it (the ACL will toggle to the bold font), and click on the **Add Rule** button.

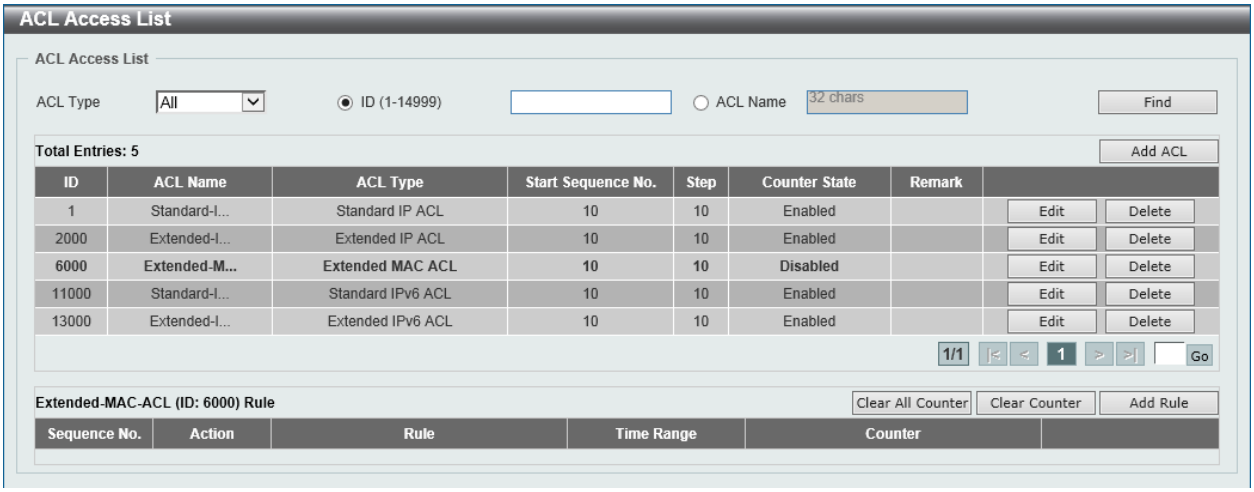



**Figure 8-79 Extended MAC ACL (Selected) Window**

After selecting the ACL and clicking the **Add Rule** button, users can configure the new ACL rule, in the selected ACL, as shown below:

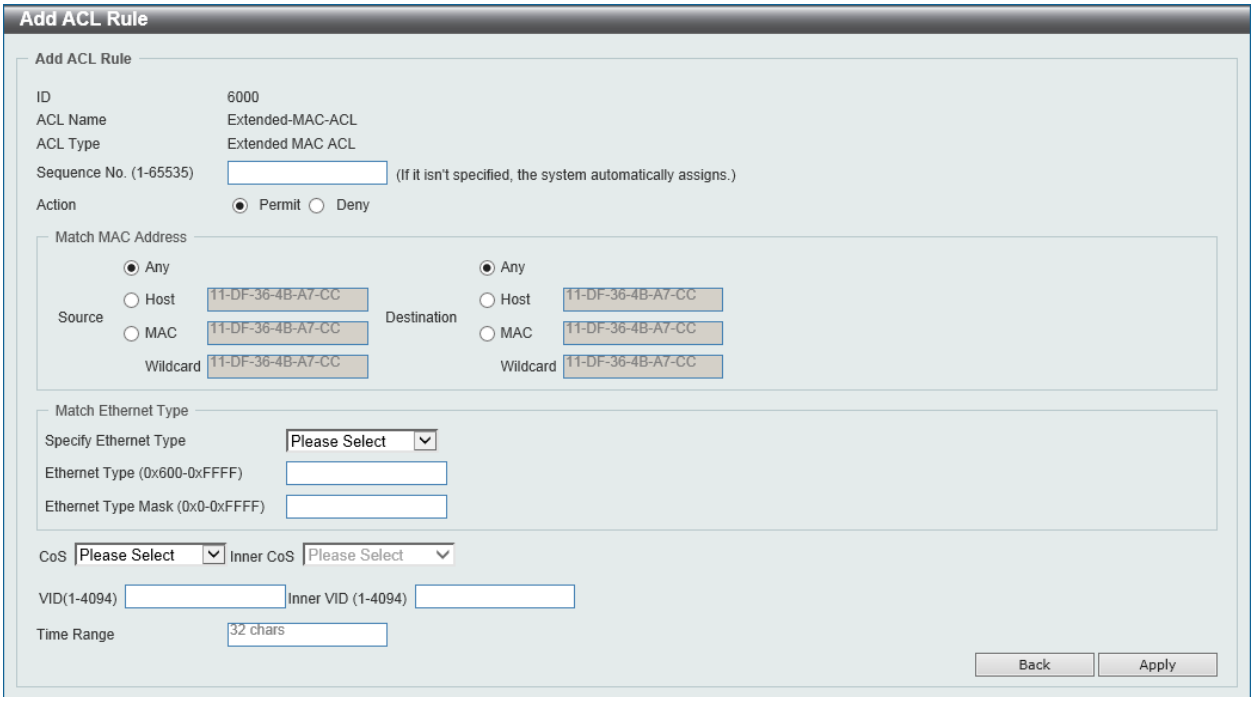



**Figure 8-80 Extended MAC ACL (Add Rule) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |
| **Source** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **Specify Ethernet Type** | Select the Ethernet type option here. Options to choose from are **aarp**, **appletalk**, **decent-iv**, **etype-6000**, **etype-8042**, **lat**, **lavc-sca**, **mop-console**, **mop-dump**, **vines-echo**, **vines-ip**, **xns-idp**, and **arp**. |
| **Ethernet Type** | Enter the Ethernet type hexadecimal value here. This value must be between 0x600 and 0xFFFF. When the Ethernet type profile is selected, above, the appropriate hexadecimal value will automatically be entered. |
| **Ethernet Type Mask** | Enter the Ethernet type mask hexadecimal value here. This value must be between 0x0 and 0xFFFF. When the Ethernet type profile is |

| Parameter | Description |
|---|---|
| | selected, above, the appropriate hexadecimal value will automatically be entered. |
| **CoS** | Select the CoS value used here. This value is between 0 and 7. |
| **Inner CoS** | Select the inner CoS value used here. This value is between 0 and 7. |
| **VID** | Enter the VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

To enable the **Counter State** option or to enter a **Remark** for the ACL, click the **Edit** button, next to the specific ACL (found in the ACL table).

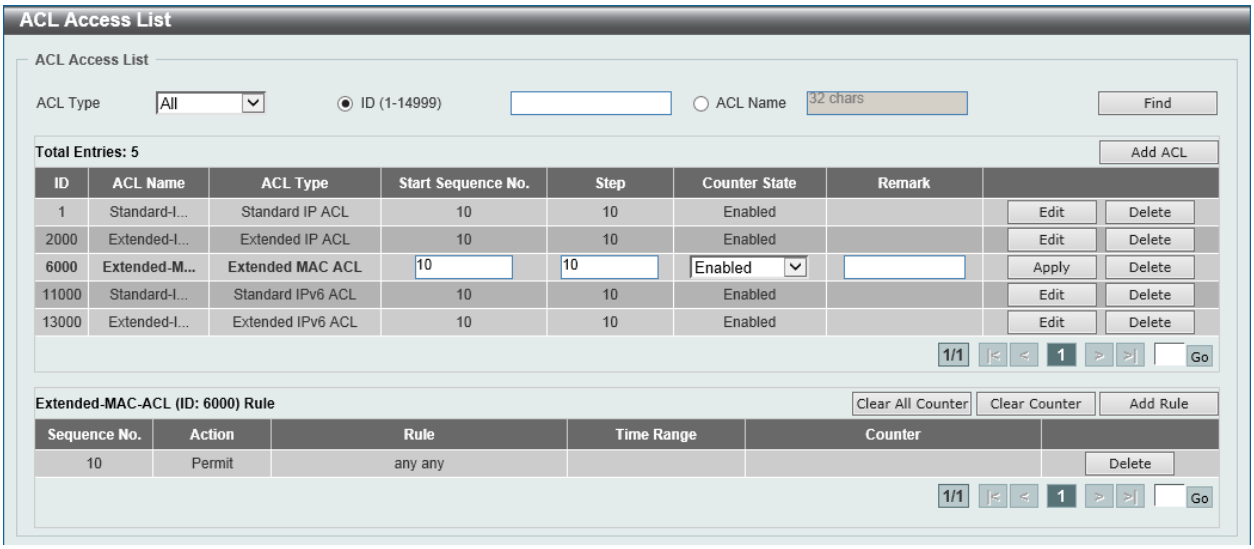



**Figure 8-81 Extended MAC ACL (Counter State Enabled) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Start Sequence No.** | Enter the start sequence number here. |
| **Stop** | Enter the stop sequence number here. |
| **Counter State** | Select to enable or disable the counter state option here. |
| **Remark** | Enter an optional remark that will be associated with this ACL here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

To view the list of rules, that are associated with an ACL, select the ACL (found in the ACL table). The rule of ACL rules, connected to the selected ACL, will be displayed in the ACL rule table, as shown below:

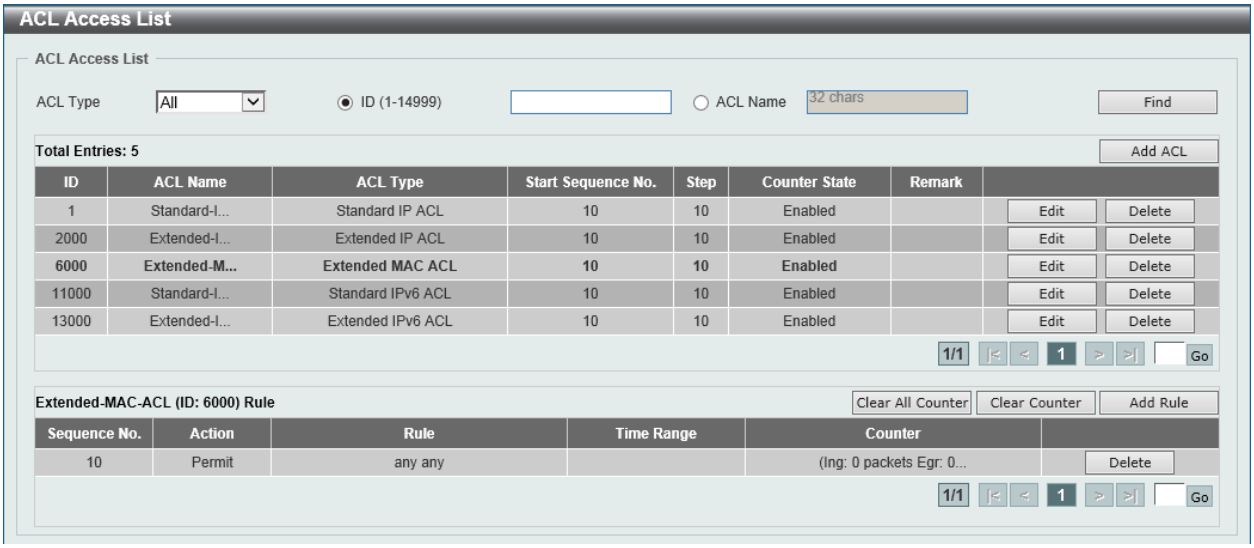



**Figure 8-82 Extended MAC ACL (Rule Display) Window**

Click the **Delete** button to remove the specific ACL rule.

# Extended Expert ACL

After clicking the **Add ACL** button, users can create a new ACL, as shown below:

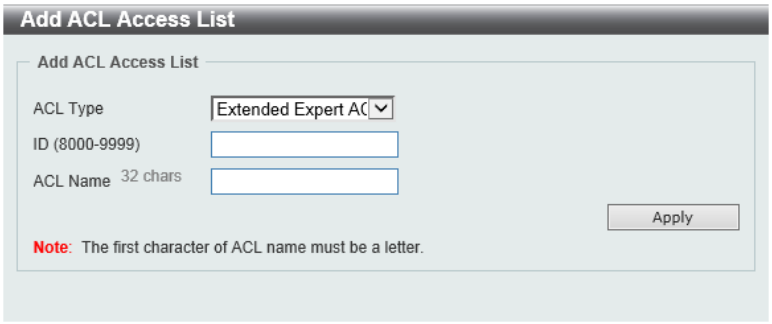



**Figure 8-83 Extended Expert ACL (Add ACL) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Type** | Select the ACL type here. For this section we'll select the **Extended Expert ACL** option. |
| **ID** | Enter the access list's ID here. The range from 6000 to 7999. |
| **ACL Name** | Enter the ACL's name here. This name can be up to 32 characters long. |

Click the **Apply** button to create the new ACL.

After creating an **Extended Expert ACL**, the newly created **Extended Expert ACL** will be displayed in the ACL display table, as shown below:

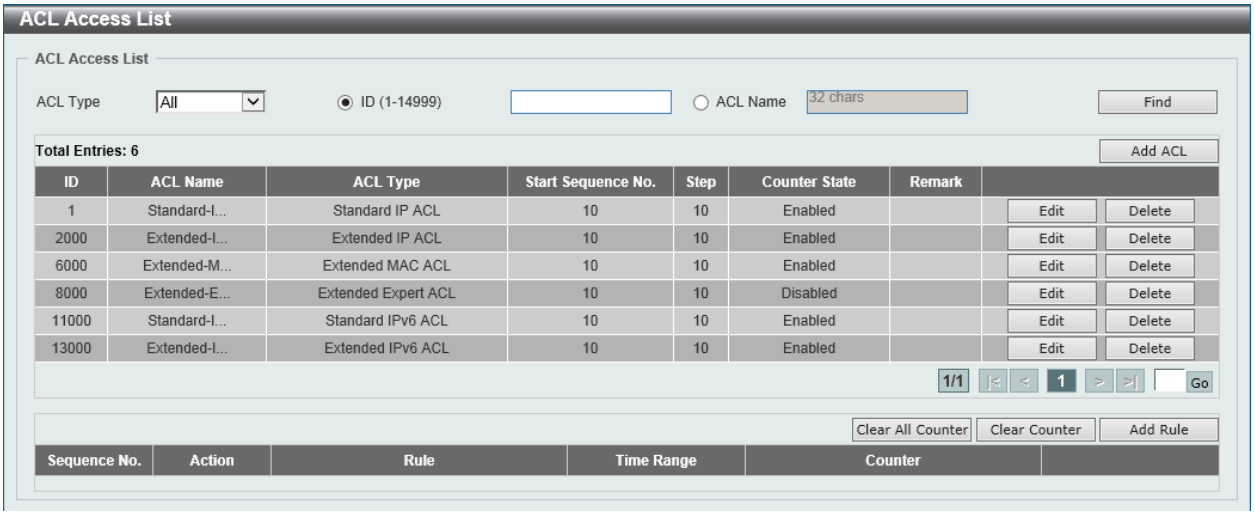



**Figure 8-84 Extended Expert ACL (Main) Window**

Click the **Edit** button to re-configure the specific ACL.

Click the **Delete** button to remove the specific ACL.

To add an ACL rule in the ACL, select it (the ACL will toggle to the bold font), and click on the **Add Rule** button.

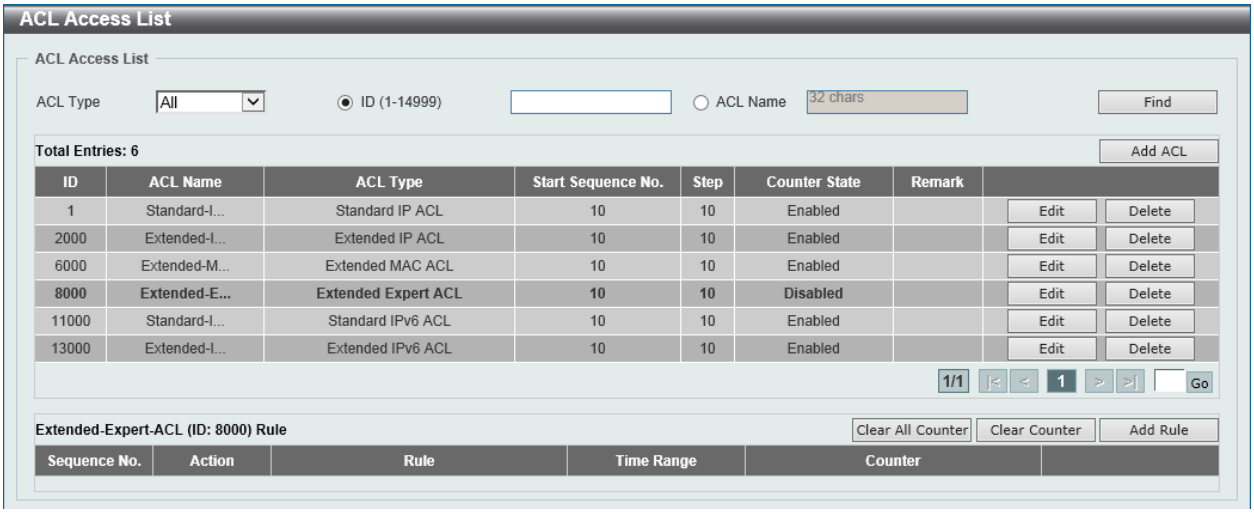



**Figure 8-85 Extended Expert ACL (Selected) Window**

After selecting the ACL and clicking the **Add Rule** button, users can configure the new ACL rule, in the selected ACL, as shown below:

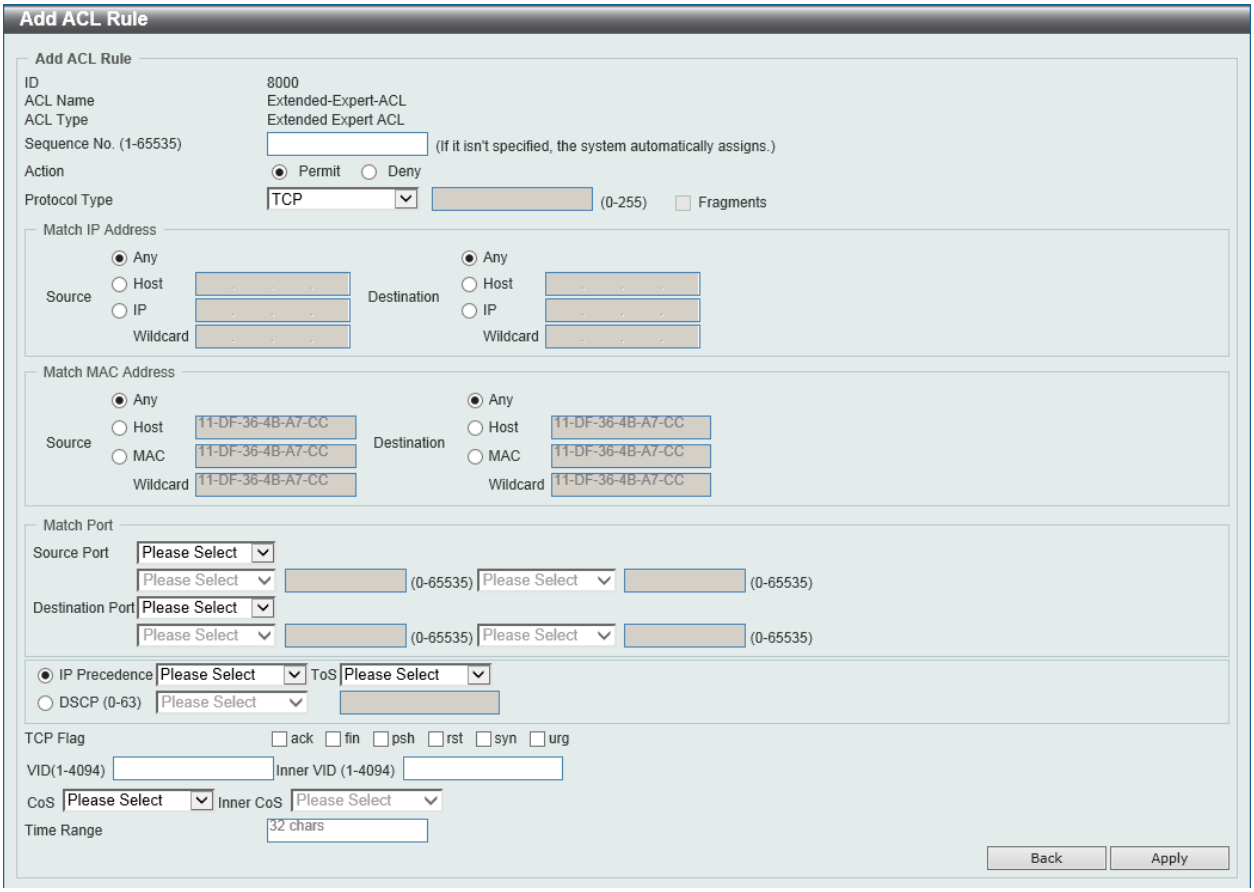



**Figure 8-86 Extended Expert ACL (Add Rule) Window**

This is a dynamic page. Every selection made in the **Protocol Type** option will change the bottom part of this page.

The **fixed** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the ACL rule number here. This value must be between 1 and 65535. If this value is not specified, the system will automatically generate an ACL rule number for this entry. |
| **Action** | Select the action that this rule will take here. Options to choose from are **Permit** and **Deny**. |
| **Protocol Type** | Select the protocol type option here. Options to choose from are **TCP**, **UDP**, **ICMP**, **EIGRP**, **ESP**, **GRE**, **IGMP**, **OSPF**, **PIM**, **VRRP**, **IP-in-IP**, **PCP**, **Protocol ID**, and **None**. |

After selecting the **TCP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

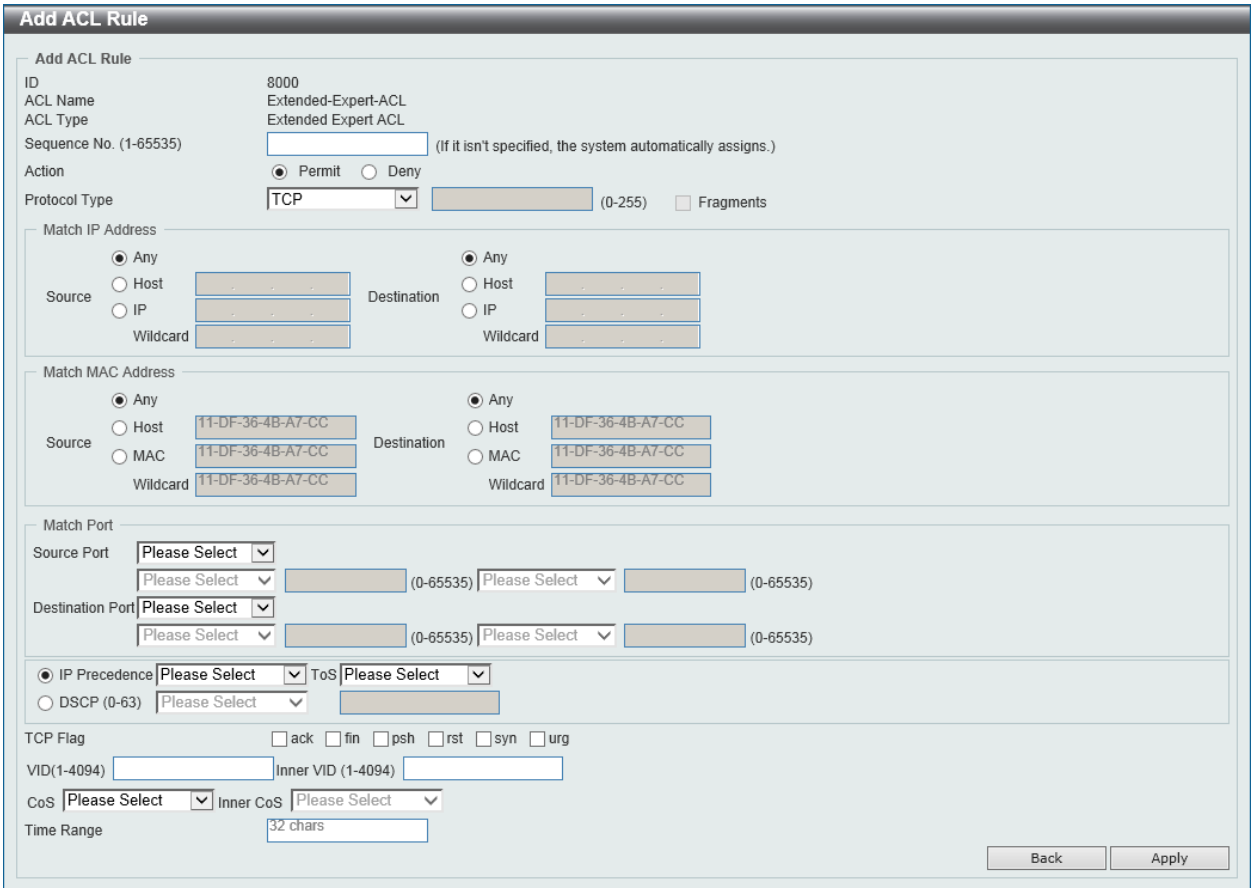



**Figure 8-87 Extended Expert ACL (Add Rule) TCP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |

| Parameter | Description |
|---|---|
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **TCP Flag** | Tick the appropriate TCP flag option to include the flag in this rule. Options to choose from are **ack**, **fin**, **psh**, **rst**, **syn**, and **urg**. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **UDP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

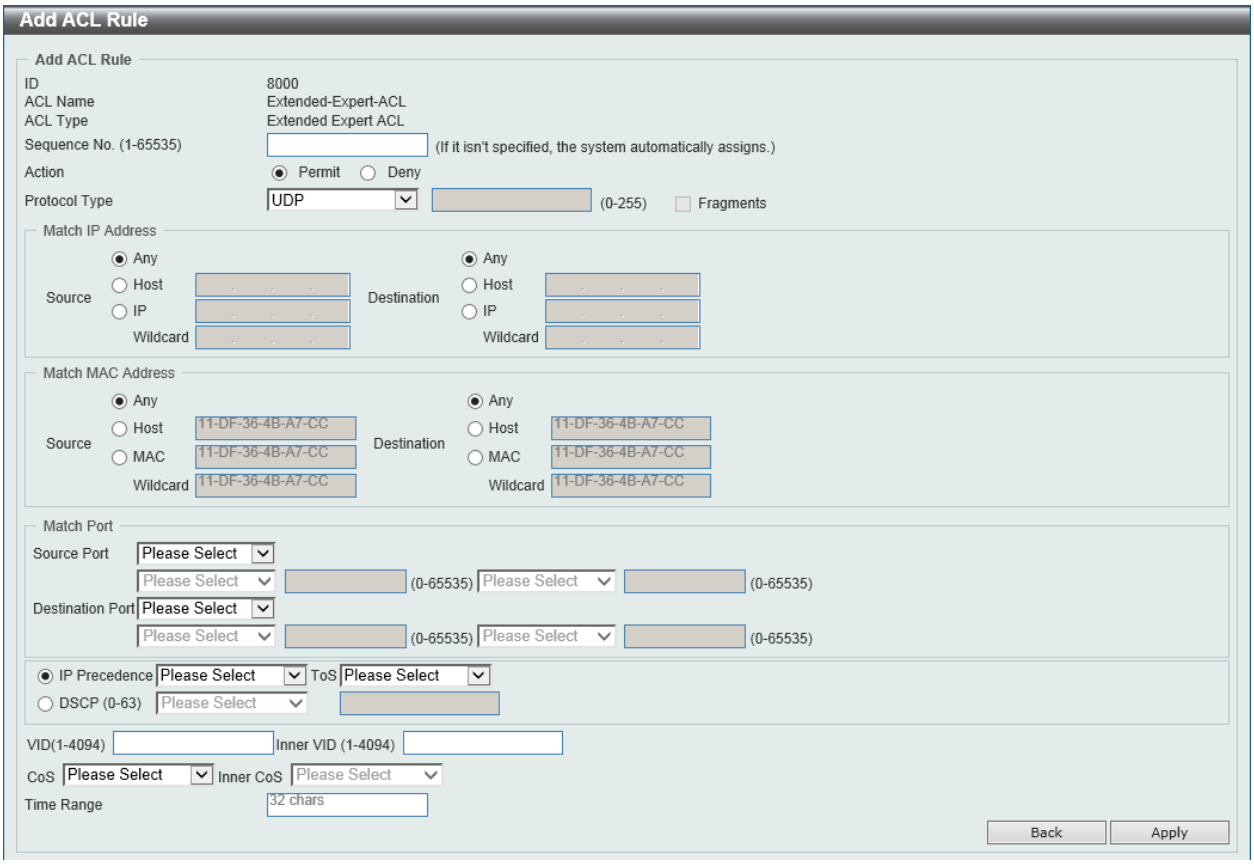



**Figure 8-88 Extended Expert ACL (Add Rule) UDP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard |

| Parameter | Description |
|---|---|
| | value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **Source Port** | Select and enter the source port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **Destination Port** | Select and enter the destination port value here. Options to choose from are **=**, **>**, **<**, **≠**, and **Range**. When selecting the **=** option, the specific selected port number will be used. When selecting the **>** option, all ports greater than the selected port, will be used. When selecting the **<** option, all ports smaller than the selected port, will be used. When selecting the **≠** option, all ports, excluding the selected port, will be used. When selecting the **Range** option, the start port number and end port number selected, of the range, will be used. Alternatively, the port number(s) can manually be entered in the space(s) provided, if the port number(s) is/are not available in the drop-down list. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **ICMP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

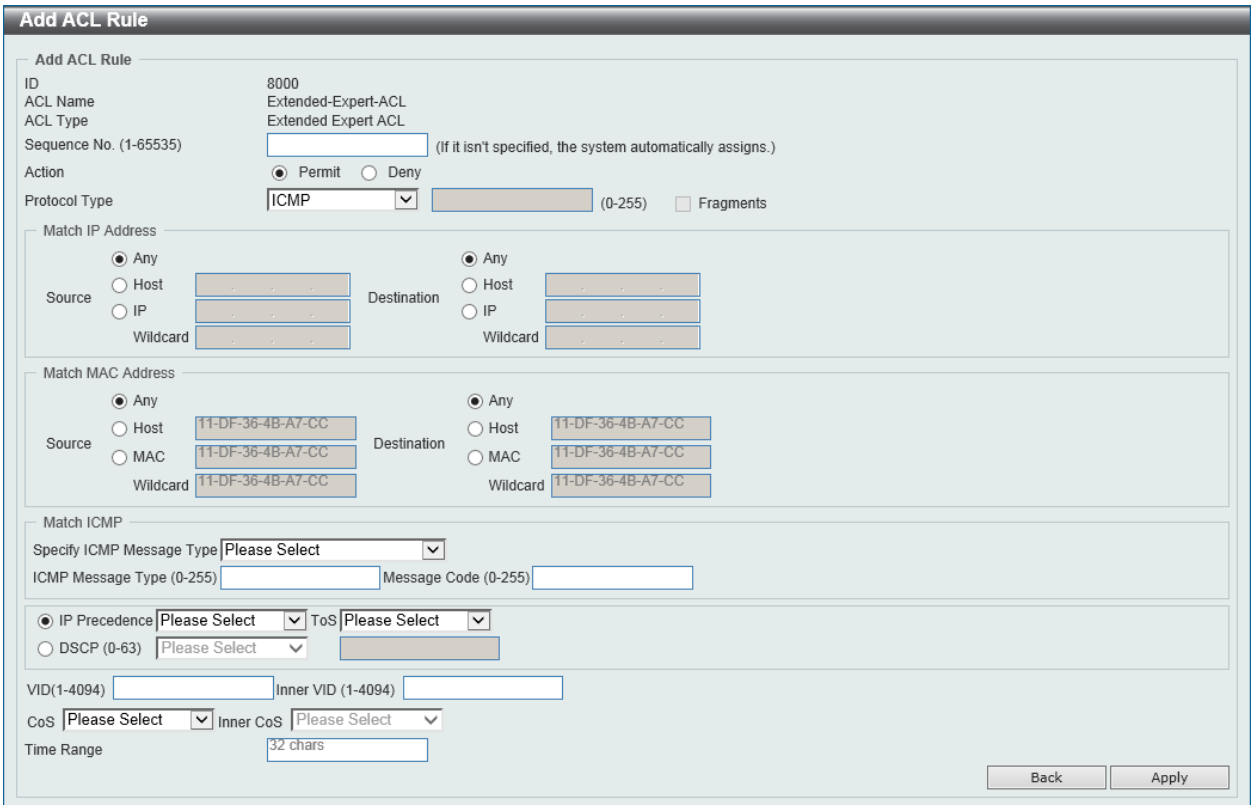



**Figure 8-89 Extended Expert ACL (Add Rule) ICMP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |

| Parameter | Description |
|---|---|
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **Specify ICMP Message Type** | Select the ICMP message type used here. |
| **ICMP Message Type** | When the **ICMP Message Type** is not selected, enter the ICMP Message Type numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **Message Code** | When the **ICMP Message Type** is not selected, enter the Message Code numerical value used here. When the **ICMP Message Type** is selected, this numerical value will automatically be entered. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **EIGRP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

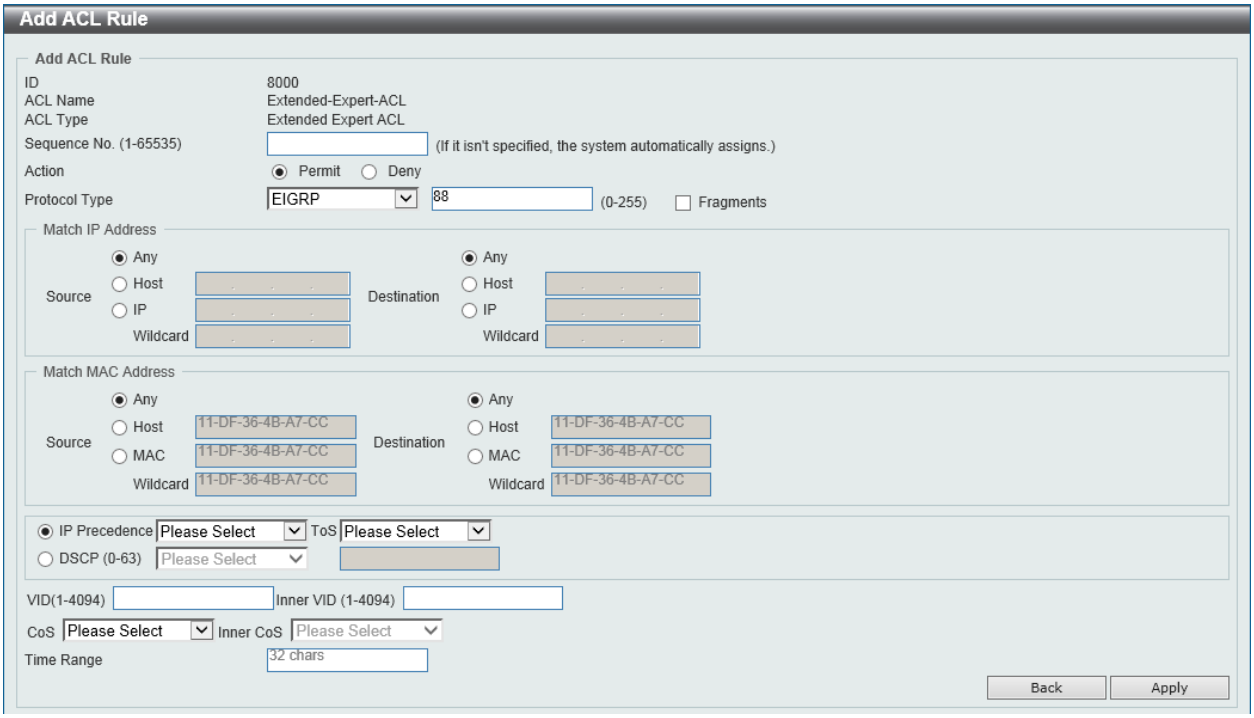



**Figure 8-90 Extended Expert ACL (Add Rule) EIGRP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the |

| Parameter | Description |
|---|---|
| | destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **ESP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

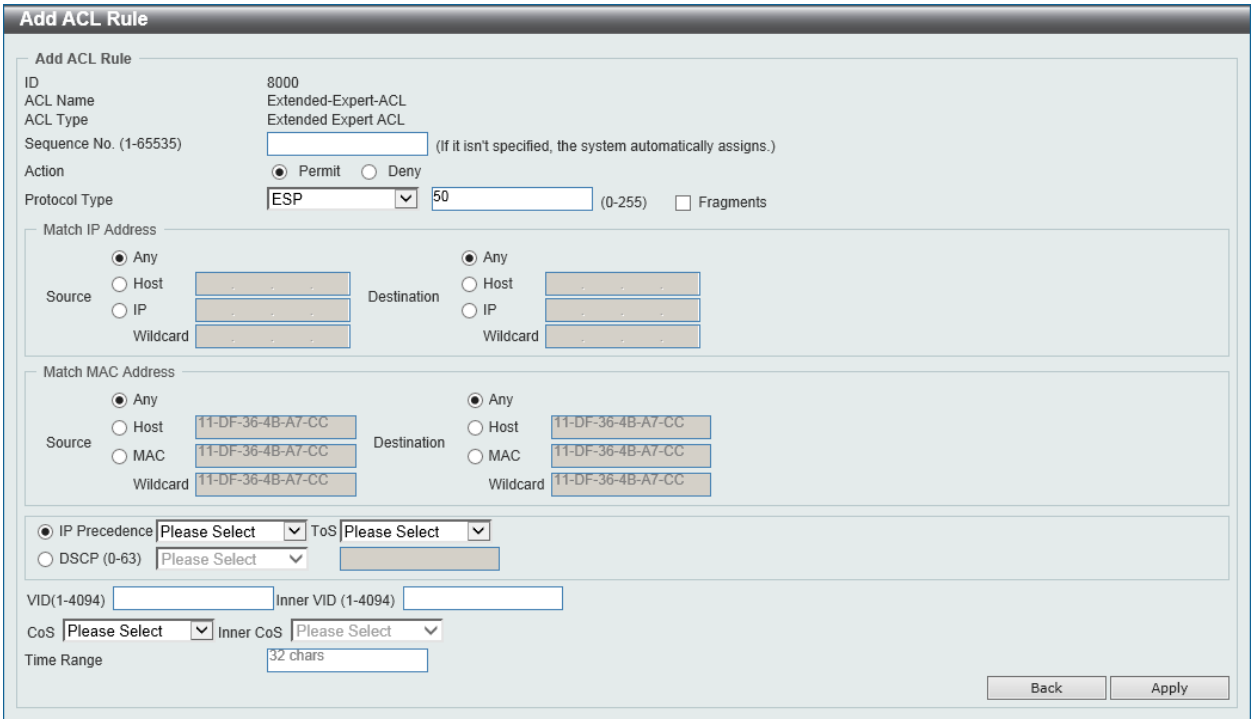



**Figure 8-91 Extended Expert ACL (Add Rule) ESP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |

| Parameter | Description |
|---|---|
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **GRE** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

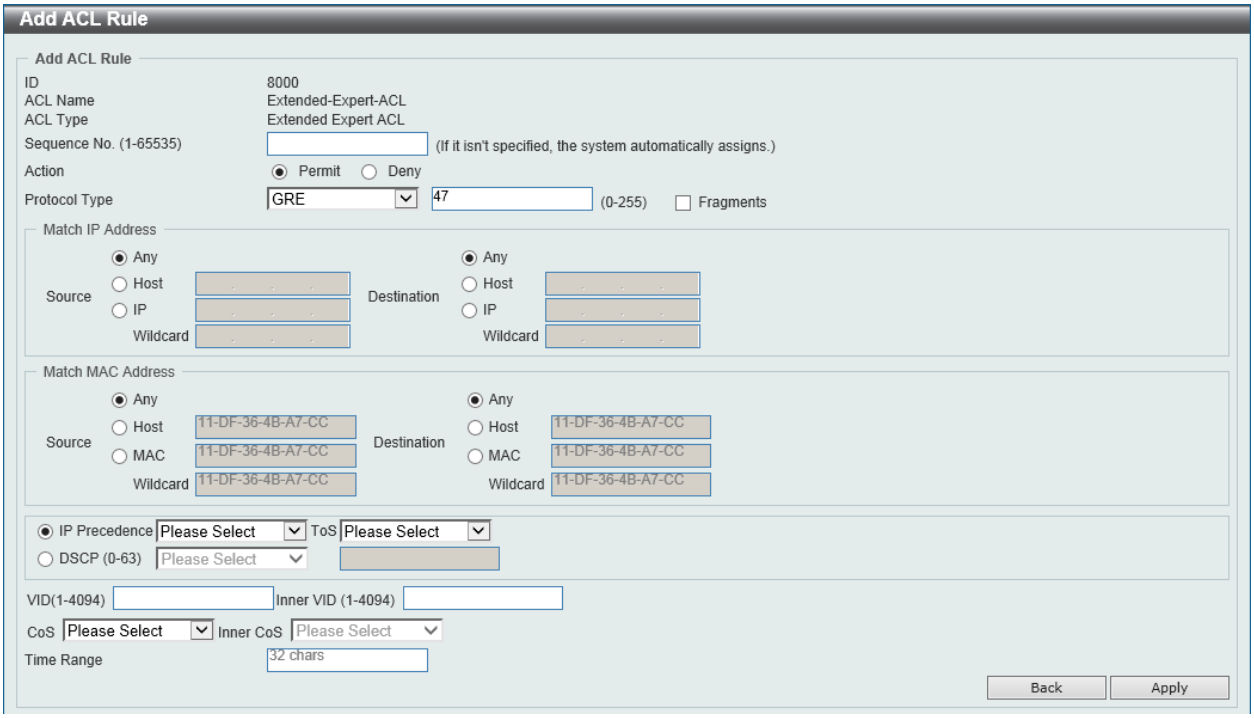



**Figure 8-92 Extended Expert ACL (Add Rule) GRE Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this |

| Parameter | Description |
|---|---|
| | rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **IGMP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

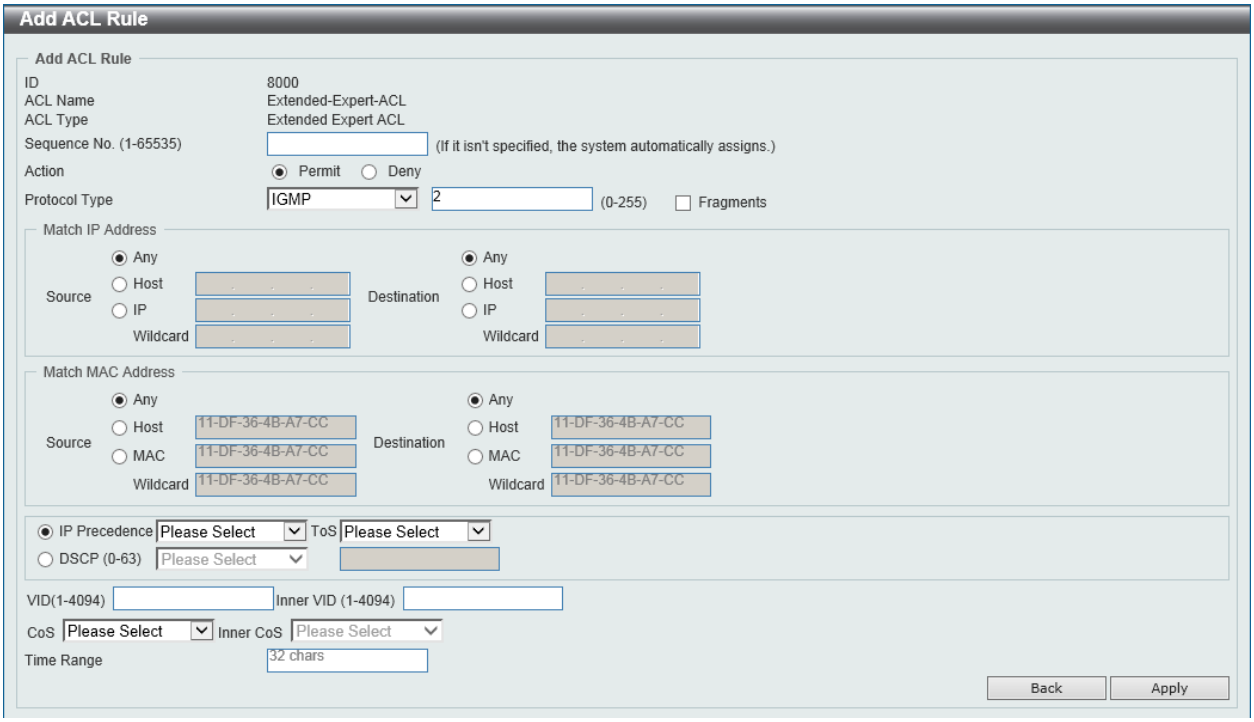



**Figure 8-93 Extended Expert ACL (Add Rule) IGMP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the |

| Parameter | Description |
|---|---|
| | destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **OSPF** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

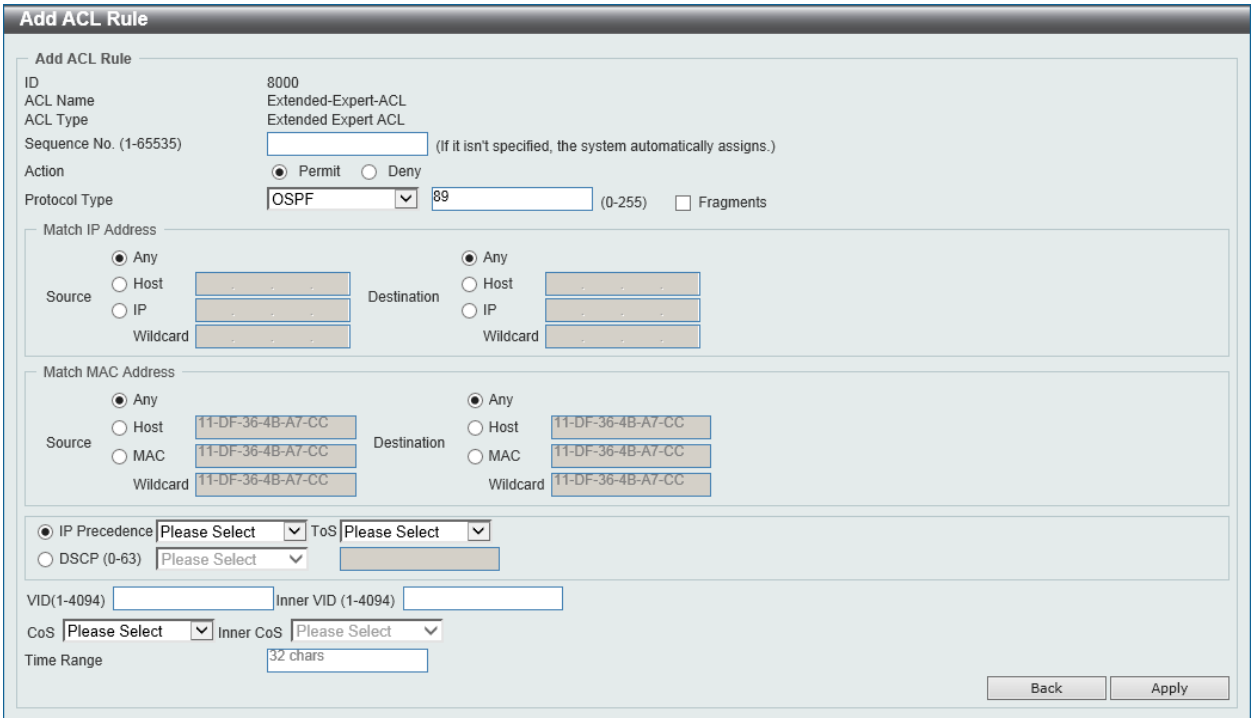



**Figure 8-94 Extended Expert ACL (Add Rule) OSPF Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |

| Parameter | Description |
|---|---|
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **PIM** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

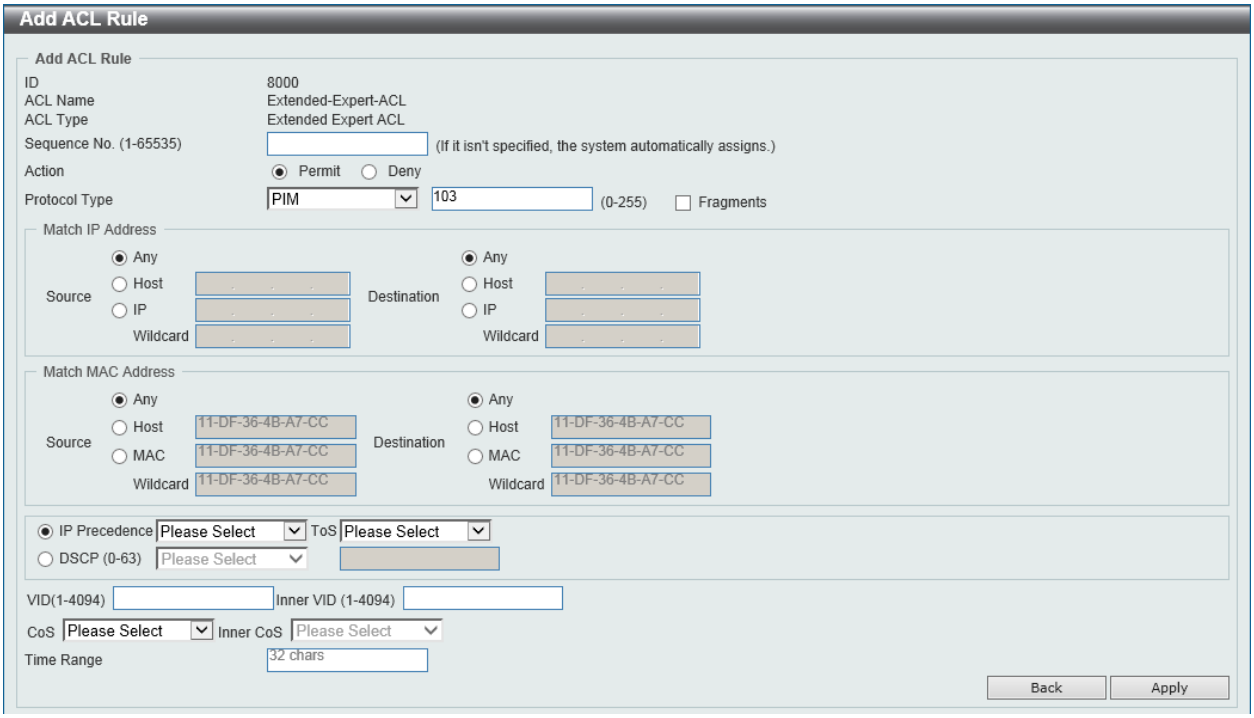



**Figure 8-95 Extended Expert ACL (Add Rule) PIM Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this |

| Parameter | Description |
|---|---|
| | rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **VRRP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

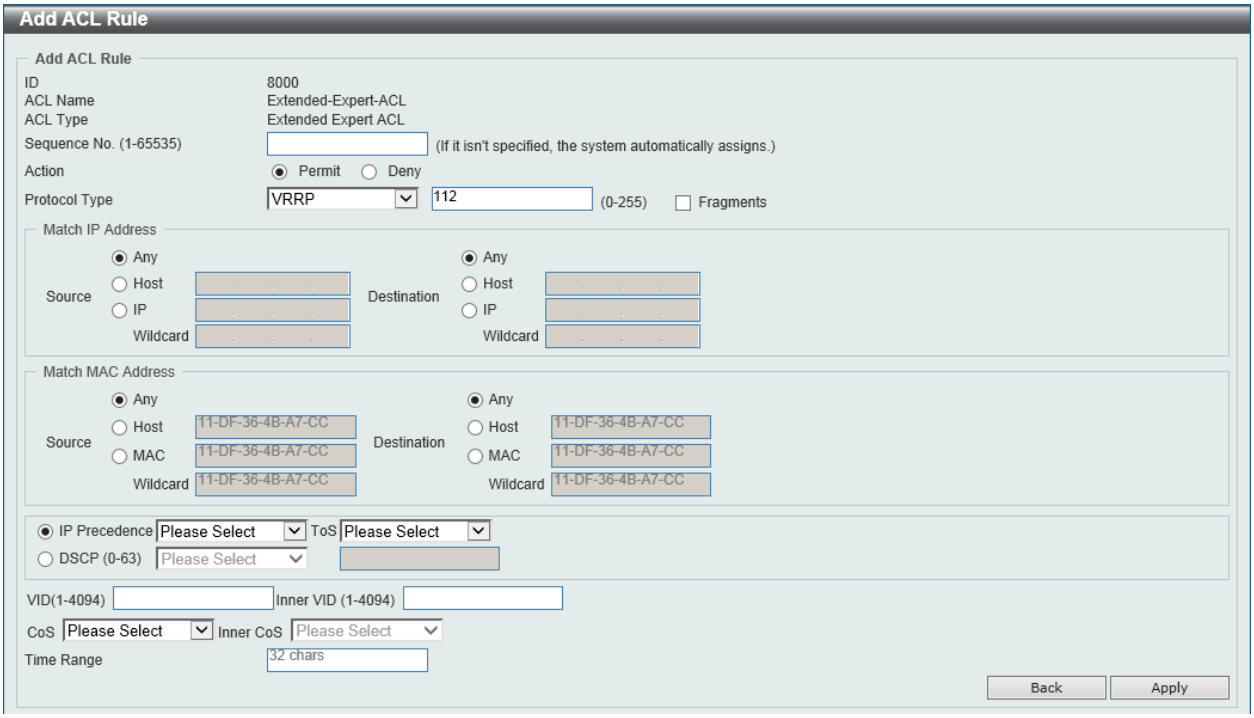



**Figure 8-96 Extended Expert ACL (Add Rule) VRRP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the |

| Parameter | Description |
|---|---|
| | destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **IP-in-IP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

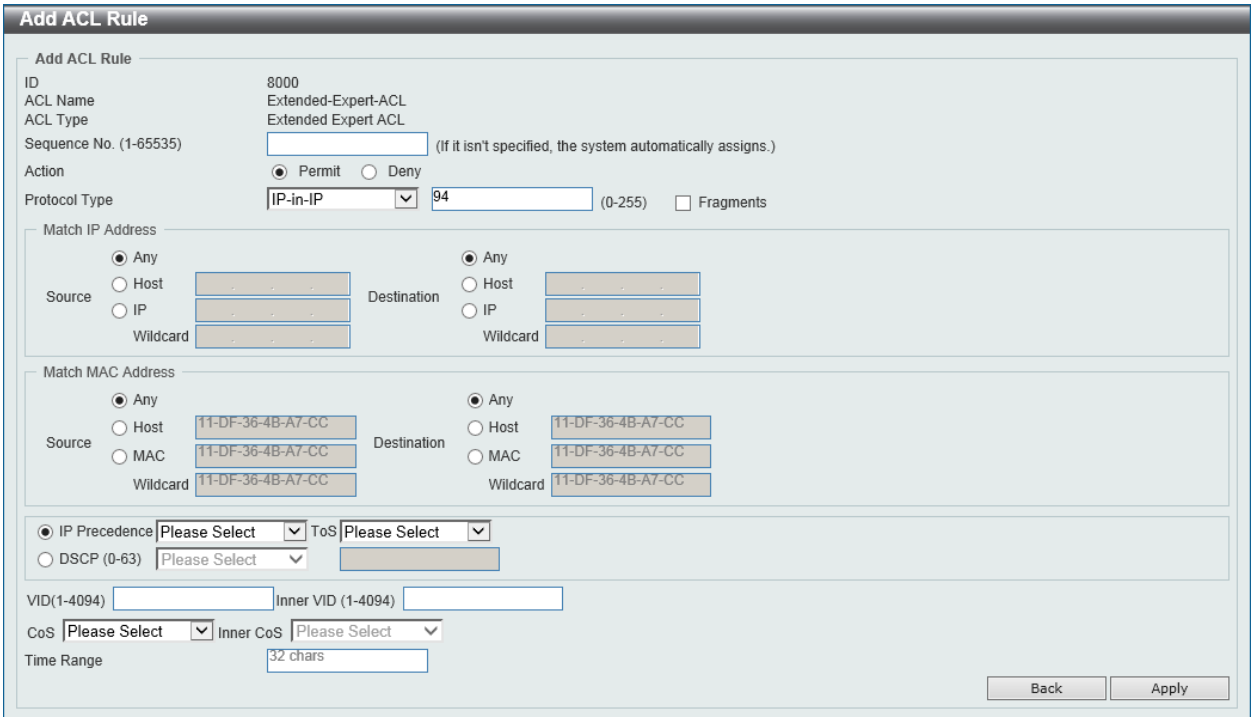



**Figure 8-97 Extended Expert ACL (Add Rule) IP-in-IP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |

| Parameter | Description |
|---|---|
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **PCP** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

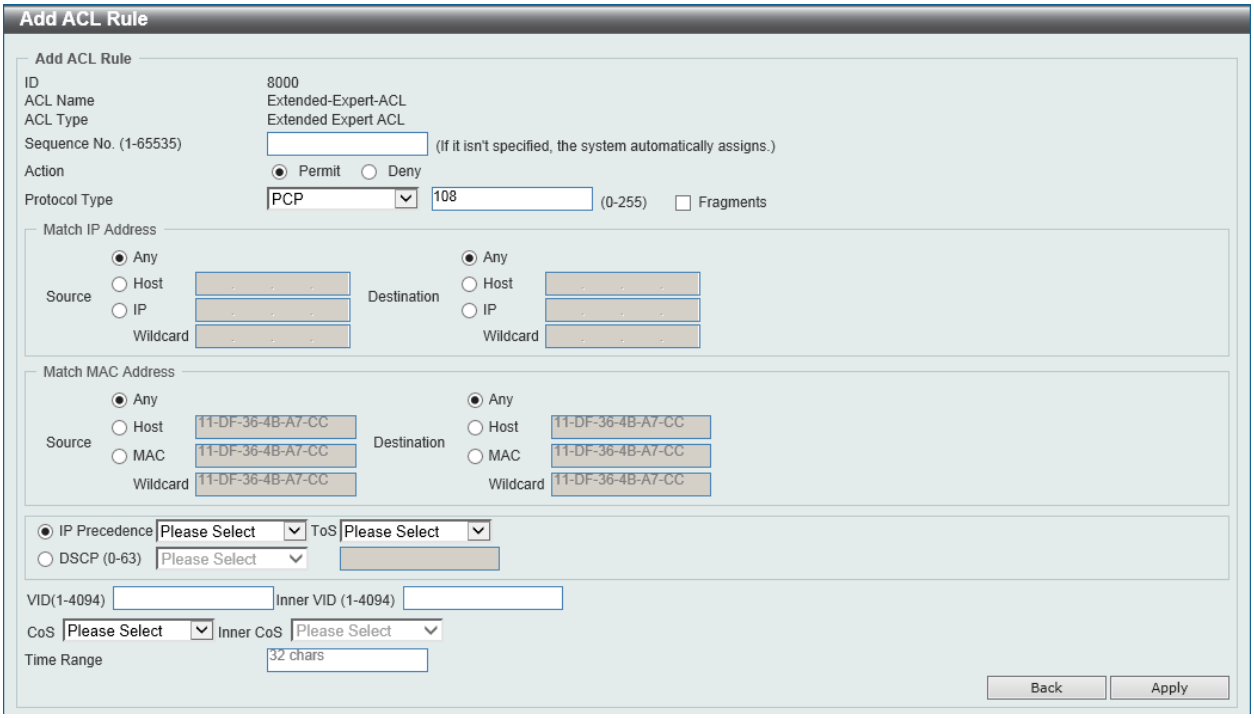



**Figure 8-98 Extended Expert ACL (Add Rule) PCP Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this |

| Parameter | Description |
|---|---|
| | rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **Protocol ID** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

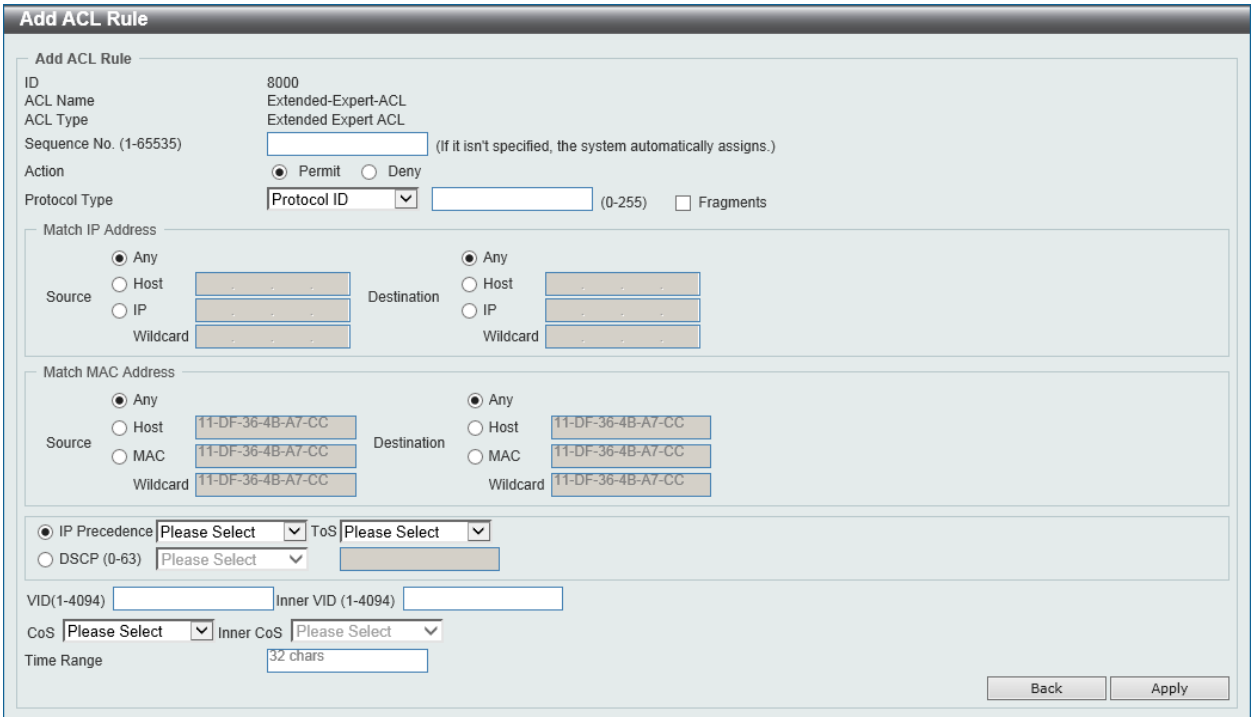



**Figure 8-99 Extended Expert ACL (Add Rule) Protocol ID Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Protocol** | Enter the Protocol ID value used here. This value must be between 0 and 255. |
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose |

| Parameter | Description |
|---|---|
| | from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

After selecting the **None** option as the **Protocol Type**, the following page and parameters will be available, as shown below:

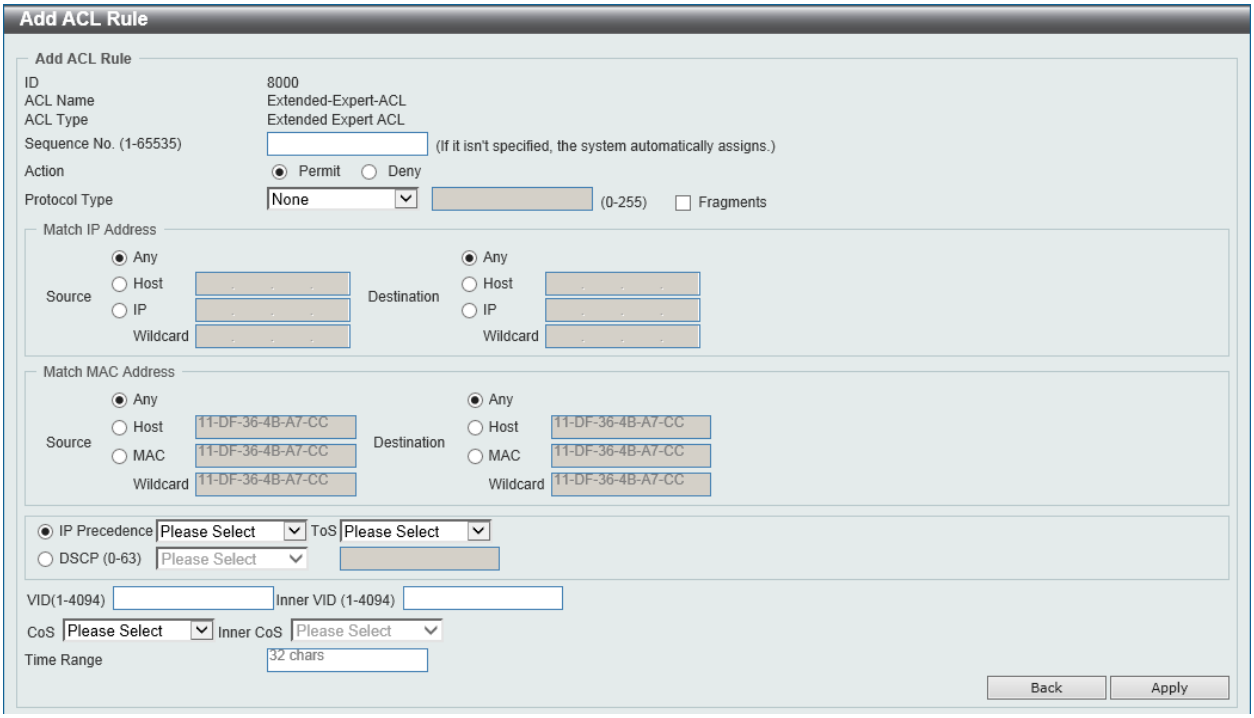



**Figure 8-100 Extended Expert ACL (Add Rule) None Window**

The **dynamic** fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Fragments** | Select the **Fragments** option to include packet fragment filtering. |
| **Source IP Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of source IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Destination IP Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **IP**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the destination host's IP address here. When the **IP** option is selected, the **Wildcard** option will also be available. Enter the group of destination IP addresses by using a wildcard bitmap. The bit corresponding to the bit value 1 will be ignored. The bit corresponding to the bit value 0 will be checked. |
| **Source MAC Address** | Select and enter the source information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any source traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the source host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the source MAC address and wildcard value in the spaces provided. |
| **Destination MAC Address** | Select and enter the destination information here. Options to choose from are **Any**, **Host**, **MAC**, and **Wildcard**. When the **Any** option is selected, any destination traffic will be evaluated according to the conditions of this rule. When the **Host** option is selected, enter the |

| Parameter | Description |
|---|---|
| | destination host's MAC address here. When the **MAC** option is selected, the **Wildcard** option will also be available. Enter the destination MAC address and wildcard value in the spaces provided. |
| **IP Precedence** | Select the IP precedence value used here. Options to choose from are **0 (routine)**, **1 (priority)**, **2, (immediate)**, **3 (flash)**, **4 (flash-override)**, **5 (critical)**, **6 (internet)**, and **7 (network)**. After selecting the IP precedence value, select the Type-of-Service (**ToS**) value that will be used here. Options to choose from are **0 (normal)**, **1 (min-monetary-cost)**, **2 (max-reliability)**, **3**, **4 (max-throughput)**, **5**, **6**, **7**, **8 (min-delay)**, **9**, **10**, **11**, **12**, **13**, **14**, and **15**. |
| **ToS** | Select the Type of Service option here. Options to choose from are 0 to 15. |
| **DSCP** | Select or enter the DSCP value used here. This value must be between 0 and 63. |
| **VID** | Enter the outer VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **Inner VID** | Enter the inner VLAN ID that will be associated with this ACL rule here. This value must be between 1 and 4094. |
| **CoS** | Select the Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Inner CoS** | Select the inner Class of Service (CoS) value here. Options to choose from are from 0 to 7. |
| **Time Range** | Enter the time profile name that will be associated with this ACL rule, here. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to discard the changes made and return to the previous page.

To enable the **Counter State** option or to enter a **Remark** for the ACL, click the **Edit** button, next to the specific ACL (found in the ACL table).

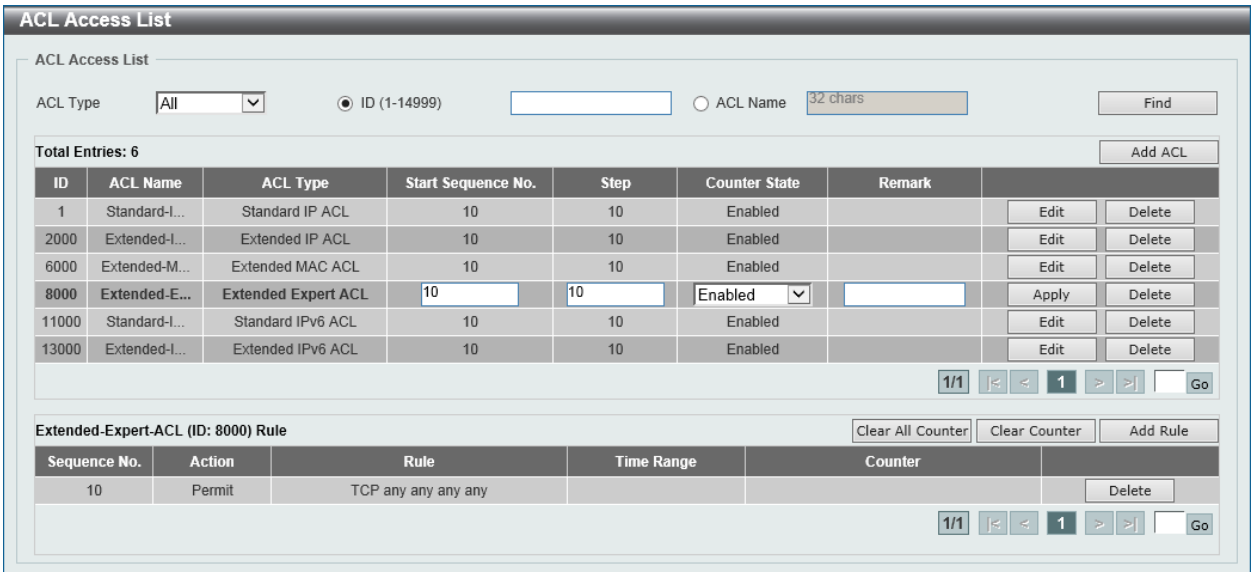



**Figure 8-101 Extended Expert ACL (Counter State Enabled) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Start Sequence No.** | Enter the start sequence number here. |
| **Stop** | Enter the stop sequence number here. |
| **Counter State** | Select to enable or disable the counter state option here. |
| **Remark** | Enter an optional remark that will be associated with this ACL here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

To view the list of rules, that are associated with an ACL, select the ACL (found in the ACL table). The rule of ACL rules, connected to the selected ACL, will be displayed in the ACL rule table, as shown below:

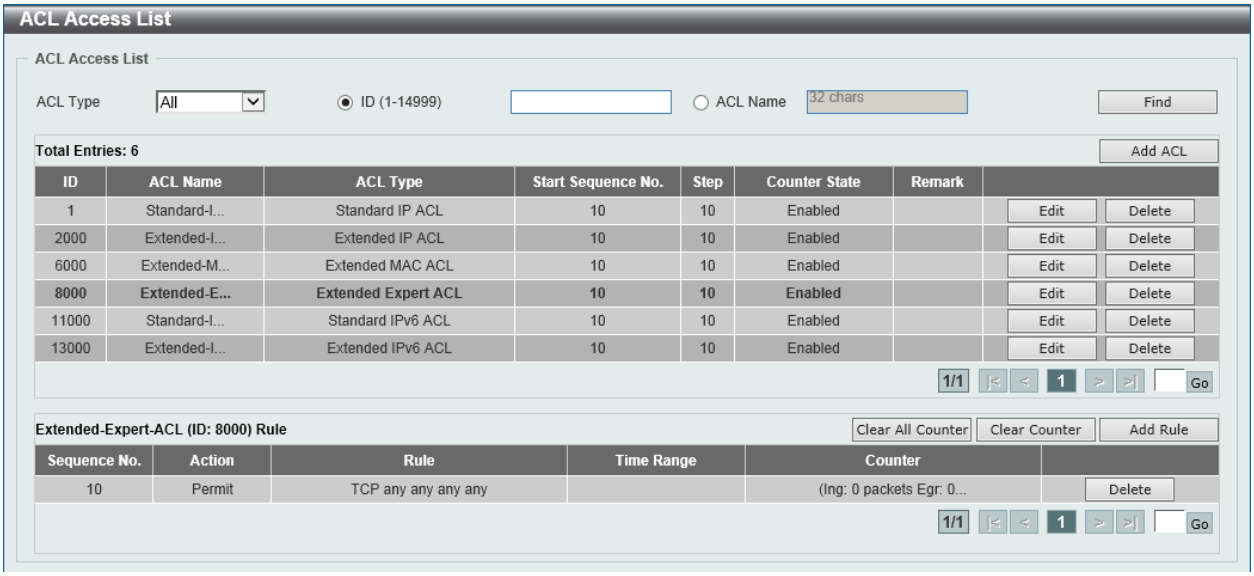



**Figure 8-102 Extended Expert ACL (Rule Display) Window**

Click the **Delete** button to remove the specific ACL rule.

# ACL Interface Access Group

This window is used to view and configure the ACL interface access group settings.

To view the following window, click **ACL > ACL Interface Access Group**, as shown below:

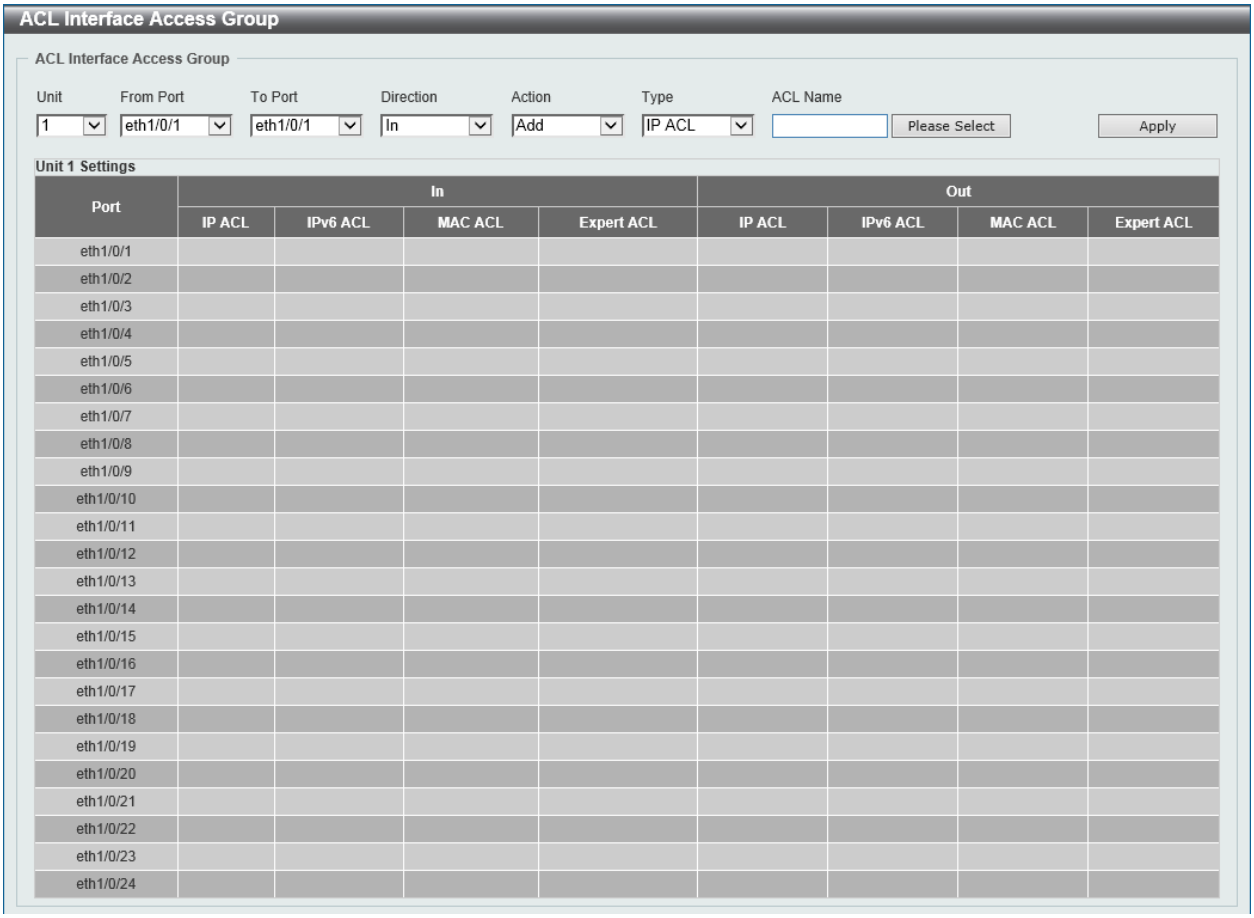



**Figure 8-103 ACL Interface Access Group Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the range of ports that will be used for this configuration here. |
| **Direction** | Select the direction here. Options to choose from are **In** and **Out**. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add** and **Delete**. |
| **Type** | Select the ACL type here. Options to choose from are **IP ACL**, **IPv6 ACL**, **MAC ACL**, and **Expert ACL**. |
| **ACL Name** | Enter the ACL's name here. This name can be up to 32 characters long. Click the **Please Select** button to select an existing ACL from the list. |

Click the **Apply** button to accept the changes made.

# ACL VLAN Access Map

This window is used to view and configure the ACL VLAN access map settings.

To view the following window, click **ACL > ACL VLAN Access Map**, as shown below:

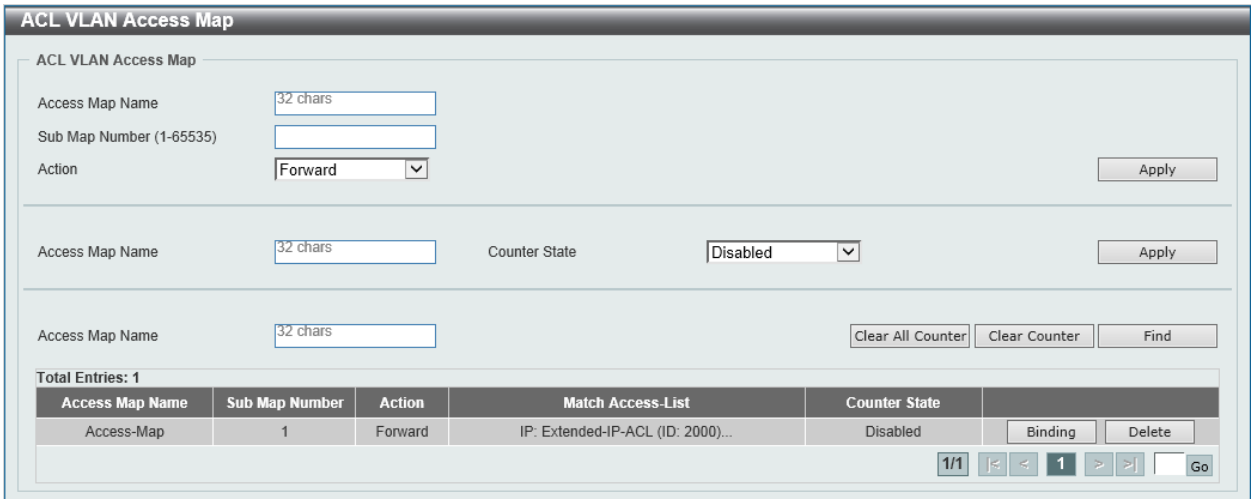



**Figure 8-104 ACL VLAN Access Map Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Access Map Name** | Enter the access map's name here. This name can be up to 32 characters long. |
| **Sub Map Number** | Enter the sub-map's number here. This value must be between 1 and 65535. |
| **Action** | Select the action that will be taken here. Options to choose from are **Forward**, **Drop**, and **Redirect**. When the **Redirect** option is selected, select the redirected interface from the drop-down list. |
| **Counter State** | Select whether to enable or disable the counter state. |

Click the **Apply** button to accept the changes made.

Click the **Clear All Counter** button to clear the counter information for all the access maps.

Click the **Clear Counter** button to the clear the counter information for the specified access map.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Binding** button to match an access list to the ACL VLAN access map.

Click the **Delete** button to remove the specific entry.

After clicking the **Binding** button, the following window will appear:

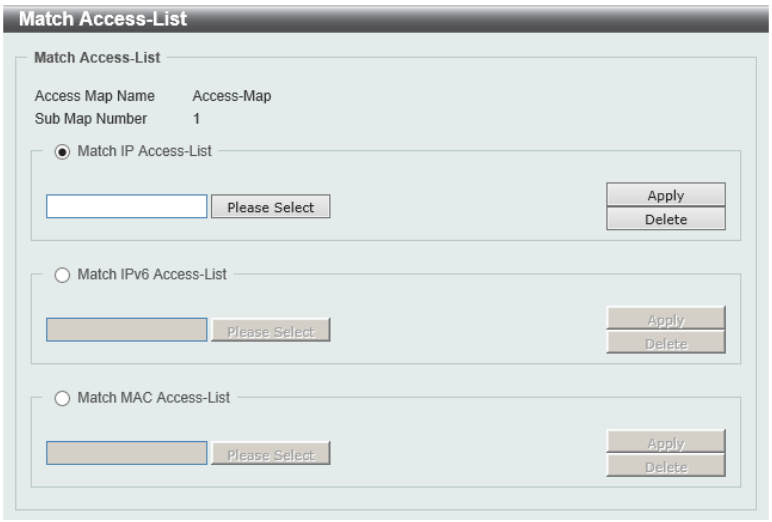



**Figure 8-105 ACL VLAN Access Map (Binding) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Match IP Access-List** | Here the IP access list that will be matched will be displayed. |
| **Match IPv6 Access-List** | Here the IPv6 access list that will be matched will be displayed. |
| **Match MAC Access-List** | Here the MAC access list that will be matched will be displayed. |

Click the **Please Select** button navigate to a list of access lists that can be selected to be used in this configuration.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

After clicking the **Please Select** button, the following window will appear:


**Figure 8-106 ACL VLAN Access Map (Binding, Selection) Window**

Select the radio button next to the entry to use that access list in the configuration.

Click the **OK** button to accept the selection made.

# ACL VLAN Filter

This window is used to view and configure the ACL VLAN filter settings.

To view the following window, click **ACL > ACL VLAN Filter**, as shown below:

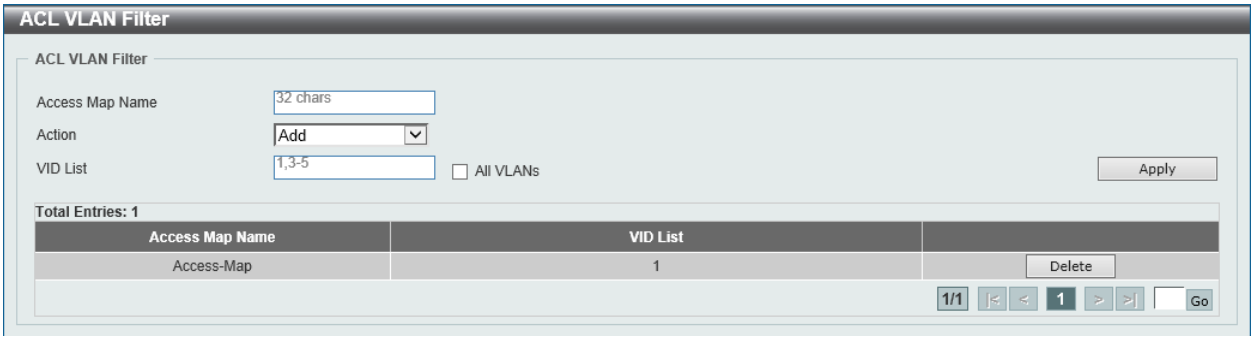



**Figure 8-107 ACL VLAN Filter Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Access Map Name** | Enter the access map's name here. This name can be up to 32 characters long. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add** and **Delete**. |
| **VID List** | Enter the VLAN ID list that will be used here. Select the **All VLANs** option to apply this configuration to all the VLANs configured on this switch. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

# CPU ACL

This window is used to view and configure the CPU ACL settings.

To view the following window, click **ACL > CPU ACL**, as shown below:

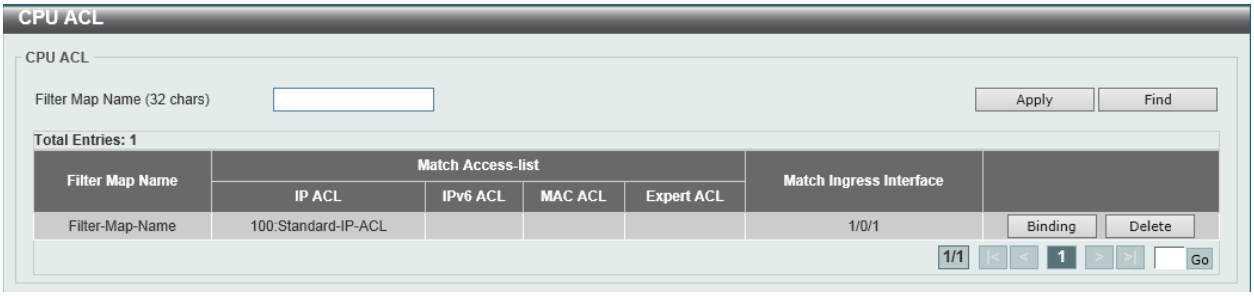



**Figure 8-108 CPU ACL Window**

The fields that can be configured in **APU ACL** are described below:

| Parameter | Description |
|---|---|
| **Filter Map Name** | Enter the CPU ACL filter map's name here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Binding** button to configure the binding settings for the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Binding** button, the following page will appear.

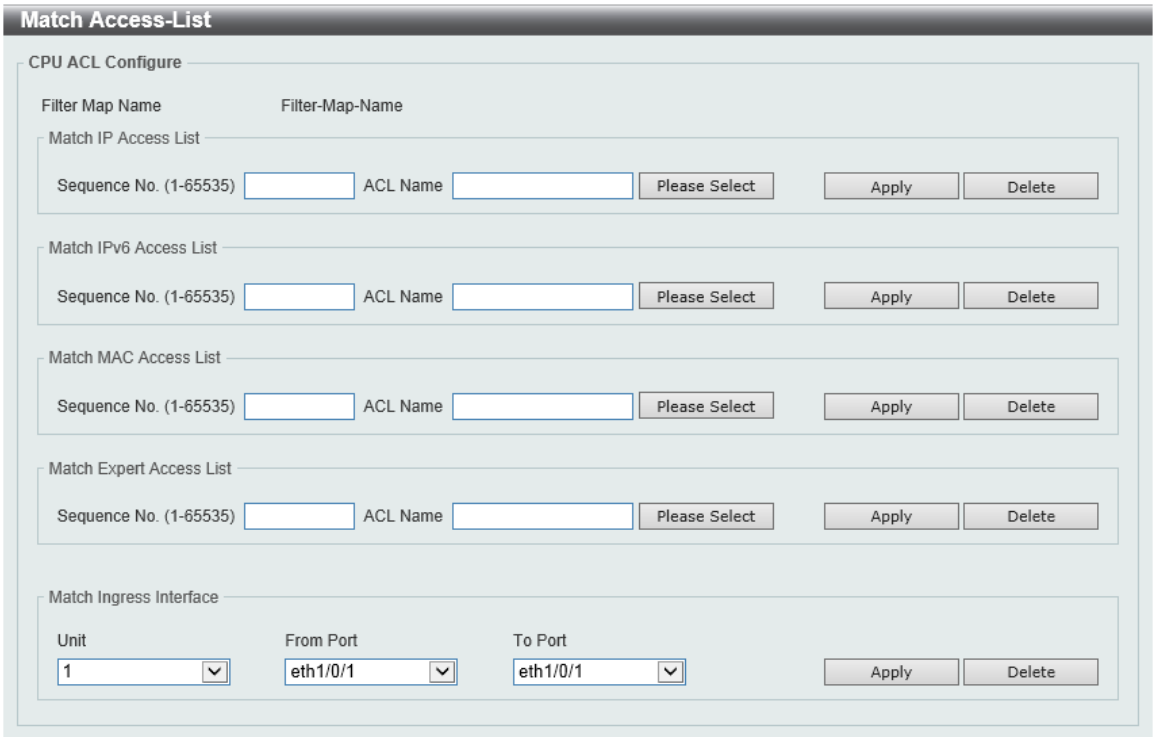



**Figure 8-109 CPU ACL (Binding) Window**

The fields that can be configured in **Match IP Access List** are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the sequence number of the associated match entry here. The range is from 1 to 65535. The lower the number is, the higher the priority of the access list. |
| **ACL Name** | Enter the standard or extended IP access list's name to be matched here. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to select an existing ACL from the list. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

The fields that can be configured in **Match IPv6 Access List** are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the sequence number of the associated match entry here. The range is from 1 to 65535. The lower the number is, the higher the priority of the access list. |
| **ACL Name** | Enter the standard or extended IPv6 access list's name to be matched here. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to select an existing ACL from the list. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

The fields that can be configured in **Match MAC Access List** are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the sequence number of the associated match entry here. The range is from 1 to 65535. The lower the number is, the higher the priority of the access list. |
| **ACL Name** | Enter the extended MAC access list's name to be matched here. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to select an existing ACL from the list. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

The fields that can be configured in **Match Expert Access List** are described below:

| Parameter | Description |
|---|---|
| **Sequence No.** | Enter the sequence number of the associated match entry here. The range is from 1 to 65535. The lower the number is, the higher the priority of the access list. |
| **ACL Name** | Enter the extended expert access list's name to be matched here. This name can be up to 32 characters long. Alternatively, click the **Please Select** button to select an existing ACL from the list. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

The fields that can be configured in **Match Ingress Interface** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

After clicking the **Please Select** button, the following window will appear:

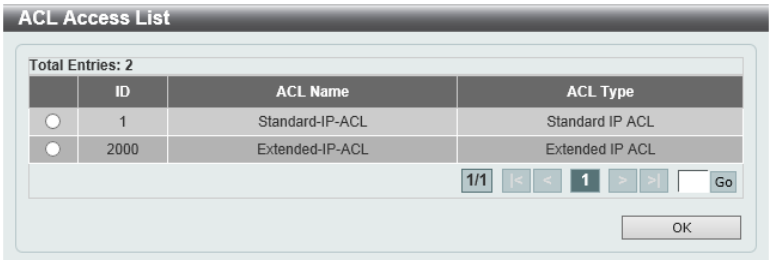



**Figure 8-110 CPU ACL (Binding, Please Select) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL List** | Select the radio button next to the access list entry to use that access list in the configuration. |

Click the **OK** button to accept the selection made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# 9. Security

***Port Security***
***802.1X***
***AAA***
***RADIUS***
***TACACS***
***IMPB***
***DHCP Server Screening***
***ARP Spoofing Prevention***
***BPDU Attack Protection***
***MAC Authentication***
***Web-based Access Control***
***Network Access Authentication***
***Safeguard Engine***
***Trusted Host***
***Traffic Segmentation Settings***
***Storm Control***
***DoS Attack Prevention Settings***
***SSH***
***SSL***
***SFTP Server Settings***

## Port Security

### Port Security Global Settings

This window is used to view and configure the port security global settings. Port Security is a security feature that prevents unauthorized computers (with source MAC addresses) unknown to the Switch prior to locking the port (or ports) from connecting to the Switch's locked ports and gaining access to the network.

To view the following window, click **Security > Port Security > Port Security Global Settings**, as shown below:

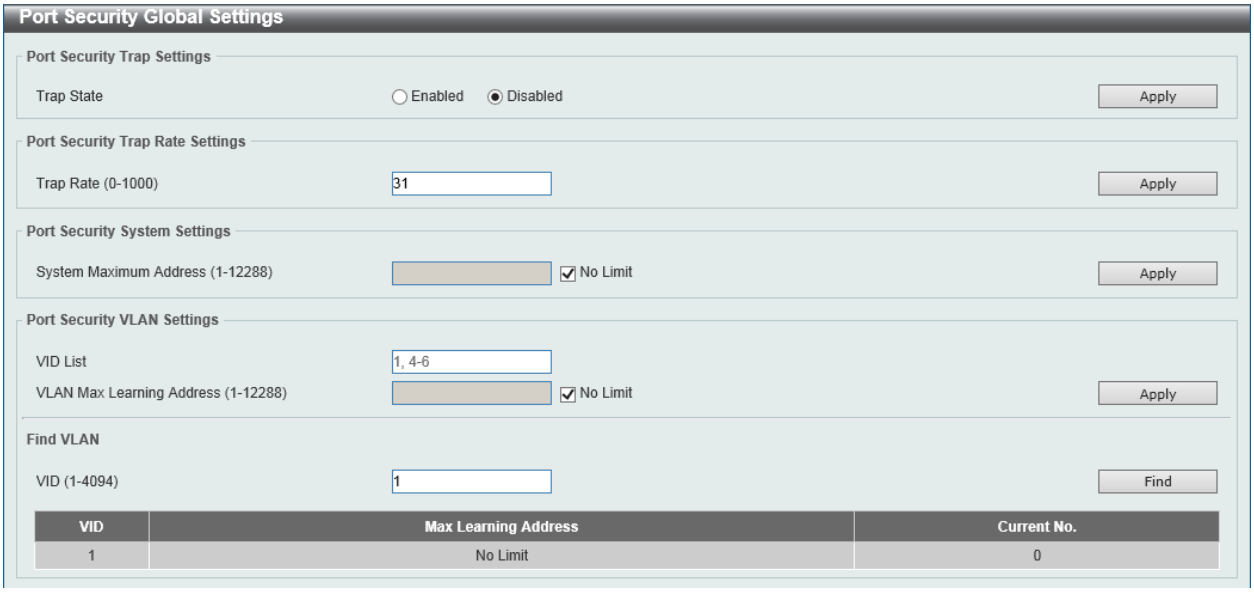



**Figure 9-1 Port Security Global Settings Window**

The fields that can be configured in **Port Security Trap Settings** are described below:

| Parameter | Description |
|---|---|
| **Trap State** | Click to enable or disable port security traps on the Switch. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Port Security Trap Rate Settings** are described below:

| Parameter | Description |
|---|---|
| **Trap Rate** | Enter the number of traps per second. The range is from 0 to 1000. The default value 0 indicates an SNMP trap to be generated for every security violation. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Port Security System Settings** are described below:

| Parameter | Description |
|---|---|
| **System Maximum Address** | Enter the maximum number of secure MAC addresses allowed. If not specified, the default value is No Limit. The valid range is from 1 to 6656. Tick the **No Limit** checkbox to allow the maximum number of secure MAC address. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Port Security VLAN Settings** are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the VLAN ID(s) here. |
| **VLAN Max Learning Address** | Enter the maximum number of allowed MAC addresses that can be learned on the specified VLAN(s) here. The range is from 1 to 12288. Tick the **No Limit** checkbox to allow the maximum number of secure MAC address. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find VLAN** are described below:

| Parameter | Description |
|---|---|
| **VID** | Enter the VLAN ID that will be located here. |

Click the **Find** button to locate a specific entry based on the information entered.

# Port Security Port Settings

This window is used to view and configure the port security port settings.

To view the following window, click **Security > Port Security > Port Security Port Settings**, as shown below:

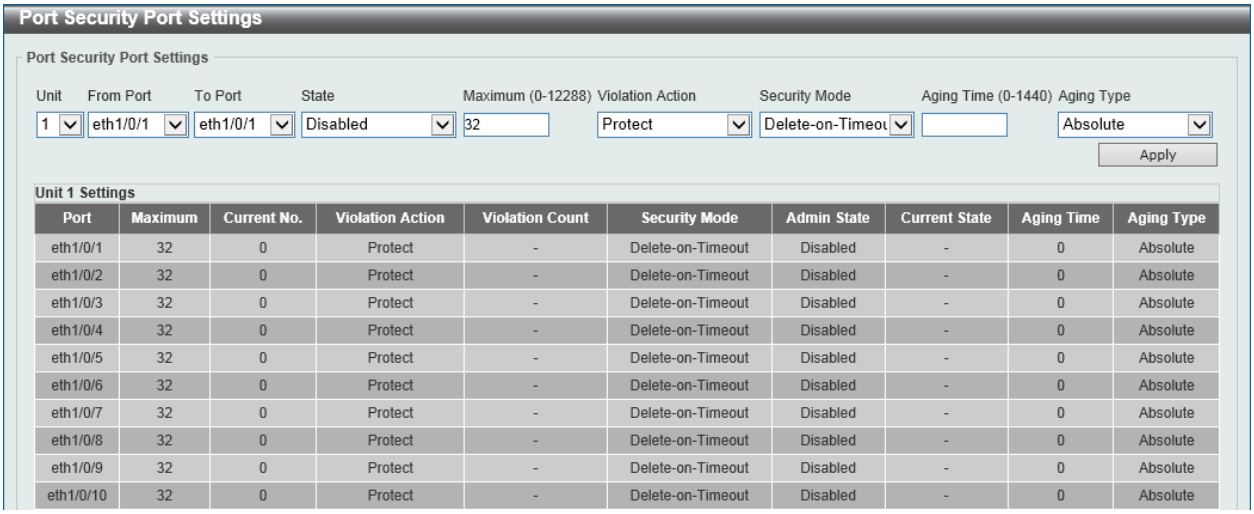



**Figure 9-2 Port Security Port Settings Window**

The fields that can be configured in **Port Security Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Select to enable or disable the port security feature on the port(s) specified. |
| **Maximum** | Enter the maximum number of secure MAC addresses that will be allowed on the port(s) specified. This value must be between 0 and 6656. By default, this value is 32. |
| **Violation Action** | Select the violation action that will be taken here. Options to choose from are **Protect**, **Restrict**, and **Shutdown**.<br>• Selecting **Protect** specifies to drop all packets from the insecure hosts at the port-security process level, but does not increment the security-violation count.<br>• Selecting **Restrict** specifies to drop all packets from the insecure hosts at the port-security process level and increments the security-violation count and record the system log.<br>• Selecting **Shutdown** specifies to shut down the port if there is a security violation and record the system log. |
| **Security Mode** | Select the security mode option here. Options to choose from are **Permanent** and **Delete-on-Timeout**.<br>• Selecting **Permanent** specifies that under this mode, all learned MAC addresses will not be purged out unless the user manually deletes those entries.<br>• Selecting **Delete-on-Timeout** specifies that under this mode, all learned MAC addresses will be purged out when an entry is aged out or when the user manually deletes these entries. |
| **Aging Time** | Enter the aging time value used for auto-learned dynamic secured addresses on the specified port here. This value must be between 0 and 1440 minutes. |
| **Aging Type** | Select the aging type here. Options to choose from are **Absolute** and **Inactivity**.<br>• Selecting **Absolute** specifies that all the secure addresses on this port age out exactly after the time specified and is removed from the secure address list. This is the default type. |

| Parameter | Description |
|---|---|
| | • Selecting **Inactivity** specifies that the secure addresses on this port age out only if there is no data traffic from the secure source address for the specified time period. |

Click the **Apply** button to accept the changes made.

## Port Security Address Entries

This window is used to view, clear and configure the port security address entries.

To view the following window, click **Security > Port Security > Port Security Address Entries**, as shown below:

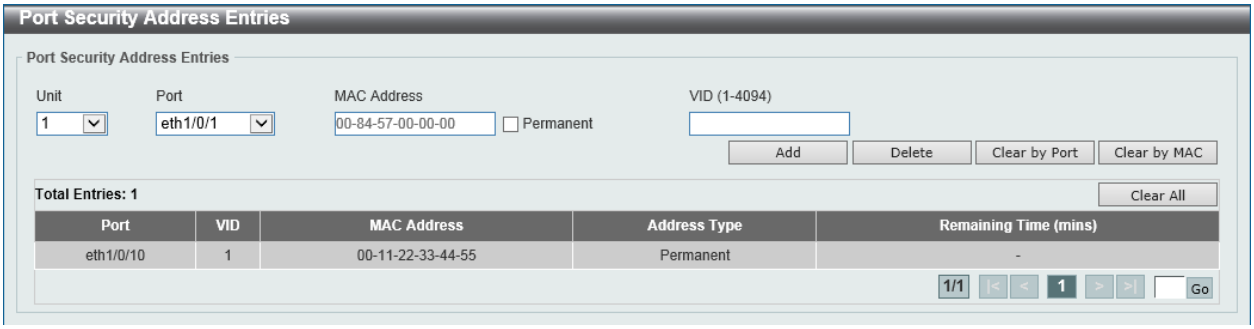



**Figure 9-3 Port Security Address Entries Window**

The fields that can be configured in **Port Security Address Entries** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select the appropriate port range used for the configuration here. |
| **MAC Address** | Enter the MAC address here. Select the **Permanent** option to specify that all learned MAC addresses will not be purged out unless the user manually deletes those entries. |
| **VID** | Enter the VLAN ID here. This value must be between 1 and 4094. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove a new entry based on the information entered.

Click the **Clear by Port** button to clear the information based on the port selected.

Click the **Clear by MAC** button to clear the information based on the MAC address entered.

Click the **Clear All** button to clear all the information in this table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# 802.1X

**802.1X (Port-based and Host-based Access Control)**

The IEEE 802.1X standard is a security measure for authorizing and authenticating users to gain access to various wired or wireless devices on a specified Local Area Network by using a Client and Server based access control model. This is accomplished by using a RADIUS server to authenticate users trying to access a network by relaying Extensible Authentication Protocol over LAN (EAPOL) packets between the Client and the Server.

The following figure represents a basic EAPOL packet:

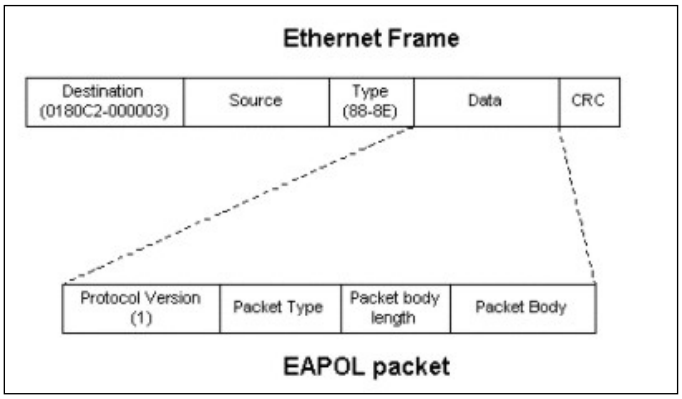



**Figure 9-4 The EAPOL Packet**

Utilizing this method, unauthorized devices are restricted from connecting to a LAN through a port to which the user is connected. EAPOL packets are the only traffic that can be transmitted through the specific port until authorization is granted. The 802.1X access control method has three roles, each of which are vital to creating and up keeping a stable and working Access Control security method.

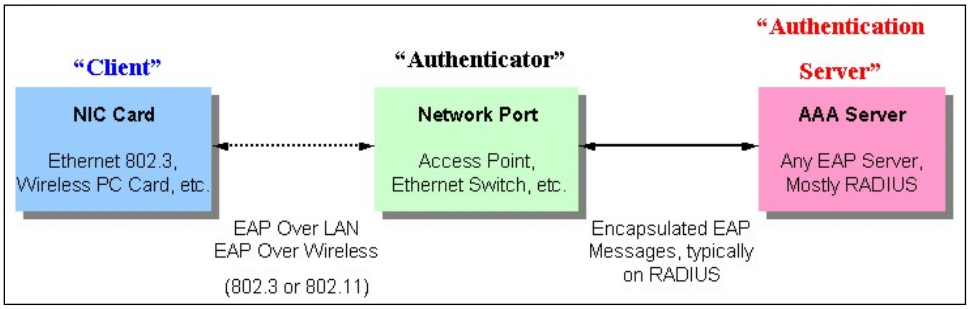



**Figure 9-5 The three roles of 802.1X**

The following section will explain the three roles of Client, Authenticator and Authentication Server in greater detail.

## Authentication Server

The Authentication Server is a remote device that is connected to the same network as the Client and Authenticator, must be running a RADIUS Server program and must be configured properly on the Authenticator (Switch). Clients connected to a port on the Switch must be authenticated by the Authentication Server (RADIUS) before attaining any services offered by the Switch on the LAN. The role of the Authentication Server is to certify the identity of the Client attempting to access the network by exchanging secure information between the RADIUS server and the Client through EAPOL packets and, in turn, informs the Switch whether or not the Client is granted access to the LAN and/or switches services.

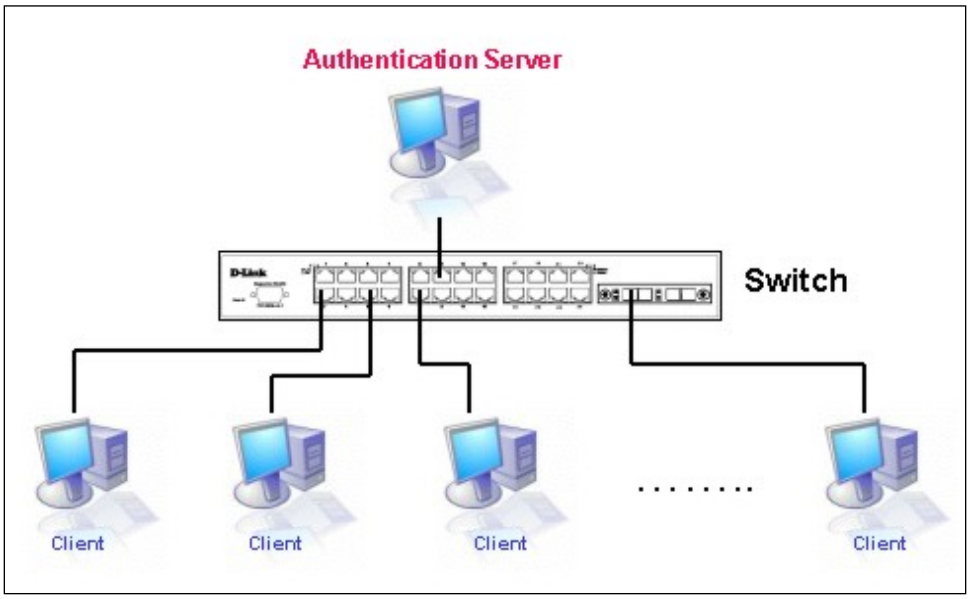



**Figure 9-6 The Authentication Server**

## Authenticator

The Authenticator (the Switch) is an intermediary between the Authentication Server and the Client. The Authenticator serves two purposes when utilizing the 802.1X function. The first purpose is to request certification information from the Client through EAPOL packets, which is the only information allowed to pass through the Authenticator before access is granted to the Client. The second purpose of the Authenticator is to verify the information gathered from the Client with the Authentication Server, and to then relay that information back to the Client.

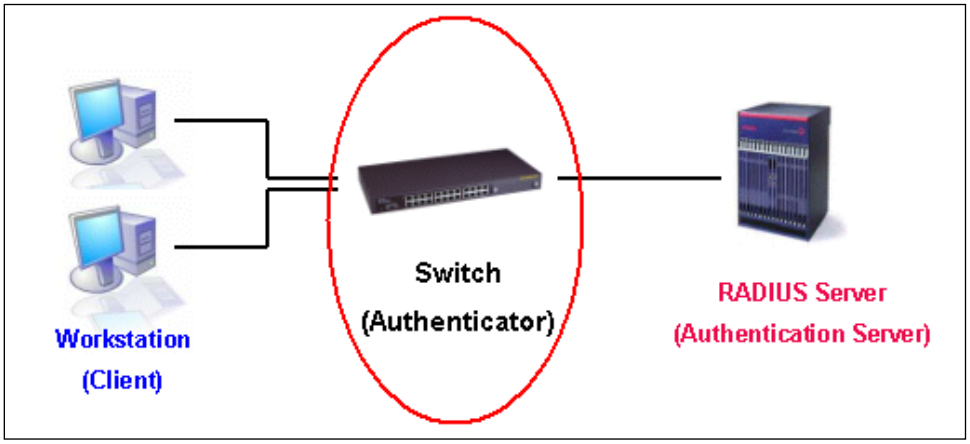



**Figure 9-7 The Authenticator**

Three steps must be implemented on the Switch to properly configure the Authenticator.

- The 802.1X State must be Enabled. (**Security > 802.1X > 802.1X Global Settings**)
- The 802.1X settings must be implemented by port (**Security > 802.1X > 802.1X Port Settings**)
- A RADIUS server must be configured on the Switch. (**Security > RADIUS > RADIUS Server Settings**)

## Client

The Client is simply the end station that wishes to gain access to the LAN or switch services. All end stations must be running software that is compliant with the 802.1X protocol. For users running windows

XP and windows Vista, that software is included within the operating system. All other users are required to attain 802.1X client software from an outside source. The Client will request access to the LAN and or Switch through EAPOL packets and, in turn will respond to requests from the Switch.

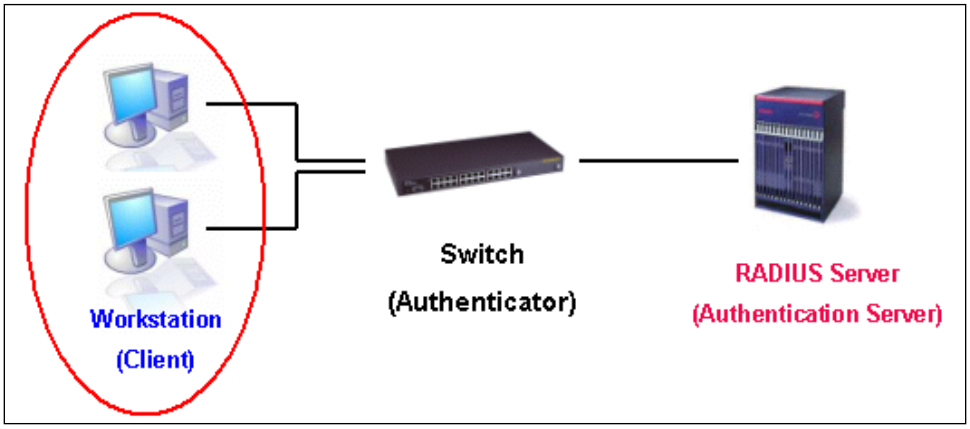



**Figure 9-8 The Client**

## Authentication Process

Utilizing the three roles stated above, the 802.1X protocol provides a stable and secure way of authorizing and authenticating users attempting to access the network. Only EAPOL traffic is allowed to pass through the specified port before a successful authentication is made. This port is “locked” until the point when a Client with the correct username and password (and MAC address if 802.1X is enabled by MAC address) is granted access and therefore successfully “unlocks” the port. Once the port is unlocked, normal traffic is allowed to pass through the port. The following figure displays a more detailed explanation of how the authentication process is completed between the three roles stated above.

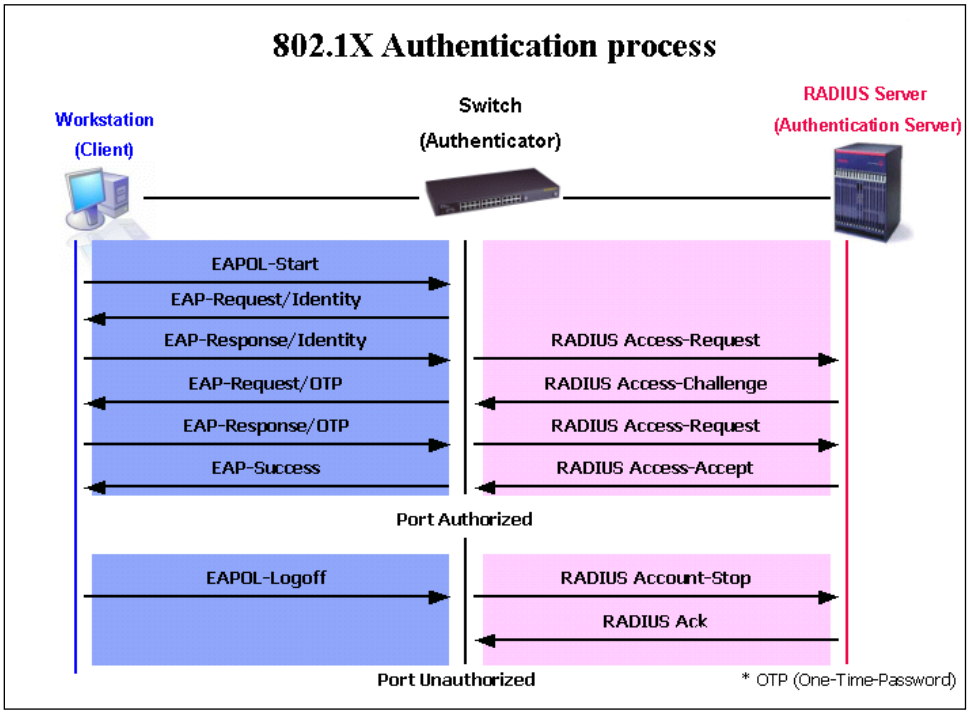



**Figure 9-9 The 802.1X Authentication Process**

The D-Link implementation of 802.1X allows network administrators to choose between two types of Access Control used on the Switch, which are:

- **Port-based Access Control** - This method requires only one user to be authenticated per port by a remote RADIUS server to allow the remaining users on the same port access to the network.
- **Host-based Access Control** - Using this method, the Switch will automatically learn up to a maximum of 448 MAC addresses by port and set them in a list. Each MAC address must be authenticated by the Switch using a remote RADIUS server before being allowed access to the Network.

## Understanding 802.1X Port-based and Host-based Network Access Control

The original intent behind the development of 802.1X was to leverage the characteristics of point-to-point in LANs. As any single LAN segment in such infrastructures has no more than two devices attached to it, one of which is a Bridge Port. The Bridge Port detects events that indicate the attachment of an active device at the remote end of the link, or an active device becoming inactive. These events can be used to control the authorization state of the Port and initiate the process of authenticating the attached device if the Port is unauthorized. This is the Port-based Network Access Control.

## Port-based Network Access Control

Once the connected device has successfully been authenticated, the Port then becomes Authorized, and all subsequent traffic on the Port is not subject to access control restriction until an event occurs that causes the Port to become Unauthorized. Hence, if the Port is actually connected to a shared media LAN segment with more than one attached device, successfully authenticating one of the attached devices effectively provides access to the LAN for all devices on the shared segment. Clearly, the security offered in this situation is open to attack.

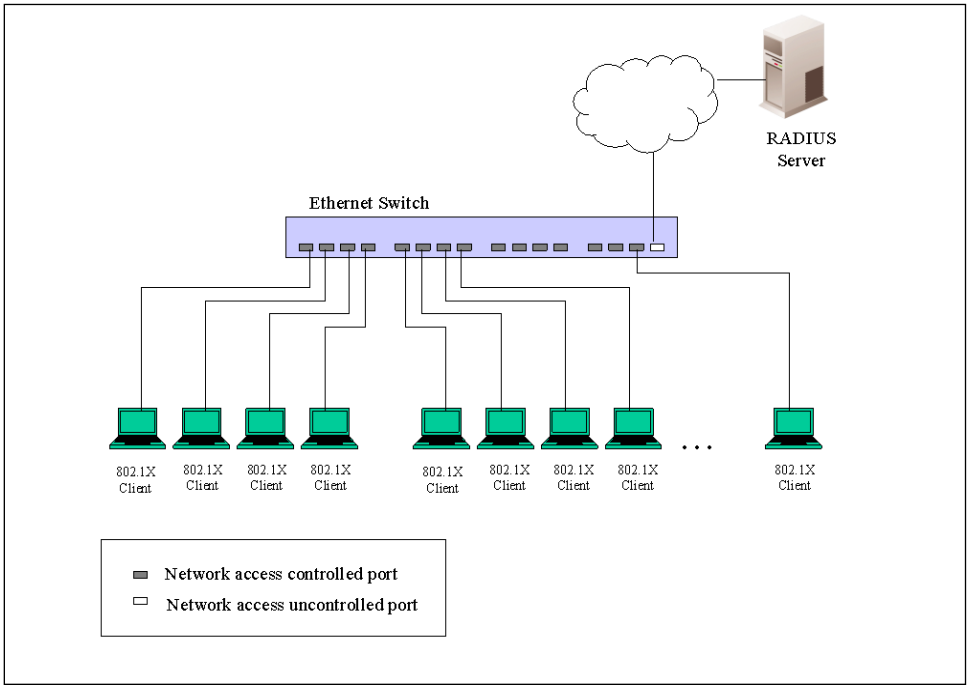



**Figure 9-10 Example of Typical Port-based Configuration**

## Host-based Network Access Control

In order to successfully make use of 802.1X in a shared media LAN segment, it would be necessary to create “logical” Ports, one for each attached device that required access to the LAN. The Switch would regard the single physical Port connecting it to the shared media segment as consisting of a number of distinct logical Ports, each logical Port being independently controlled from the point of view of EAPOL exchanges and authorization state. The Switch learns each attached devices’ individual MAC addresses,

and effectively creates a logical Port that the attached device can then use to communicate with the LAN via the Switch.

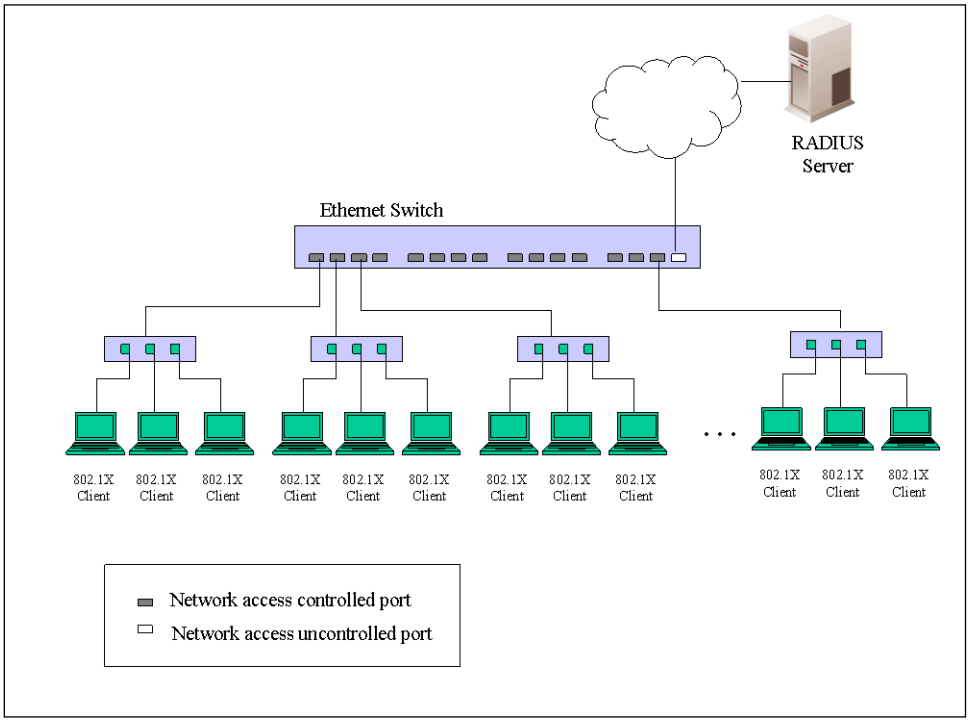



**Figure 9-11 Example of Typical Host-based Configuration**

# 802.1X Global Settings

This window is used to view and configure the 802.1X global settings.

To view the following window, click **Security > 802.1X > 802.1X Global Settings**, as shown below:

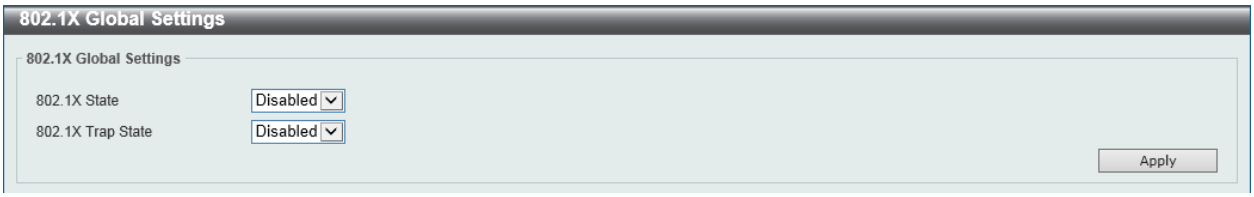



**Figure 9-12 802.1X Global Settings Window**

The fields that can be configured in **802.1X Global Settings** are described below:

| Parameter | Description |
|---|---|
| **802.1X State** | Select to enable or disable the 802.1X global state here. |
| **802.1XTrap State** | Select to enable or disable the 802.1X trap state here. |

Click the **Apply** button to accept the changes made.

# 802.1X Port Settings

This window is used to view and configure the 802.1X port settings.

To view the following window, click **Security > 802.1X > 802.1X Port Settings**, as shown below:

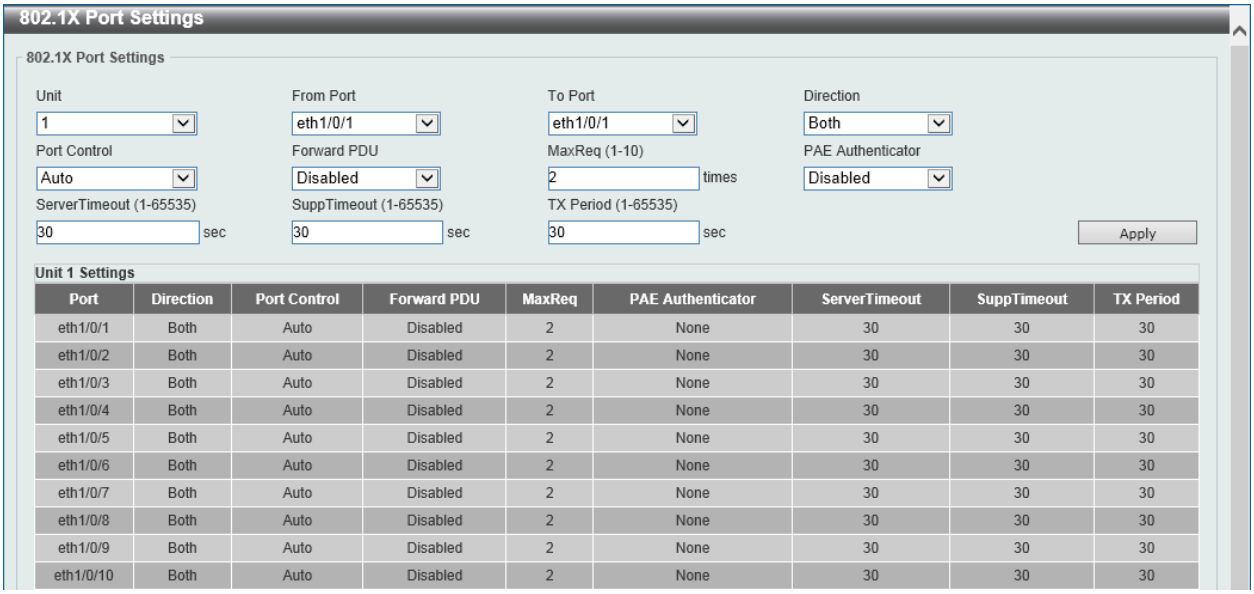



**Figure 9-13 802.1X Port Settings Window**

The fields that can be configured in **802.1X Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Direction** | Select the direction here. Options to choose from are **Both** and **In**. This option configures the direction of the traffic on a controlled port as unidirectional (**In**) or bidirectional (**Both**). |
| **Port Control** | Select the port control option here. Options to choose from are **ForceAuthorized**, **Auto**, and **ForceUnauthorized**. If the port control is set to force-authorized, then the port is not controlled in both directions. If the port control is set to automatic, then the access to the port for the controlled direction needs to be authenticated. If the port control is set to force-unauthorized, then the access to the port for the controlled direction is blocked. |
| **Forward PDU** | Select to enable or disable the forward PDU option here. |
| **MaxReq** | Enter the maximum required times value here. This value must be between 1 and 10. By default, this option is 2. This option configures the maximum number of times that the backend authentication state machine will retransmit an Extensible Authentication Protocol (EAP) request frame to the supplicant before restarting the authentication process. |
| **PAE Authenticator** | Select to enable or disable the PAE authenticator option here. This option configures a specific port as an IEEE 802.1X port access entity (PAE) authenticator. |
| **Server Timeout** | Enter the server timeout value here. This value must be between 1 and 65535 seconds. By default, this value is 30 seconds. |
| **SuppTimeout** | Enter the supplicant timeout value here. This value must be between 1 and 65535 seconds. By default, this value is 30 seconds. |
| **TX Period** | Enter the transmission period value here. This value must be between 1 and 65535 seconds. By default, this value is 30 seconds. |

Click the **Apply** button to accept the changes made.

# Authentication Sessions Information

This window is used to view and configure the authentication session information.

To view the following window, click **Security > 802.1X > Authentication Sessions Information**, as shown below:

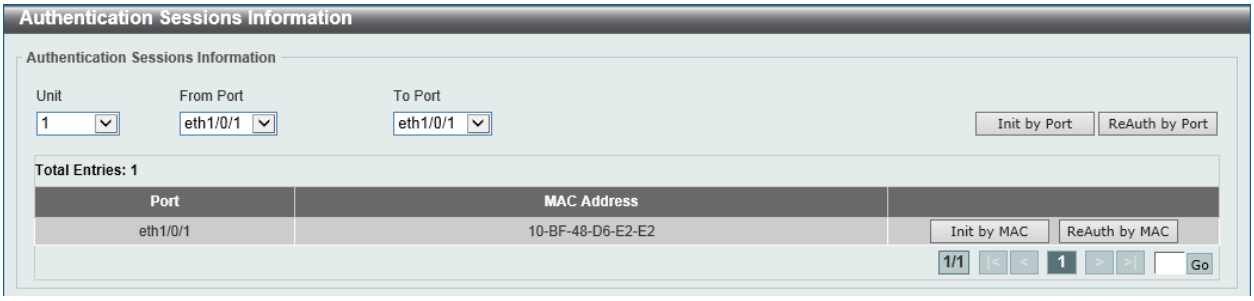



**Figure 9-14 Authentication Sessions Information Window**

The fields that can be configured in **Authentication Sessions Information** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Init by Port** button to initiate the session information based on the port selections made.

Click the **ReAuth by Port** button to re-authenticate the session information based on the port selections made.

Click the **Init by MAC** button to initiate the session information based on the MAC address.

Click the **ReAuth by Port** button to re-authenticate the session information based on the MAC address.

# Authenticator Statistics

This window is used to view and clear the authenticator statistics.

To view the following window, click **Security > 802.1X > Authenticator Statistics**, as shown below:

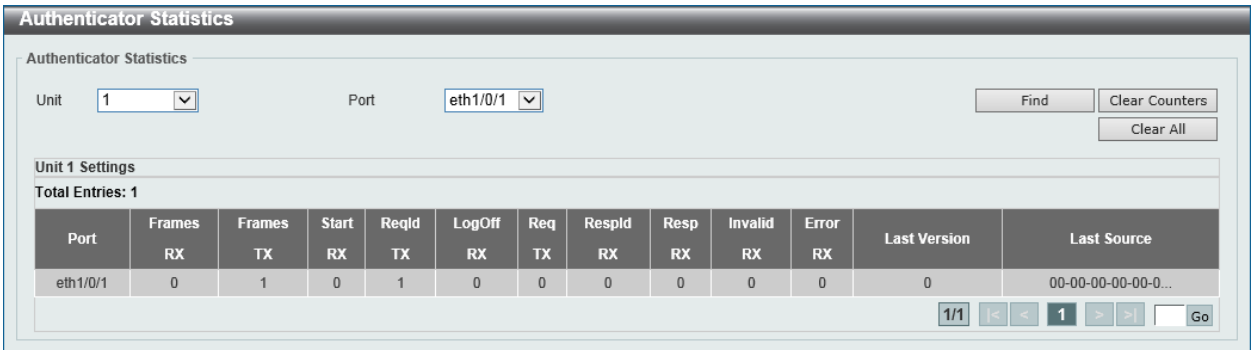



**Figure 9-15 Authenticator Statistics Window**

The fields that can be configured in **Authenticator Statistics** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this query here. |

| Parameter | Description |
|---|---|
| **Port** | Select the appropriate port used for the query here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear Counters** button to clear the counter information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

# Authenticator Session Statistics

This window is used to view and clear the authenticator session statistics.

To view the following window, click **Security > 802.1X > Authenticator Session Statistics**, as shown below:


**Figure 9-16 Authenticator Session Statistics Window**

The fields that can be configured in **Authenticator Session Statistics** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this query here. |
| **Port** | Select the appropriate port used for the query here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear Counters** button to clear the counter information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

# Authenticator Diagnostics

This window is used to view and clear the authenticator diagnostics information.

To view the following window, click **Security > 802.1X > Authenticator Diagnostics**, as shown below:

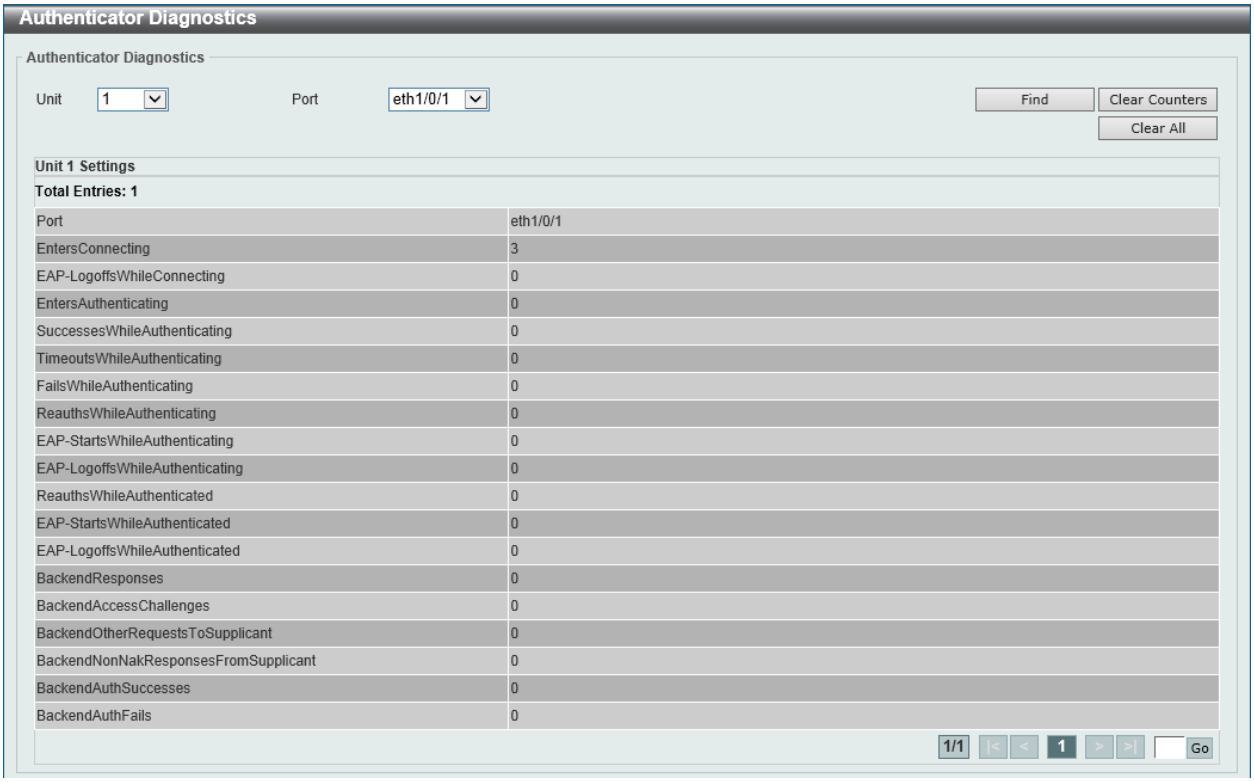



**Figure 9-17 Authenticator Diagnostics Window**

The fields that can be configured in **Authenticator Diagnostics** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this query here. |
| **Port** | Select the appropriate port used for the query here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear Counters** button to clear the counter information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

# AAA

## AAA Global Settings

This window is used to enable or disable the Authentication, Authorization, and Accounting (AAA) global state.

To view the following window, click **Security > AAA > AAA Global Settings**, as shown below:

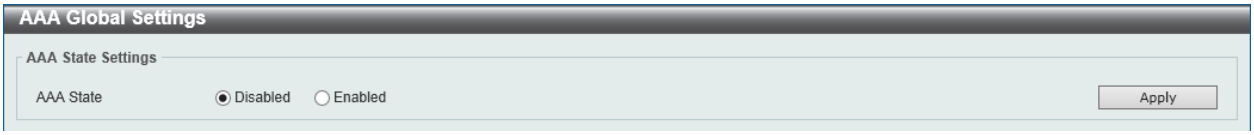



**Figure 9-18 AAA Global Settings Window**

The fields that can be configured in **AAA State Settings** are described below:

| Parameter | Description |
|---|---|
| **AAA State** | Select to enable or disable the Authentication, Authorization, and Accounting (AAA) global state. |

Click the **Apply** button to accept the changes made.

# Application Authentication Settings

This window is used to view and configure the application authentication settings.

To view the following window, click **Security > AAA > Application Authentication Settings**, as shown below:

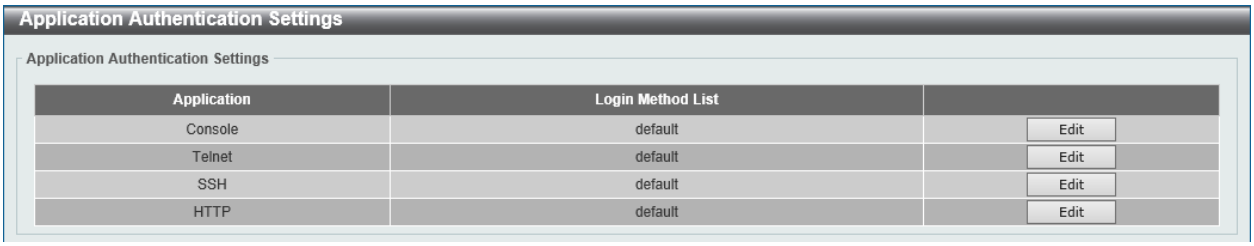



**Figure 9-19 Application Authentication Settings Window**

Click the **Edit** button to re-configure the specific entry.

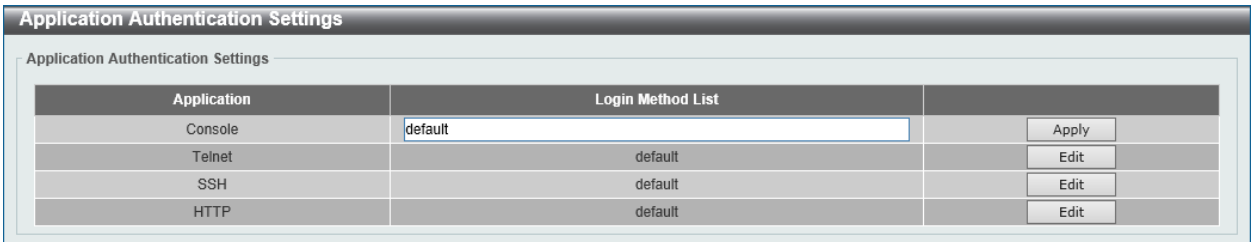



**Figure 9-20 Application Authentication Settings (Edit) Window**

The fields that can be configured in **Application Authentication Settings** are described below:

| Parameter | Description |
|---|---|
| **Login Method List** | After clicking the **Edit** button for the specific entry, enter the login method list name used here. |

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

# Application Accounting Settings

This window is used to view and configure the application accounting settings.

To view the following window, click **Security > AAA > Application Accounting Settings**, as shown below:

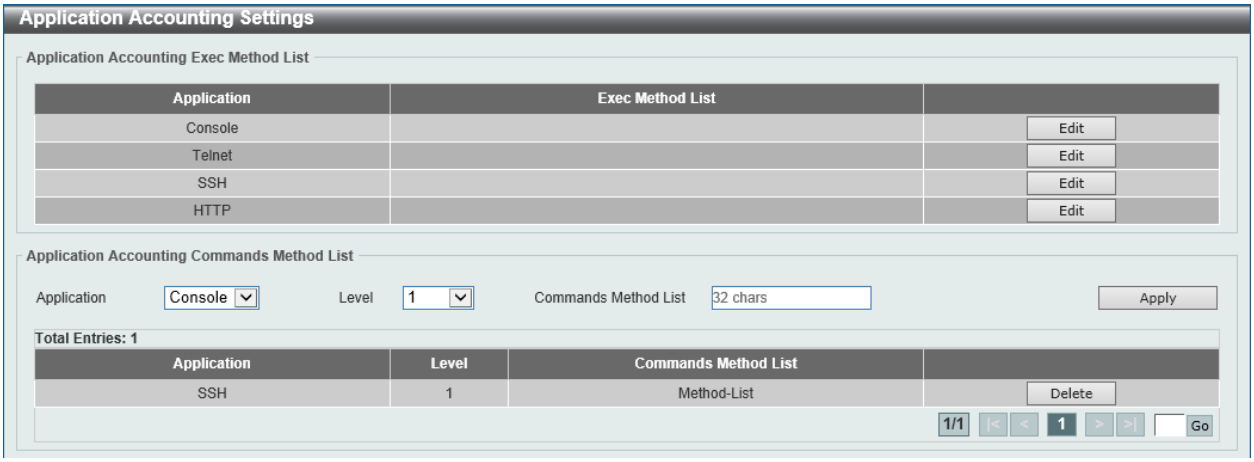



**Figure 9-21 Application Accounting Settings Window**

Click the **Edit** button to re-configure the specific entry.

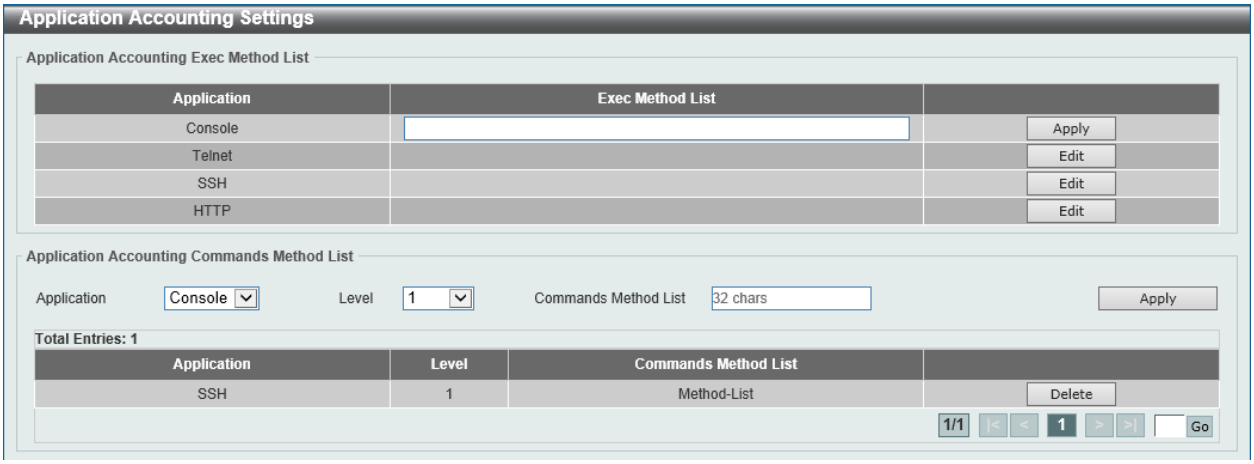



**Figure 9-22 Application Accounting Settings (Edit) Window**

The fields that can be configured in **Application Accounting Exec Method list** are described below:

| Parameter | Description |
|---|---|
| **Exec Method List** | After clicking the **Edit** button for the specific entry, enter the EXEC method list name used here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Application Accounting Commands Method List** are described below:

| Parameter | Description |
|---|---|
| **Application** | Select the application used here. Options to choose from are **Console**, **Telnet**, and **SSH**. |
| **Level** | Select the privilege level used here. Options to choose from are levels 1 to 15. |
| **Commands Method List** | Enter the commands method list name used here. |

Click the **Edit** button to re-configure the specific entry.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# Authentication Settings

This window is used to view and configure the AAA network and EXEC authentication settings.

To view the following window, click **Security > AAA > Authentication Settings**, as shown below:

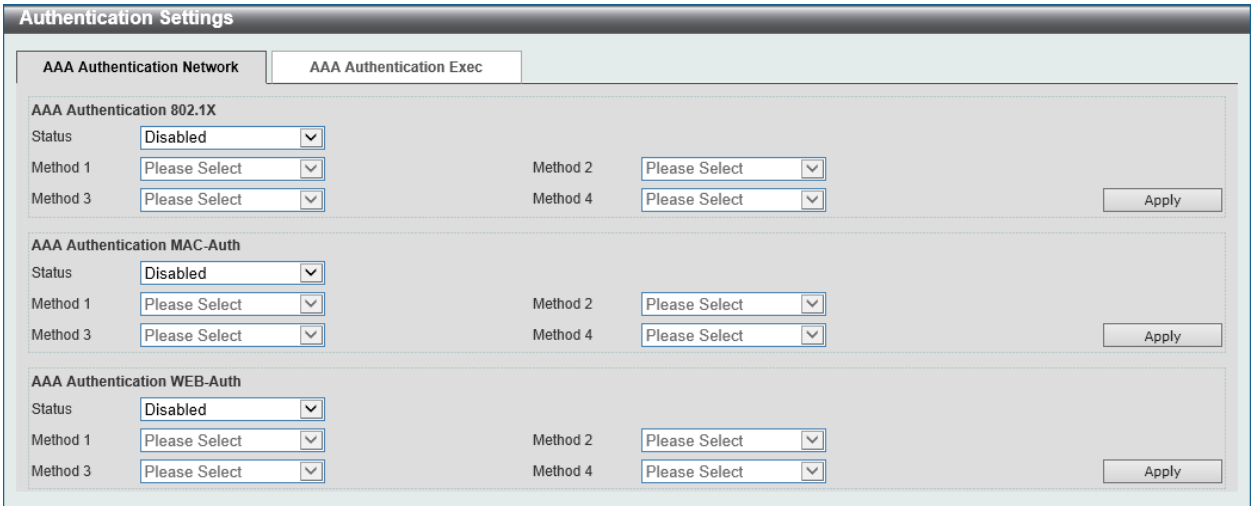



**Figure 9-23 Authentication Settings Window**

The fields that can be configured in **AAA Authentication 802.1X** are described below:

| Parameter | Description |
|---|---|
| **Status** | Select to enable or disable the AAA 802.1X authentication state here. |
| **Method 1 ~ Method 4** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **local**, **group** and **radius**. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **AAA Authentication MAC-Auth** are described below:

| Parameter | Description |
|---|---|
| **Status** | Select to enable or disable the AAA MAC authentication state here. |
| **Method 1 ~ Method 4** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **local**, **group** and **radius**. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **AAA Authentication WEB-Auth** are described below:

| Parameter | Description |
|---|---|
| **Status** | Select to enable or disable the AAA Web authentication state here. |
| **Method 1 ~ Method 4** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **local**, **group** and **radius**. |

Click the **Apply** button to accept the changes made.

After clicking the **AAA Authentication Exec** tab, the following page will appear.

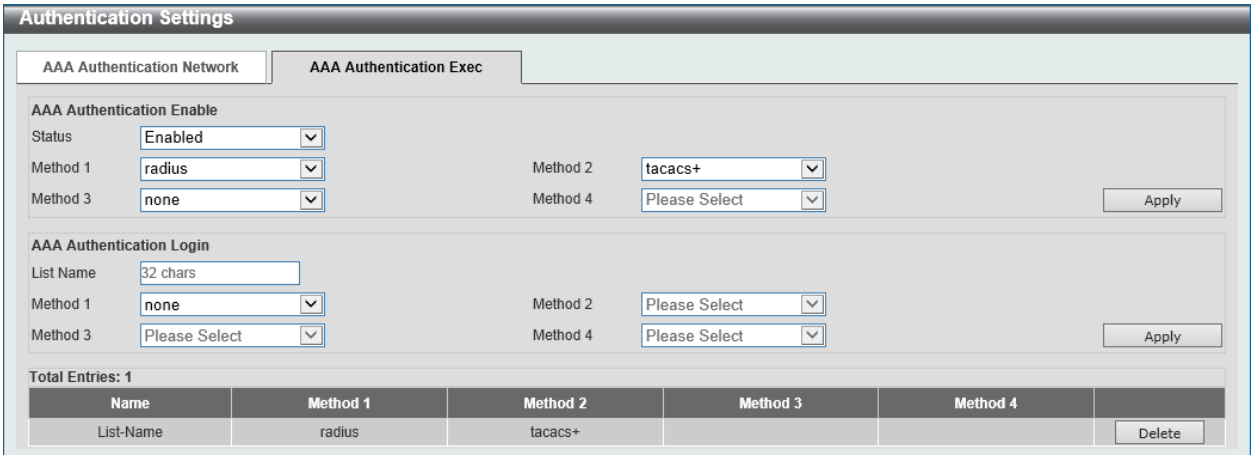



**Figure 9-24 Authentication Settings (AAA Authentication EXEC) Window**

The fields that can be configured in **AAA Authentication Enable** are described below:

| Parameter | Description |
|---|---|
| **Status** | Select to enable or disable the AAA authentication enable state here. |
| **Method 1 ~ Method 4** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **enable**, **group**, **radius,** and **tacacs+**. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **AAA Authentication Login** are described below:

| Parameter | Description |
|---|---|
| **List Name** | Enter the method list name that will be used with the AAA authentication login option here. |
| **Method 1 ~ Method 4** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **enable**, **group**, **radius,** and **tacacs+**. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# Accounting Settings

This window is used to view and configure the AAA accounting settings.

To view the following window, click **Security > AAA > Accounting Settings**, as shown below:

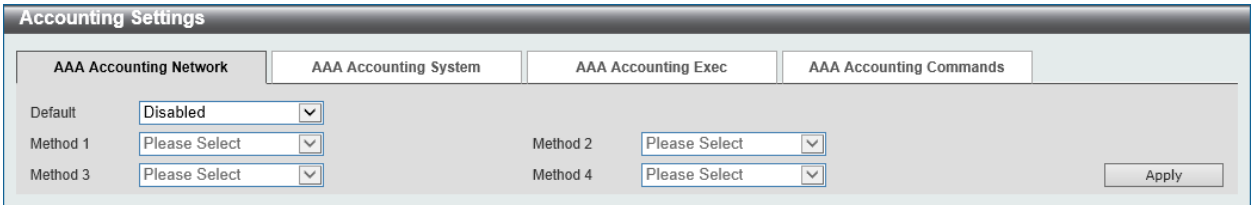



**Figure 9-25 Accounting Settings Window**

The fields that can be configured in **AAA Accounting Network** are described below:

| Parameter | Description |
|---|---|
| **Default** | Select to enable or disable the use of the default method list here. |
| **Method 1 ~ Method 4** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **group**, **radius**, and **tacacs+**. |

Click the **Apply** button to accept the changes made.

After clicking the **AAA Accounting System** tab, the following page will appear.

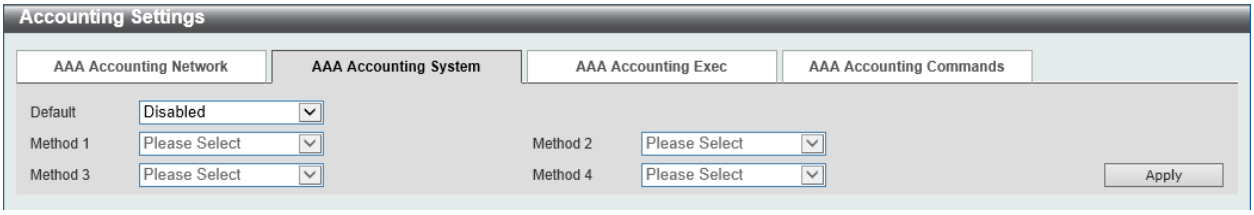



**Figure 9-26 Accounting Settings (AAA Accounting System) Window**

The fields that can be configured in **AAA Accounting System** are described below:

| Parameter | Description |
|---|---|
| **Default** | Select to enable or disable the use of the default method list here. |
| **Method 1 ~ Method 4** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **group**, **radius**, and **tacacs+**. |

Click the **Apply** button to accept the changes made.

After clicking the **AAA Accounting Exec** tab, the following page will appear.

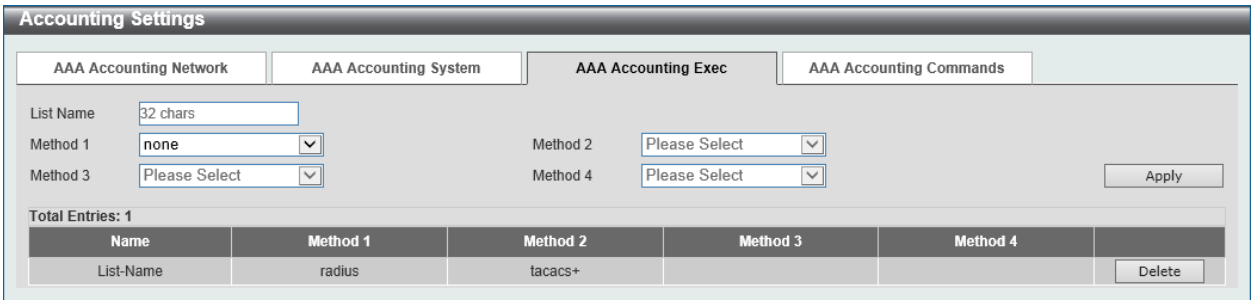



**Figure 9-27 Accounting Settings (AAA Accounting Exec) Window**

The fields that can be configured in **AAA Accounting Exec** are described below:

| Parameter | Description |
|---|---|
| **List Name** | Enter the method list name that will be used with the AAA accounting EXEC option here. |
| **Method 1 ~ Method 4** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **group**, **radius**, and **tacacs+**. |

Click the **Apply** button to accept the changes made.

After clicking the **AAA Accounting Commands** tab, the following page will appear.

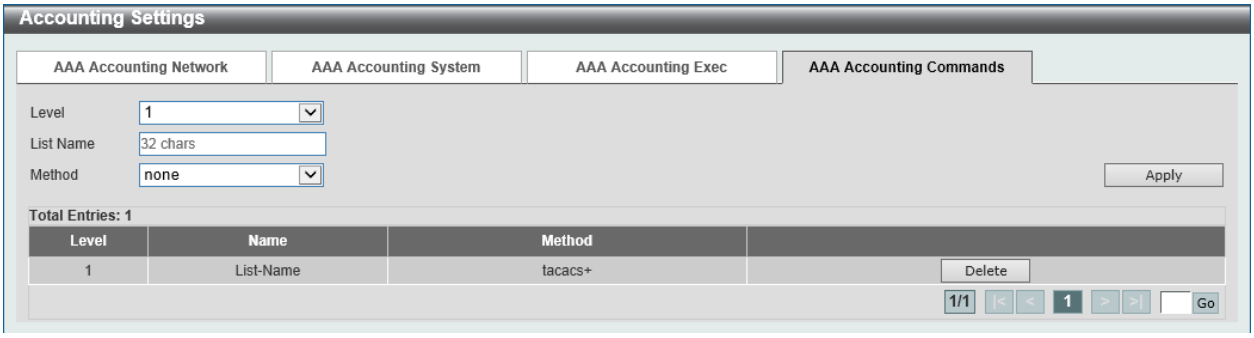



**Figure 9-28 Accounting Settings (AAA Accounting Commands) Window**

The fields that can be configured in **AAA Accounting Commands** are described below:

| Parameter | Description |
|---|---|
| **Level** | Select the privilege level used here. Options to choose from are levels 1 to 15. |
| **List Name** | Enter the method list name that will be used with the AAA accounting commands option here. |
| **Method** | Select the method lists that will be used for this configuration here. Options to choose from are **none**, **group**, and **tacacs+**. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# RADIUS

## RADIUS Global Settings

This window is used to view and configure the RADIUS global settings.

To view the following window, click **Security > RADIUS > RADIUS Global Settings**, as shown below:

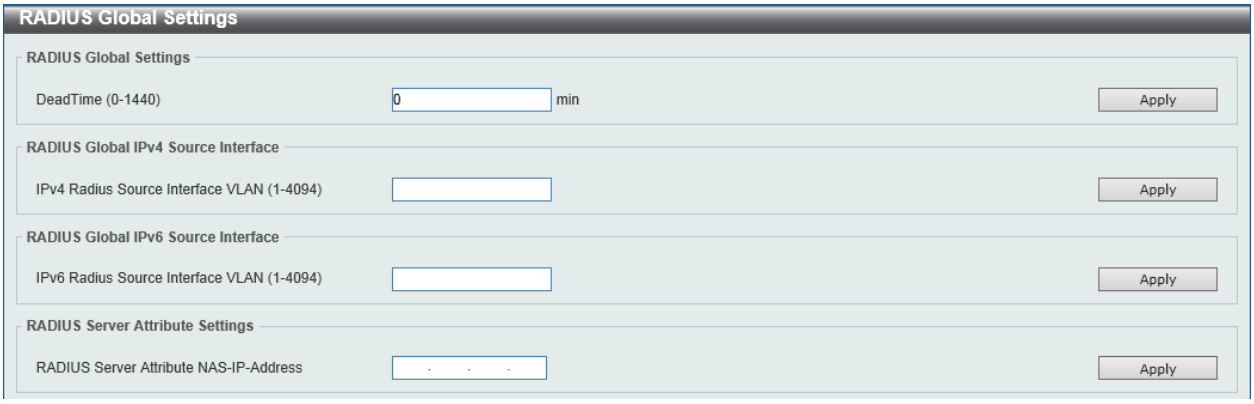



**Figure 9-29 RADIUS Global Settings Window**

The fields that can be configured in **RADIUS Global Settings** are described below:

| Parameter | Description |
|---|---|
| **DeadTime** | Enter the dead time value here. This value must be between 1 and 1440 minutes. By default, this value is 0 minutes. When this option is 0, the unresponsive server will not be marked as dead. This setting can be used to improve the authentication processing time by setting the dead time to skip the unresponsive server host entries.<br>When the system performs authentication with the authentication server, it attempts one server at a time. If the attempted server does not respond, the system will attempt the next server. When the system finds a server does not respond, it will mark the server as down, start a dead time timer, and skip them in authentication of the following requests until expiration of the dead time. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RADIUS Global IPv4 Source Interface** are described below:

| Parameter | Description |
|---|---|
| **IPv4 RADIUS Source Interface** | Enter the source IPv4 RADIUS interface's global interface VLAN ID here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RADIUS Global IPv4 Source Interface** are described below:

| Parameter | Description |
|---|---|
| **IPv6 RADIUS Source Interface** | Enter the source IPv6 RADIUS interface's global interface VLAN ID here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **RADIUS Server Attribute Settings** are described below:

| Parameter | Description |
|---|---|
| **RADIUS Server Attribute NAS-IP-Address** | Enter the RADIUS server's attribute NAS-IP-Address here. |

Click the **Apply** button to accept the changes made.

# RADIUS Server Settings

This window is used to view and configure the RADIUS server settings.

To view the following window, click **Security > RADIUS > RADIUS Server Settings**, as shown below:

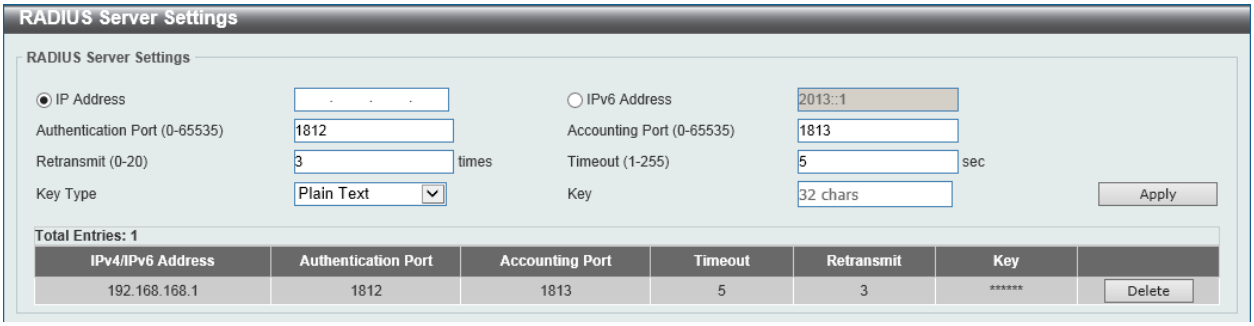



**Figure 9-30 RADIUS Server Settings Window**

The fields that can be configured in **RADIUS Server Settings** are described below:

| Parameter | Description |
|---|---|
| **IP Address** | Enter the RADIUS server's IPv4 address here. |
| **IPv6 Address** | Enter the RADIUS server's IPv6 address here. |
| **Authentication Port** | Enter the authentication port number used here. This value must be between 0 and 65535. By default, this value is 1812. If no authentication is used, use the value 0. |
| **Accounting Port** | Enter the accounting port number used here. This value must be between 0 and 65535. By default, this value is 1813. If no accounting is used, use the value 0. |
| **Retransmit** | Enter the retransmit value used here. This value must be between 0 and 20. By default, this value is 3. To disable this option, enter the value 0. |
| **Timeout** | Enter the timeout value used here. This value must be between 1 and 255 seconds. By default, this value is 5 seconds. |
| **Key Type** | Select the key type that will be used here. Options to choose from are **Plain Text** and **Encrypted**. |
| **Key** | Enter the key, used to communicate with the RADIUS server, here. This key can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# RADIUS Group Server Settings

This window is used to view and configure the RADIUS group server settings.

To view the following window, click **Security > RADIUS > RADIUS Group Server Settings**, as shown below:


**Figure 9-31 RADIUS Group Server Settings Window**

The fields that can be configured in **RADIUS Group Server Settings** are described below:

| Parameter | Description |
|---|---|
| **Group Server Name** | Enter the RADIUS group server's name here. This name can be up to 32 characters long. |
| **IP Address** | Enter the group server's IPv4 address here. |
| **IPv6 Address** | Enter the group server's IPv6 address here. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Click the **Detail** button to view and configure more detailed settings for the RADIUS group server.

After clicking the **Detail** button, the following page will be available.

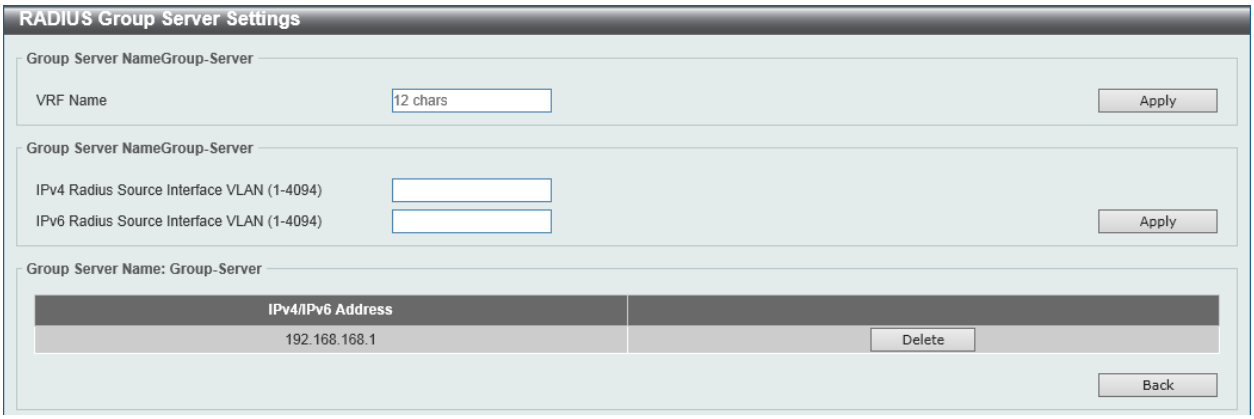



**Figure 9-32 RADIUS Group Server Settings (Detail) Window**

The fields that can be configured in **Group Server NameGroup-Server** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Group Server NameGroup-Server** are described below:

| Parameter | Description |
|---|---|
| **IPv4 RADIUS Source Interface VLAN** | Enter the source IPv4 RADIUS interface's interface VLAN ID here. |
| **IPv6 RADIUS Source Interface VLAN** | Enter the source IPv6 RADIUS interface's interface VLAN ID here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Back** button to return to the previous window.

## RADIUS Statistic

This window is used to view and clear the RADIUS statistics information.

To view the following window, click **Security > RADIUS > RADIUS Statistic**, as shown below:

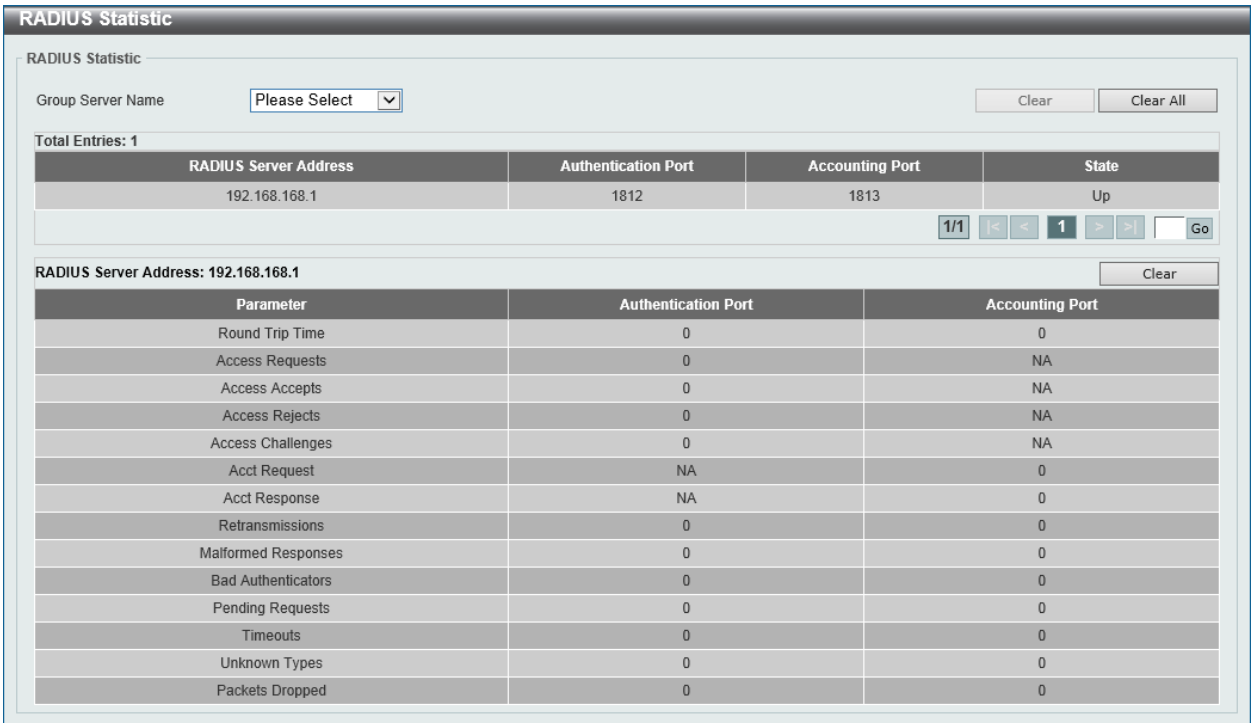



**Figure 9-33 RADIUS Statistic Window**

The fields that can be configured in **RADIUS Statistics** are described below:

| Parameter | Description |
|---|---|
| **Group Server Name** | Select the RADIUS group server name from this list here. |

Click the **Clear** button to clear the information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# TACACS

## TACACS Server Settings

This window is used to view and configure the TACACS server settings.

To view the following window, click **Security > TACACS > TACACS Server Settings**, as shown below:


**Figure 9-34 TACACS Server Settings Window**

The fields that can be configured in **TACACS Server Settings** are described below:

| Parameter | Description |
|---|---|
| **IP Address** | Enter the TACACS server's IPv4 address here. |
| **IPv6 Address** | Enter the TACACS server's IPv6 address here. |
| **Port** | Enter the port number used here. This value must be between 1 and 65535. By default, this value is 49. |
| **Timeout** | Enter the timeout value here. This value must be between 1 and 255 seconds. By default, this value is 5 seconds. |
| **Key Type** | Select the key type that will be used here. Options to choose from are **Plain Text** and **Encrypted**. |
| **Key** | Enter the key, used to communicate with the TACACS server, here. This key can be up to 254 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# TACACS Group Server Settings

This window is used to view and configure the TACACS group server settings.

To view the following window, click **Security > TACACS > TACACS Group Server Settings**, as shown below:

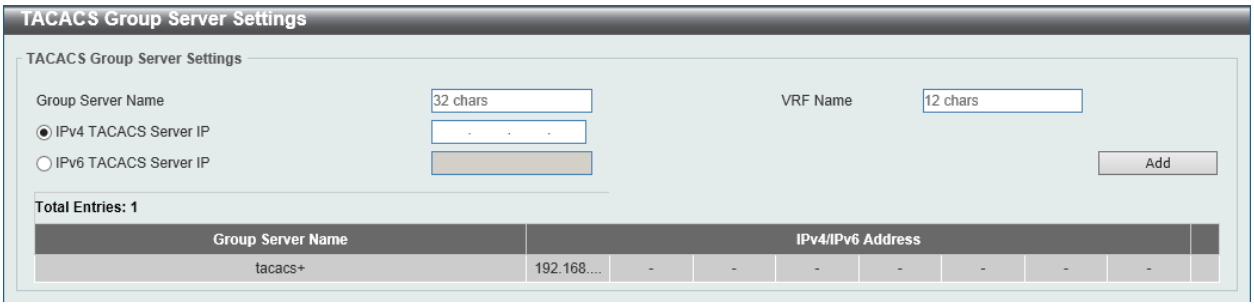



**Figure 9-35 TACACS Group Server Settings Window**

The fields that can be configured in **TACACS Group Server Settings** are described below:

| Parameter | Description |
|---|---|
| **Group Server Name** | Enter the TACACS group server's name here. This name can be up to 32 characters long. |
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration |

| Parameter | Description |
|---|---|
| | here. This name can be up to 12 characters long. |
| **IPv4 TACACS Server IP** | Enter the group server's IPv4 address here. |
| **IPv6 TACACS Server IP** | Enter the group server's IPv6 address here. |

Click the **Add** button to add a new entry based on the information entered.

## TACACS Statistic

This window is used to view and clear the TACACS statistic information.

To view the following window, click **Security > TACACS > TACACS Statistic**, as shown below:

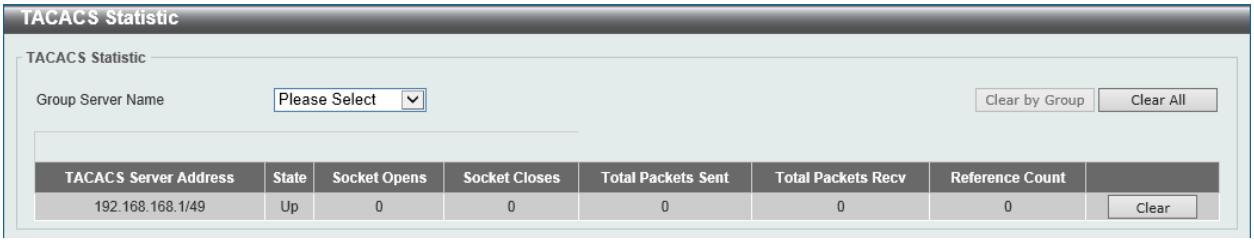



**Figure 9-36 TACACS Statistic Window**

The fields that can be configured in **TACACS Statistic** are described below:

| Parameter | Description |
|---|---|
| **Group Server Name** | Select the TACACS group server name from this list here. |

Click the **Clear by Group** button to clear the information based on the group selected.

Click the **Clear All** button to clear all the information in this table.

Click the **Clear** button to clear all the information for the specific port.

# IMPB

The IP network layer uses a four-byte address. The Ethernet link-layer uses a six-byte MAC address. Binding these two address types together allows the transmission of data between the layers. The primary purpose of IP-MAC-Port Binding (IMPB) is to restrict the access to a switch to a number of authorized users. Authorized clients can access a switch's port by either checking the pair of IP-MAC addresses with the pre-configured database or if DHCP snooping has been enabled in which case the switch will automatically learn the IP/MAC pairs by snooping DHCP packets and saving them to the IMPB white list. If an unauthorized user tries to access an IP-MAC binding enabled port, the system will block the access by dropping its packet. Active and inactive entries use the same database. The function is port-based, meaning a user can enable or disable the function on the individual port.

## IPv4

### DHCPv4 Snooping

#### DHCP Snooping Global Settings

This window is used to view and configure the DHCP snooping global settings.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping Global Settings**, as shown below:

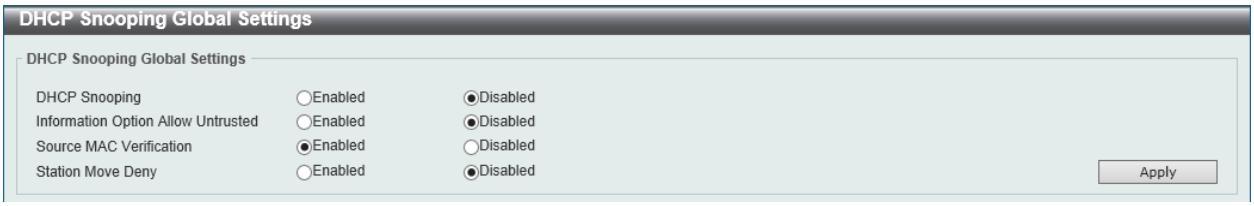



**Figure 9-37 DHCP Snooping Global Settings Window**

The fields that can be configured in **DHCP Snooping Global Settings** are described below:

| Parameter | Description |
|---|---|
| **DHCP Snooping** | Select to enable or disable the DHCP snooping global status. |
| **Information Option Allow Untrusted** | Select to enable or disable the option to globally allow DHCP packets with the relay Option 82 on the untrusted interface. |
| **Source MAC Verification** | Select to enable or disable the verification that the source MAC address in a DHCP packet matches the client hardware address. |
| **Station Move Deny** | Select to enable or disable the DHCP snooping station move state. When DHCP snooping station move is enabled, the dynamic DHCP snooping binding entry with the same VLAN ID and MAC address on the specific port can move to another port if it detects that a new DHCP process belong to the same VLAN ID and MAC address. |

Click the **Apply** button to accept the changes made.

## DHCP Snooping Port Settings

This window is used to view and configure the DHCP snooping port settings.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping Port Settings**, as shown below:

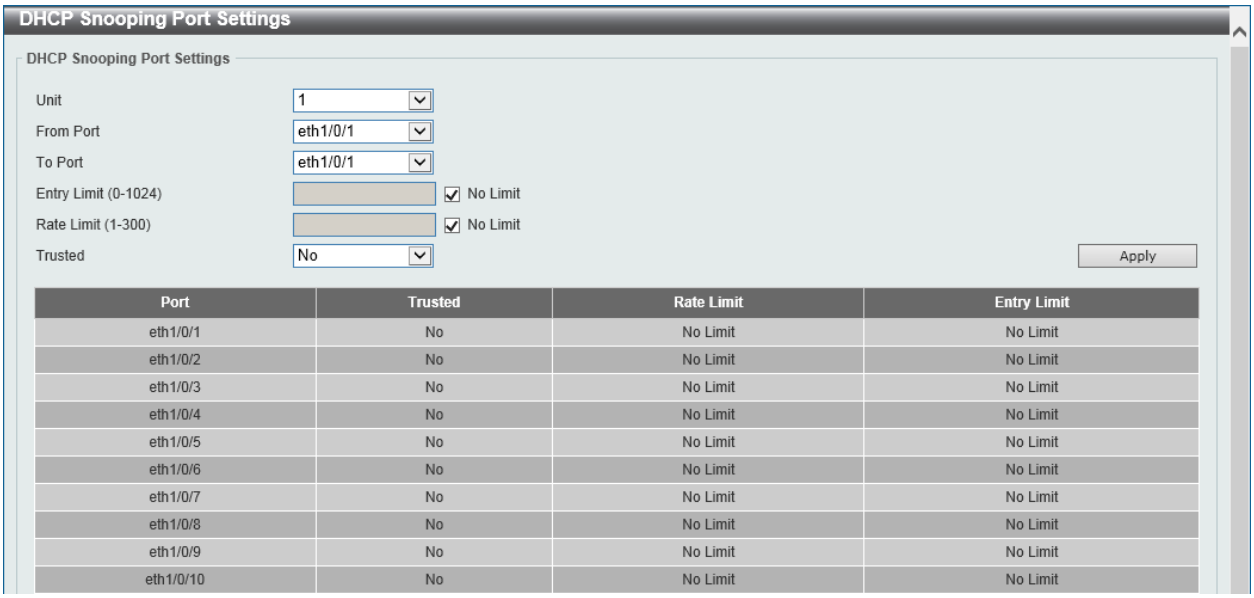



**Figure 9-38 DHCP Snooping Port Settings Window**

The fields that can be configured in **DHCP Snooping Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Entry Limit** | Enter the entry limit value here. This value must be between 0 and 1024. Tick the **No Limit** option to disable the function. |
| **Rate Limit** | Enter the rate limit value here. This value must be between 1 and 300. Tick the **No Limit** option to disable the function. |
| **Trusted** | Select the trusted option here. Options to choose from are **No** and **Yes**. Ports connected to the DHCP server or to other switches should be configured as trusted interfaces. The ports connected to DHCP clients should be configured as untrusted interfaces. DHCP snooping acts as a firewall between untrusted interfaces and DHCP servers. |

Click the **Apply** button to accept the changes made.

## DHCP Snooping VLAN Settings

This window is used to view and configure the DHCP snooping VLAN settings.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping VLAN Settings**, as shown below:

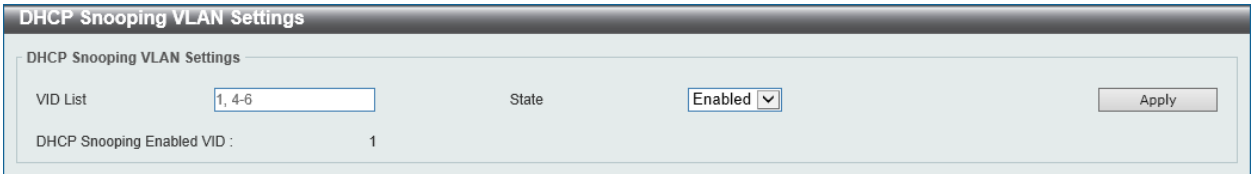



**Figure 9-39 DHCP Snooping VLAN Settings Window**

The fields that can be configured in **DHCP Snooping VLAN Settings** are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the VLAN ID list used here. |
| **State** | Select to enable or disable the DHCP snooping VLAN setting here. |

Click the **Apply** button to accept the changes made.

## DHCP Snooping Database

This window is used to view and configure the DHCP snooping database settings.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping Database**, as shown below:

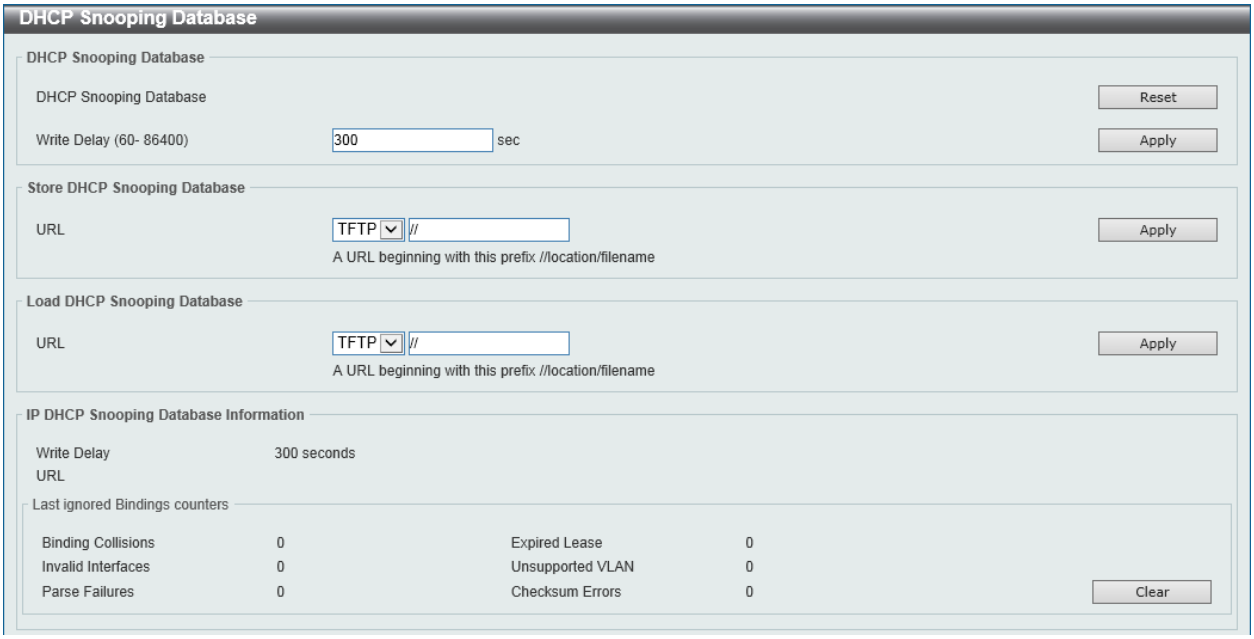



**Figure 9-40 DHCP Snooping Database Window**

The fields that can be configured in **DHCP Snooping Database** are described below:

| Parameter | Description |
|---|---|
| **Write Delay** | Enter the write delay time value here. This value must be between 60 and 86400 seconds. By default, this value is 300 seconds. |

Click the **Reset** button to reset the information entered.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Store DHCP Snooping Database** are described below:

| Parameter | Description |
|---|---|
| **URL** | Select the location from the drop-down list and enter the URL where the DHCP snooping database will be stored to here. Locations to choose from are **TFTP**, **FTP**, and **Flash**. An example URL is given. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Load DHCP Snooping Database** are described below:

| Parameter | Description |
|---|---|
| **URL** | Select the location from the drop-down list and enter the URL where the DHCP snooping database will be loaded from here. Locations to choose from are **TFTP**, **FTP**, and **Flash**. An example URL is given. |

Click the **Apply** button to accept the changes made.

Click the **Clear** button to clear all the counter information.

## DHCP Snooping Binding Entry

This window is used to view and configure the DHCP snooping binding entries.

To view the following window, click **Security > IMPB > IPv4 > DHCPv4 Snooping > DHCP Snooping Binding Entry**, as shown below:

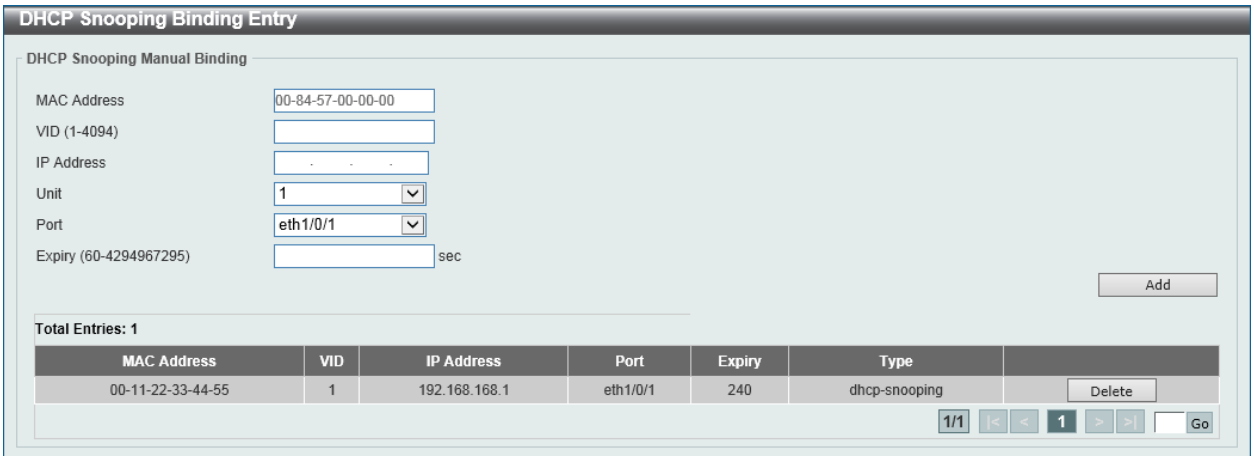



**Figure 9-41 DHCP Snooping Binding Entry Window**

The fields that can be configured in **DHCP Snooping Manual Binding** are described below:

| Parameter | Description |
|---|---|
| **MAC Address** | Enter the MAC address of the DHCP snooping binding entry here. |
| **VID** | Enter the VLAN ID of the DHCP snooping binding entry here. This value must be between 1 and 4094. |
| **IP Address** | Enter the IP address of the DHCP snooping binding entry here. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select the appropriate port used for the configuration here. |
| **Expiry** | Enter the expiry time value used here. This value must be between 60 and 4294967295 seconds. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# Dynamic ARP Inspection

## ARP Access List

This window is used to view and configure the dynamic ARP inspection settings.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Access List**, as shown below:

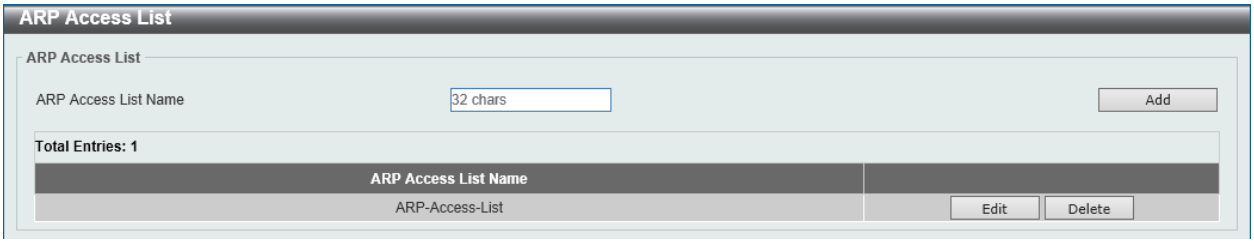



**Figure 9-42 ARP Access List Window**

The fields that can be configured in **ARP Access List** are described below:

| Parameter | Description |
|---|---|
| **ARP Access List Name** | Enter the ARP access list name used here. This name can be up to 32 characters long. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

After clicking the **Edit** button, the following window will appear.

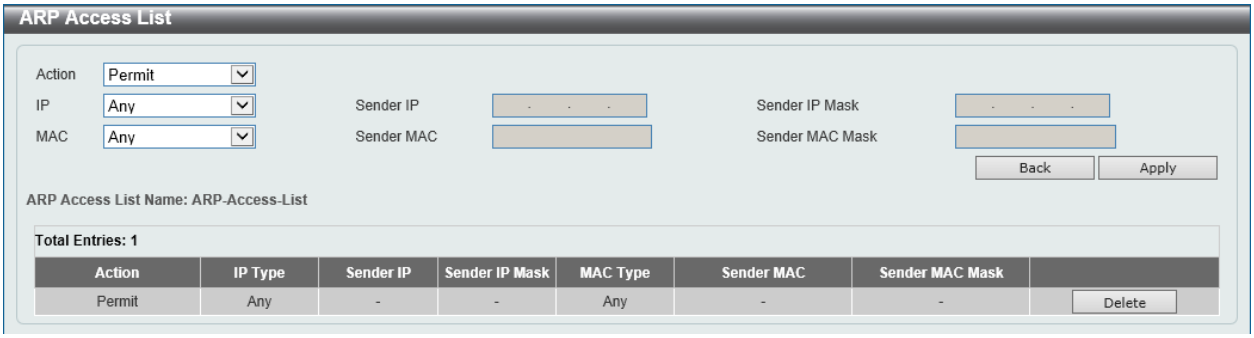



**Figure 9-43 ARP Access List (Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Action** | Select the action that will be taken here. Options to choose from are **Permit** and **Deny**. |
| **IP** | Select the type of sender IP address that will be used here. Options to choose from are **Any**, **Host**, and **IP with Mask**. |
| **Sender IP** | After selecting the **Host** or **IP with Mask** options as the type of **IP**, enter the sender IP address used here. |
| **Sender IP Mask** | After selecting the **IP with Mask** option as the type of **IP**, enter the sender IP mask used here. |
| **MAC** | Select the type of sender MAC address that will be used here. Options to choose from are **Any**, **Host**, and **MAC with Mask**. |
| **Sender MAC** | After selecting the **Host** or **MAC with Mask** options as the type of **MAC**, enter the sender MAC address used here. |
| **Sender MAC Mask** | After selecting the **MAC with Mask** option as the type of **MAC**, enter the sender MAC mask used here. |

Click the **Back** button to return to the previous page.

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

## ARP Inspection Settings

This window is used to view and configure the ARP inspection settings.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection Settings**, as shown below:

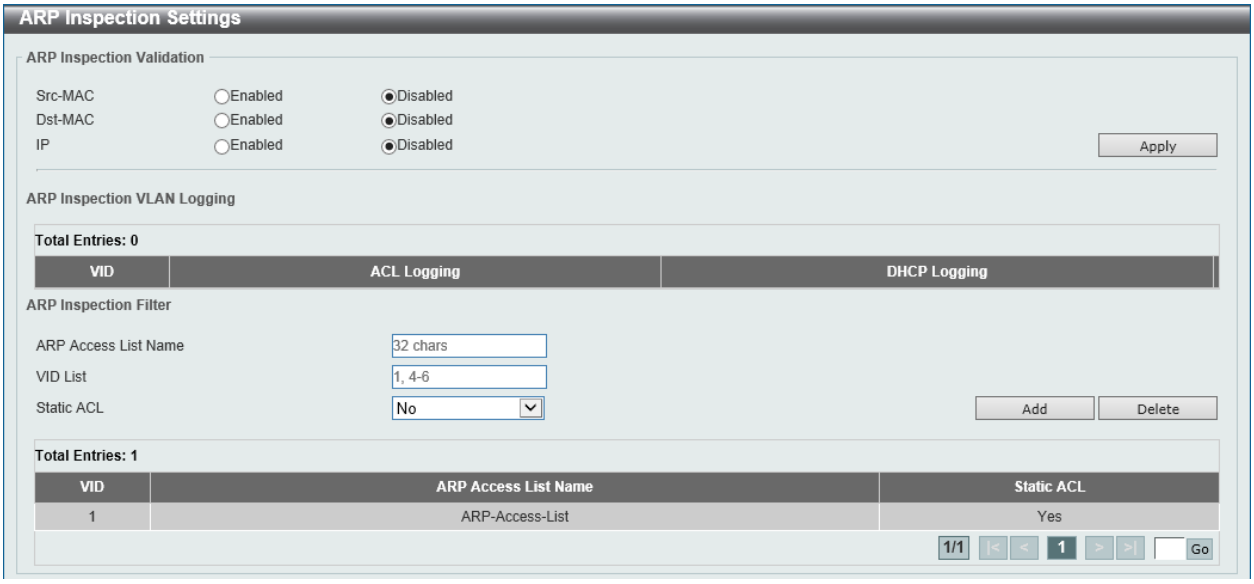



**Figure 9-44 ARP Inspection Settings Window**

The fields that can be configured in **ARP Inspection Validation** are described below:

| Parameter | Description |
|---|---|
| **Src-MAC** | Select to enable of disable the source MAC option here. This option specifies to check for ARP requests and response packets and the consistency of the source MAC address in the Ethernet header against the sender MAC address in the ARP payload. |
| **Dst-MAC** | Select to enable of disable the destination MAC option here. This option specifies to check for ARP response packets and the consistency of the destination MAC address in the Ethernet header against the target MAC address in the ARP payload. |
| **IP** | Select to enable of disable the IP option here. This option specifies to check the ARP body for invalid and unexpected IP addresses. It also specifies to check the validity of IP address in the ARP payload. The sender IP in both the ARP request and response and target IP in the ARP response are validated. Packets destined for the IP addresses 0.0.0.0, 255.255.255.255, and all IP multicast addresses are dropped. Sender IP addresses are checked in all ARP requests and responses, and target IP addresses are checked only in ARP responses. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **ARP Inspection Filter** are described below:

| Parameter | Description |
|---|---|
| **ARP Access List Name** | Enter the ARP access list name used here. This name can be up to 32 characters long. |
| **VID List** | Enter the VLAN ID list used here. |
| **Static ACL** | Select whether to use a static ACL or not here by either selecting **Yes** or **No**. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove an entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## ARP Inspection Port Settings

This window is used to view and configure the ARP inspection port settings.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection Port Settings**, as shown below:

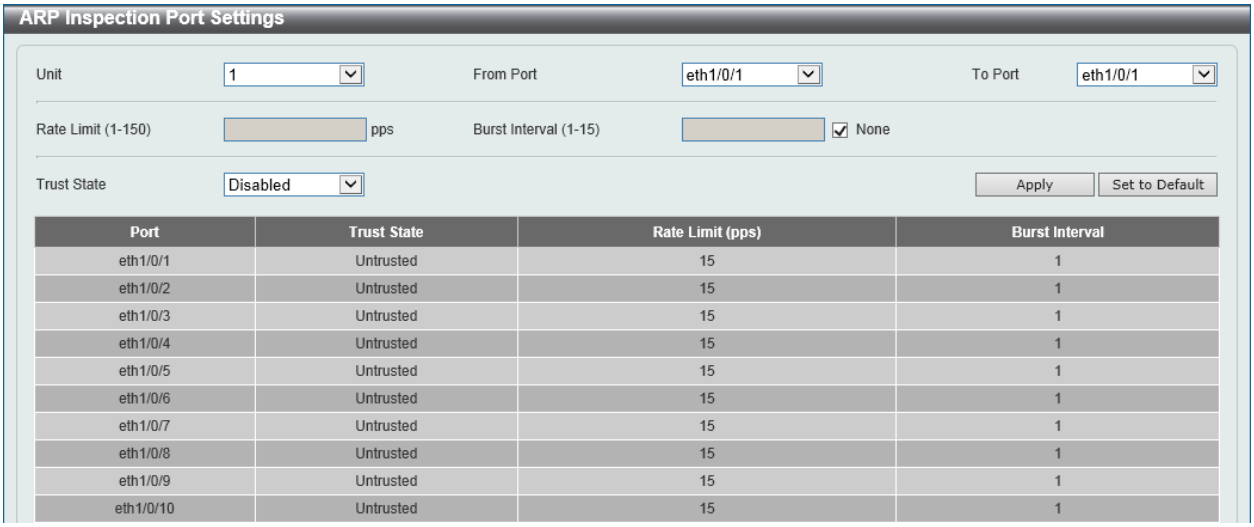



**Figure 9-45 ARP Inspection Port Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Rate Limit** | Enter the rate limit value here. This value must be between 1 and 150 packets per seconds. |
| **Burst Interval** | Enter the burst interval value here. This value must be between 1 and 15. Tick the **None** option to disable the option. |
| **Trust State** | Select to enable or disable the trust state here. |

Click the **Apply** button to accept the changes made.

Click the **Set to Default** button to change the information to the default values.

## ARP Inspection VLAN

This window is used to view and configure the ARP inspection VLAN settings.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection VLAN**, as shown below:

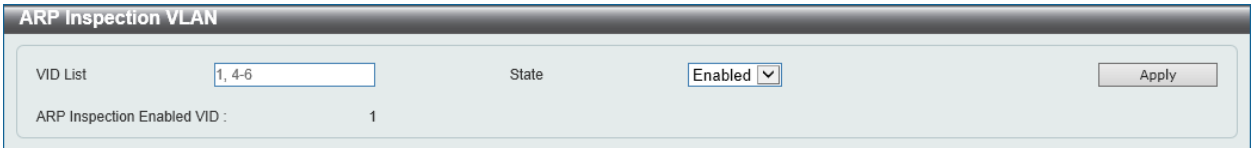



**Figure 9-46 ARP Inspection VLAN Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the VLAN ID list used here. |
| **State** | Select to enable or disable the ARP inspection option's state for the specified VLAN here. |

Click the **Apply** button to accept the changes made.

## ARP Inspection Statistics

This window is used to view and clear the ARP inspection statistics information.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection Statistics**, as shown below:

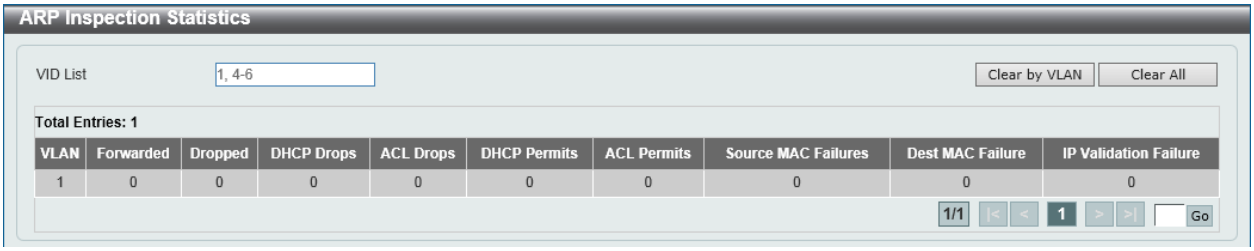



**Figure 9-47 ARP Inspection Statistics Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the VLAN ID list used here. |

Click the **Clear by VLAN** button to clear the information based on the VLAN ID(s) entered.

Click the **Clear All** button to clear all the information in this table.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## ARP Inspection Log

This window is used to view, configure and clear the ARP inspection log information.

To view the following window, click **Security > IMPB > IPv4 > Dynamic ARP Inspection > ARP Inspection Log**, as shown below:


**Figure 9-48 ARP Inspection Log Window**

The fields that can be configured in **ARP Inspection Log** are described below:

| Parameter | Description |
|---|---|
| **Log Buffer** | Enter the log's buffer value used here. This value must be between 1 and 1024. By default, this value is 32. |

Click the **Apply** button to accept the changes made.

Click the **Clear Log** button to clear the log.

# IP Source Guard

## IP Source Guard Port Settings

This window is used to view and configure the IP source guard port settings.

To view the following window, click **Security > IMPB > IPv4 > IP Source Guard > IP Source Guard Port Settings**, as shown below:

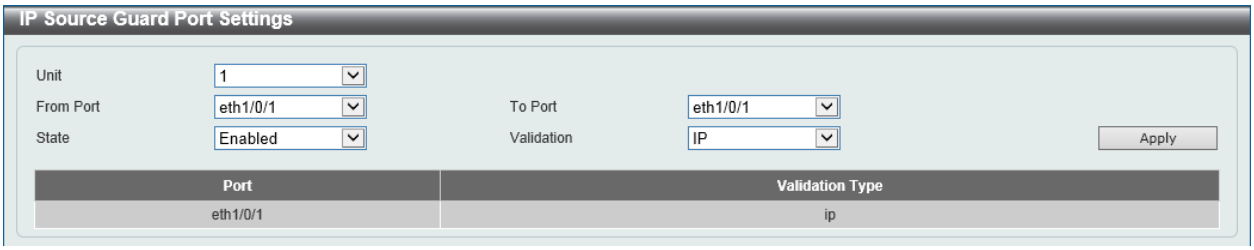



**Figure 9-49 IP Source Guard Port Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Select to enable or disable the IP source guard's state for the specified port(s) here. |
| **Validation** | Select the validation method used here. Options to choose from are **IP** and **IP-MAC**. Selecting **IP** means that the IP address of the received packets will be checked. Selecting **IP-MAC** means that the IP address and the MAC address of the received packets will be checked. |

Click the **Apply** button to accept the changes made.

## IP Source Guard Binding

This window is used to view and configure the IP source guard binding settings.

To view the following window, click **Security > IMPB > IPv4 > IP Source Guard > IP Source Guard Binding**, as shown below:

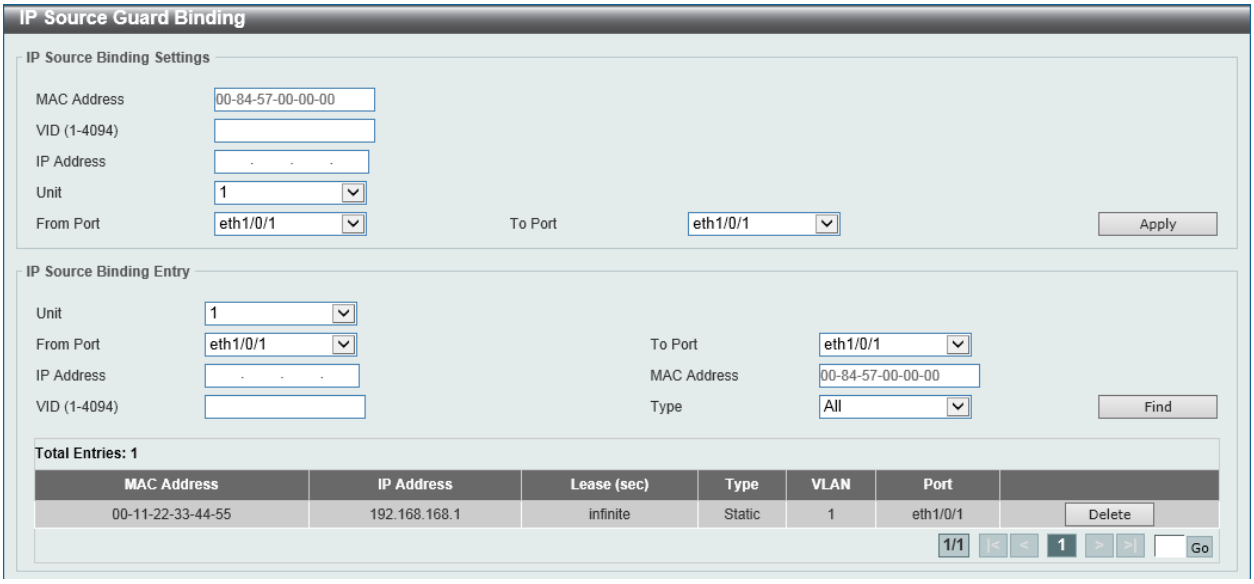



**Figure 9-50 IP Source Guard Binding Window**

The fields that can be configured in **IP Source Binding Settings** are described below:

| Parameter | Description |
|---|---|
| **MAC Address** | Enter the MAC address of the binding entry here. |
| **VID** | Enter the VLAN ID of the binding entry here. |
| **IP Address** | Enter the IP address of the binding entry here. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP Source Binding Entry** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this query here. |
| **From Port ~ To Port** | Select the appropriate port range used for the query here. |
| **IP Address** | Enter the IP address of the binding entry here. |
| **MAC Address** | Enter the MAC address of the binding entry here. |
| **VID** | Enter the VLAN ID of the binding entry here. |
| **Type** | Select the type of binding entry to find here. Options to choose from are **All**, **DHCP Snooping**, and **Static**.<br>• Selecting **All** specifies that all the DHCP binding entries will be displayed.<br>• Selecting **DHCP Snooping** specifies to display the IP-source guard binding entry learned by DHCP binding snooping.<br>• Selecting **Static** specifies to display the IP-source guard binding entry that is manually configured. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

### IP Source Guard HW Entry

This window is used to view the IP source guard hardware entries.

To view the following window, click **Security > IMPB > IPv4 > IP Source Guard > IP Source Guard HW Entry**, as shown below:

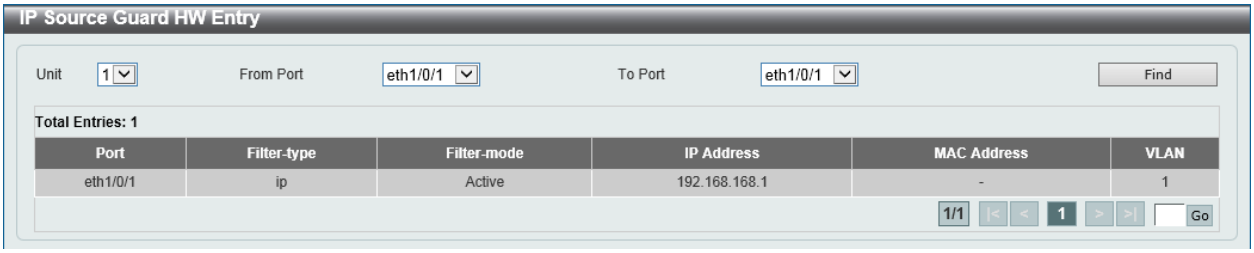



**Figure 9-51 IP Source Guard HW Entry Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this query here. |
| **From Port ~ To Port** | Select the appropriate port range used for the query here. |

Click the **Find** button to locate a specific entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## Advanced Settings

### IP-MAC-Port Binding Settings

This window is used to view and configure the IP-MAC-Port binding settings.

To view the following window, click **Security > IMPB > IPv4 > Advanced Settings > IP-MAC-Port Binding Settings**, as shown below:

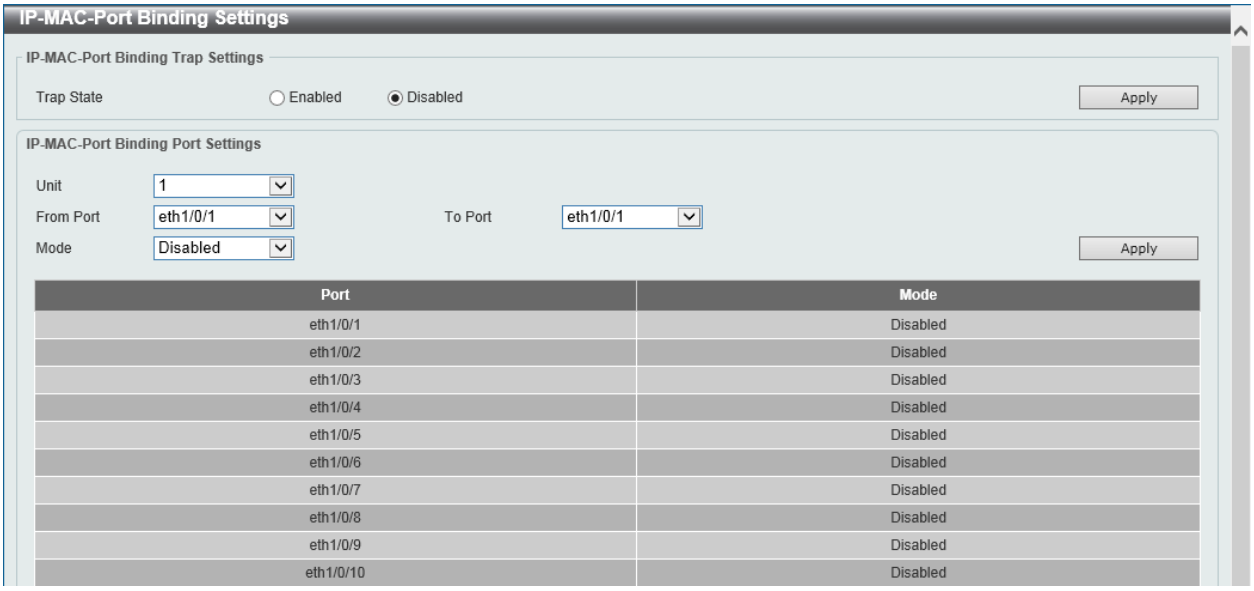



**Figure 9-52 IP-MAC-Port Binding Settings Window**

The fields that can be configured in **IP-MAC-Port Binding Trap Settings** are described below:

| Parameter | Description |
|---|---|
| **Trap State** | Select the enable or disable the IP-MAC-Port binding option's trap state. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IP-MAC-Port Binding Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Mode** | Select the mode of access control that will be used here. Options to choose from are **Disabled**, **Strict**, and **Loose**. When a port is enabled for IMPB strict-mode access control, a host can only access the port after the host sends ARP or IP packets and the ARP packet or IP packet sent by the host passes the binding check. To pass the binding check, the source IP address, source MAC address, VLAN ID, and arrival port number must match any of the entries defined by either the IP source guard static binding entry or the DHCP snooping learned dynamic binding entry. When a port is enabled for IMPB loose-mode access control, a host will be denied to access the port after the host sends ARP or IP packets and the ARP packet or IP packet sent by the host does not pass the binding check. To pass the binding check, the source IP address, source MAC address, VLAN ID, and arrival port must match any of the entries defined by either the IP source guard static binding entry or the DHCP snooping learned dynamic binding entry. |

Click the **Apply** button to accept the changes made.

## IP-MAC-Port Binding Blocked Entry

This window is used to view and clear the IP-MAC-Port binding blocked entry table.

To view the following window, click **Security > IMPB > IPv4 > Advanced Settings > IP-MAC-Port Binding Blocked Entry**, as shown below:

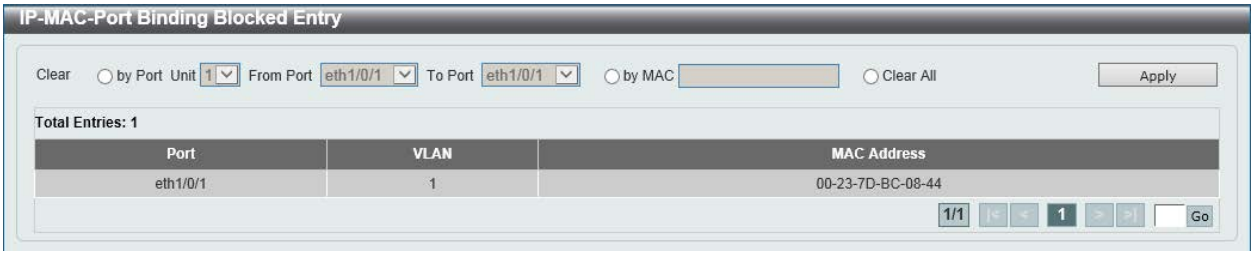



**Figure 9-53 IP-MAC-Port Binding Blocked Entry Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Clear by Port** | Select this option to clear the entry table based on the port(s) selected. |
| **Unit** | Select the switch unit that will be clear here. |
| **From Port ~ To Port** | Select the appropriate port range that will be cleared here. |

| Parameter | Description |
|---|---|
| **Clear by MAC** | Select this option to clear the entry table based on the MAC address entered. Enter the MAC address that will be cleared in the space provided. |
| **Clear All** | Select this option to clear all entries that contain MAC addresses. |

Click the **Apply** button to accept the changes made.

# IPv6

## IPv6 Snooping

This window is used to view and configure the IPv6 snooping settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 Snooping**, as shown below:

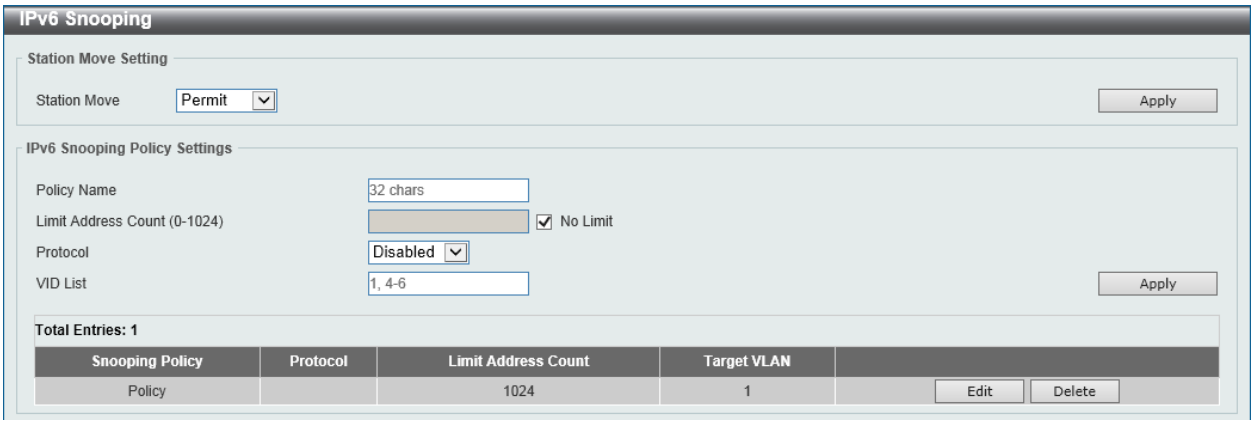



**Figure 9-54 IPv6 Snooping Window**

The fields that can be configured in **Station Move Setting** are described below:

| Parameter | Description |
|---|---|
| **Station Move** | Select the station move options here. Options to choose from are **Permit** and **Deny**. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IPv6 Snooping Policy Settings** are described below:

| Parameter | Description |
|---|---|
| **Policy Name** | Enter the IPv6 snooping policy name used here. This name can be up to 32 characters long. |
| **Limit Address Count** | Enter the address count limit value used here. This value must be between 0 and 511. Tick the **No Limit** option to disable this option. |
| **Protocol** | Select the protocol that will be associated with this policy here. Options to choose from are **Disabled**, **DHCP**, **NDP**, and **All**. DHCPv6 Snooping sniffs the DHCPv6 packets sent between the DHCPv6 client and server in the address assigning procedure. When a DHCPv6 client successfully got a valid IPv6 address, DHCPv6 snooping creates its binding database. ND Snooping is designed for a stateless auto-configuration assigned IPv6 address and manually configured IPv6 address. Before assigning an IPv6 address, the host must perform |

| Parameter | Description |
|---|---|
| | Duplicate Address Detection first. ND snooping detects DAD messages (DAD NS and DAD NA) to build its binding database. The NDP packet (NS and NA) is also used to detect whether a host is still reachable and determine whether to delete a binding or not. |
| **VID List** | Enter the VLAN ID list used here. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

## IPv6 ND Inspection

This window is used to view and configure the IPv6 ND inspection settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 ND Inspection**, as shown below:


**Figure 9-55 IPv6 ND Inspection Window**

The fields that can be configured in **IPv6 ND Inspection** are described below:

| Parameter | Description |
|---|---|
| **Policy Name** | Enter the policy name used here. This name can be up to 32 characters long. |
| **Device Role** | Select the device role here. Options to choose from are **Host** and **Router**. By default, the device's role is set as host and inspection for NS and NA messages are performed. If the device role is set as router, the NS and NA inspection is not performed. When performing NS/NA inspection, the message will be verified against the dynamic binding table learned from the ND protocol or from the DHCP. |
| **Validate Source-MAC** | Select to enable or disable the validation of the source MAC address option here. When the Switch receives an ND message that contains a link-layer address, the source MAC address is checked against the link-layer address. The packet will be dropped if the link-layer address and the MAC addresses are different from each other. |
| **Target Port** | Tick this option to specify the target port. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

# IPv6 RA Guard

This window is used to view and configure the IPv6 Router Advertisement (RA) guard settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 RA Guard**, as shown below:

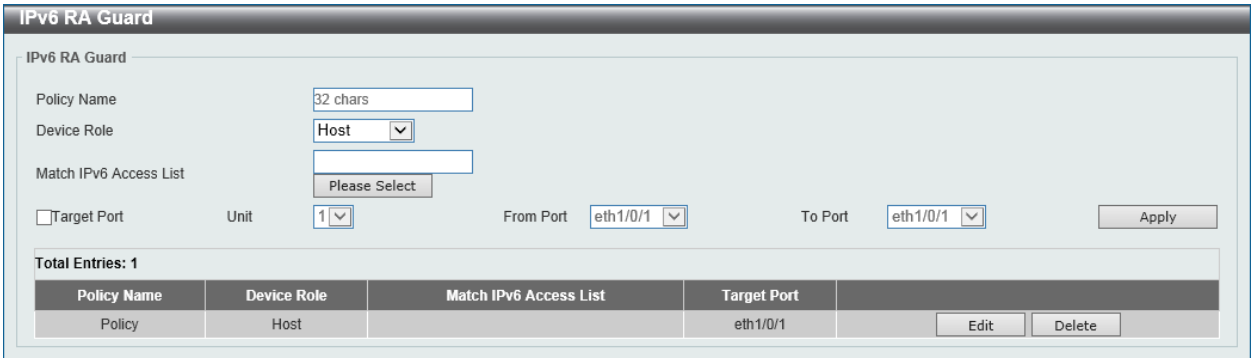



**Figure 9-56 IPv6 RA Guard Window**

The fields that can be configured in **IPv6 RA Guard** are described below:

| Parameter | Description |
|---|---|
| **Policy Name** | Enter the policy name here. This name can be up to 32 characters long. |
| **Device Role** | Select the device role here. Options to choose from are **Host** and **Router**. By default, the device's role is **Host**, which will block all the RA packets. If the device's role is **Router**, RA packets will be forwarded according to the port's bound ACL. |
| **Match IPv6 Access List** | Enter or select the IPv6 access list to match here. |
| **Target Port** | Tick this option to specify the target port. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

# IPv6 DHCP Guard

This window is used to view and configure the IPv6 DHCP guard settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 DHCP Guard**, as shown below:

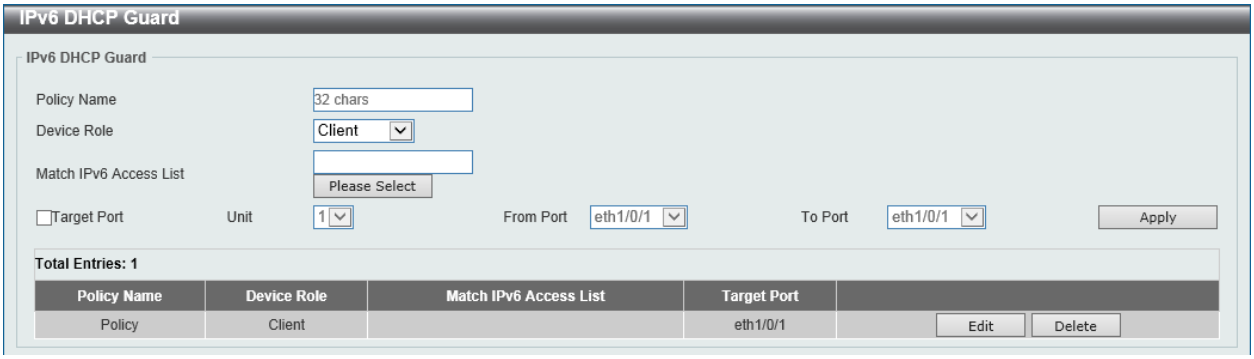



**Figure 9-57 IPv6 DHCP Guard Window**

The fields that can be configured in **IPv6 DHCP Guard** are described below:

| Parameter | Description |
|---|---|
| **Policy Name** | Enter the policy name here. This name can be up to 32 characters long. |
| **Device Role** | Select the device role here. Options to choose from are **Client** and **Server**. By default, the device's role is set as **Client**, which will block all the DHCPv6 packets from the DHCPv6 Server. If the device's role is set as **Server**, DHCPv6 Server packets will be forwarded according to the port's bound ACL. |
| **Match IPv6 Access List** | Enter or select the IPv6 access list to match here. |
| **Target Port** | Tick this option to specify the target port. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

# IPv6 Source Guard

## IPv6 Source Guard Settings

This window is used to view and configure the IPv6 source guard settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 Source Guard > IPv6 Source Guard Settings**, as shown below:


**Figure 9-58 IPv6 Source Guard Settings Window**

The fields that can be configured in **IPv6 Source Guard Settings** are described below:

| Parameter | Description |
|---|---|
| **Policy Name** | Enter the policy name here. This name can be up to 32 characters long. |
| **Global Auto-Configure Address** | Select to permit of deny data traffic from the auto-configured global address. It is useful when all global addresses on a link are assigned by DHCP and the administrator that wants to block hosts with self-configured addresses from sending traffic. |
| **Link Local Traffic** | Select to permit of deny hardware permitted data traffic send by the link-local address. |
| **Target Port** | Tick this option to specify the target port. |
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

## IPv6 Neighbor Binding

This window is used to view and configure the IPv6 neighbor binding settings.

To view the following window, click **Security > IMPB > IPv6 > IPv6 Source Guard > IPv6 Neighbor Binding**, as shown below:

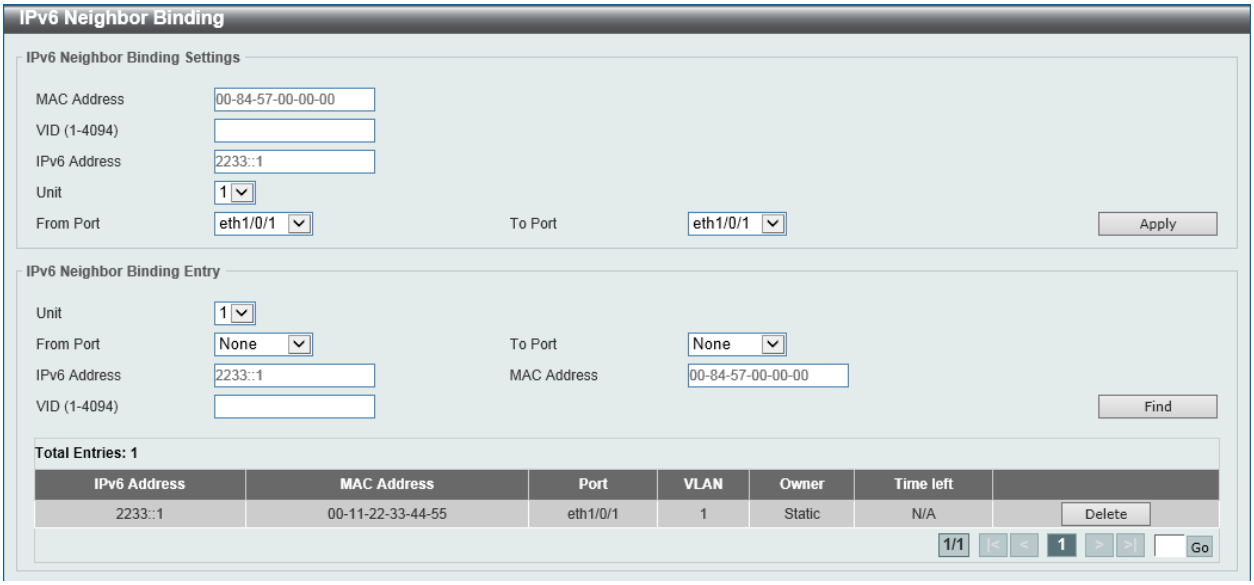



**Figure 9-59 IPv6 Neighbor Binding Window**

The fields that can be configured in **IPv6 Neighbor Binding Settings** are described below:

| Parameter | Description |
|---|---|
| **MAC Address** | Enter the MAC address used here. |
| **VID** | Enter the VLAN ID used here. This value must be between 1 and 4094. |
| **IPv6 Address** | Enter the IPv6 address used here. |

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **IPv6 Neighbor Binding Entry** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this search here. |
| **From Port ~ To Port** | Select the appropriate port range used for the search here. |
| **IPv6 Address** | Enter the IPv6 address to find here. |
| **MAC Address** | Enter the MAC address to find here. |
| **VID** | Enter the VLAN ID to find here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

# DHCP Server Screening

This function allows users to not only to restrict all DHCP server packets but also to receive any specified DHCP server packet by any specified DHCP client. It is useful when one or more DHCP servers are present on the network and both provide DHCP services to different distinct groups of clients.

The first time the DHCP filter is enabled it will create both an access profile entry and an access rule per port entry, it will also create other access rules. These rules are used to block all DHCP server packets. In addition to a permit DHCP entry it will also create one access profile and one access rule entry the first time the DHCP client MAC address is used as the client MAC address. The Source IP address is the same as the DHCP server's IP address (UDP port number 67). These rules are used to permit the DHCP server packets with specific fields, which the user has configured.

When DHCP Server filter function is enabled all DHCP Server packets will be filtered from a specific port.

## DHCP Server Screening Global Settings

This window is used to view and configure the DHCP server screening global settings.

To view the following window, click **Security > DHCP Server Screening > DHCP Server Screening Global Settings**, as shown below:

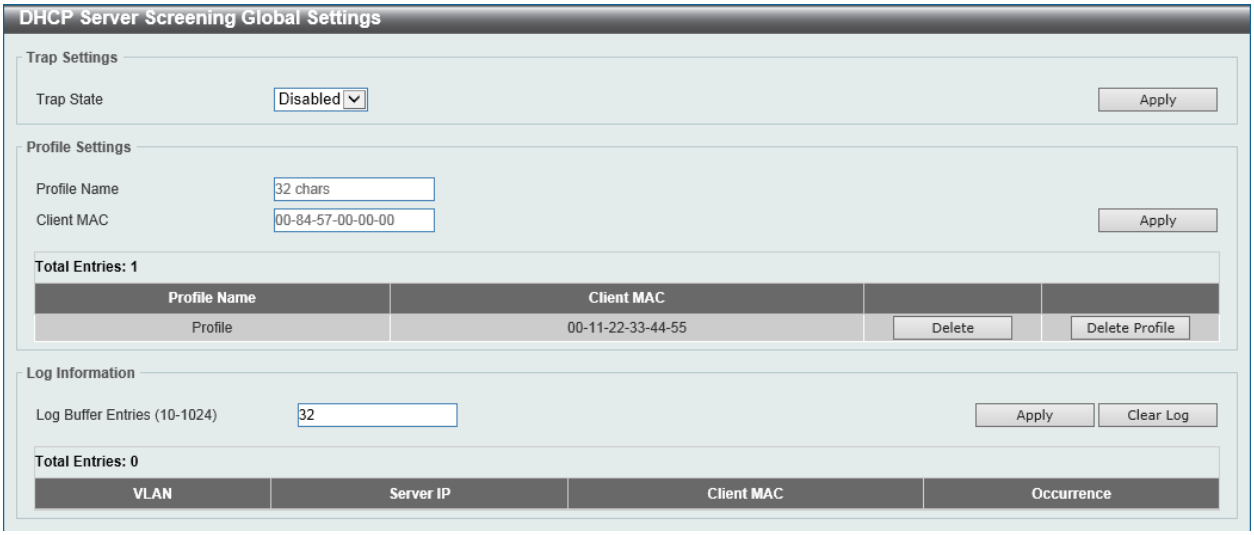



**Figure 9-60 DHCP Server Screening Global Settings Window**

The fields that can be configured in **Trap Settings** are described below:

| Parameter | Description |
|---|---|
| **Trap State** | Select to enable or disable the DHCP server screening trap here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Profile Settings** are described below:

| Parameter | Description |
|---|---|
| **Profile Name** | Enter the DHCP server screening profile name here. This name can be up to 32 characters long. |
| **Client MAC** | Enter the MAC address used here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

Click the **Delete Profile** button to remove the specified profile.

The fields that can be configured in **Log Information** are described below:

| Parameter | Description |
|---|---|
| **Log Buffer Entries** | Enter the logged buffer entries value here. This value must be between 10 and 1024. By default, this value is 32. |

Click the **Apply** button to accept the changes made.

Click the **Clear Log** button to clear the log.

# DHCP Server Screening Port Settings

This window is used to view and configure the DHCP server screening port settings.

To view the following window, click **Security > DHCP Server Screening > DHCP Server Screening Port Settings**, as shown below:

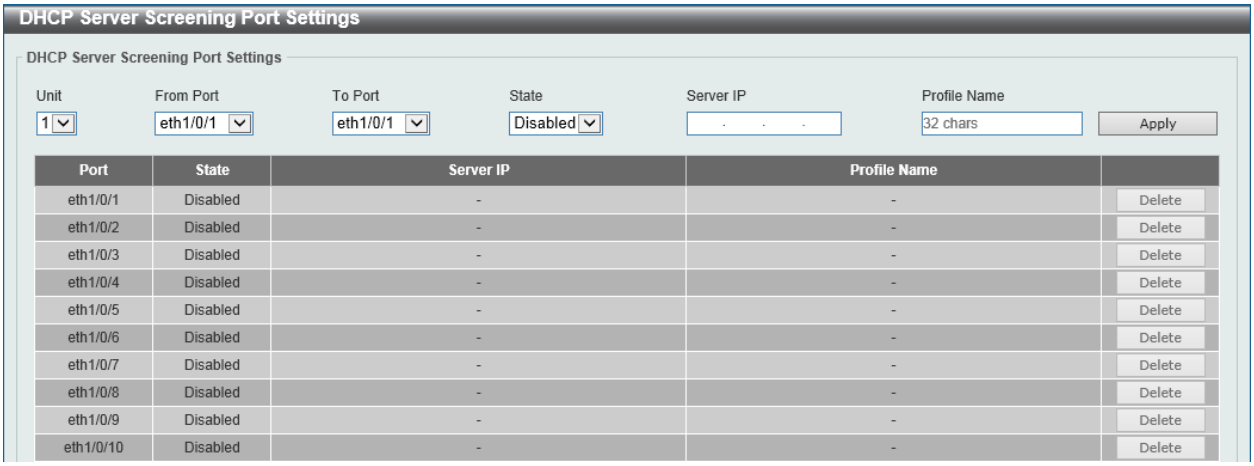



**Figure 9-61 DHCP Server Screening Port Settings Window**

The fields that can be configured in **DHCP Server Screening Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Select to enable or disable the DHCP server screening function on the port(s) specified. |
| **Server IP** | Enter the DHCP server's IP address here. |
| **Profile Name** | Enter the DHCP server screening profile that will be used for the port(s) specified here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# ARP Spoofing Prevention

This window is used to view and configure the ARP spoofing prevention settings. When an entry is created, ARP packets whose sender IP address matches the gateway IP address, of an entry, but its sender MAC address field does not match the gateway MAC address, of the entry, will be dropped by the system. The ASP will bypass the ARP packets whose sender IP address doesn't match the configured gateway IP address.

If an ARP address matches a configured gateway's IP address, MAC address, and port list, then bypass the Dynamic ARP Inspection (DAI) check no matter if the receiving port is ARP trusted or untrusted.

To view the following window, click **Security > ARP Spoofing Prevention**, as shown below:

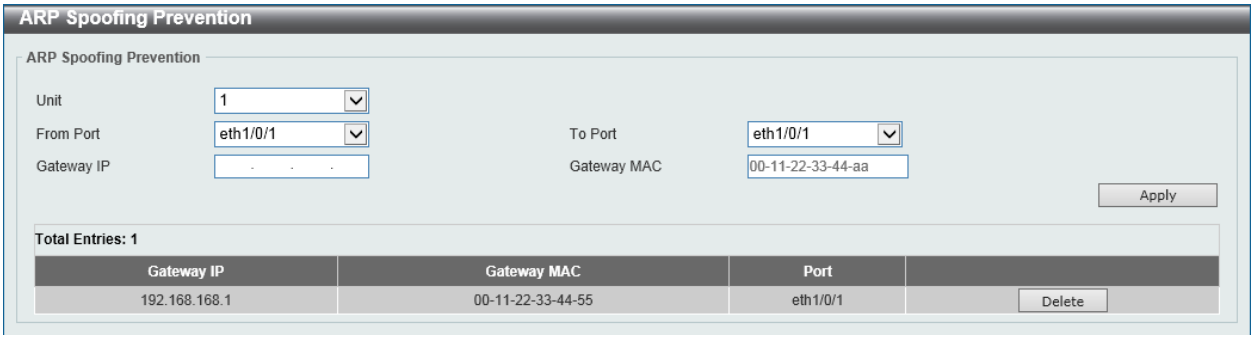



**Figure 9-62 ARP Spoofing Prevention Window**

The fields that can be configured in **ARP Spoofing Prevention** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Gateway IP** | Enter the gateway's IP address used here. |
| **Gateway MAC** | Enter the gateway's MAC address used here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# BPDU Attack Protection

This window is used to view and configure the BPDU attack protection settings. In generally, there are two states in the BPDU attack protection function. One is normal state, and another is under attack state. The under attack state have three modes: drop, block, and shutdown. A BPDU protection enabled port will enter an under attack state when it receives one STP BPDU packet and it will take action based on the configuration. Thus, BPDU protection can only be enabled on the STP-disabled port.

BPDU protection has a higher priority than the (Forward BPDU) FBPDU setting configured by configure STP command in the determination of BPDU handling. That is, when FBPDU is configured to forward STP BPDU but BPDU protection is enabled, then the port will not forward STP BPDU.

BPDU protection also has a higher priority than the BPDU tunnel port setting in determination of BPDU handling. That is, when a port is configured as BPDU tunnel port for STP, it will forward STP BPDU. But if the port is BPDU protection enabled. Then the port will not forward STP BPDU.

To view the following window, click **Security > BPDU Attack Protection**, as shown below:

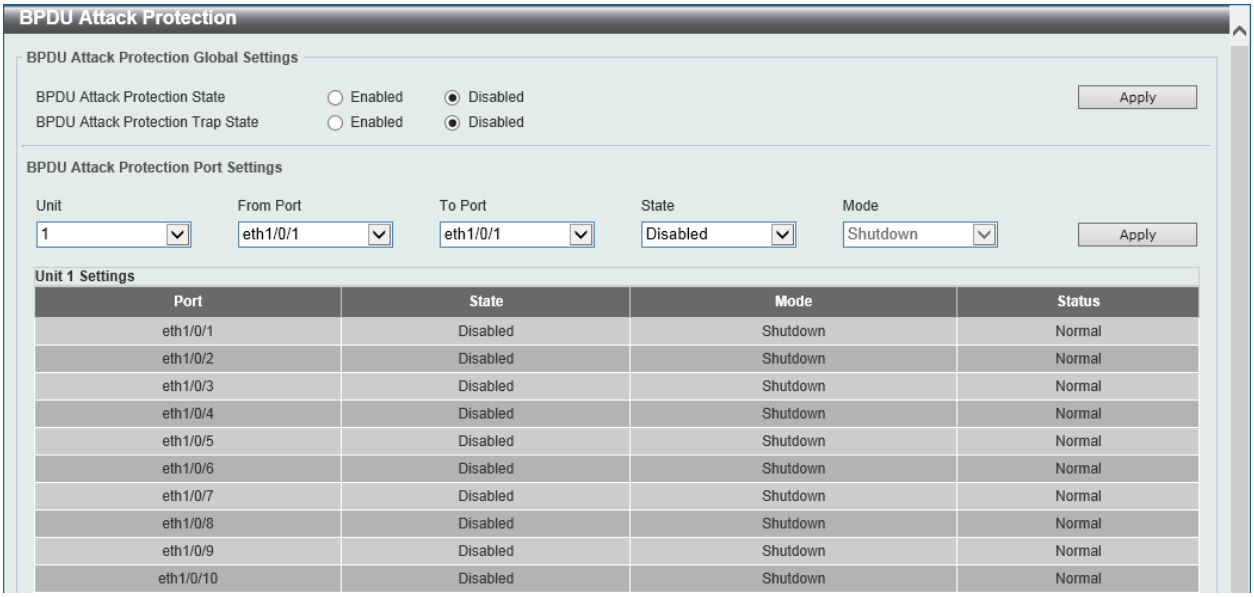



**Figure 9-63 BPDU Attack Protection Window**

The fields that can be configured in **BPDU Attack Protection Global Settings** are described below:

| Parameter | Description |
|---|---|
| **BPDU Attack Protection State** | Select to enable or disable the BPDU attack protection feature's global state here. |
| **BPDU Attack Protection Trap State** | Select to enable or disable the BPDU attack protection feature's trap state here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **BPDU Attack Protection Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Select to enable or disable the BPDU attack protection feature's state on the port(s) specified. |
| **Mode** | Select the BPDU attack protection feature's mode that will be applied to the port(s) specified. Options to choose from are **Drop**, **Block** and **Shutdown**.<br>• **Drop** - Drop all received BPDU packets when the port enters under attack state.<br>• **Block** - Drop all packets (include BPDU and normal packets) when the port enters under attack state.<br>• **Shutdown** - Shut down the port when the port enters under attack state. |

Click the **Apply** button to accept the changes made.

# MAC Authentication

This window is used to view and configure the MAC authentication settings. MAC authentication is a feature designed to authenticate a user by MAC address when the user is trying to access the network via the Switch. The Switch itself can perform the authentication based on a local database or be a RADIUS client and perform the authentication process via the RADIUS protocol with a remote RADIUS server.

To view the following window, click **Security > MAC Authentication**, as shown below:

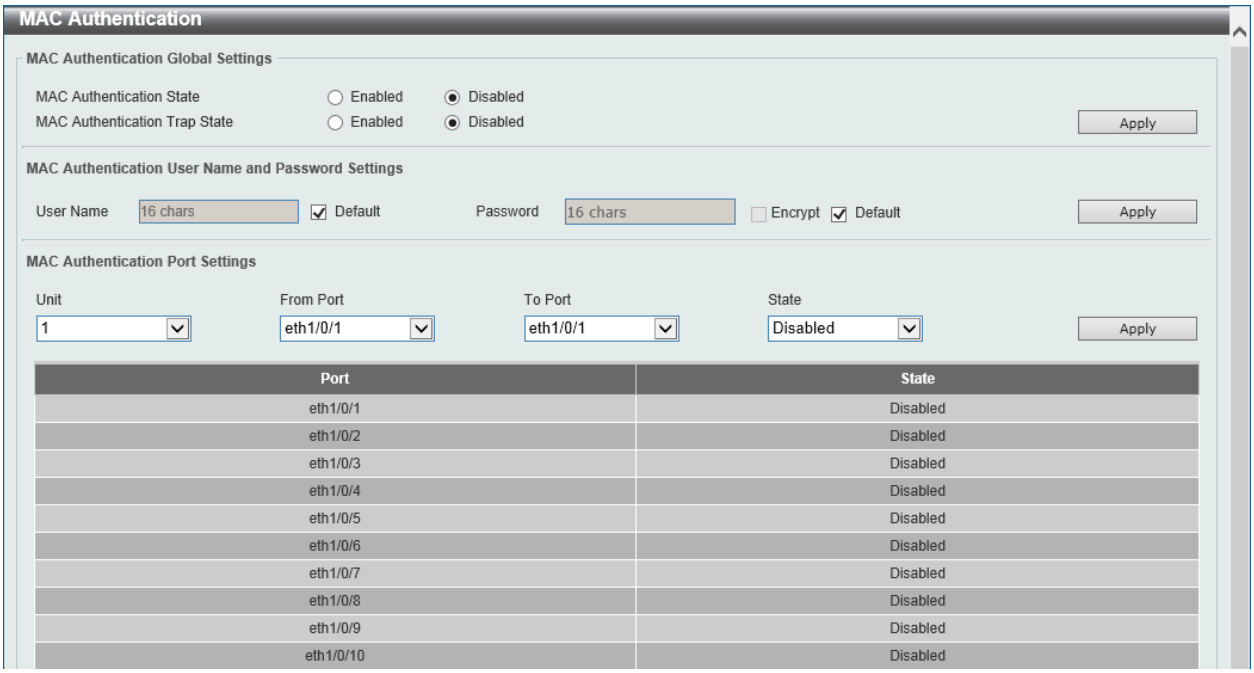



**Figure 9-64 MAC Authentication Window**

The fields that can be configured in **MAC Authentication Global Settings** are described below:

| Parameter | Description |
|---|---|
| **MAC Authentication State** | Select to enable or disable the MAC authentication feature's global state. |
| **MAC Authentication Trap State** | Select to enable or disable the MAC authentication feature's trap state. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MAC Authentication User Name and Password Settings** are described below:

| Parameter | Description |
|---|---|
| **User Name** | Enter the username used for MAC authentication here. This name can be up to 16 characters long. Tick the **Default** option to restore the username to the client's MAC address here. |
| **Password** | Enter the password used for MAC authentication here. Tick the **Encrypt** option save this password in the encrypted form. Tick the **Default** option to restore the password to the client's MAC address here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MAC Authentication Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Select to enable or disable MAC authentication for the port(s) specified here. |

Click the **Apply** button to accept the changes made.

# Web-based Access Control

Web-based Access Control (WAC) is a feature designed to authenticate a user when the user is trying to access the Internet via the Switch. The authentication process uses the HTTP or HTTPS protocol. The Switch enters the authenticating stage when users attempt to browse Web pages (e.g., http://www.dlink.com) through a Web browser. When the Switch detects HTTP or HTTPS packets and this port is unauthenticated, the Switch will launch a pop-up user name and password window to query users. Users are not able to access the Internet until the authentication process is passed.

The Switch can be the authentication server itself and do the authentication based on a local database, or be a RADIUS client and perform the authentication process via the RADIUS protocol with a remote RADIUS server. The client user initiates the authentication process of WAC by attempting to gain Web access.

D-Link's implementation of WAC uses a virtual IP that is exclusively used by the WAC function and is not known by any other modules of the Switch. In fact, to avoid affecting a Switch's other features, WAC will only use a virtual IP address to communicate with hosts. Thus, all authentication requests must be sent to a virtual IP address but not to the IP address of the Switch's physical interface.

Virtual IP works like this, when a host PC communicates with the WAC Switch through a virtual IP, the virtual IP is transformed into the physical IPIF (IP interface) address of the Switch to make the communication possible. The host PC and other servers' IP configurations do not depend on the virtual IP of WAC. The virtual IP does not respond to any ICMP packets or ARP requests, which means it is not allowed to configure a virtual IP on the same subnet as the Switch's IPIF (IP interface) or the same subnet as the host PCs' subnet.

As all packets to a virtual IP from authenticated and authenticating hosts will be trapped to the Switch's CPU, if the virtual IP is the same as other servers or PCs, the hosts on the WAC-enabled ports cannot communicate with the server or PC which really own the IP address. If the hosts need to access the server or PC, the virtual IP cannot be the same as the one of the server or PC. If a host PC uses a proxy to access the Web, to make the authentication work properly the user of the PC should add the virtual IP to the exception of the proxy configuration. Whether or not a virtual IP is specified, users can access the WAC pages through the Switch's system IP. When a virtual IP is not specified, the authenticating Web request will be redirected to the Switch's system IP.

The Switch's implementation of WAC features a user-defined port number that allows the configuration of the TCP port for either the HTTP or HTTPS protocols. This TCP port for HTTP or HTTPs is used to identify the HTTP or HTTPs packets that will be trapped to the CPU for authentication processing, or to access the login page. If not specified, the default port number for HTTP is 80 and the default port number for HTTPS is 443. If no protocol is specified, the default protocol is HTTP.

The following diagram illustrates the basic six steps all parties go through in a successful Web Authentication process:

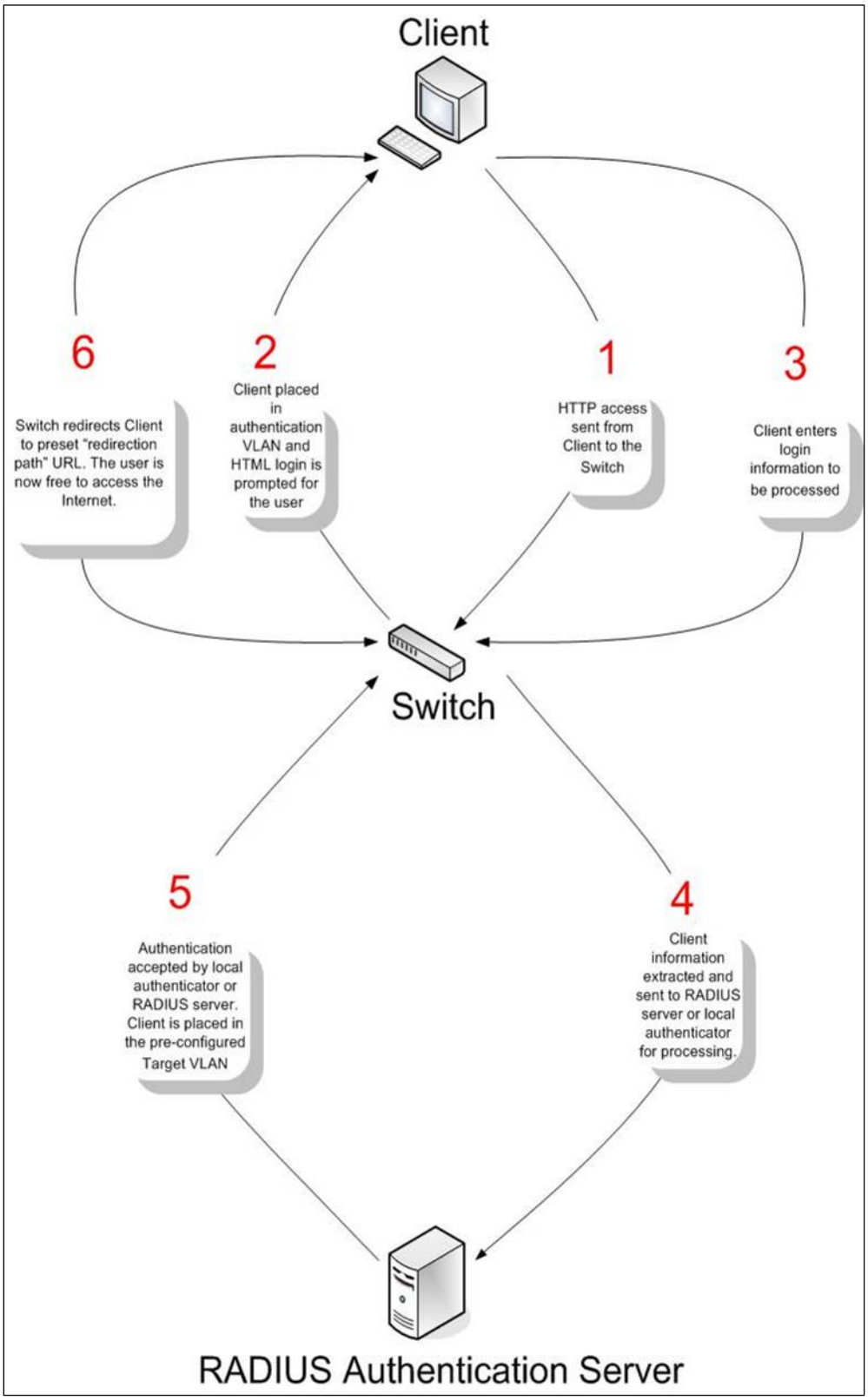



**Figure 9-65 RADIUS Authentication Server**

**Conditions and Limitations**

- If the client is utilizing DHCP to attain an IP address, the authenticating VLAN must provide a DHCP server or a DHCP relay function so that client may obtain an IP address.

- Certain functions exist on the Switch that will filter HTTP packets, such as the Access Profile function. The user needs to be very careful when setting filter functions for the target VLAN, so that these HTTP packets are not denied by the Switch.
- If a RADIUS server is to be used for authentication, the user must first establish a RADIUS Server with the appropriate parameters, including the target VLAN, before enabling Web Authentication on the Switch.

# Web Authentication

This window is used to view and configure the Web authentication settings.

To view the following window, click **Security > Web-based Access Control > Web Authentication**, as shown below:

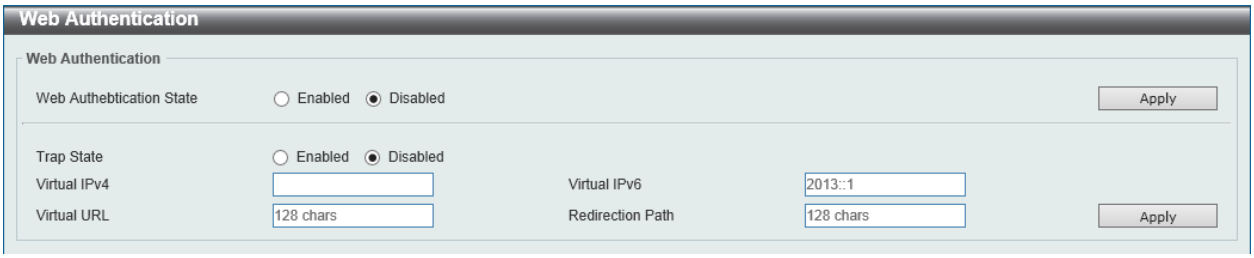



**Figure 9-66 Web Authentication Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Web Authentication State** | Select to enable or disable the Web authentication feature's global state. |
| **Trap State** | Select to enable or disable the Web authentication feature's trap state. |
| **Virtual IPv4** | Enter the virtual IPv4 address used here. The virtual IP of Web authentication is just the characterization of the Web authentication function on the Switch. All Web authentication processes communicate with this IP address, however, the virtual IP does not respond to any ICMP packet or ARP request. So it's not allowed to configure virtual IP in the same subnet as the Switch's IP interface or the same subnet as the host PCs' subnet, otherwise the Web authentication cannot operate correctly. The defined URL only takes effect when the virtual IP address is configured. The users get the FQDN URL stored on the DNS server to get the virtual IP address. The obtained IP address must match the virtual IP address configured by the command. If the IPv4 virtual IP is not configured, the IPv4 access cannot start a Web authentication. |
| **Virtual IPv6** | Enter the virtual IPv6 address used here. If the IPv6 virtual IP is not configured, the IPv6 access cannot start a Web authentication. |
| **Virtual URL** | Enter the virtual URL used here. This URL can be up to 128 characters long. |
| **Redirection Path** | Enter the redirection path here. This path can be up to 128 characters long. |

Click the **Apply** button to accept the changes made.

# WAC Port Settings

This window is used to view and configure the WAC port settings.

To view the following window, click **Security > Web-based Access Control > WAC Port Settings**, as shown below:

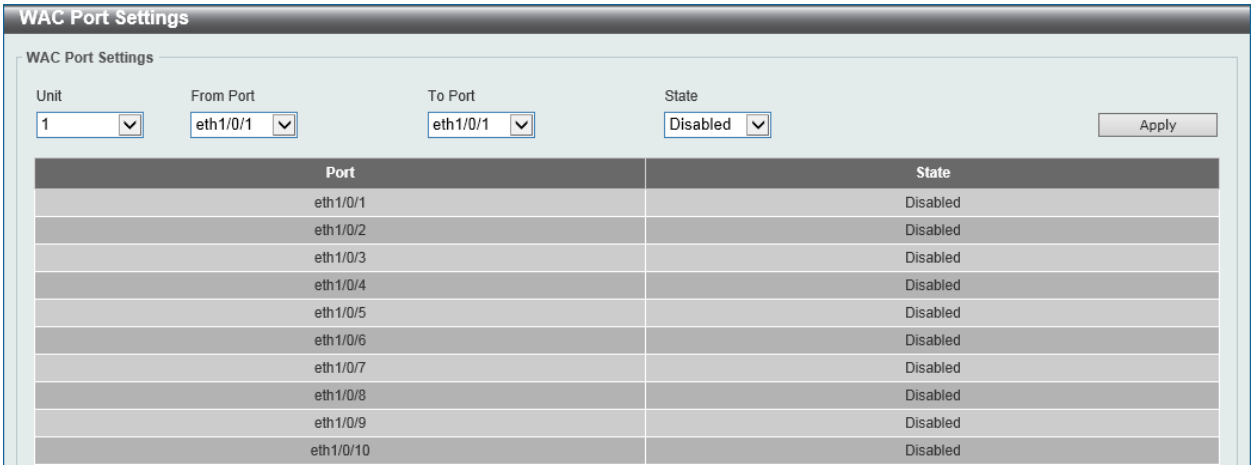



**Figure 9-67 WAC Port Settings Window**

The fields that can be configured in **WAC Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Select to enable or disable the WAC feature on the port(s) specified. |

Click the **Apply** button to accept the changes made.

# WAC Customize Page

This window is used to view and configure the WAC customized login page.

To view the following window, click **Security > Web-based Access Control > WAC Customize Page**, as shown below:

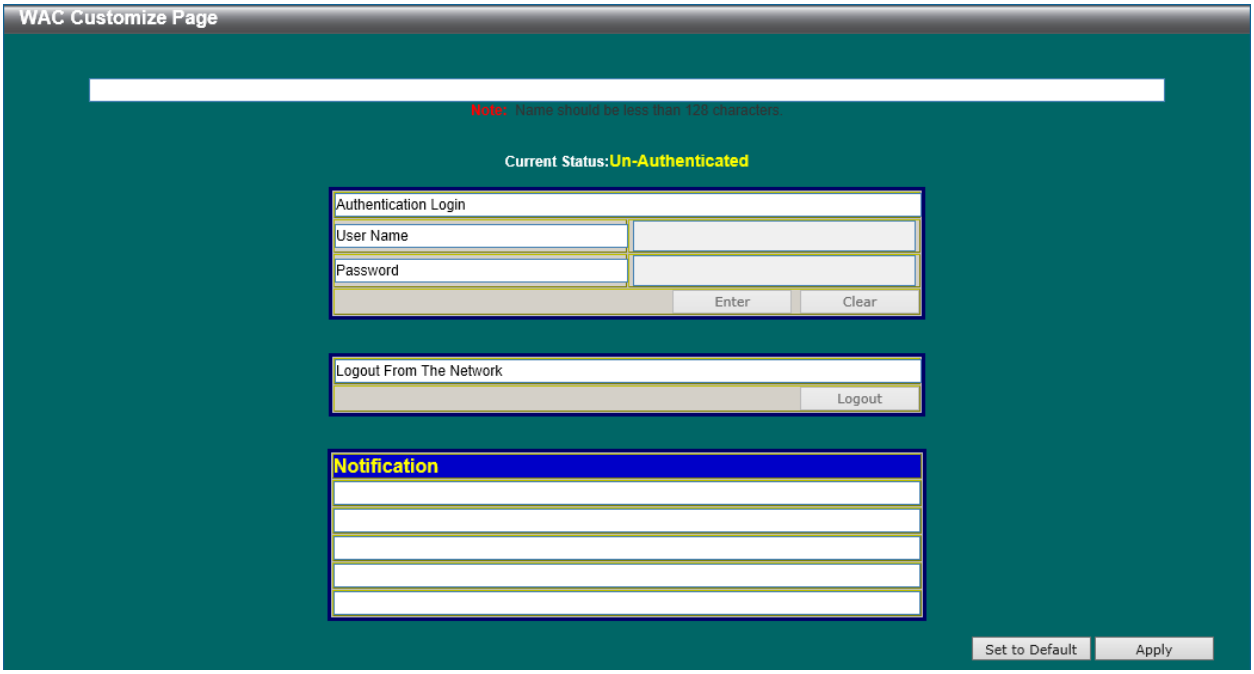



**Figure 9-68 WAC Customize Page Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Page Title** | Enter a custom page title message here. This message can be up to 128 characters long. |
| **Login Window Title** | Enter a custom login window title here. This title can be up to 64 characters long. |
| **User Name Title** | Enter a custom username title here. This title can be up to 32 characters long. |
| **Password Title** | Enter a custom password title here. This title can be up to 32 characters long. |
| **Logout Window Title** | Enter a custom logout window title here. This title can be up to 64 characters long. |
| **Notification** | Enter additional information to display in the notification area here. This information can be up to 128 characters long for each line. There a 5 lines available for additional information. |

Click the **Set to Default** button to replace the information with the default information.

Click the **Apply** button to accept the changes made.

# Network Access Authentication

## Guest VLAN

This window is used to view and configure the network access authentication guest VLAN settings.

To view the following window, click **Security > Network Access Authentication > Guest VLAN**, as shown below:

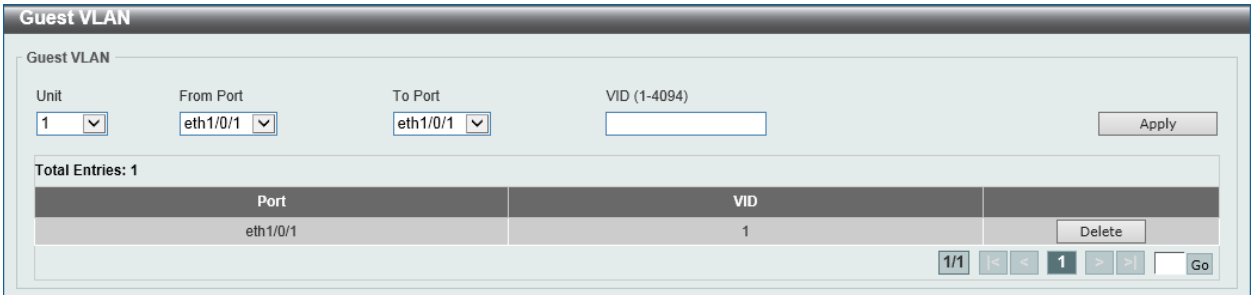



**Figure 9-69 Guest VLAN Window**

The fields that can be configured in **Guest VLAN** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **VID** | Enter the VLAN ID used here. This value must be between 1 and 4094. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# Network Access Authentication Global Settings

This window is used to view and configure the network access authentication global settings.

To view the following window, click **Security > Network Access Authentication > Network Access Authentication Global Settings**, as shown below:

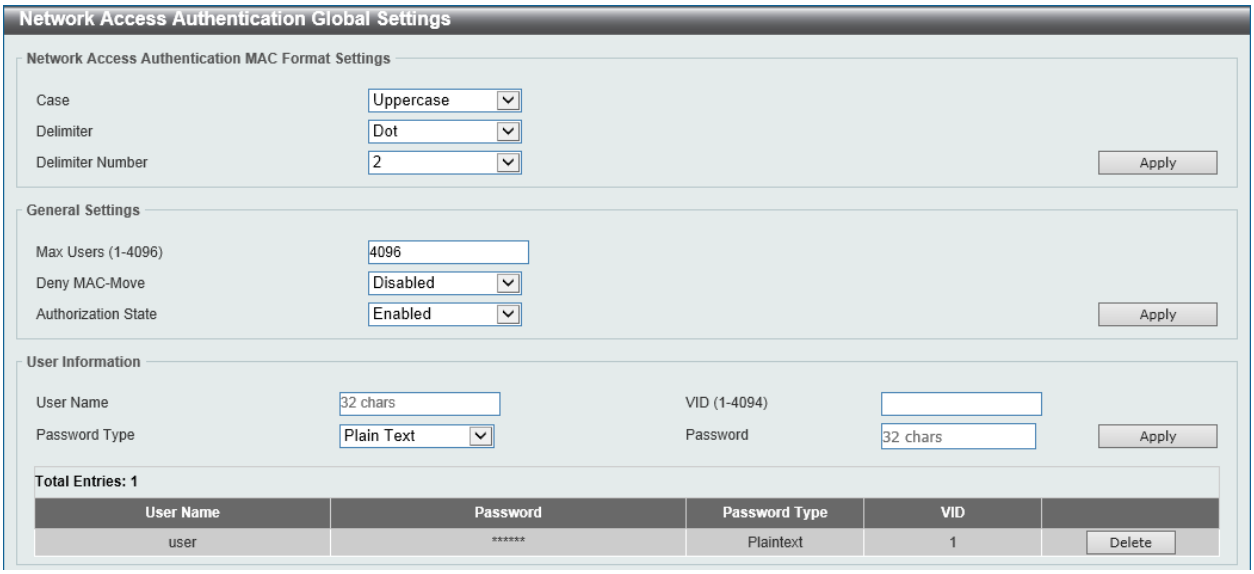



**Figure 9-70 Network Access Authentication Global Settings Window**

The fields that can be configured in **Network Access Authentication MAC Format Settings** are described below:

| Parameter | Description |
|---|---|
| **Case** | Select the case format that will be used for the network access authentication MAC address here. Options to choose from are |

| Parameter | Description |
|---|---|
| | **Lowercase** and **Uppercase**. |
| **Delimiter** | Select the delimiter that will be used for the network access authentication MAC address here. Options to choose from are **Hyphen**, **Colon**, **Dot**, and **None**. |
| **Delimiter Number** | Select the delimiter number option here. Options to choose from are **1**, **2**, and **5**. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **General Settings** are described below:

| Parameter | Description |
|---|---|
| **Max Users** | Enter the maximum amount of users allowed here. This value must be between 1 and 1000. By default, this option is 1000. |
| **Deny MAC-Move** | Select to enable or disable the deny MAC-move feature here. This option controls whether to allow authenticated hosts to do roaming across different switch ports and only controls whether a host which is authenticated at a port set to the multi-authenticate mode is allowed to move to another port.<br>If a station is allowed to move, there are two situations. It may either need to be re-authenticated or directly moved to the new port without re-authentication based on the following rule. If the new port has the same authentication configuration as the original port, then re-authentication is not needed. The host will inherit the same authorization attributes with new port. The authenticated host can do roaming from port 1 to port 2, and inherit the authorization attributes without re-authentication. If the new port has the different authentication configuration as the original port, then re-authentication is needed. The authenticated host on port 1 can move and re-authenticated by port 2. If the new port has no authentication method enabled, then the station is directly moved to the new port. The session with the original port is removed. The authenticated host on port 1 can be moved to port 2.<br>If this feature is disabled and an authenticated host moves to another port, then this is treated as a violation error. |
| **Authorization State** | Select to enable or disable the authorized state here. The option is used to enable or disable the acceptance of an authorized configuration. When authorization is enabled for authentication, the authorized attributes (for example VLAN, 802.1p default priority, bandwidth, and ACL) assigned by the RADIUS server will be accepted if the authorization status is enabled. Bandwidth and ACL are assigned on a per-port basis. If in the multi-authenticated mode, VLAN and 802.1p are assigned on a per-host basis. Otherwise, Bandwidth and ACL are assigned on a per-port basis. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **User Information** are described below:

| Parameter | Description |
|---|---|
| **User Name** | Enter the user name used here. This name can be up to 32 characters long. |
| **VID** | Enter the VLAN ID used here. |

| Parameter | Description |
|---|---|
| **Password Type** | Select the password type option here. Options to choose from are **Plain Text** and **Encrypted**. |
| **Password** | Enter the password used here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# Network Access Authentication Port Settings

This window is used to view and configure the network access authentication port settings.

To view the following window, click **Security > Network Access Authentication > Network Access Authentication Port Settings**, as shown below:

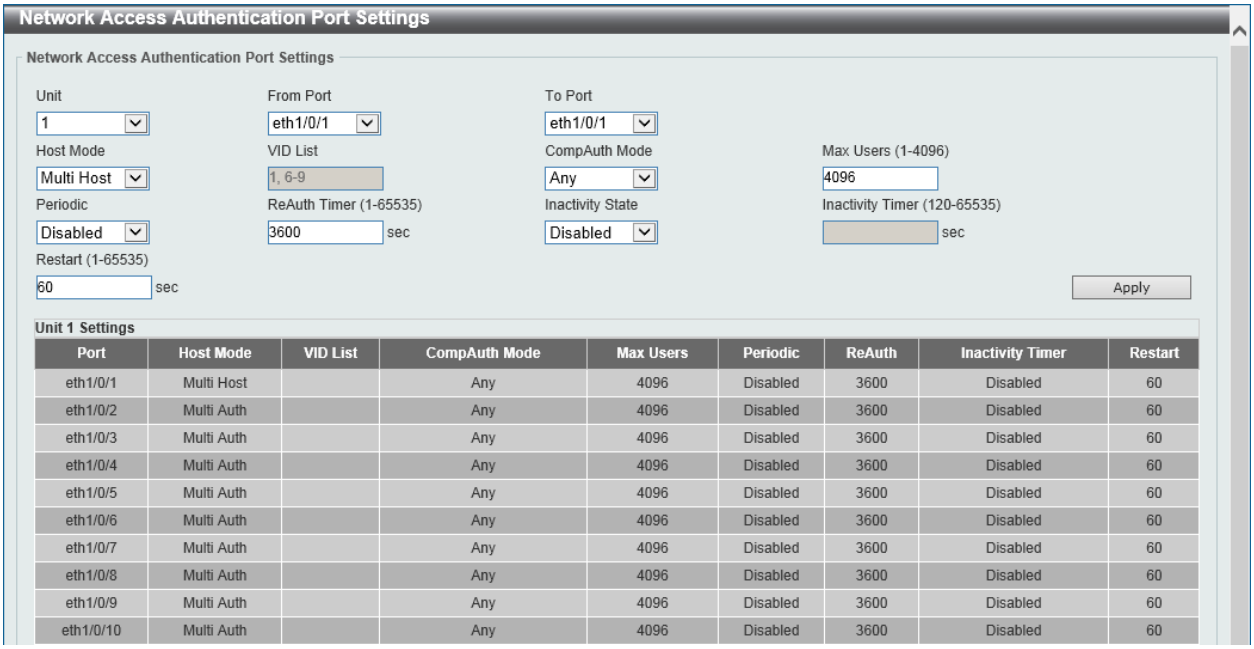



**Figure 9-71 Network Access Authentication Port Settings Window**

The fields that can be configured in **Network Access Authentication Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Host Mode** | Select the host mode option that will be associated with the selected port(s) here. Options to choose from are **Multi Host** and **Multi Auth**. If the port is operated in the multi-host mode, and if one of the hosts is authenticated, then all other hosts are allowed to access the port. According to 802.1X authentication, if the re-authentication fails or the authenticated user logs off, the port will be blocked for a quiet period. The port restores the processing of EAPOL packets after the quiet period. If the port is operated in the multi-authenticated mode, then each host needs to be authenticated individually to access the port. A host is represented by its MAC address. Only the authorized host is allowed to access. |
| **VID List** | After selecting the **Multi Auth** option as the **Host Mode**, the following |

| Parameter | Description |
|---|---|
| | parameter is available. Enter the VLAN ID used here. This is useful when different VLANs on the Switch have different authentication requirements. After the client is authenticated, the client will not be re-authenticated when received from other VLANs. This option is useful for trunk ports to do per-VLAN authentication control. When a port's authentication mode is changed to multi-host, the previous authentication VLAN(s) on this port will be cleared. |
| **CompAuth Mode** | Select the compound authentication mode option here. Options to choose from are **Any** and **MAC-WAC**. Selecting **Any** specifies that if any of the authentication method (802.1X, MAC-based Access Control or WAC) to passes, then pass. Selecting **MAC-WAC** specifies to verify MAC-based authentication first. If the client passes, WAC will be verified next. Both authentication methods need to be passed. |
| **Max Users** | Enter the maximum users value used here. This value must be between 1 and 4094. |
| **Periodic** | Select to enable or disable periodic re-authentication for the selected port here. This parameter only affects the 802.1X protocol. |
| **ReAuth Timer** | Enter the re-authentication timer value here. This value must be between 1 and 65535 seconds. By default, this value is 3600 seconds. |
| **Inactivity State** | Select to enable or disable the inactivity state here. Select the **Time** option to enable this feature. |
| **Inactivity Timer** | When the **Inactivity State** is enabled, enter the inactivity timer value here. This value must be between 120 and 65535 seconds. This parameter only affects the WAC authentication protocol. |
| **Restart** | Enter the restart time value used here. This value must be between 1 and 65535 seconds. |

Click the **Apply** button to accept the changes made.

# Network Access Authentication Sessions Information

This window is used to view and clear the network access authentication session information.

To view the following window, click **Security > Network Access Authentication > Network Access Authentication Sessions Information**, as shown below:

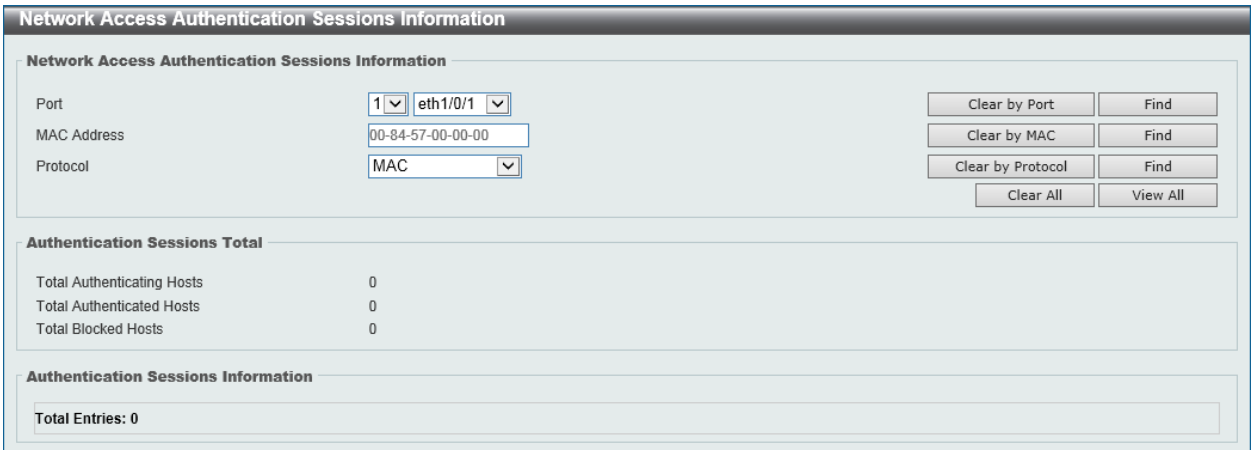



**Figure 9-72 Network Access Authentication Sessions Information Window**

The fields that can be configured in **Network Access Authentication Sessions Information** are described below:

| Parameter | Description |
|---|---|
| **Port** | Select the appropriate switch unit and port used for the query here. |
| **MAC Address** | Enter the MAC address used here. |
| **Protocol** | Select the protocol option used here. Options to choose from are **MAC**, **WAC**, and **DOT1X**. |

Click the **Clear by Port** button to the clear the information based on the port selected.

Click the **Clear by MAC** button to the clear the information based on the MAC address entered.

Click the **Clear by Protocol** button to the clear the information based on the protocol selected.

Click the **Clear All** button to clear all the information in this table.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to locate and display all the entries.

# Safeguard Engine

Periodically, malicious hosts on the network will attack the Switch by utilizing packet flooding (ARP Storm) or other methods. These attacks may increase the switch's CPU load beyond its capability. To alleviate this problem, the Safeguard Engine function was added to the Switch's software.

The Safeguard Engine can help the overall operability of the Switch by minimizing the workload of the Switch while the attack is ongoing, thus making it capable to forward essential packets over its network in a limited bandwidth.

If the CPU load rises above the rising threshold value, the Safeguard Engine function will be activated and the Switch will enter the exhausted mode. In the exhausted mode, the Switch will limit the bandwidth available for ARP and broadcast IP packets. If the CPU load falls below the falling threshold value, the Safeguard Engine will be deactivated and the Switch will exit the exhausted mode and enter the normal mode.

Packets that are destined to the CPU can be classified into three groups. These groups, otherwise known as sub-interfaces, are logical interfaces that the CPU will use to identify certain types of traffic. The three groups are **Protocol**, **Manage**, and **Route**. Generally, the **Protocol** group should receive the highest priority when the Switch's CPU processes received packets and the **Route** group should receive the lowest priority as the Switch's CPU usually does get involved in the processing of routing packets. In the **Protocol** group, packets are protocol control packets identified by the router. In the **Manage** group, packets are destined to any router or system network management interface by means of interactive access protocols, like Telnet and SSH. In the **Route** group, packets are identified as traversing routing packets that is generally processed by the router CPU.

In the following table a list of supported protocols are displayed with their respective sub-interfaces (groups):

| Protocol Name | Sub-interface (Group) | Description |
|---|---|---|
| **802.1X** | Protocol | Port-based Network Access Control |
| **ARP** | Protocol | Address resolution Protocol (ARP) |
| **DHCP** | Protocol | Dynamic Host Configuration Protocol |
| **DNS** | Protocol | Domain Name System |
| **GVRP** | Protocol | GARP VLAN Registration Protocol |

| Protocol Name | Sub-interface (Group) | Description |
|---|---|---|
| **ICMPv4** | Protocol | Internet Control Message Protocol |
| **ICMPv6-Neighbor** | Protocol | IPv6 Internet Control Message Protocol Neighbor Discovery Protocol (NS/NA/RS/RA) |
| **ICMPv6-Other** | Protocol | IPv6 Internet Control Message Protocol except Neighbor Discovery Protocol (NS/NA/RS/RA) |
| **IGMP** | Protocol | Internet Group Management Protocol |
| **LACP** | Protocol | Link Aggregation Control Protocol |
| **SNMP** | Manage | Simple Network Management Protocol |
| **SSH** | Manage | Secure Shell |
| **STP** | Protocol | Spanning Tree Protocol |
| **Telnet** | Manage | Telnet |
| **TFTP** | Manage | Trivial File Transfer Protocol |
| **Web** | Manage | Hypertext Transfer Protocol (HTTP) and Hypertext Transfer Protocol Secure (HTTPS) |

A customized rate limit (in packets per second) can be assigned to the Safeguard Engine's sub-interfaces as a whole or to individual protocols specified by the user in the management interface. Be careful when customizing the rate limit for individual protocols, using this function, as improper rate limits can cause the Switch to process packets abnormally.

**NOTE:** When Safeguard Engine is enabled, the Switch will allot bandwidth to various traffic flows (ARP, IP) using the FFP (Fast Filter Processor) metering table to control the CPU utilization and limit traffic. This may limit the speed of routing traffic over the network.

# Safeguard Engine Settings

This window is used to view and configure the safeguard engine settings.

To view the following window, click **Security > Safeguard Engine > Safeguard Engine Settings**, as shown below:

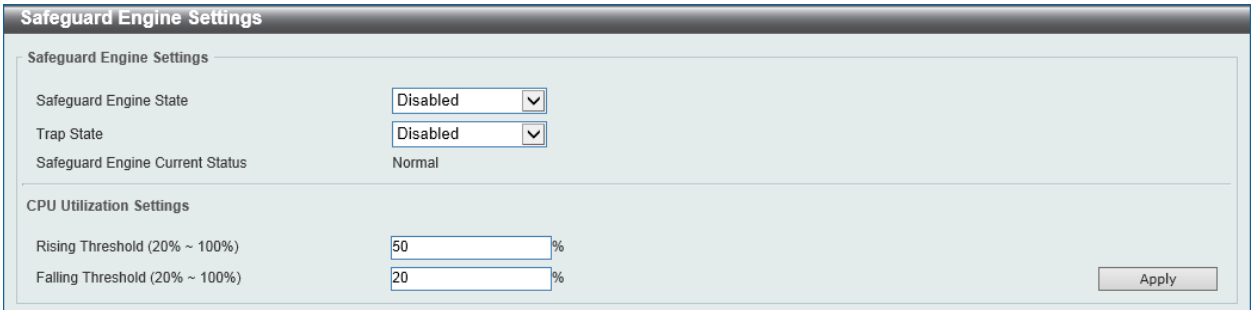



**Figure 9-73 Safeguard Engine Settings Window**

The fields that can be configured in **Safeguard Engine Settings** are described below:

| Parameter | Description |
|---|---|
| **Safeguard Engine State** | Select to enable or disable the safeguard engine feature here. |

| Parameter | Description |
|---|---|
| **Trap State** | Select to enable or disable the safeguard engine trap state here. |

The fields that can be configured in **CPU Utilization Settings** are described below:

| Parameter | Description |
|---|---|
| **Rising Threshold** | Enter the rising threshold value here. This value must be between 20% and 100%. This value is used to configure the acceptable level of CPU utilization before the Safeguard Engine mechanism is enabled. Once the CPU utilization reaches this percentage level, the Switch will move into Exhausted mode, based on the parameters provided in this window. |
| **Falling Threshold** | Enter the falling threshold value here. This value must be between 20% and 100%. This value is used to configure the acceptable level of CPU utilization as a percentage, where the Switch leaves the Safeguard Engine state and returns to normal mode. |

Click the **Apply** button to accept the changes made.

# CPU Protect Counters

This window is used to view and clear the CPU protection counter information.

To view the following window, click **Security > Safeguard Engine > CPU Protect Counters**, as shown below:

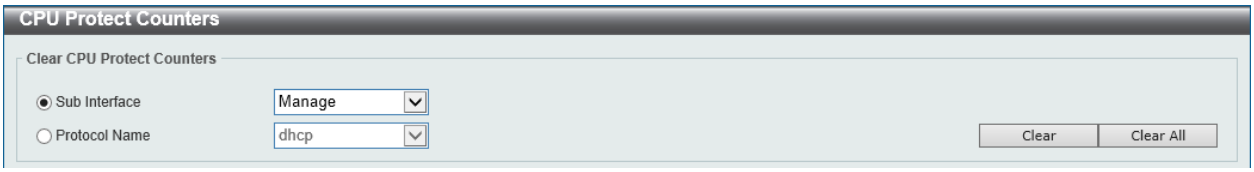



**Figure 9-74 CPU Protect Counters Window**

The fields that can be configured in **Clear CPU Protect Counters** are described below:

| Parameter | Description |
|---|---|
| **Sub Interface** | Select the sub-interface option here. Options to choose from are **Manage**, **Protocol**, **Route**, and **All**. This option specifies to clear the CPU protect related counters of sub-interfaces. |
| **Protocol Name** | Select the protocol name option here. |

Click the **Clear** button to clear the information based on the selections made.

Click the **Clear All** button to clear all the information in this table.

# CPU Protect Sub-Interface

This window is used to view and configure the CPU protection sub-interface settings.

To view the following window, click **Security > Safeguard Engine > CPU Protect Sub-Interface**, as shown below:

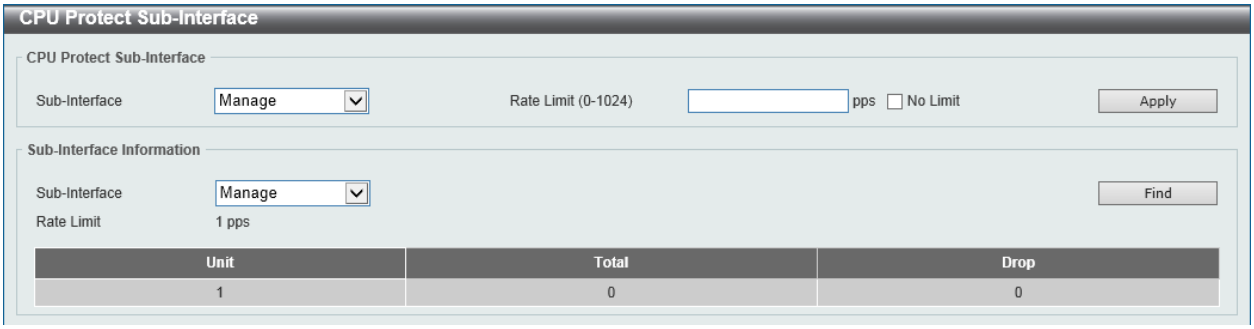



**Figure 9-75 CPU Protect Sub-Interface Window**

The fields that can be configured in **CPU Protect Sub-Interface** are described below:

| Parameter | Description |
|---|---|
| **Sub-Interface** | Select the sub-interface option here. Options to choose from are **Manage**, **Protocol**, and **Route**. |
| **Rate Limit** | Enter the rate limit value used here. This value must be between 0 and 1024 packets per second. Tick the **No Limit** option to disable the rate limit. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Sub-Interface Information** are described below:

| Parameter | Description |
|---|---|
| **Sub-Interface** | Select the sub-interface option here. Options to choose from are **Manage**, **Protocol**, and **Route**. |

Click the **Find** button to locate a specific entry based on the information entered.

# CPU Protect Type

This window is used to view and configure the CPU protection type settings.

To view the following window, click **Security > Safeguard Engine > CPU Protect Type**, as shown below:

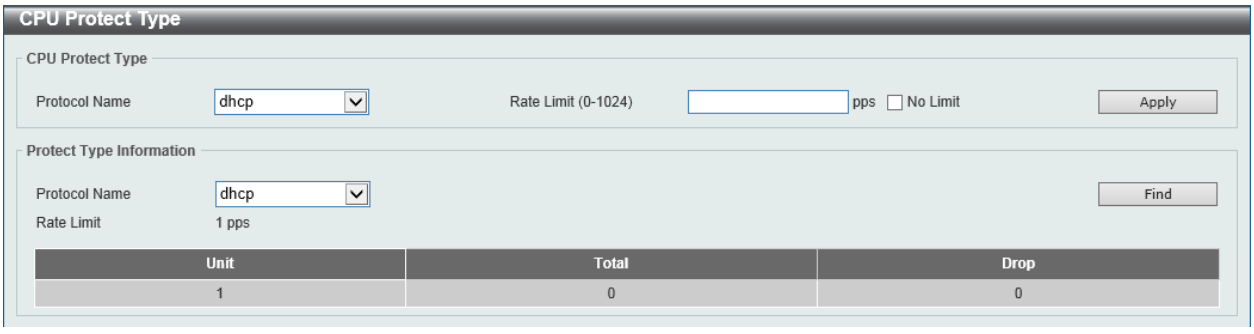



**Figure 9-76 CPU Protect Type Window**

The fields that can be configured in **CPU Protect Type** are described below:

| Parameter | Description |
|---|---|
| **Protocol Name** | Select the protocol name option here. |
| **Rate Limit** | Enter the rate limit value used here. This value must be between 0 and |

| Parameter | Description |
|---|---|
| | 1024 packets per second. Tick the **No Limit** option to disable the rate limit. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Protect Type Information** are described below:

| Parameter | Description |
|---|---|
| **Protocol Name** | Select the protocol name option here. |

Click the **Find** button to locate a specific entry based on the information entered.

# Trusted Host

This window is used to view and configure the trusted host settings.

To view the following window, click **Security > Trusted Host**, as shown below:

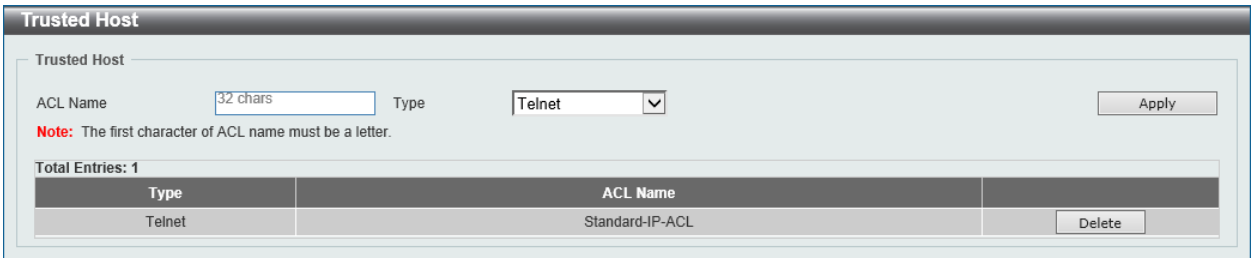



**Figure 9-77 Trusted Host Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **ACL Name** | Enter the access class' name here. This name can be up to 32 characters long. |
| **Type** | Select the trusted host type here. Options to choose from are **Telnet**, **SSH**, **Ping**, **HTTP**, and **HTTPS**. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specific entry.

# Traffic Segmentation Settings

This window is used to view and configure the traffic segmentation settings. When the traffic segmentation forwarding domain is specified, packets received by the port will be restricted in Layer 2 packet forwarding to interfaces within the domain. When the forwarding domain of a port is empty, Layer 2 forwarding for packets received by the port is not restricted.

The traffic segmentation member list can be comprised of different interface types, for example port and port-channel in the same forwarding domain. If the interfaces specified by the command include a port-channel, all the member ports of this port-channel will be included in the forwarding domain.

If the forwarding domain of an interface is empty, then there is no restriction on Layer 2 forwarding of packets received by the port.

To view the following window, click **Security > Traffic Segmentation Settings**, as shown below:

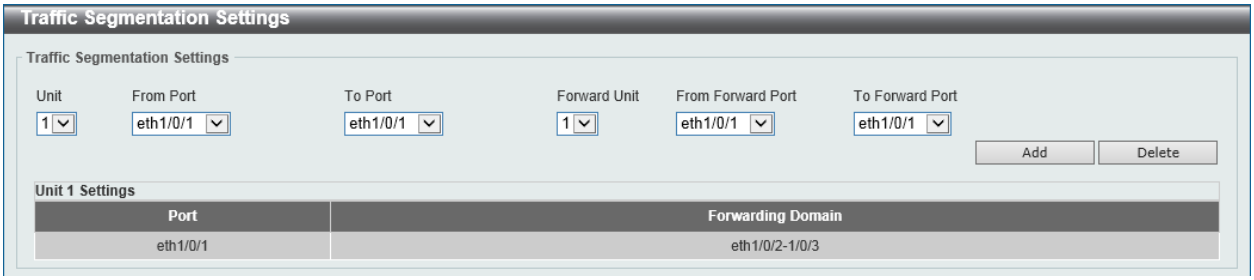



**Figure 9-78 Traffic Segmentation Settings Window**

The fields that can be configured in **Traffic Segmentation Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the receiving switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the receiving port range used for the configuration here. |
| **Forward Unit** | Select the forward switch unit that will be used for this configuration here. |
| **From Forward Port ~ To Forward Port** | Select the forward port range used for the configuration here. |

Click the **Add** button to add a new entry based on the information entered.

Click the **Delete** button to remove an entry based on the information entered.

# Storm Control

This window is used to view and configure the storm control settings.

To view the following window, click **Security > Storm Control**, as shown below:

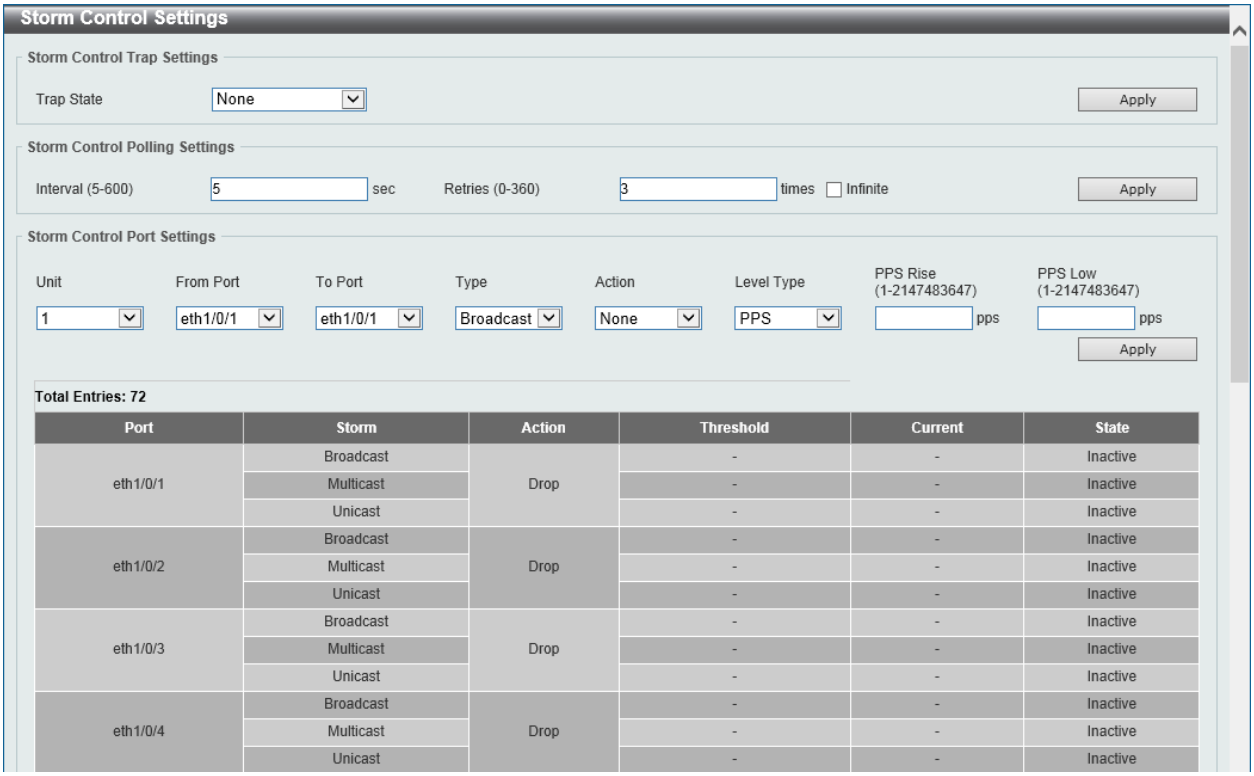



**Figure 9-79 Storm Control Window**

The fields that can be configured in **Storm Control Trap Settings** are described below:

| Parameter | Description |
|---|---|
| **Trap State** | Select the storm control trap option here. Options to choose from are **None**, **Storm Occur**, **Storm Clear**, and **Both**. When **None** is selected, no traps will be sent. When **Storm Occur** is selected, a trap notification will be sent when a storm event is detected. When **Storm Clear** is selected, a trap notification will be sent when a storm event is cleared. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Storm Control Polling Settings** are described below:

| Parameter | Description |
|---|---|
| **Interval** | Enter the interval value used here. This value must be between 5 and 600 seconds. By default, this value is 5 seconds. |
| **Retries** | Enter the retries value used here. This value must be between 0 and 360. By default, this value is 3. Tick the **Infinite** option to disable this feature. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Storm Control Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

| Parameter | Description |
|---|---|
| **Type** | Select the type of storm attack that will be controlled here. Options to choose from are **Broadcast**, **Multicast**, and **Unicast**. When the action is configured as the shutdown mode, the unicast refers to both known and unknown unicast packets; that is, if the known and unknown unicast packets hit the specified threshold, the port will be shutdown. Otherwise, unicast refers to unknown unicast packets. |
| **Action** | Select the action that will be taken here. Options to choose from are **None**, **Shutdown**, and **Drop**. Selecting **None** specifies not to filter the storm packets. Selecting **Shutdown** specifies to shut down the port when the value specified for rise threshold is reached. Selecting **Drop** specifies to discards packets that exceed the risen threshold. |
| **Level Type** | Select the level type option here. Options to choose from are **PPS**, **Kbps**, and **Level**. |
| **PPS Rise** | Enter the rise packets per second value here. This option specifies the rise threshold value in packets count per second. This value must be between 0 and 2147483647 packets per second. If the low PPS value is not specified, the default value is 80% of the specified risen PPS. |
| **PPS Low** | Enter the low packets per second value here. This option specifies the low threshold value in packets count per second. This value must be between 0 and 2147483647 packets per second. If the low PPS value is not specified, the default value is 80% of the specified risen PPS. |

Click the **Apply** button to accept the changes made.

After selecting the **Kbps** option as the **Level Type**, the following parameters are available.

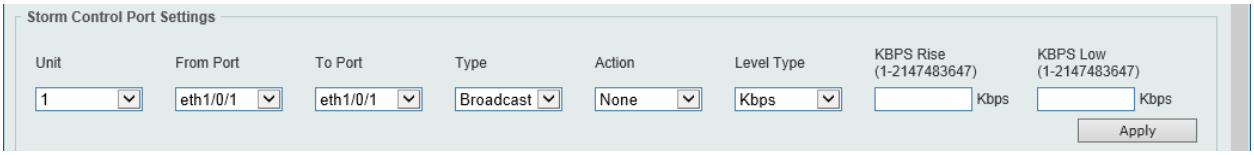



**Figure 9-80 Storm Control (Level Type - Kbps) Window**

The fields that can be configured in **Storm Control Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Type** | Select the type of storm attack that will be controlled here. Options to choose from are **Broadcast**, **Multicast**, and **Unicast**. When the action is configured as the shutdown mode, the unicast refers to both known and unknown unicast packets; that is, if the known and unknown unicast packets hit the specified threshold, the port will be shutdown. Otherwise, unicast refers to unknown unicast packets. |
| **Action** | Select the action that will be taken here. Options to choose from are **None**, **Shutdown**, and **Drop**.<br>• Selecting **None** specifies not to filter the storm packets.<br>• Selecting **Shutdown** specifies to shut down the port when the value specified for rise threshold is reached.<br>• Selecting **Drop** specifies to discards packets that exceed the risen threshold. |
| **Level Type** | Select the level type option here. Options to choose from are **PPS**, |

| Parameter | Description |
|---|---|
| | **Kbps**, and **Level**. |
| **KBPS Rise** | Enter the rise KBPS value used here. This option specifies the rise threshold value as a rate of kilobits per second at which traffic is received on the port. This value must be between 0 and 2147483647 Kbps. |
| **KBPS Low** | Enter the low KBPS value used here. This option specifies the low threshold value as a rate of kilobits per second at which traffic is received on the port. This value must be between 0 and 2147483647 Kbps. If the low KBPS is not specified, the default value is 80% of the specified risen KBPS. |

Click the **Apply** button to accept the changes made.

After selecting the **Level** option as the **Level Type**, the following parameters are available.

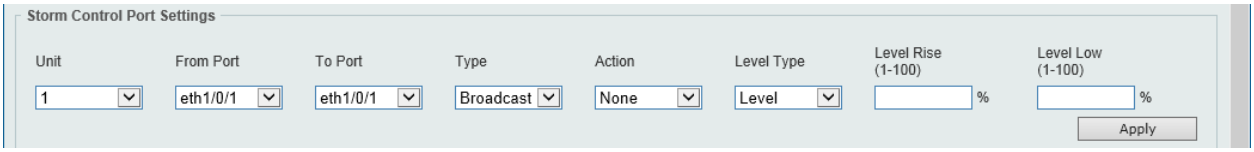



**Figure 9-81 Storm Control (Level Type - Level) Window**

The fields that can be configured in **Storm Control Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Type** | Select the type of storm attack that will be controlled here. Options to choose from are **Broadcast**, **Multicast**, and **Unicast**. When the action is configured as the shutdown mode, the unicast refers to both known and unknown unicast packets; that is, if the known and unknown unicast packets hit the specified threshold, the port will be shutdown. Otherwise, unicast refers to unknown unicast packets. |
| **Action** | Select the action that will be taken here. Options to choose from are **None**, **Shutdown**, and **Drop**.<br>• Selecting **None** specifies not to filter the storm packets.<br>• Selecting **Shutdown** specifies to shut down the port when the value specified for rise threshold is reached.<br>• Selecting **Drop** specifies to discards packets that exceed the risen threshold. |
| **Level Type** | Select the level type option here. Options to choose from are **PPS**, **Kbps**, and **Level**. |
| **Level Rise** | Enter the rise level value used here. This option specifies the rise threshold value as a percentage of the total bandwidth per port at which traffic is received on the port. This value must be between 0% and 100%. |
| **Level Low** | Enter the low level value used here. This option specifies the low threshold value as a percentage of the total bandwidth per port at which traffic is received on the port. This value must be between 0% and 100%. If the low level is not specified, the default value is 80% of the specified risen level. |

Click the **Apply** button to accept the changes made.

# DoS Attack Prevention Settings

This window is used to view and configure the Denial-of-Service (DoS) attack prevention settings. The following well-known DoS types which can be detected by most switches:

- **Land Attack:** This type of attack involves IP packets where the source and destination address are set to the address of the target device. It may cause the target device to reply to itself continuously.
- **Blat Attack**: This type of attack will send packets with the TCP/UDP source port equal to the destination port of the target device. It may cause the target device to respond to itself.
- **TCP-Null:** This type of attack involves port scanning by using specific packets which contain a sequence number of 0 and no flags.
- **TCP-Xmas:** This type of attack involves port scanning by using specific packets which contain a sequence number of 0 and the Urgent (URG), Push (PSH), and FIN flags.
- **TCP SYN-FIN:** This type of attack involves port scanning by using specific packets which contain SYN and FIN flags.
- **TCP SYN SrcPort Less 1024:** This type of attack involves port scanning by using specific packets which contain source port 0 to 1023 and SYN flag.
- **Ping of Death Attack:** A ping of death is a type of attack on a computer that involves sending a malformed or otherwise a malicious ping to a computer. A ping is normally 64 bytes in size (many computers cannot handle a ping larger than the maximum IP packet size which is 65535 bytes). The sending of a ping of this size can crash the target computer. Traditionally, this bug has been relatively easy to exploit. Generally, sending a 65536 byte ping packet is illegal according to networking protocol, but a packet of such a size can be sent if it is fragmented; when the target computer reassembles the packet, a buffer overflow can occur, which often causes a system crash.
- **TCP Tiny Fragment Attack:** The Tiny TCP Fragment attacker uses IP fragmentation to create extremely small fragments and force the TCP header information into a separate packet fragment to pass through the check function of the router and issue an attack.
- **All Types:** All of above types.

To view the following window, click **Security > DoS Attack Prevention Settings**, as shown below:

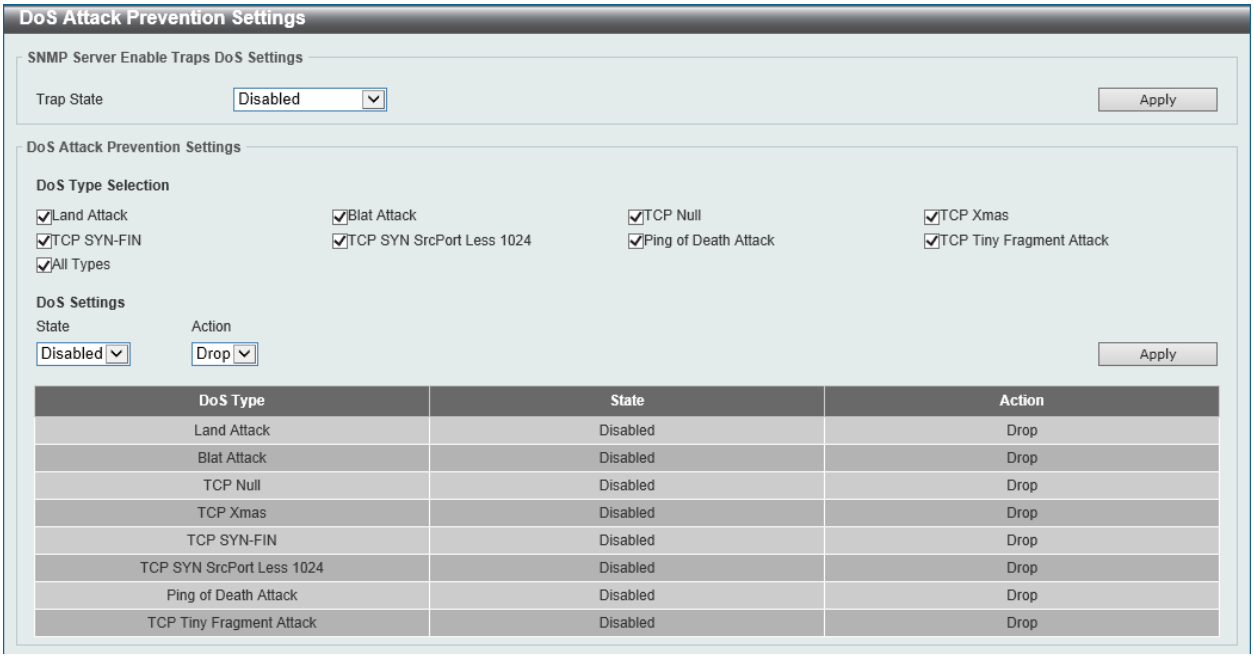



**Figure 9-82 DoS Attack Prevention Settings Window**

The fields that can be configured in **SNMP Server Enable Traps DoS Settings** are described below:

| Parameter | Description |
|---|---|
| **Trap State** | Select to enable or disable the DoS attack prevention trap state here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **DoS Attack Prevention Settings** are described below:

| Parameter | Description |
|---|---|
| **DoS Type Selection** | Tick the DoS type option that will be prevented here. |
| **State** | Select to enable or disable the DoS attack prevention feature's global state here. |
| **Action** | Select the action that will be taken when the DoS attack was detected here. The only option to select here is **Drop**. |

Click the **Apply** button to accept the changes made.

# SSH

Secure Shell (SSH) is a program allowing secure remote login and secure network services over an insecure network. It allows a secure login to remote host computers, a safe method of executing commands on a remote end node, and will provide secure encrypted and authenticated communication between two non-trusted hosts. SSH, with its array of unmatched security features is an essential tool in today's networking environment. It is a powerful guardian against numerous existing security hazards that now threaten network communications.

The steps required to use the SSH protocol for secure communication between a remote PC (the SSH client) and the Switch (the SSH server) are as follows:

- Create a user account with admin-level access using the User Accounts window. This is identical to creating any other admin-level User Account on the Switch, including specifying a password. This password is used to logon to the Switch, once a secure communication path has been established using the SSH protocol.
- Configure the User Account to use a specified authorization method to identify users that are allowed to establish SSH connections with the Switch using the SSH User Authentication Mode window. There are three choices as to the method SSH will use to authorize the user, which are Host Based, Password, and Public Key.
- Configure the encryption algorithm that SSH will use to encrypt and decrypt messages sent between the SSH client and the SSH server, using the SSH Authentication Method and Algorithm Settings window.
- Finally, enable SSH on the Switch using the SSH Configuration window.

After completing the preceding steps, a SSH Client on a remote PC can be configured to manage the Switch using a secure, in band connection.

## SSH Global Settings

This window is used to view and configure the SSH global settings.

To view the following window, click **Security > SSH > SSH Global Settings**, as shown below:

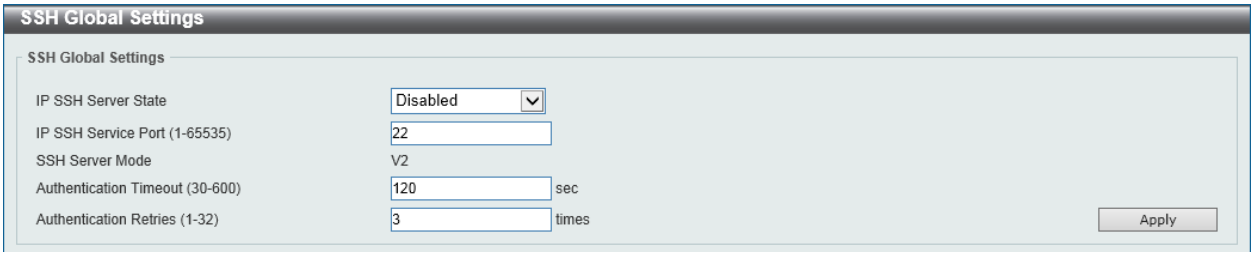



**Figure 9-83 SSH Global Settings Window**

The fields that can be configured in **SSH Global Settings** are described below:

| Parameter | Description |
|---|---|
| **IP SSH Server State** | Select to enable or disable the SSH server's global state. |
| **IP SSH Service Port** | Enter the SSH service port number used here. This value must be between 1 and 65535. By default, this number is 22. |
| **Authentication Timeout** | Enter the authentication timeout value here. This value must be between 30 and 600 seconds. By default, this value is 120 seconds. |
| **Authentication Retries** | Enter the authentication retries value here. This value must be between 1 and 32. By default, this value is 3. |

Click the **Apply** button to accept the changes made.

# Host Key

This window is used to view and generate the SSH host key.

To view the following window, click **Security > SSH > Host Key**, as shown below:

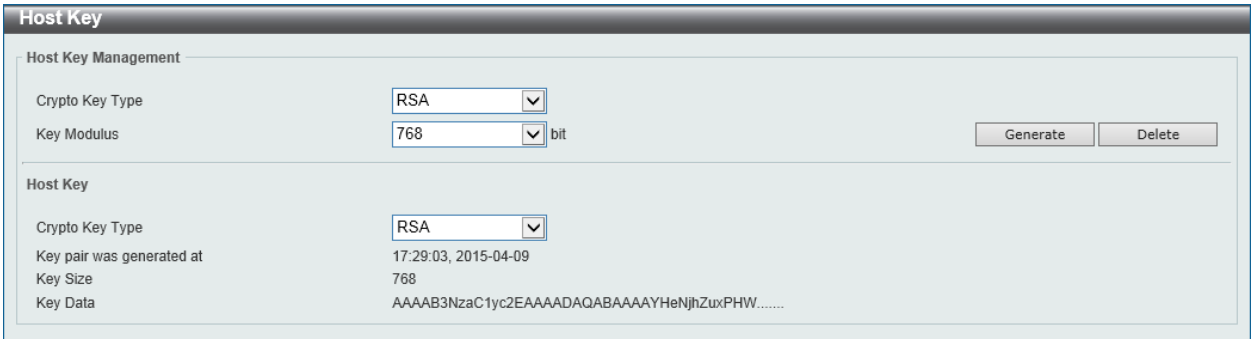



**Figure 9-84 Host Key Window**

The fields that can be configured in **Host Key Management** are described below:

| Parameter | Description |
|---|---|
| **Crypto Key Type** | Select the crypto key type used here. Options to choose from are the Rivest Shamir Adleman (**RSA**) key type and the Digital Signature Algorithm (**DSA**) key type. |
| **Key Modulus** | Select the key modulus value here. Options to choose from are **360**, **512**, **768**, **1024**, and **2048** bit. |

Click the **Generate** button to generate a host key based on the selections made.

Click the **Delete** button to remove a host key based on the selections made.

The fields that can be configured in **Host Key** are described below:

| Parameter | Description |
|---|---|
| **Crypto Key Type** | Select the crypto key type used here. Options to choose from are the Rivest Shamir Adleman (**RSA**) key type and the Digital Signature Algorithm (**DSA**) key type. |

Click the **Apply** button to accept the changes made.

After clicking the **Generate** button, the following window will appear:

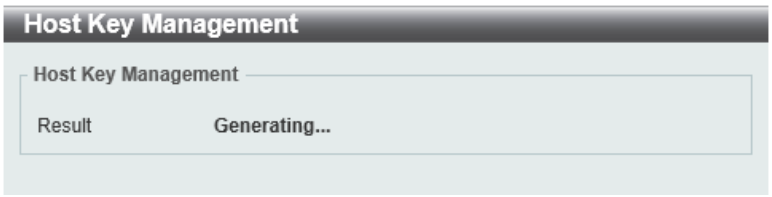



**Figure 9-85 Host Key (Generating) Window**

After the key was successfully generated, the following window will appear.

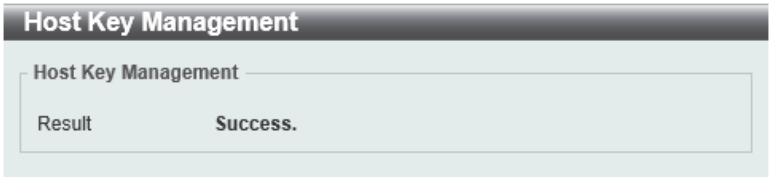



**Figure 9-86 Host Key (Generating, Success) Window**

# SSH Server Connection

This window is used to view the SSH server connections table.

To view the following window, click **Security > SSH > SSH Server Connection**, as shown below:


**Figure 9-87 SSH Server Connection Window**

# SSH User Settings

This window is used to view and configure the SSH user settings.

To view the following window, click **Security > SSH > SSH User Settings**, as shown below:

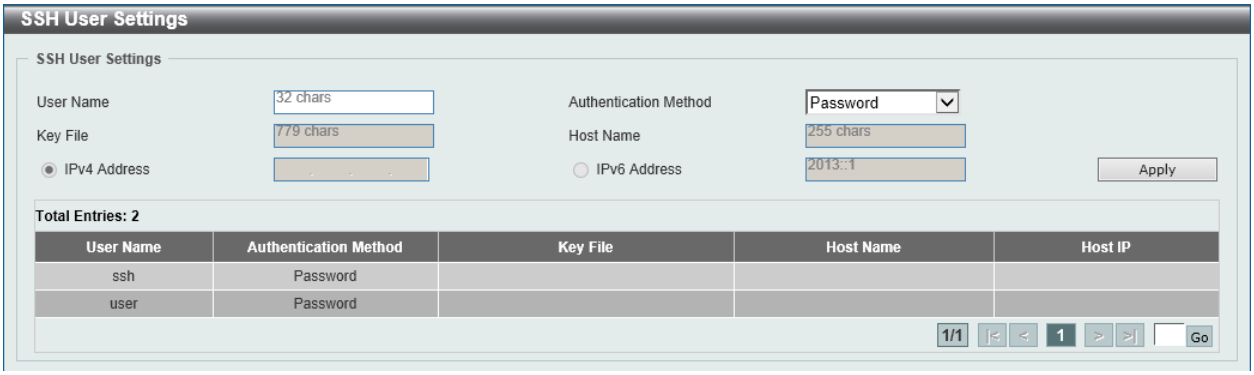



**Figure 9-88 SSH User Settings Window**

The fields that can be configured in **SSH User Settings** are described below:

| Parameter | Description |
|---|---|
| **User Name** | Enter the SSH user's username used here. This name can be up to 32 characters long. |
| **Authentication Method** | Select the authentication methods used here. Options to choose from are **Password**, **Public Key**, and **Host-based**. |
| **Key File** | After selecting the **Public Key** or **Host-based** option as the **Authentication Method**, enter the public key here. |
| **Host Name** | After selecting the **Host-based** option as the **Authentication Method**, enter the host name here. |
| **IPv4 Address** | After selecting the **Host-based** option as the **Authentication Method**, select and enter the IPv4 address here. |
| **IPv6 Address** | After selecting the **Host-based** option as the **Authentication Method**, select and enter the IPv6 address here. |

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# SSL

Secure Sockets Layer (SSL) is a security feature that will provide a secure communication path between a host and client through the use of authentication, digital signatures and encryption. These security functions are implemented through the use of a cipher suite, which is a security string that determines the exact cryptographic parameters, specific encryption algorithms and key sizes to be used for an authentication session and consists of three levels:

- **Key Exchange:** The first part of the Cipher suite string specifies the public key algorithm to be used. This switch utilizes the Rivest Shamir Adleman (RSA) public key algorithm and the Digital Signature Algorithm (DSA), specified here as the DHE DSS Diffie-Hellman (DHE) public key algorithm. This is the first authentication process between client and host as they "exchange keys" in looking for a match and therefore authentication to be accepted to negotiate encryptions on the following level.
- **Encryption:** The second part of the cipher suite that includes the encryption used for encrypting the messages sent between client and host. The Switch supports two types of cryptology algorithms:
  - **Stream Ciphers** - There are two types of stream ciphers on the Switch, RC4 with 40-bit keys and RC4 with 128-bit keys. These keys are used to encrypt messages and need to be consistent between client and host for optimal use.
  - **CBC Block Ciphers** - CBC refers to Cipher Block Chaining, which means that a portion of the previously encrypted block of encrypted text is used in the encryption of the current block. The

Switch supports the 3DES EDE encryption code defined by the Data Encryption Standard (DES) to create the encrypted text.

- **Hash Algorithm:** This part of the cipher suite allows the user to choose a message digest function which will determine a Message Authentication Code. This Message Authentication Code will be encrypted with a sent message to provide integrity and prevent against replay attacks. The Switch supports two hash algorithms, MD5 (Message Digest 5) and SHA (Secure Hash Algorithm).

These three parameters are uniquely assembled in four choices on the Switch to create a three-layered encryption code for secure communication between the server and the host. The user may implement any one or combination of the cipher suites available, yet different cipher suites will affect the security level and the performance of the secured connection. The information included in the cipher suites is not included with the Switch and requires downloading from a third source in a file form called a certificate. This function of the Switch cannot be executed without the presence and implementation of the certificate file and can be downloaded to the Switch by utilizing a TFTP server. The Switch supports SSLv3. Other versions of SSL may not be compatible with this Switch and may cause problems upon authentication and transfer of messages from client to host.

When the SSL function has been enabled, the web will become disabled. To manage the Switch through the web based management while utilizing the SSL function, the web browser must support SSL encryption and the header of the URL must begin with https://. (Ex. https://xx.xx.xx.xx) Any other method will result in an error and no access can be authorized for the web-based management.

Users can download a certificate file for the SSL function on the Switch from a TFTP server. The certificate file is a data record used for authenticating devices on the network. It contains information on the owner, keys for authentication and digital signatures. Both the server and the client must have consistent certificate files for optimal use of the SSL function. The Switch only supports certificate files with .der file extensions. Currently, the Switch comes with a certificate pre-loaded though the user may need to download more, depending on user circumstances.

# SSL Global Settings

This window is used to view and configure the SSL feature's global settings.

To view the following window, click **Security > SSL > SSL Global Settings**, as shown below:

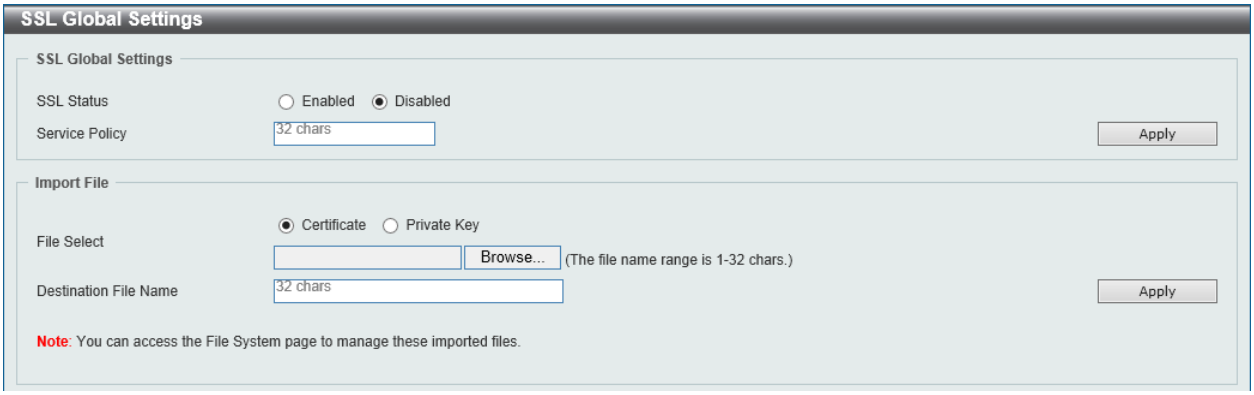



**Figure 9-89 SSL Global Settings Window**

The fields that can be configured in **SSL Global Settings** are described below:

| Parameter | Description |
|---|---|
| **SSL Status** | Select to enable or disable the SSL feature's global status here. |
| **Service Policy** | Enter the service policy name here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Import File** are described below:

| Parameter | Description |
|---|---|
| **File Select** | Select the file type that will be loaded here. Options to choose from are **Certificate** and **Private Key**. After selecting the file type, browse to the appropriate file, located on the local computer, by pressing the **Browse** button. |
| **Destination File Name** | Enter the destination file name used here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

# Crypto PKI Trustpoint

This window is used to view and configure the crypto PKI trust point settings.

To view the following window, click **Security > SSL > Crypto PKI Trustpoint**, as shown below:

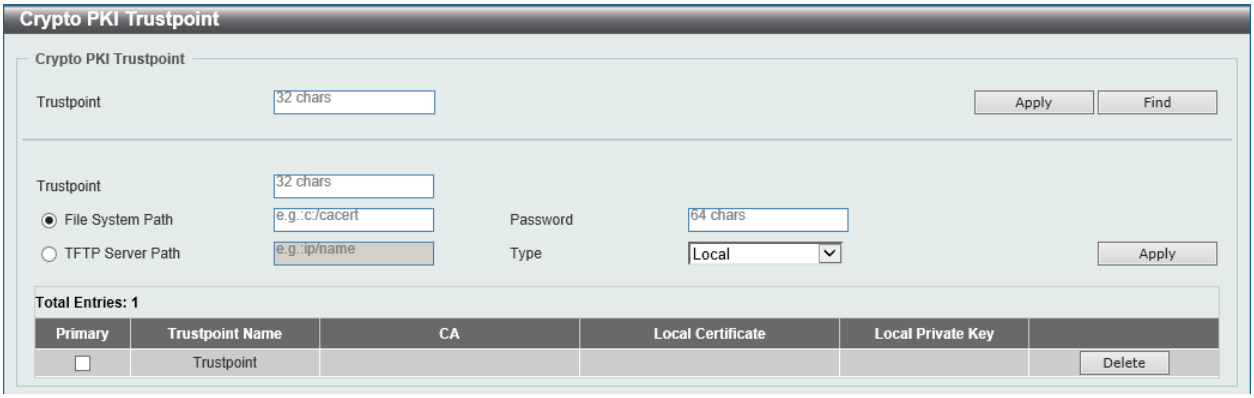



**Figure 9-90 Crypto PKI Trustpoint Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Trustpoint** | Enter the name of the trust-point that is associated with the imported certificates and key pairs here. This name can be up to 32 characters long. |
| **File System Path** | Enter the file system path for certificates and key pairs here. |
| **Password** | Enter the encrypted password phrase that is used to undo encryption when the private keys are imported here. The password phrase is a string of up to 64 characters. If the password phrase is not specified, the NULL string will be used. |
| **TFTP Server Path** | Enter the TFTP server's path here. |
| **Type** | Select the type of certificate that will be imported here. Options to choose from are **Both**, **CA**, and **Local**.<br>• Selecting **Both** specifies to import the CA certificate, local certificate and key pairs.<br>• Selecting **CA** specifies to import the CA certificate only.<br>• Selecting **Local** specifies to import local certificate and key pairs only. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete** button to remove the specified entry.

# SSL Service Policy

This window is used to view and configure the SSL service policy settings.

To view the following window, click **Security > SSL > SSL Service Policy**, as shown below:

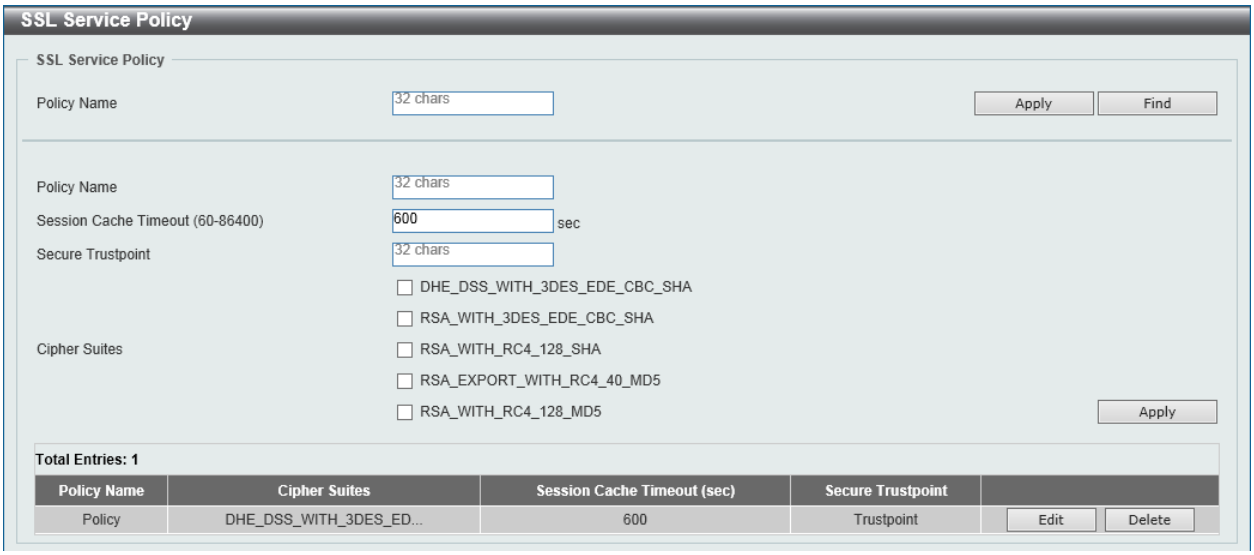



**Figure 9-91 SSL Service Policy Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Policy Name** | Enter the SSL service policy name here. This name can be up to 32 characters long. |
| **Session Cache Timeout** | Enter the session cache timeout value used here. This value must be between 60 and 86400 seconds. By default, this value is 600 seconds. |
| **Secure Trustpoint** | Enter the secure trust point's name here. This name can be up to 32 characters long. |
| **Cipher Suites** | Select the cipher suites that will be associated with this profile here. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Edit** button to re-configure the specific entry.

Click the **Delete** button to remove the specified entry.

# SFTP Server Settings

This window is used to view and configure the Secure File Transfer Protocol (SFTP) server's settings. SFTP is a remotely secure file transfer protocol over a reliable data stream. Because SFTP itself does not provide authentication and security, the SFTP server runs as a sub-system of the SSH server.

To view the following window, click **Security > SFTP Server Settings**, as shown below:

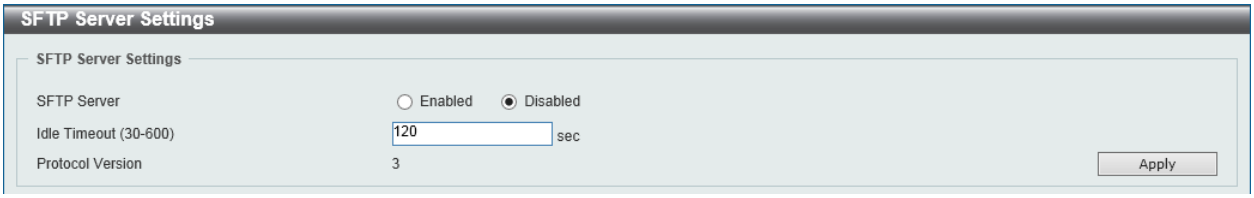



**Figure 9-92 SFTP Server Settings Window**

The fields that can be configured in **SFTP Server Settings** are described below:

| Parameter | Description |
|---|---|
| **SFTP Server** | Select to globally enable or disable the SFTP server feature here. |
| **Idle Timeout** | Enter the idle timeout value here. If the SFTP server detects no operation after the duration of the idle timer for a specific SFTP session, the switch will close this SFTP session. The range is from 30 to 600 seconds. By default, this value is 120 seconds. |

Click the **Apply** button to accept the changes made.

# 10. OAM

***CFM***
***Cable Diagnostics***
***Ethernet OAM***
***DDM***

## CFM

### CFM Settings

This window is used to view and configure the Connectivity Fault Management (CFM) feature's settings.

To view the following window, click **OAM > CFM > CFM Settings**, as shown below:

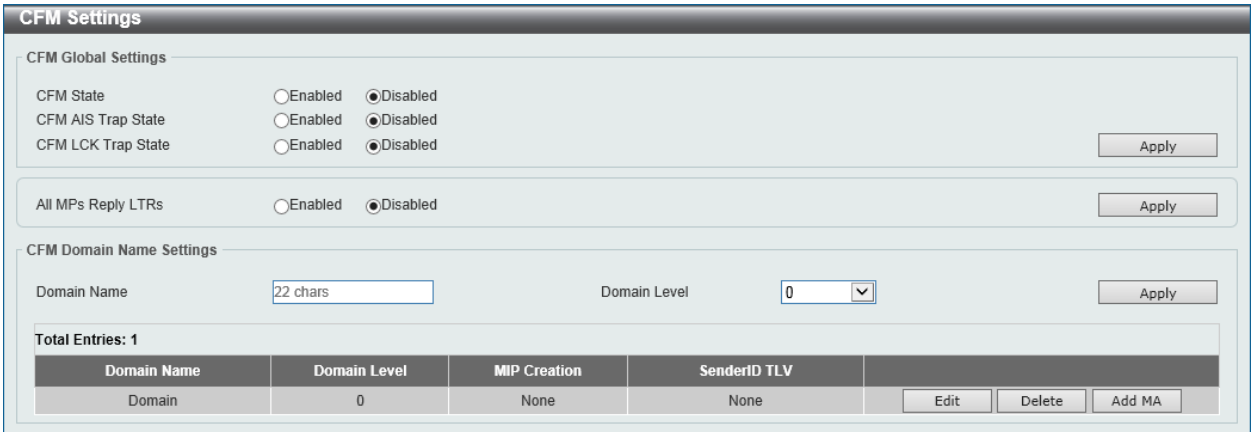



**Figure 10-1 CFM Settings Window**

The fields that can be configured in **CFM Global Settings** are described below:

| Parameter | Description |
|---|---|
| **CFM State** | Select to globally enable or disable the CFM feature here. |
| **CFM AIS Trap State** | Select to enable or disable the CFM Alarm Indication Signal (AIS) trap feature here. If the trap status of AIS is enabled, once an ETH-AIS event occurs or an ETH-AIS event clears, a trap will be sent out. |
| **CFM LCK Trap State** | Select to enable or disable the CFM Locked Signal (LCK) trap feature here. If the trap status of LCK is enabled, once an ETH-LCK event occurs or an ETH-LCK event clears, a trap will be sent out. |
| **All MPs Reply LTRs** | Select to enable or disable the all MPs Linktrace Reply (LTR) feature here. According to IEEE 802.1ag, a Bridge replies with one LTR to a Linktrace Message (LTM). This feature can make all MPs on an LTM's forwarding path reply with LTRs, whether they are on a Bridge or not. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **CFM Domain Name Settings** are described below:

| Parameter | Description |
|---|---|
| **Domain Name** | Enter the Maintenance Domain's (MD's) name here. This name can be up to 22 characters long. The name does not allow spaces. Each MD has a unique name amongst all those used or available to a service |

| Parameter | Description |
|---|---|
| | provider or operator. It facilitates easy identification of administrative responsibility for each maintenance domain. |
| **Domain Level** | Enter the Maintenance Domain's (MD's) level here. The range is from 0 to 7. A unique MD level is assigned to define the hierarchical relationship between domains. The larger range of domain has the higher value of level. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Click the **Add MA** button to add a new Maintenance Association (MA) rule.

After clicking the **Edit** button, the following page will appear.

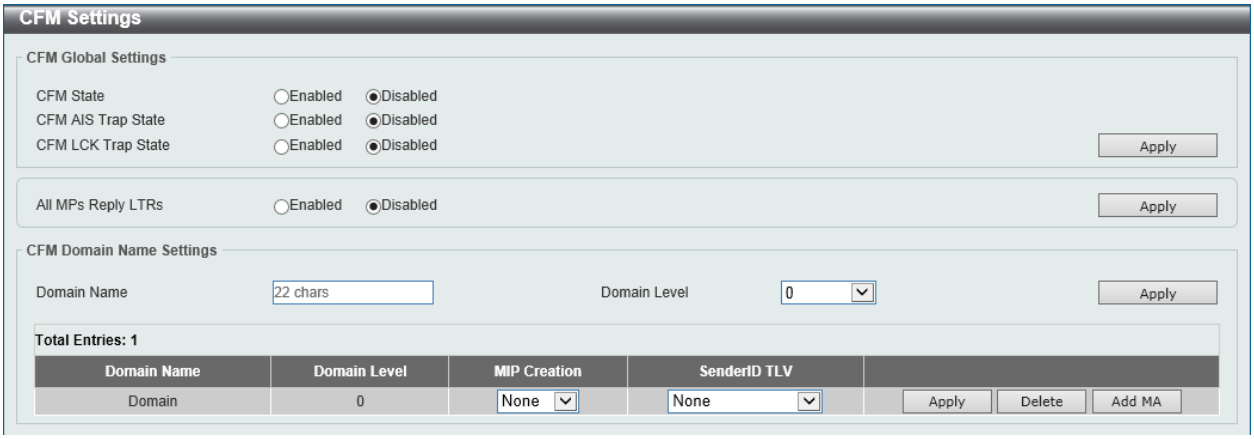



**Figure 10-2 CFM Settings (Edit) Window**

The fields that can be configured in the table are described below:

| Parameter | Description |
|---|---|
| **MIP Creation** | Select the Maintenance domain Intermediate Point (MIP) option here. The creation of MIPs on a maintenance domain is useful for tracing the link, MIP by MIP. It also allows the user to perform a loopback from an MEP to an MIP. An enumerated value indicates whether the management entity can create MIP Half Functions (MHF) for a maintenance domain.<br>Options to choose from are **None**, **Auto**, and **Explicit**.<br>• **None:** Specifies not to create the MIP for a maintenance domain.<br>• **Auto:** Specifies that MIPs will always be created on any port in this maintenance domain, if that port is not configured as an MEP of this maintenance domain. For an intermediate switch in an MA, the setting must be automatically in order for the MIPs to be created on this device.<br>• **Explicit:** Specifies that MIPs can be created on ports that has an existing lower level MEP configured on it and that the port is not configured as an MEP of this maintenance domain. |
| **SenderID TLV** | This option is used to configure the default transmission of the sender ID TLV by MPs in an MD. Select one of the following options:<br>• **None:** Specifies not to transmit the sender ID TLV.<br>• **Chassis:** Specifies to transmit the sender ID TLV with the chassis ID information. |

| Parameter | Description |
|---|---|
| | • **Manage:** Specifies to transmit the sender ID TLV with the managed address information.<br>• **Chassis-Manage:** Specifies to transmit the sender ID TLV with the chassis ID information and the managed address information. |

Click the **Apply** button to accept the changes made.

After clicking the **Add MA** button, the following page will appear.


**Figure 10-3 CFM Settings (Add MA) Window**

The fields that can be configured in **CFM MA Settings** are described below:

| Parameter | Description |
|---|---|
| **MA Name** | Enter the Maintenance Association (MA) entry's name here. This name can be up to 22 characters long. Each MA in an MD must have a unique MA name. MAs configured in different MDs may have the same MA identifier. When the MA entry is deleted, the configuration on it is also deleted. |
| **MA VID** | Enter the Maintenance Association (MA) entry's VLAN ID here. The range is from 1 to 4094. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Click the **Add MEP** button to add a new Maintenance association End Point (MEP) entry.

After clicking the **Edit** button, the following page will appear.


**Figure 10-4 CFM Settings (Add MA, Edit) Window**

The fields that can be configured in the table are described below:

| Parameter | Description |
|---|---|
| **MIP Creation** | This option is used to configure the MIP creation for an MA. Select one of the following options:<br>• **None:** Specifies not to create the MIP on ports in an MA.<br>• **Auto:** Specifies that MIPs can always be created on any port in an MA, if that port is not configured with an MEP of this MA. For an intermediate switch in an MA, the setting must be automatic in order for the MIPs to be created on this device.<br>• **Explicit:** Specifies that MIPs can be created on ports which has an existing lower level MEP configured on it, and that port is not configured with an MEP of this MA.<br>• **Defer:** Specifies to inherit the settings configured for the maintenance domain that the MA is associated with. This is the default value. |
| **CCM Interval** | Select the Continuity Check Message (CCM) interval value here. Options to choose from are **100ms**, **1sec**, **10sec**, **1min**, and **10min**. An MEP will transmit a CCM packet periodically across the MA. The CCM interval indicates the interval at which CCMs are sent by a MEP in a MA. |
| **SenderID TLV** | This option is used to configure the transmission of the sender ID TLV by MPs for an MA. Select one of the following options:<br>• **None:** Specifies not to transmit the sender ID TLV. In the CFM hardware mode, the value is fixed to none.<br>• **Chassis:** Specifies to transmit the sender ID TLV with the chassis ID information.<br>• **Manage:** Specifies to transmit the sender ID TLV with the managed address information.<br>• **Chassis-Manage:** Specifies to transmit the sender ID TLV with the chassis ID information and the managed address information.<br>• **Defer:** Specifies to inherit the setting configured for the maintenance domain that the MA is associated with. This is the default value. |
| **MEPID List** | Enter the Maintenance association End Point's (MEP's) ID contained in the MA here. The range is from 1 to 8191. |

Click the **Apply** button to accept the changes made.

After clicking the **Add MEP** button, the following page will appear.

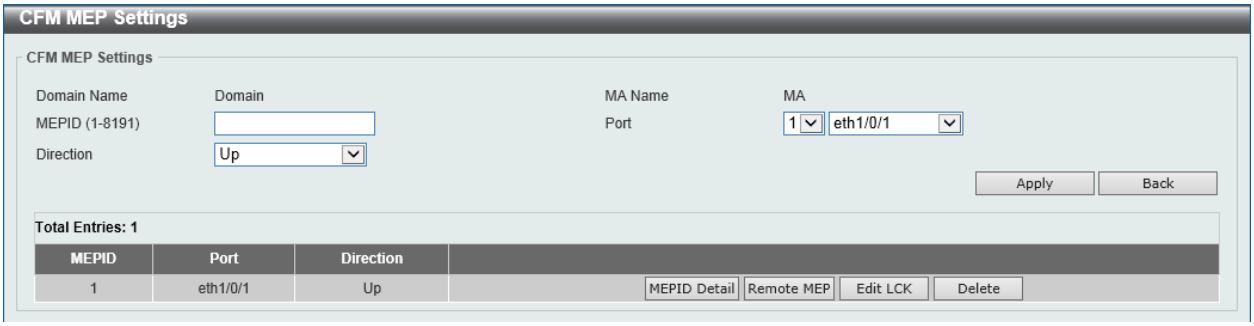



**Figure 10-5 CFM Settings (Add MA, Add MEP) Window**

The fields that can be configured in **CFM MEP Settings** are described below:

| Parameter | Description |
|---|---|
| **MEPID** | Enter the MEP's ID here. The range is from 1 to 8191. Each MEP configured in the same MA must have a unique MEP ID. The MEP on different MA can have the same MEPID. Before creating a MEP, its MEP ID should be configured in the MA's MEP ID list. |
| **Port** | Select the switch's unit ID and port number that will be used here. |
| **Direction** | Select the direction of the MEP here. Options to choose from are **Up** and **Down**.<br>• **Up:** Specifies to create an inward facing (up) MEP.<br>• **Down:** Specifies to create an outward facing (down) MEP. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

Click the **MEPID Detail** button to view more detailed information about the specified MEP.

Click the **Remove MEP** button to view the remove MEP table.

Click the **Edit LCK** button to modify the LCK settings of the specified entry.

Click the **Delete** button to delete the specified entry.

After clicking the **MEPID Detail** button, the following page will appear.

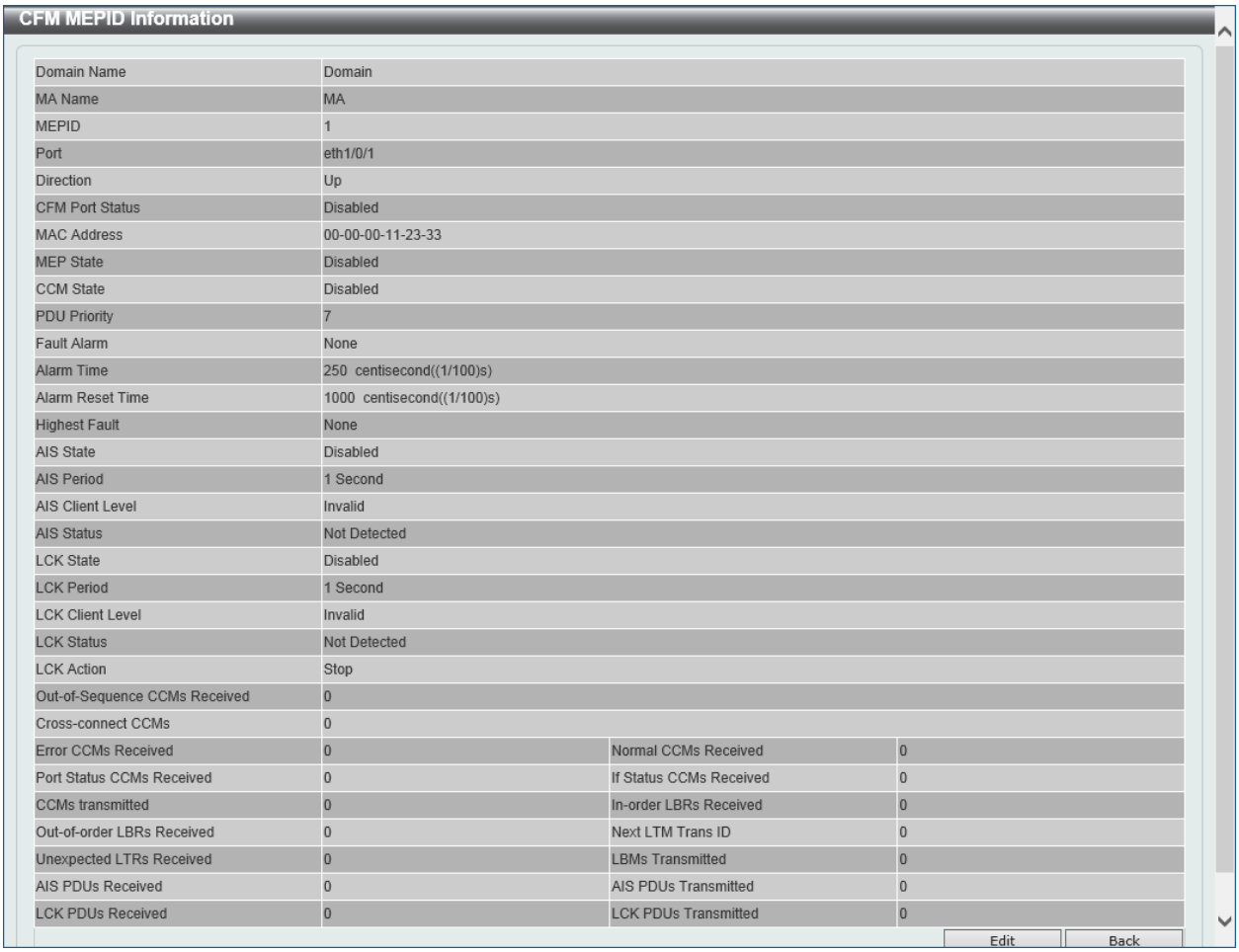



**Figure 10-6 CFM Settings (Add MA, Add MEP, MEPID Detail) Window**

Click the **Edit** button to modify the specified entry.

Click the **Back** button to return to the previous window.

After clicking the **Edit** button, the following page will appear.

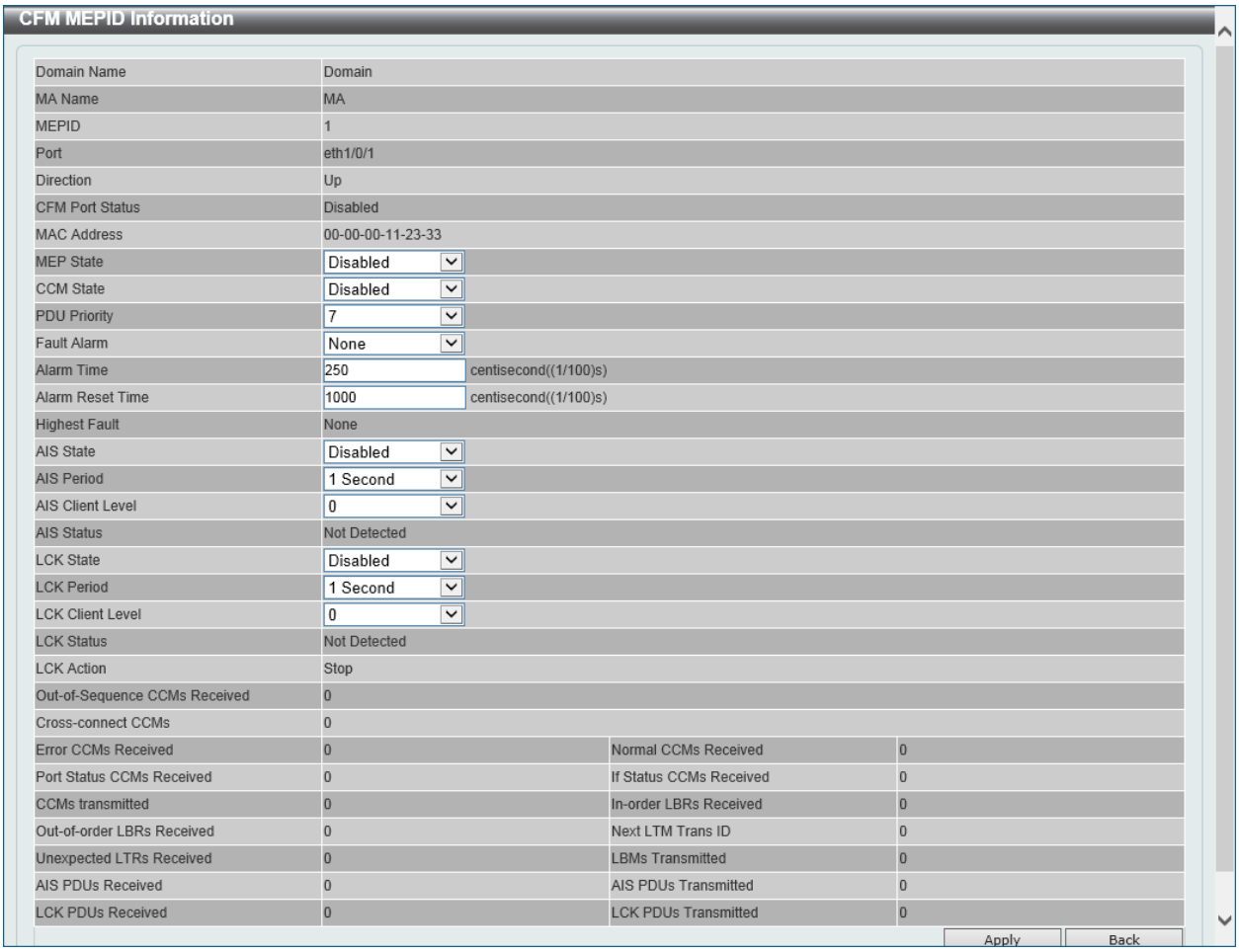



**Figure 10-7 CFM Settings (Add MA, Add MEP, MEPID Detail, Edit) Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **MEP State** | Select to enable or disable the MEP's state on the interface here. |
| **CCM State** | Select to enable or disable the CCM feature's state here. |
| **PDU Priority** | Select the PDU priority value here. The range is from 0 to 7. This feature is used to define the 802.1p priority that is set in the CCM and the LTM messages transmitted by the MEP. |
| **Fault Alarm** | Select the type of fault alarms that will be sent by this MEP. Options to choose from are **None**, **All**, **MAC-Status**, **Remote-CCM**, **Error-CCM**, and **XCON-CCM**.<br>• **None:** Specifies that no fault alarm will be sent.<br>• **All:** Specifies that all types of fault alarms will be sent.<br>• **MAC-Status:** Specifies that only the fault alarms whose priority is equal to or higher than "Some Remote MEP MAC Status Errors" will be sent.<br>• **Remote-CCM:** Specifies that only the fault alarms whose priority is equal to or higher than "Some Remote MEPs Down" will be sent. |

| Parameter | Description |
|---|---|
| | • **Error-CCM:** Specifies that only the fault alarms whose priority is equal to or higher than “Error CCM Received” will be sent.<br>• **XCON-CCM:** Specifies that only the fault alarms whose priority is equal to or higher than “Cross-connect CCM Received” will be sent. |
| **Alarm Time** | Enter the time period to control when a fault alarm will be sent if a defect is reported continuously here. The range is from 250 to 1000 centiseconds. By default, this value is 250 centiseconds. |
| **Alarm Reset Time** | Enter the time period to reset the fault alarm if a defect has not been reported since the last defect report here. The range is from 250 to 1000 centiseconds. By default, this value is 1000 centiseconds. |
| **AIS State** | Select the enable or disable the AIS feature on this interface here. |
| **AIS Period** | Select the transmitting interval of the AIS PDU here. Options to choose from are **1 Seconds** and **1 Minute**. The default period is 1 second. |
| **AIS Client Level** | Select the client level ID to which the MEP sends the AIS PDUs here. The default client MD level is that the most immediate client layer Maintenance domain Intermediate Points (MIP) and MEPs exist on. The range is from 0 to 7. |
| **LCK State** | Select the enable or disable the LCK feature on this interface here. |
| **LCK Period** | Select the transmitting interval of the LCK PDU here. Options to choose from are **1 Seconds** and **1 Minute**. The default period is 1 second. |
| **LCK Client Level** | Select the client level ID to which the MEP sends the LCK PDU here. The default client MD level is the MD level that the most immediate client layer MIPs and MEPs exist on. The range is from 0 to 7. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

After clicking the **Remote MEP** button, the following page will appear.

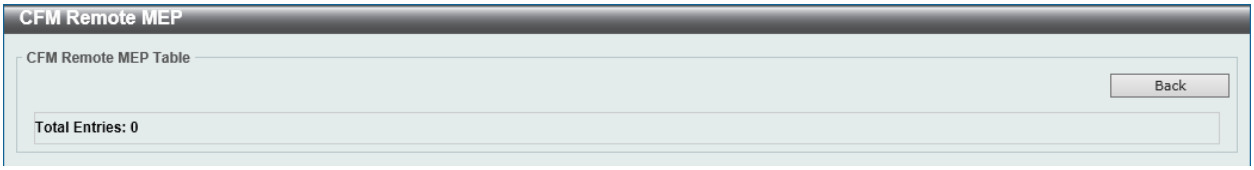



**Figure 10-8 CFM Settings (Add MA, Add MEP, Remote MEP) Window**

Click the **Back** button to return to the previous window.

After clicking the **Edit LCK** button, the following page will appear.

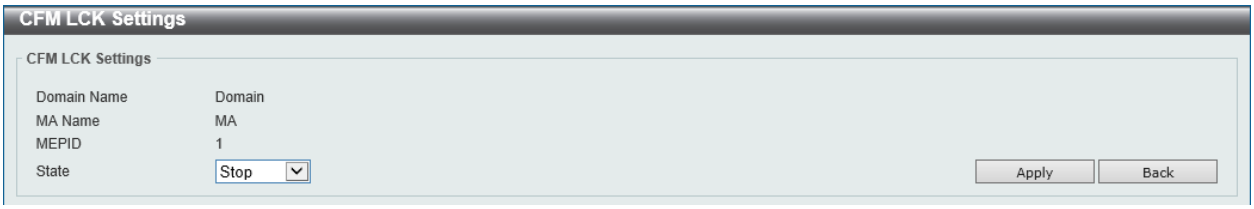



**Figure 10-9 CFM Settings (Add MA, Add MEP, Edit LCK) Window**

The fields that can be configured in **CFM LCK Settings** are described below:

| Parameter | Description |
|---|---|
| **State** | Select to **Start** or **Stop** the CFM management lock here. This feature will result in the MEP to send LCK PDUs to a client level MEP. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

# CFM Port Settings

This window is used to view and configure the CFM feature's port settings.

To view the following window, click **OAM > CFM > CFM Port Settings**, as shown below:

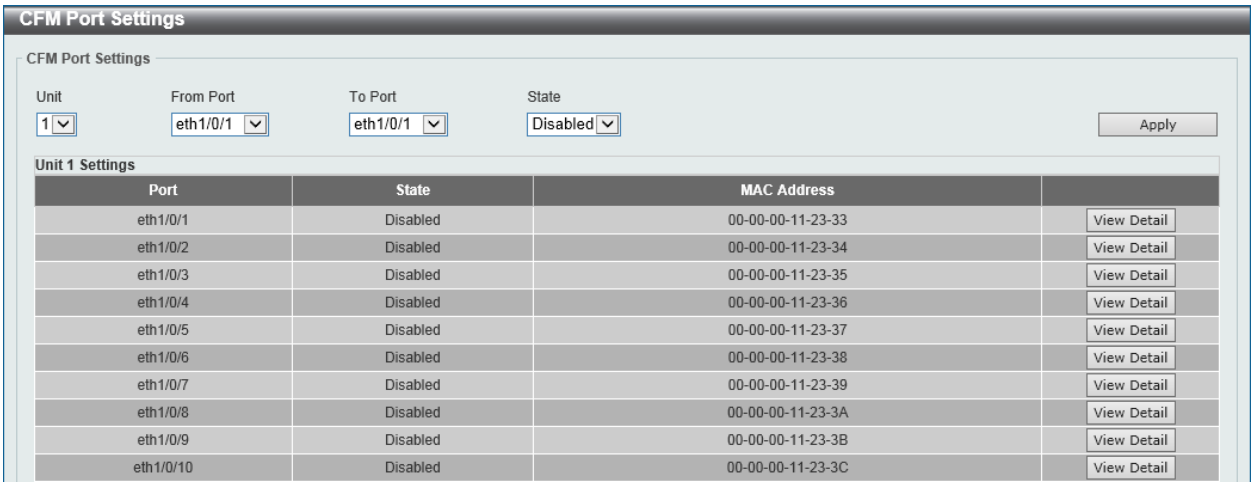



**Figure 10-10 CFM Port Settings Window**

The fields that can be configured in **CFM Port Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **State** | Select the enable or disable the CFM feature on the specified port(s) here. |

Click the **Apply** button to accept the changes made.

Click the **View Detail** button to more detailed information about the CFM settings on the specified port.

After clicking the **View Detail** button, the following page will appear.

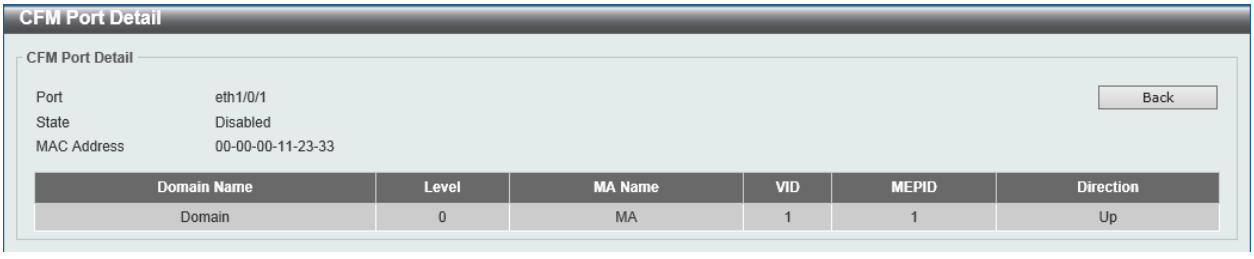



**Figure 10-11 CFM Port Settings (View Detail) Window**

Click the **Back** button to return to the previous window.

# CFM Loopback Test

This window is used to view and configure the CFM loopback test settings.

To view the following window, click **OAM > CFM > CFM Loopback Test**, as shown below:

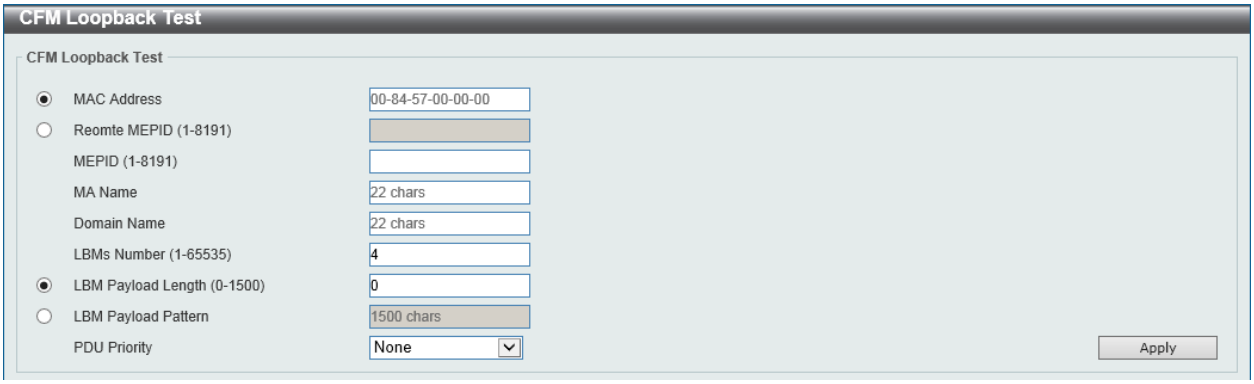



**Figure 10-12 CFM Loopback Test Window**

The fields that can be configured in **CFM Loopback Test** are described below:

| Parameter | Description |
|---|---|
| **MAC Address** | Select and enter the destination MAC address here. |
| **Remote MEPID** | Select and enter the remote MEP's ID here. The range is from 1 to 8191. |
| **MEPID** | Enter the MEP's ID that will initiate the loopback test here. The range is from 1 to 8191. |
| **MA Name** | Enter the MA's name here. This name can be up to 22 characters long. |
| **Domain Name** | Enter the MD's name here. This name can be up to 22 characters long. |
| **LBMs Number** | Enter the number of LBMs to be sent here. The range is from 1 to 65535. By default, this value is 4. |
| **LBM Payload Length** | Select and enter the payload length of the LBM to be sent here. The range is from 0 to1500. By default, this value is 0. |
| **LBM Payload Pattern** | Select and enter the LBM payload pattern here. This specifies an arbitrary amount of data to be included in a Data TLV, along with an indication whether the Data TLV is to be included. This string can be up to 1500 characters long. No spaces are allowed. |
| **PDU Priority** | Select the 802.1p priority to be set in the transmitted LBMs here. If not specified, it uses the same priority as the CCMs and LTMs sent by the MA. The range is from 0 to 7. Select the **None** option to use the default setting. |

Click the **Apply** button to accept the changes made.

# CFM Linktrace Settings

This window is used to view and configure the CFM link-trace feature's settings.

To view the following window, click **OAM > CFM > CFM Linktrace Settings**, as shown below:

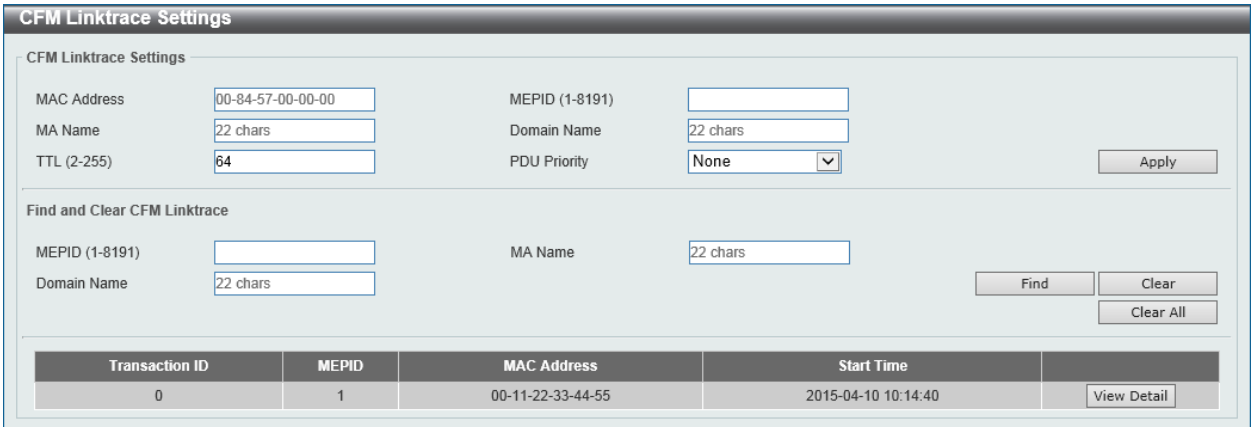



**Figure 10-13 CFM Linktrace Settings Window**

The fields that can be configured in **CFM Linktrace Settings** are described below:

| Parameter | Description |
|---|---|
| **MAC Address** | Enter the destination MAC address here. |
| **MEPID** | Enter the MEP's ID here used to initiate the link-trace feature. The range is from 1 to 8191. |
| **MA Name** | Enter the MA's name here. The name can be up to 22 characters long. |
| **Domain Name** | Enter the MD's name here. The name can be up to 22 characters long. |
| **TTL** | Enter the link-trace message's TTL value here. The range is from 2 to 255. The default value is 64. |
| **PDU Priority** | Select the 802.1p priority to be set in the transmitted LBMs here. If not specified, it uses the same priority as the CCMs and LTMs sent by the MA. The range is from 0 to 7. Select the **None** option to use the default setting. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find and Clear CFM Linktrace** are described below:

| Parameter | Description |
|---|---|
| **MEPID** | Enter the MEP's ID here. The range is from 1 to 8191. |
| **MA Name** | Enter the MA's name here. The name can be up to 22 characters long. |
| **Domain Name** | Enter the MD's name here. The name can be up to 22 characters long. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information specified.

Click the **Clear All** button to clear the information associated with all entries.

Click the **View Detail** button to view more detailed information about the link-trace entry.

After clicking the **View Detail** button, the following page will appear.

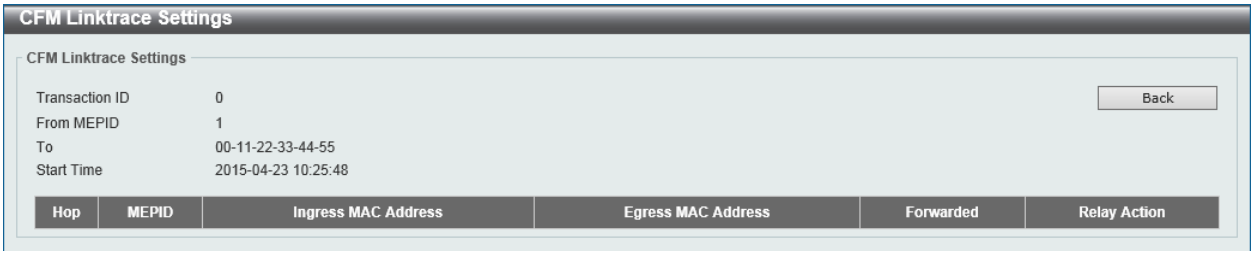



**Figure 10-14 CFM Linktrace Settings Window**

Click the **Back** button to return to the previous window.

# CFM Packet Counter

This window is used to find and display the CFM packet counter information.

To view the following window, click **OAM > CFM > CFM Packet Counter**, as shown below:

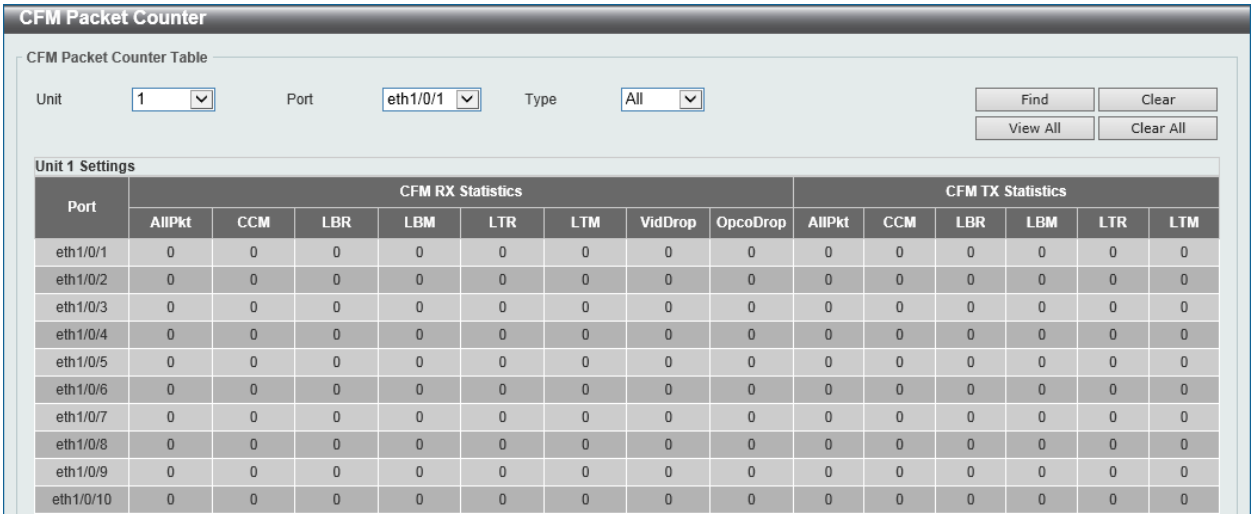



**Figure 10-15 CFM Packet Counter Window**

The fields that can be configured in **CFM Packet Counter Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **Port** | Select the switch's port that will be used here. |
| **Type** | Select the type of counter information that will be cleared or displayed here. Options to choose from are **All**, **TX**, and **RX**. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the counter information based on the information specified.

Click the **View All** button to display all the entries.

Click the **Clear All** button to clear the counter information associated with all entries.

# CFM Counter CCM

This window is used to view and clear the CFM CCM counter information.

To view the following window, click **OAM > CFM > CFM Counter CCM**, as shown below:

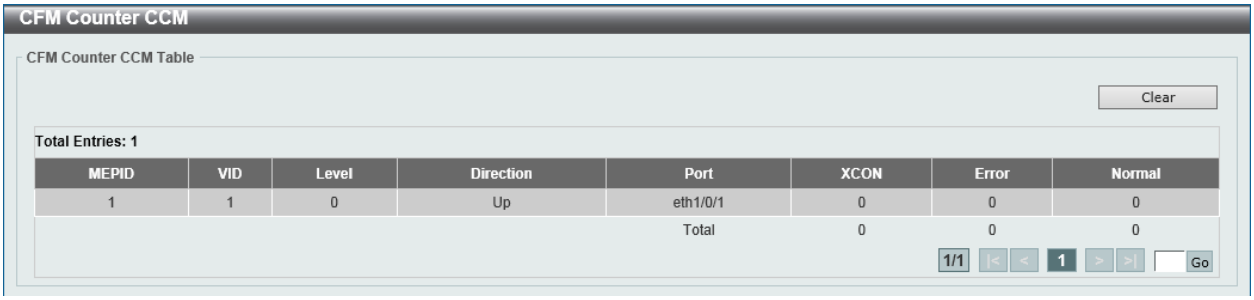



**Figure 10-16 CFM Counter CCM Window**

Click the **Clear** button to clear the counter information associated with all entries.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

## CFM MIP CCM Table

This window is used to display the MIP CCM database entries.

To view the following window, click **OAM > CFM > CFM MIP CCM Table**, as shown below:


**Figure 10-17 CFM MIP CCM Table Window**

## CFM MEP Fault Table

This window is used to display the MEPs that have faults.

To view the following window, click **OAM > CFM > CFM MEP Fault Table**, as shown below:

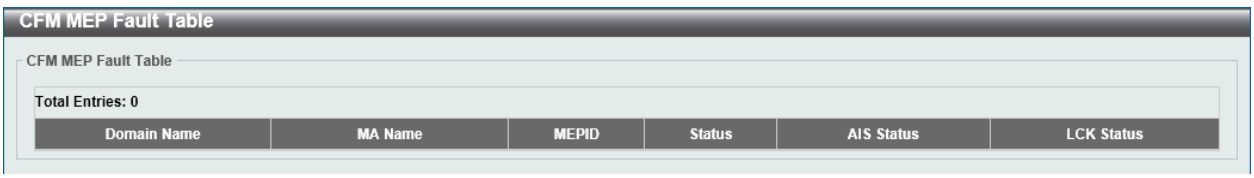



**Figure 10-18 CFM MEP Fault Table Window**

# Cable Diagnostics

The cable diagnostics feature is designed primarily for administrators or customer service representatives to verify and test copper cables; it can rapidly determine the quality of the cables and the types of error.

To view the following window, click **OAM > Cable Diagnostics**, as shown below:

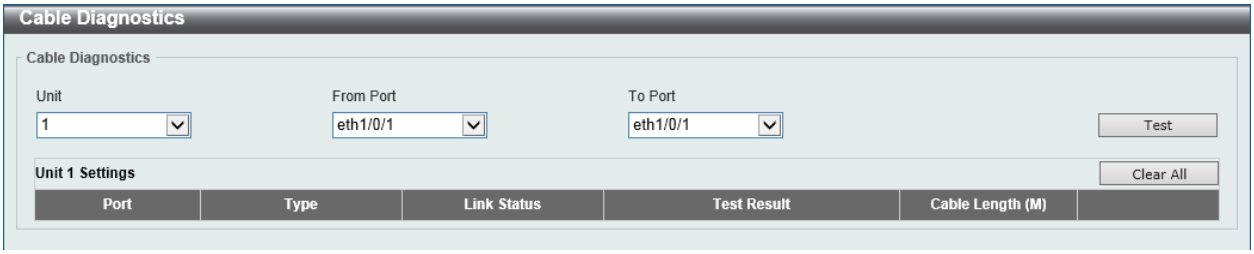



**Figure 10-19 Cable Diagnostics Window**

The fields that can be configured in **Cable Diagnostics** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |

Click the **Test** button to test the specific port.

Click the **Clear** button to clear all the information for the specific port.

Click the **Clear All** button to clear all the information in this table.

# Ethernet OAM

## Ethernet OAM Settings

This window is used to view and configure the Ethernet Operations, Administration, and Maintenance (OAM) settings.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Settings**, as shown below:

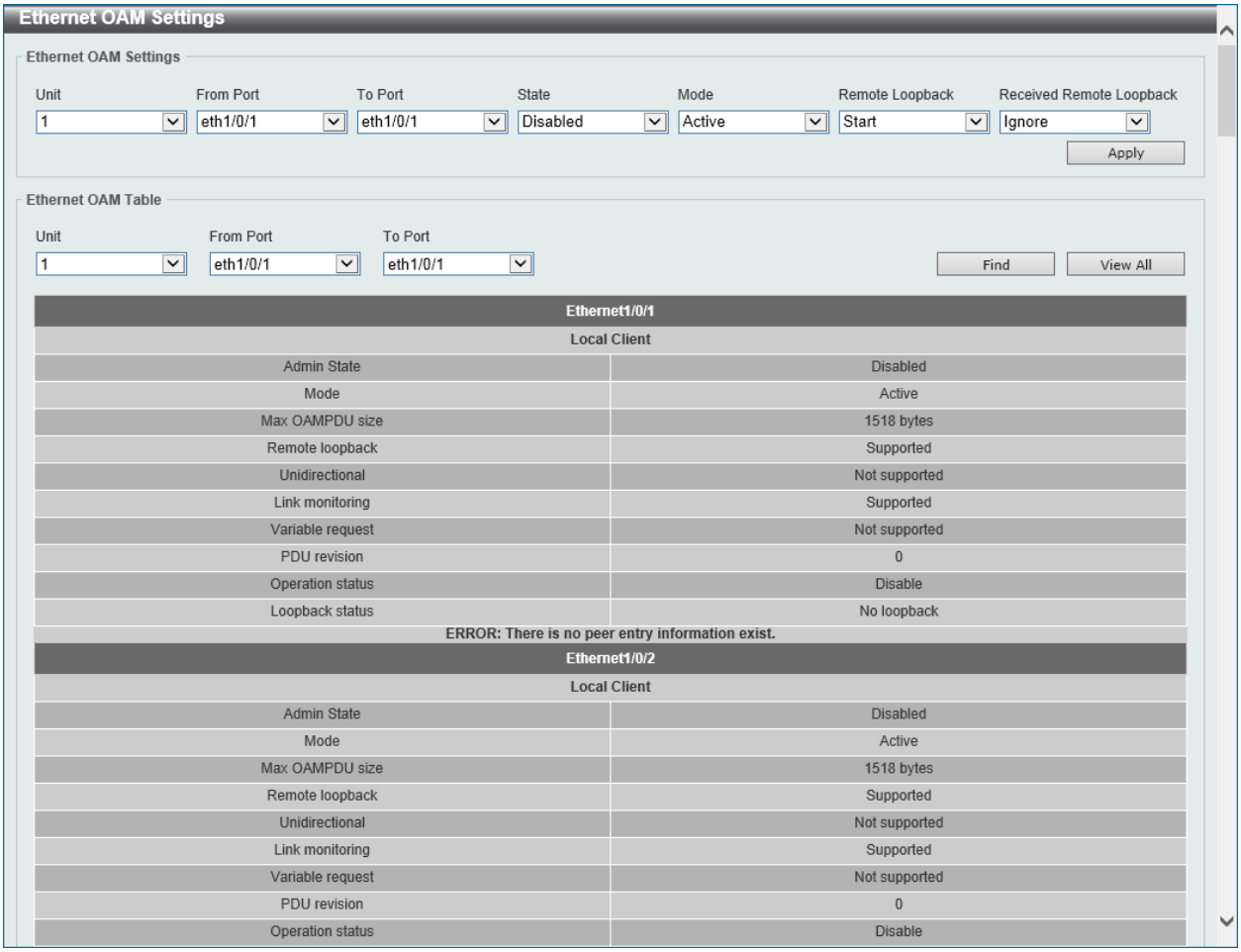



**Figure 10-20 Ethernet OAM Settings Window**

The fields that can be configured in **Ethernet OAM Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **State** | Select to enable or disable the Ethernet OAM feature on the specified port(s) here. After enabling this function on the interface, the interface will start OAM discovery. If the OAM mode of this interface is active, it initiates the discovery. Otherwise, it reacts to the discovery received from the peer. |
| **Mode** | Select the Ethernet OAM mode here. Options to choose from are **Active** and **Passive**. The following two actions are allowed by ports in the active mode, but disallowed by ports in the passive mode. (1) Initiate OAM discovery. (2) Start or stop remote loopback. |
| **Remote Loopback** | Select the remote loopback action here. Options to choose from are **Start** and **Stop**.<br>• **Start:** Specifies to request the peer to change to the remote loopback mode.<br>• **Stop:** Specifies to request the peer to change to the normal operation mode.<br>If the remote peer is configured to ignore the remote loopback request, then the remote peer will not enter or exit the remote loopback mode upon receiving the request. To start the remote peer to enter the |

| Parameter | Description |
|---|---|
| | remote loopback mode, administrators must ensure that the local client is in the active mode and the OAM connection is established. If the local client is already in the remote loopback mode, then this feature cannot be applied. |
| **Received Remote Loopback** | Select to configure the behavior of the received remote loopback requirement from the peer on the specified port(s) here. Options to choose from are **Ignore** and **Process**.<br>• **Ignore:** Specifies not to react to remote loopback requirements from a peer.<br>• **Process:** Specifies to react to remote loopback requirements from a peer.<br>The feature is used to configure the client to process or to ignore the received Ethernet OAM remote loopback feature. In the remote loopback mode, all user traffic will not be processed. Ignoring the received remote loopback feature will prevent the port from entering the remote loopback mode. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Ethernet OAM Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# Ethernet OAM Configuration Settings

This window is used to view and configure the Ethernet OAM feature's configuration settings.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Configuration Settings**, as shown below:

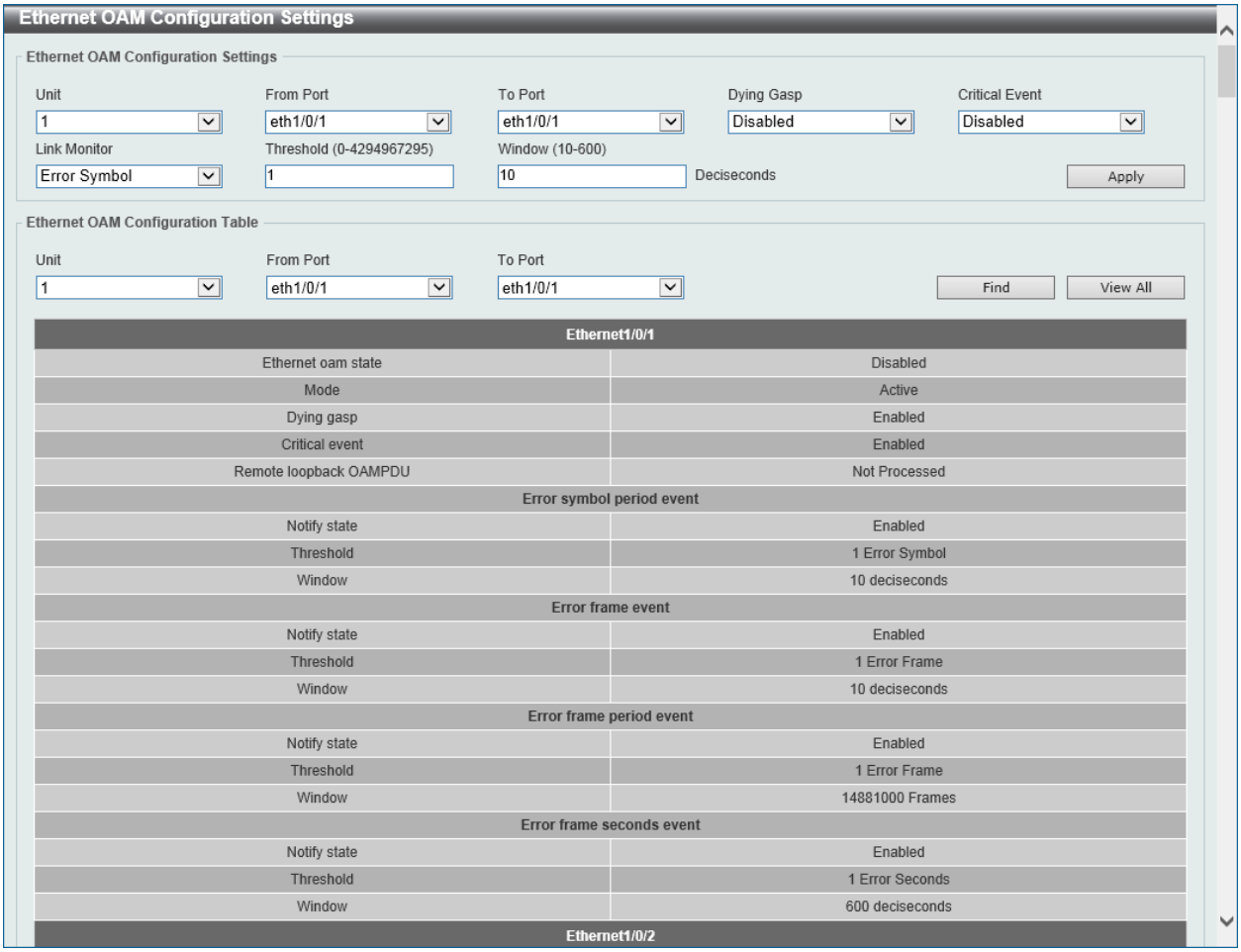



**Figure 10-21 Ethernet OAM Configuration Settings Window**

The fields that can be configured in **Ethernet OAM Configuration Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Dying Gasp** | Select to enable or disable the dying gasp feature here. This feature is used to configure the capability of the dying gasp event. If the capability for the dying gasp event is disabled, the port will never send out OAM PDUs with the dying gasp event bit set when an unrecoverable local failure condition has occurred. |
| **Critical Event** | Select to enable or disable the critical event feature here. This feature is used to configure the capability of the critical event. If the capability for a critical event is disabled, the port will never send out OAM PDUs with critical event bit set when an unspecified critical event has occurred. |
| **Link Monitor** | Select the link monitor feature here. Options to choose from are **Error Symbol**, **Error Frame**, **Error Frame Seconds**, and **Error Frame Period**.<br>• **Error Symbol:** This feature is used to enable notifying the Ethernet OAM error symbol event and configure the monitor threshold and window on the specified port.<br>• **Error Frame:** This feature is used to enable notifying the Ethernet OAM error frame event and configure the monitor threshold and window on the specified port. |

| Parameter | Description |
|---|---|
| | • **Error Frame Seconds:** This feature is used to enable notifying the Ethernet OAM error frame second event and configure the monitor threshold and window on the specified port.<br>• **Error Frame Period:** This feature is used to enable notifying the Ethernet OAM error frame period event and configure the monitor threshold and window on the specified port. |
| **Threshold** | Enter the threshold value here.<br>• When **Error Symbol** is selected as the link monitor, enter the number of symbol errors here. If symbol errors occur in the specified window and it exceeds the threshold value, then the event is generated. The range is from 0 to 4294967295.<br>• When **Error Frame** is selected as the link monitor, enter the number of frame errors here. If the error frames occur in the specified window and exceeds the threshold value, then an error frame event is triggered. The range is from 0 to 4294967295.<br>• When **Error Frame Seconds** is selected as the link monitor, enter the number of error frames in seconds here. If the number of the error frames occurred in the specified window and exceeds the threshold value, then the frame event is triggered. The range is from 1 to 900 seconds.<br>• When **Error Frame Period** is selected as the link monitor, enter the number of frame errors that must occur for this event to be triggered here. The range is from 0 to 4294967295. |
| **Window** | Enter the window value here.<br>• When **Error Symbol** is selected as the link monitor, enter the amount of time over which the threshold is defined here. If threshold symbol errors occur within the period, an event notification OAM PDU should be generated with an error symbol period event TLV, indicating that the threshold has been crossed in this window. The range is from 10 to 600 deciseconds.<br>• When **Error Frame** is selected as the link monitor, enter the amount of time over which the threshold is defined here. If the threshold frame errors occur within the period, an event notification OAM PDU will be generated with an error frame event TLV, indicating that the threshold has been crossed in this window. The range is from 10 to 600 deciseconds.<br>• When **Error Frame Seconds** is selected as the link monitor, enter the amount of time over which the threshold is defined here. If threshold frame errors occur within the period, an event notification OAM PDU will be generated with an error frame seconds summary event TLV indicating that the threshold has been crossed in this window. The range is from 100 to 9000 deciseconds.<br>• When **Error Frame Period** is selected as the link monitor, enter the number of frames over which the threshold is defined here. If threshold frame errors occur within the period, an event notification OAM PDU should be generated with an error frame period event TLV indicating that the threshold has been crossed in this window. The lower bound is the number of minimum frame-size frames that can be received in 100ms on the underlying physical layer. The upper bound is the number of minimum frame-size frames that can be received in one minute on the underlying physical layer. The range is from 148810 to 89286000. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Ethernet OAM Configuration Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# Ethernet OAM Event Log Table

This window is used to view and clear the Ethernet OAM event log table.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Event Log Table**, as shown below:

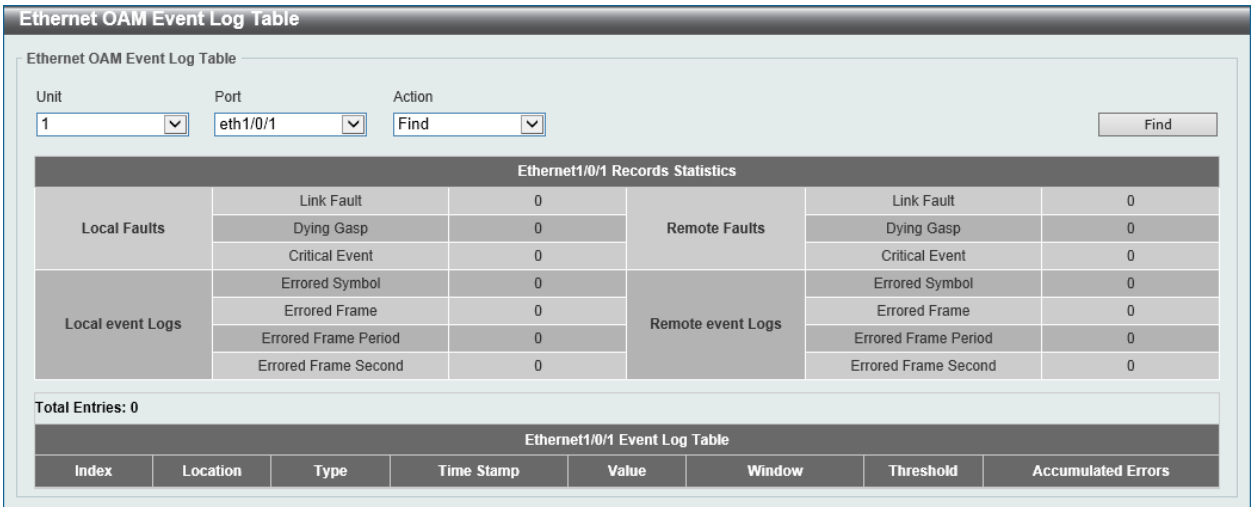



**Figure 10-22 Ethernet OAM Event Log Table Window**

The fields that can be configured in **Ethernet OAM Event Log Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **Port** | Select the switch's port that will be used here. |
| **Action** | Select the **Find** option to find and display the log entries associated with the specified port.<br>Select the **Clear** option to clear the log entries associated with the specified port. |

Click the **Find** button to find and display the log entries associated with the specified port.

Click the **Clear** button to clear the log entries associated with the specified port.

Click the **Clear All** button to clear all the log entries.

# Ethernet OAM Statistics Table

This window is used to view and clear the Ethernet OAM statistics table.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM Statistics Table**, as shown below:

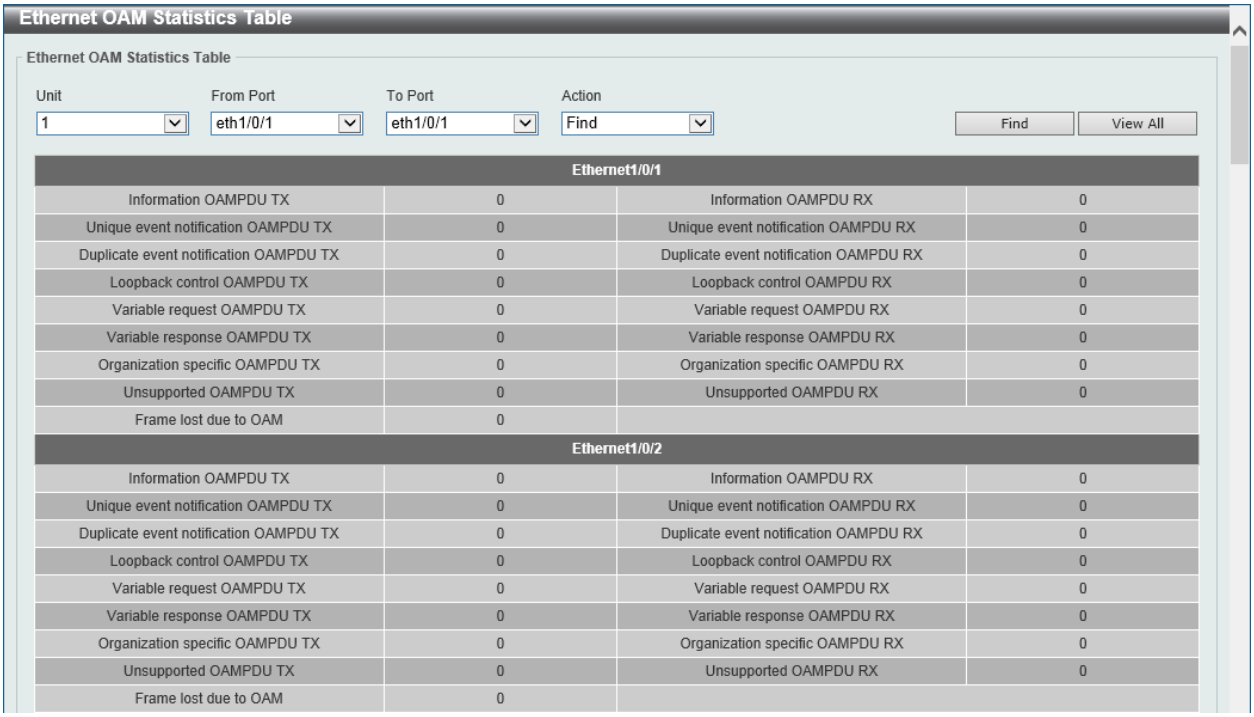



**Figure 10-23 Ethernet OAM Statistics Table Window**

The fields that can be configured in **Ethernet OAM Statistics Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Action** | Select the **Find** option to find and display the statistics information associated with the specified port.<br>Select the **Clear** option to clear the statistics information associated with the specified port(s). |

Click the **Find** button to find and display the statistics information associated with the specified port(s).

Click the **View All** button to display all the statistics information.

Click the **Clear** button to clear the statistics information associated with the specified port(s).

Click the **Clear All** button to clear all the statistics information.

# Ethernet OAM DULD Settings

This window is used to view and configure the Ethernet OAM feature's D-Link Unidirectional Link Detection (DULD) settings. DULD is an extension of 802.3ah Ethernet OAM. It provides a mechanism to detect a unidirectional point-to-point Ethernet link without PHY support. OAM vendor specific messages are used in the detection. The detection process is started after OAM discovery was started but does not complete the negotiation in the configured discovery time.

To view the following window, click **OAM > Ethernet OAM > Ethernet OAM DULD Settings**, as shown below:

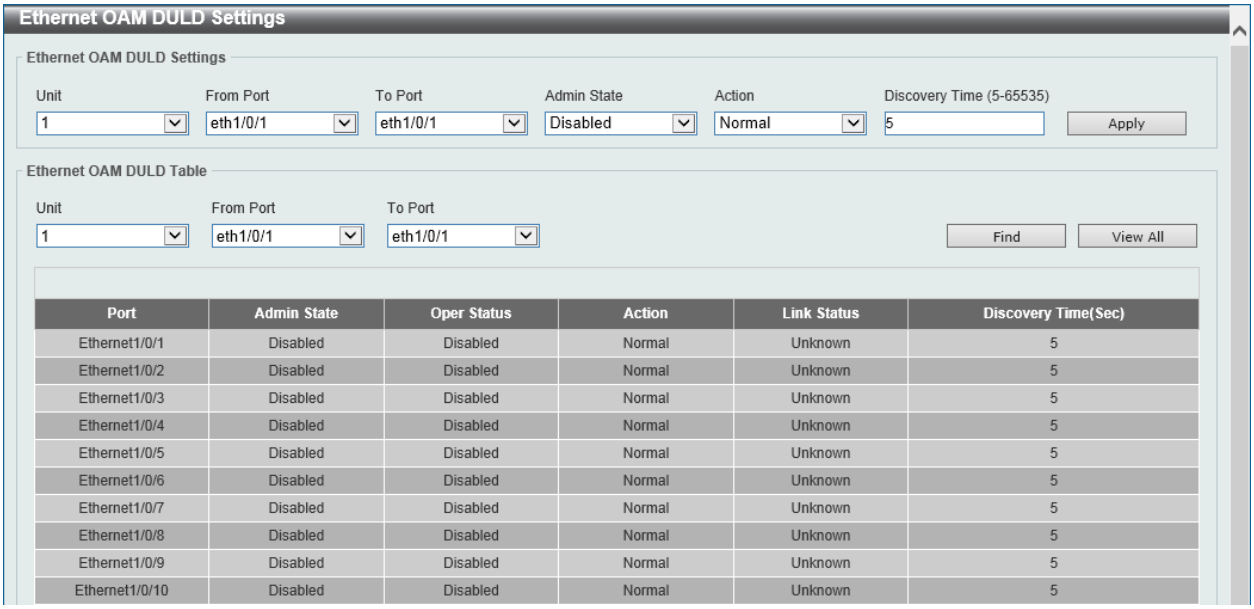



**Figure 10-24 Ethernet OAM DULD Settings Window**

The fields that can be configured in **Ethernet OAM DULD Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **Admin State** | Select to enable or disable the admin state here. This feature is used to enable Ethernet OAM unidirectional link detection on the specified port(s). |
| **Action** | Select the action that will be taken here. Options to choose from are **Normal** and **Shutdown**. |
| **Discovery Time** | Enter the discovery time value here. The range is from 5 to 65535 seconds. By default, this value is 5 seconds. If the OAM discovery does not successfully negotiate before discovery time expired, OAM unidirectional link detection will start. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Ethernet OAM DULD Table** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

# DDM

This folder contains windows that perform Digital Diagnostic Monitoring (DDM) functions on the Switch. There are windows that allow the user to view the digital diagnostic monitoring status of SFP modules inserting to the Switch and to configure alarm settings, warning settings, temperature threshold settings,

voltage threshold settings, bias current threshold settings, Tx power threshold settings, and Rx power threshold settings.

# DDM Settings

The window is used to view and configure the action that will occur for specific ports when an exceeding alarm threshold or warning threshold event is encountered.

To view the following window, click **OAM > DDM > DDM Settings**, as shown below:

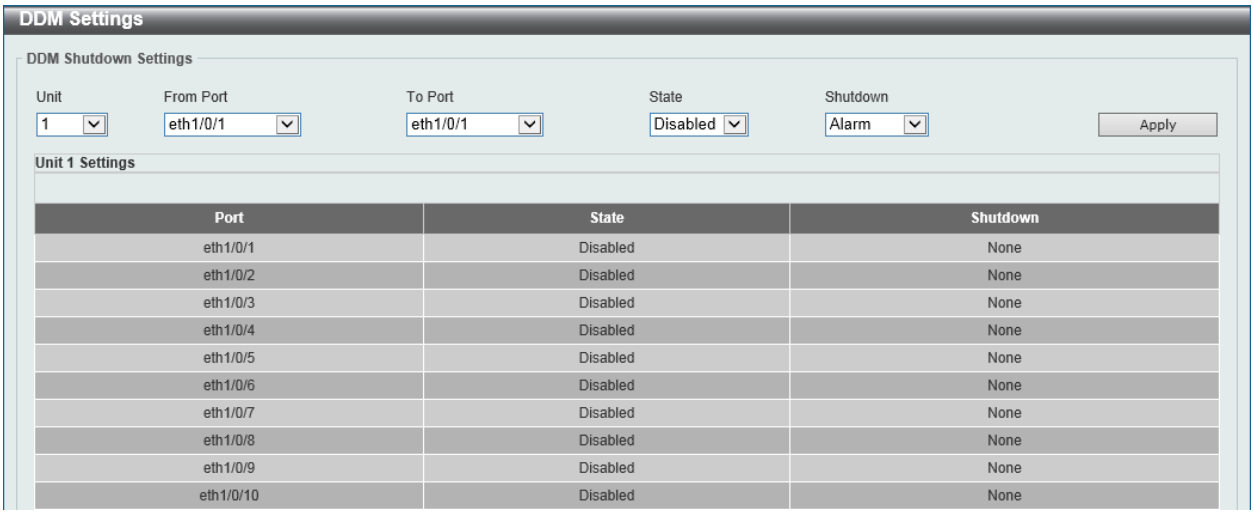



**Figure 10-25 DDM Settings Window**

The fields that can be configured in **DDM Shutdown Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Use the drop-down menu to enable or disable the DDM state. |
| **Shutdown** | Specify whether to shut down the port, when the operating parameter exceeds the Alarm or Warning threshold.<br>• **Alarm** - Shutdown the port when the configured alarm threshold range is exceeded.<br>• **Warning** - Shutdown the port when the configured warning threshold range is exceeded.<br>• **None** - The port will never shutdown regardless if the threshold ranges are exceeded or not. This is the default. |

Click the **Apply** button to accept the changes made.

# DDM Temperature Threshold Settings

This window is used to view and configure the DDM Temperature Threshold Settings for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM Temperature Threshold Settings**, as shown below:

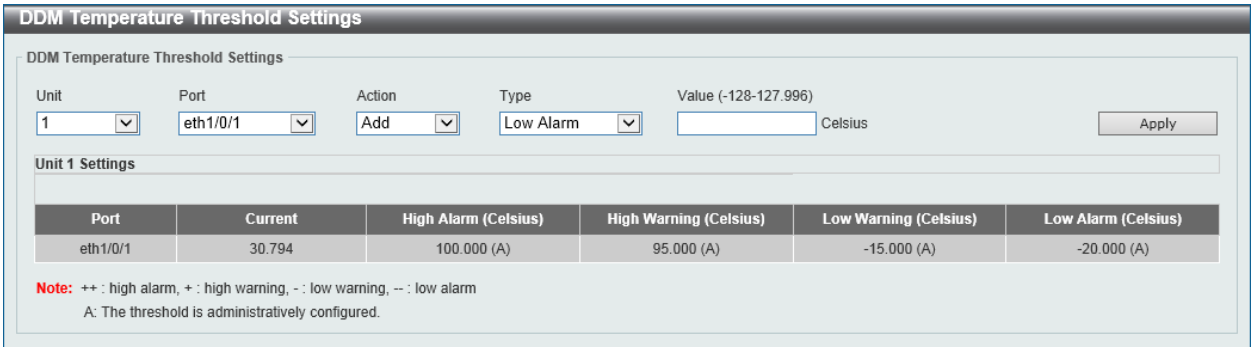



**Figure 10-26 DDM Temperature Threshold Settings Window**

The fields that can be configured in **DDM Temperature Threshold Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select the port used for the configuration here. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add** and **Delete**. |
| **Type** | Select the type of temperature threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**. |
| **Value** | Enter the threshold value. This value must be between -128 and 127.996 °C. |

Click the **Apply** button to accept the changes made.

# DDM Voltage Threshold Settings

This window is used to view and configure the DDM Voltage Threshold Settings for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM Voltage Threshold Settings**, as shown below:

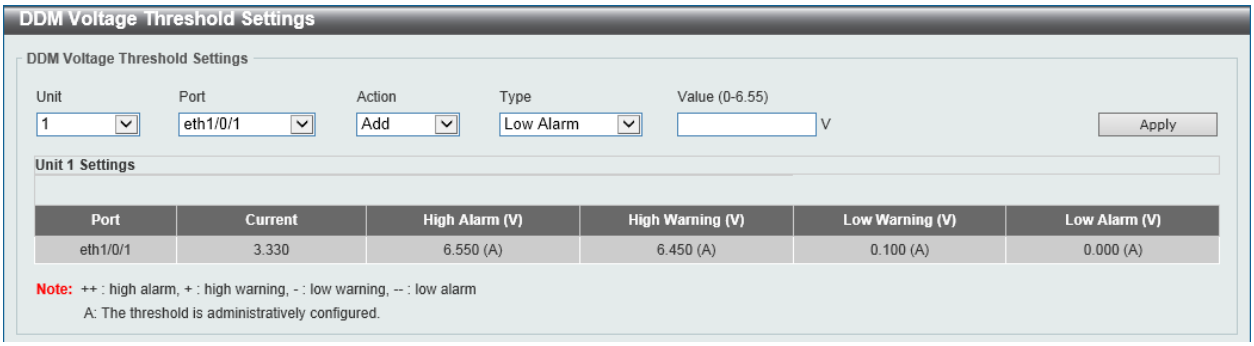



**Figure 10-27 DDM Voltage Threshold Settings Window**

The fields that can be configured in **DDM Voltage Threshold Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select the port used for the configuration here. |
| **Action** | Select the action that will be taken here. Options to choose from are |

| Parameter | Description |
|---|---|
| | **Add** and **Delete**. |
| **Type** | Select the type of voltage threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**. |
| **Value** | Enter the threshold value. This value must be between 0 and 6.55 Volt. |

Click the **Apply** button to accept the changes made.

# DDM Bias Current Threshold Settings

This window is used to view and configure the threshold of the bias current for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM Bias Current Threshold Settings**, as shown below:

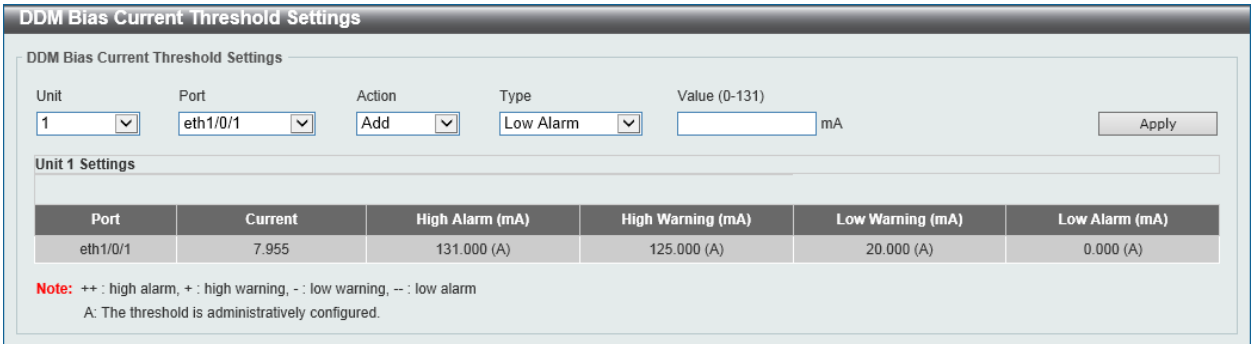



**Figure 10-28 DDM Bias Current Threshold Settings Window**

The fields that can be configured in **DDM Bias Current Threshold Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select the port used for the configuration here. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add** and **Delete**. |
| **Type** | Select the type of bias current threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**. |
| **Value** | Enter the threshold value. This value must be between 0 and 131 mA. |

Click the **Apply** button to accept the changes made.

# DDM TX Power Threshold Settings

This window is used to view and configure the threshold of TX power for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM TX Power Threshold Settings**, as shown below:

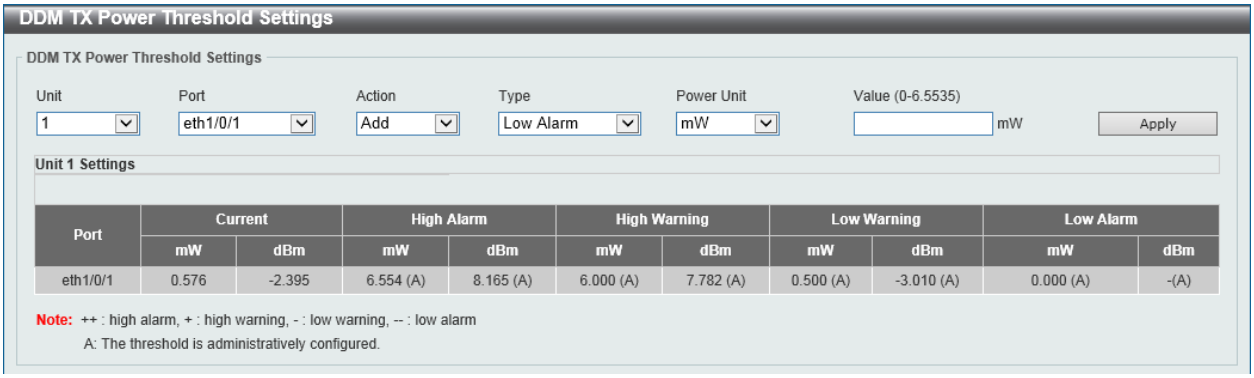



**Figure 10-29 DDM TX Power Threshold Settings Window**

The fields that can be configured in **DDM TX Power Threshold Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select the port used for the configuration here. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add** and **Delete**. |
| **Type** | Select the type of TX power threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**. |
| **Power Unit** | Select the power unit here. Options to choose from are **mW** and **dBm**. |
| **Value** | Enter the threshold value. When selecting **mW** in the **Power Unit** drop-down list, this value must be between 0 and 6.5535. When selecting **dBm** in the **Power Unit** drop-down list, this value must be between -40 and 8.1647. |

Click the **Apply** button to accept the changes made.

# DDM RX Power Threshold Settings

This window is used to view and configure the threshold of RX power for specific ports on the Switch.

To view the following window, click **OAM > DDM > DDM RX Power Threshold Settings**, as shown below:

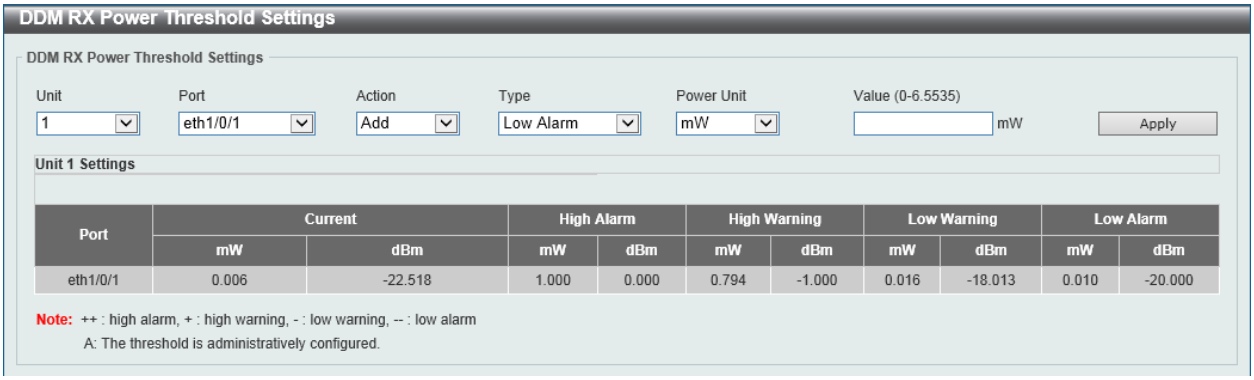



**Figure 10-30 DDM RX Power Threshold Settings Window**

The fields that can be configured in **DDM RX Power Threshold Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Port** | Select the port used for the configuration here. |
| **Action** | Select the action that will be taken here. Options to choose from are **Add** and **Delete**. |
| **Type** | Select the type of RX power threshold. Options to choose from are **Low Alarm**, **Low Warning**, **High Alarm**, and **High Warning**. |
| **Power Unit** | Select the power unit here. Options to choose from are **mW** and **dBm**. |
| **Value** | Enter the threshold value. When selecting **mW** in the **Power Unit** drop-down list, this value must be between 0 and 6.5535. When selecting **dBm** in the **Power Unit** drop-down list, this value must be between -40 and 8.1647. |

Click the **Apply** button to accept the changes made.

# DDM Status Table

This window is used to display the current operating digital diagnostic monitoring parameters and their values on the SFP module for specified ports.

To view the following window, click **OAM > DDM > DDM Status Table**, as shown below:

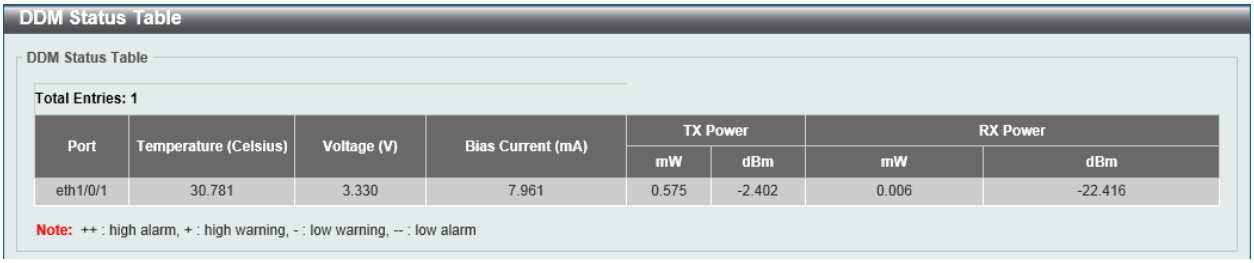



**Figure 10-31 DDM Status Table Window**

# 11. MPLS



## MPLS LDP Information Settings

This window is used to view and configure the Multiprotocol Label Switching (MPLS) feature's Label Distribution Protocol (LDP) information settings.

To view the following window, click **MPLS > MPLS LDP Information Settings**, as shown below:

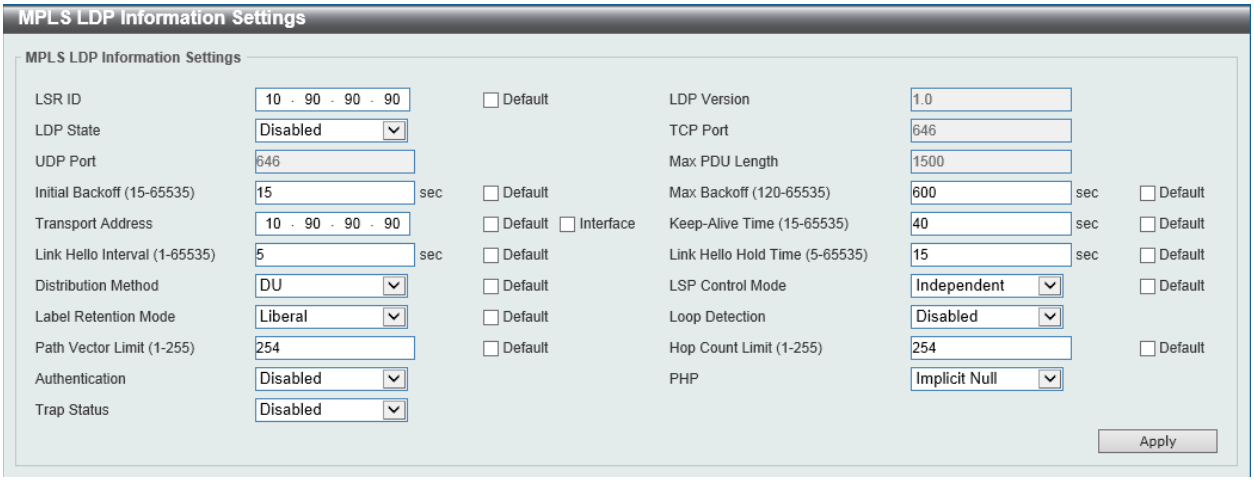



**Figure 11-1 MPLS LDP Information Settings Window**

The fields that can be configured in **MPLS LDP Information Settings** are described below:

| Parameter | Description |
|---|---|
| **LSR ID** | Enter the Label Switching Router (LSR) ID here. The IPv4 address must be an IPv4 address of an existing interface. The LSR ID is used to identify the LSR in the MPLS network. Select the **Default** option to use the default setting. |
| **LDP Version** | In this field the LDP version will be displayed. |
| **LDP State** | Select to enable or disable the LDP feature here. |
| **TCP Port** | In this field the LDP feature's TCP port number will be displayed. |
| **UDP Port** | In this field the LDP feature's UDP port number will be displayed. |

| Parameter | Description |
|---|---|
| **Max PDU Length** | In this field the LDP feature's maximum PDU length value will be displayed. |
| **Initial Backoff** | Enter the initial back-off delay time here. The LDP back-off delay time is a mechanism to prevent an endless sequence of session setup failures that occur between two LSRs with incompatible settings. The range is from 15 to 65535 seconds. Select the **Default** option to use the default value, which is 15 seconds. |
| **Max Backoff** | Enter the maximum back-off delay time here. The range is from 120 to 65535 seconds. Select the **Default** option to use the default value, which is 600 seconds. |
| **Transport Address** | Enter the transport IPv4 address here. The transport address is used to establish a LDP TCP connection. Select the **Default** option to use the default setting. Selecting the **Interface** option specifies to use the IP address of the corresponding interface as the transmission address for the session on each interface. |
| **Keep-Alive Time** | Enter the keep-alive time value here. LDP maintains a keep-alive hold timer for each peer session. If the keep-alive hold timer expires without receipt of an LDP PDU from the peer, LDP terminates the LDP session. The range is from 15 to 65535 seconds. Select the **Default** option to use the default value, which is 40 seconds. |
| **Link Hello Interval** | Enter the link hello interval value here. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value, which is 5 seconds. |
| **Link Hello Hold Time** | Enter the link hello hold time value here. The range is from 5 to 65535 seconds. Select the **Default** option to use the default value, which is 15 seconds. |
| **Distribution Method** | Select the distribution method here. Options to choose from are **DU** and **DoD**.<br>• **DU:** Specifies the downstream unsolicited distribution mode.<br>• **DoD:** Specifies the downstream on-demand distribution mode.<br>If the mode is configured as Downstream-on-Demand mode, the downstream LSR advertises a label mapping when an upstream connection makes an explicit request. If the mode is configured as Downstream-Unsolicited mode, the downstream LSR advertises a label mapping when a label is learned in the routing table.<br>Select the **Default** option to use the default setting, which is **DU**. |
| **LSP Control Mode** | Select the Label-Switched Path (LSP) control mode here. Options to choose from are **Independent** and **Ordered**. In Independent LSP Control mode, each LSR independently binds a label to a Forwarding Equivalence Class (FEC) and distributes the binding to its label distribution peers. In Ordered LSP Control mode, an LSR only binds a label to a FEC if it is the egress LSR for that FEC, or if it has already received a label binding for that FEC from its next hop for that FEC.<br>Select the **Default** option to use the default setting, which is **Independent**. |
| **Label Retention Mode** | Select the label retention mode here. Options to choose from are **Liberal** and **Conservative**. If the label distribution method is Downstream-Unsolicited and the label retention mode is conservative, once the LSR received label bindings from LSRs which are not its next hop for that FEC, it discards such bindings. If the label retention mode is liberal, it maintains such bindings. It helps to speed up the setup of LSP in case there is a change in the next hop.<br>Select the **Default** option to use the default setting, which is **Liberal**. |

| Parameter | Description |
|---|---|
| **Loop Detection** | Select to enable or disable the loop detection feature here. LDP loop detection makes use of the Path Vector and Hop Count TLVs carried by the label request and label mapping messages to prevent looping of LDP messages. If enabled, LDP does not send the LDP message that violates the path vector check or hop count check to next hop.<br>Select the **Default** option to use the default setting, which is disabled. |
| **Path Vector Limit** | Enter the path vector limit value here. The range is from 1 to 255. If loop detection is enabled, the LDR ID that is in the path vector list of the label mapping message or the label request message or the path vector length exceeds the maximum length, then it is deemed that a loop occurs.<br>Select the **Default** option to use the default value, which is 254. |
| **Hop Count Limit** | Enter the hop count limit here. The range is from 1 to 255. This feature is used to configure the maximum number of hops permitted in the LSP setup. Select the **Default** option to use the default value, which is 254. |
| **Authentication** | Select to enable or disable the authentication feature here. If the LDP MD5 authentication is enabled, the LSR applies the MD5 algorithm to compute the MD5 digest for the TCP segment that will be sent to the peer. This computation makes use of the peer password as well as the TCP segment. When the LSR receives a TCP segment with an MD5 digest, it validates the segment by calculating the MD5 digest (using its own record of the password) and compares the computed digest with the received digest. If the comparison fails, the segment is dropped without any response to the sender. The LSR ignores LDP Hellos from any LSR for which a password has not been configured. |
| **PHP** | Select the Penultimate Hop Popping (PHP) behavior here. Options to choose from are **Implicit Null** and **Explicit Null**. If the egress router advertises the Implicit Null label, the upstream will do PHP. If the egress router advertises the Explicit Null label, the upstream will keep the outer label without popping. |
| **Trap Status** | Select to enable or disable the LDP trap feature here. |

Click the **Apply** button to accept the changes made.

# MPLS LSP Trigger Information

This window is used to view and configure the MPLS feature's Label-Switched Path (LSP) trigger information. The LSP trigger filter rules are IP access list rules that it is used to control the IP routes that can be used to trigger the establishment of an LSP.

To view the following window, click **MPLS > MPLS LSP Trigger Information**, as shown below:

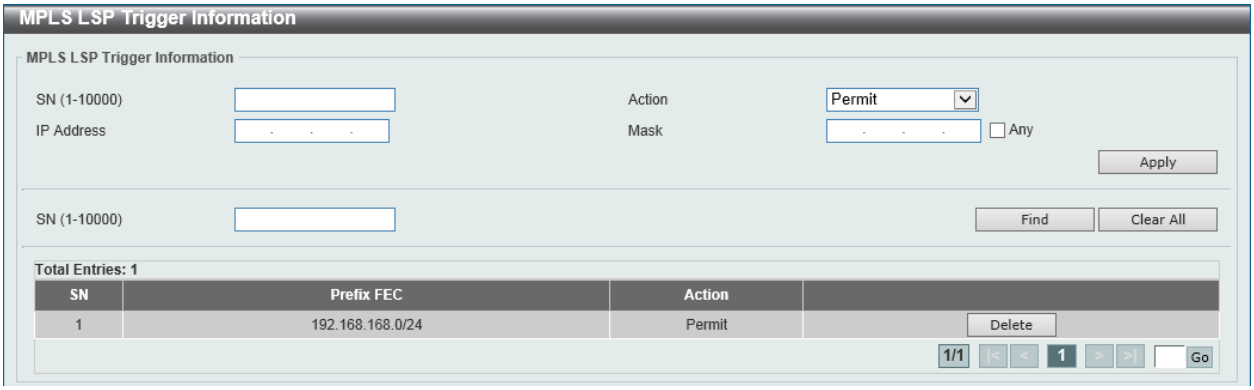



**Figure 11-2 MPLS LSP Trigger Information Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **SN** | Enter the sequence number of the LSP trigger filter rule here. When creating a new rule, if not specified, the SN begins from 10 and is incremented by 10. The range is from 1 to 10000. |
| **Action** | Select the action that will be taken here. Options to choose from are **Permit** and **Deny**.<br>• **Permit:** Specifies to permit LDP in establishing the LSP to follow the IP prefix FEC.<br>• **Deny:** Specifies no permit LDP in establishing the LSP to follow the IP prefix FEC. |
| **IP Address** | Enter the IPv4 address FEC on which the rule will apply. |
| **Mask** | Enter the subnet mask FEC on which the rule will apply. Selecting the **Any** option specifies that the rule will apply on any IP prefix FEC. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear All** button to clear all the entries.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# MPLS Forwarding Settings

This window is used to view and configure the MPLS feature's forwarding settings.

The **Static FTN Settings** section is used to add or delete a static FEC-To-NHLFE Map (FTN) entry. FEC stands form Forwarding Equivalence Class and NHLFE stands for Next Hop Label Forwarding Entry. At the ingress Label Edge Router (LER), the incoming IP packets that are classified to the Forwarding Equivalence Class (FEC) will be pushed with the MPLS label and forwarded to the next hop according to the FEC-to-NHLFE (FTN).

The **Static ILM Settings** section is used to add a static Incoming Label Map (ILM) entry. At LSR, the incoming MPLS packets that are matched to the incoming label will be processed according configured ILM action. The label operation is either swapping the incoming top label to configured outgoing label or popping the top label and then forwards the packets to the next-hop.

To view the following window, click **MPLS > MPLS Forwarding Settings**, as shown below:

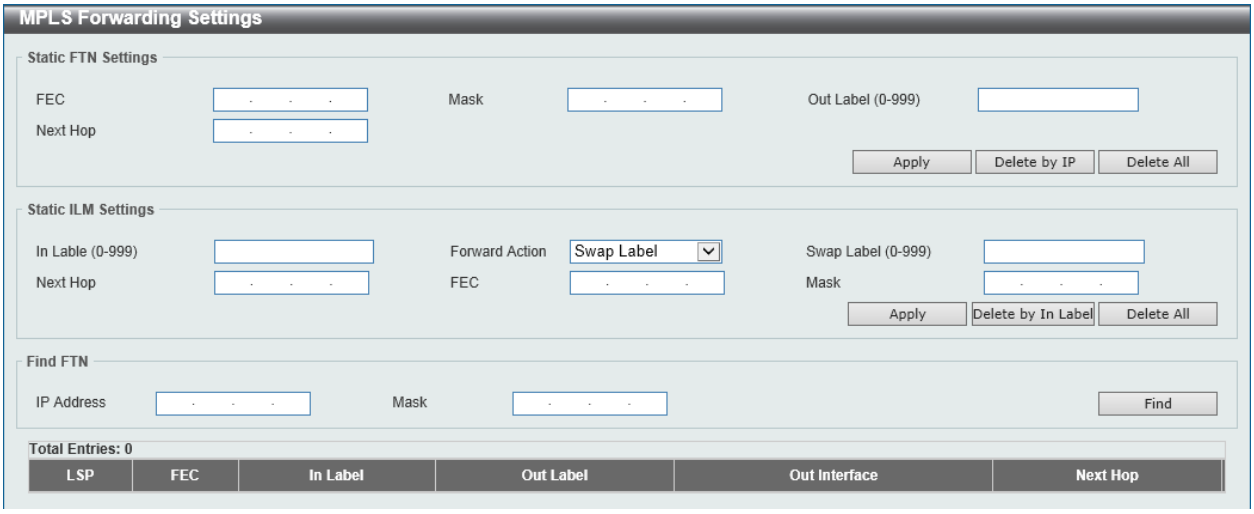



**Figure 11-3 MPLS Forwarding Settings Window**

The fields that can be configured in **Static FTN Settings** are described below:

| Parameter | Description |
|---|---|
| **FEC** | Enter the FEC's IPv4 address of the static FTN here. |
| **Mask** | Enter the FEC's subnet mask of the static FTN here. |
| **Out Label** | Enter the out label value for this FEC here. The range is from 0 to 999. |
| **Next Hop** | Enter the next hop IPv4 address of this FEC here. |

Click the **Apply** button to accept the changes made.

Click the **Delete by IP** button to delete the specified entry based on the IP address entered.

Click the **Delete All** button to delete all the entries.

The fields that can be configured in **Static ILM Settings** are described below:

| Parameter | Description |
|---|---|
| **In Label** | Enter the incoming label's value of the ILM here. The range is from 0 to 999. |
| **Forward Action** | Select the forward action that will be taken here. Options to choose from are **Swap Label** and **Pop**. |
| **Swap Label** | After selecting to use the **Swap Label** forward action, enter the swap label value here. The range is from 0 to 999. |
| **Next Hop** | After selecting to use the **Swap Label** forward action, enter the next hop IPv4 address of the FEC here. |
| **FEC** | Enter the FEC's IPv4 address that will be associated with the ILM here. |
| **Mask** | Enter the FEC's subnet mask that will be associated with the ILM here. |

Click the **Apply** button to accept the changes made.

Click the **Delete by In Label** button to delete the specified entry based on the In Label entered.

Click the **Delete All** button to delete all the entries.

The fields that can be configured in **Find FTN** are described below:

| Parameter | Description |
|---|---|
| **IP Address** | Enter the FEC's IPv4 address of the static FTN here. |
| **Mask** | Enter the FEC's subnet mask of the static FTN here. |

Click the **Find** button to locate a specific entry based on the information entered.

# MPLS LDP Neighbor Password Settings

This window is used to view and configure the MPLS feature's LDP neighbor password settings. If the MD5 authentication is enabled, the LSR only establishes sessions with the peer when they exchange the same password. The password setting will be applied to negotiation with link neighbors or targeted neighbors.

To view the following window, click **MPLS > MPLS LDP Neighbor Password Settings**, as shown below:

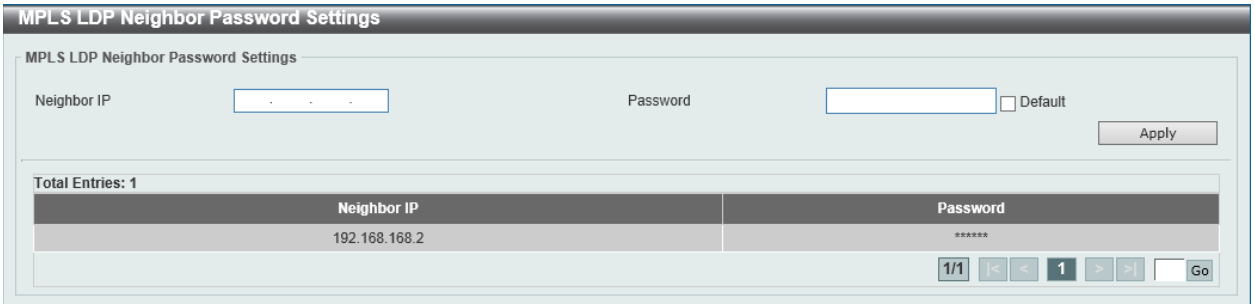



**Figure 11-4 MPLS LDP Neighbor Password Settings Window**

The fields that can be configured in **MPLS LDP Neighbor Password Settings** are described below:

| Parameter | Description |
|---|---|
| **Neighbor IP** | Enter the neighbor's IPv4 address here. This address will also be the neighbor's (peer) LSR ID. |
| **Password** | Enter the LDP peer password here. Select the **Default** option to use the default password (which is empty). |

Click the **Apply** button to accept the changes made.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# MPLS LDP Neighbor Targeted Settings

This window is used to view and configure the MPLS feature's LDP neighbor targeted settings. LDP sends the targeted hello message at the configured interval to discover the neighbor. For a discovered neighbor, LDP maintains a hold-timer. The neighbor will time out if the timer has expired without the receipt of a hello message from the neighbor.

To view the following window, click **MPLS > MPLS LDP Neighbor Targeted Settings**, as shown below:

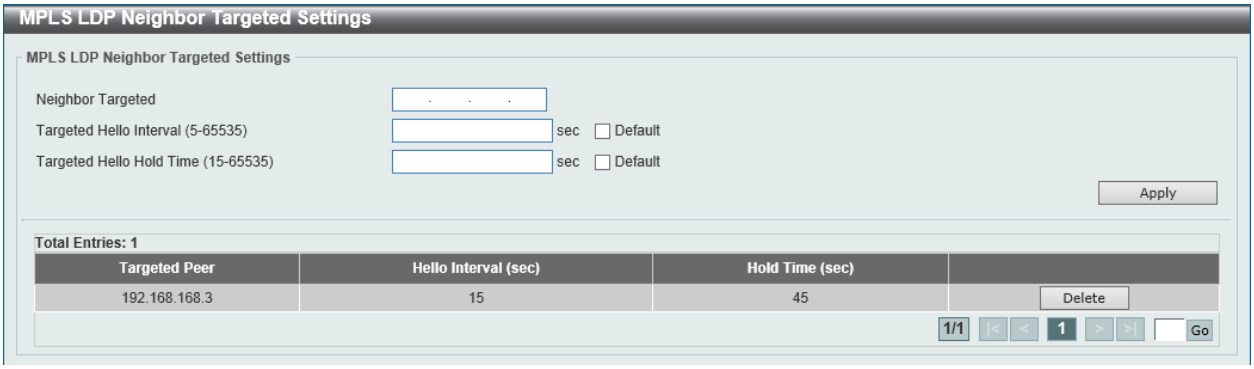



**Figure 11-5 MPLS LDP Neighbor Targeted Settings Window**

The fields that can be configured in **MPLS LDP Neighbor Targeted Settings** are described below:

| Parameter | Description |
|---|---|
| **Neighbor Targeted** | Enter the LSR ID of the targeted peer here. The targeted peer is used to establish the LDP session with the non-directly connected neighbor. |
| **Targeted Hello Interval** | Enter the interval to the hello message for sessions with extended peers here. The range is from 5 to 65535 seconds. Select the **Default** option to use the default value, which is 15 seconds. |
| **Targeted Hello Hold Time** | Enter the hold-time of the hello messages for sessions with extended peers here. The range is from 15 to 65535 seconds. Select the **Default** option to use the default value, which is 45 seconds. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# MPLS LDP Neighbor Information

This window is used to view and clear the MPLS feature's LDP neighbor information

To view the following window, click **MPLS > MPLS LDP Neighbor Information**, as shown below:

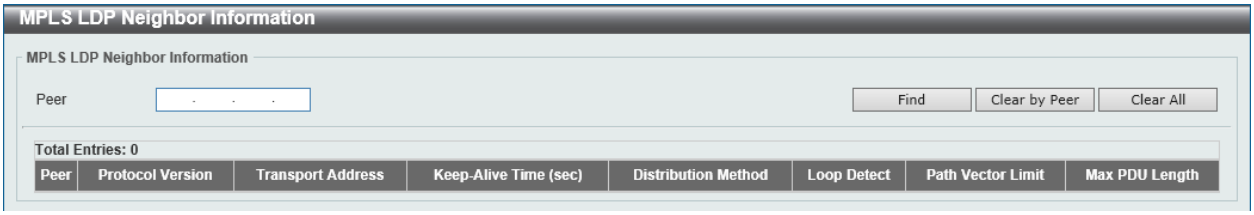



**Figure 11-6 MPLS LDP Neighbor Information Window**

The fields that can be configured in **MPLS LDP Neighbor Information** are described below:

| Parameter | Description |
|---|---|
| **Peer** | Enter the IP address which is used as the peer LSR ID here. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear** button to clear the entries based on the information entered.

Click the **Clear All** button to clear the information associated with all entries.

# MPLS Global Settings

This window is used to view and configure the MPLS feature's global settings.

To view the following window, click **MPLS > MPLS Global Settings**, as shown below:

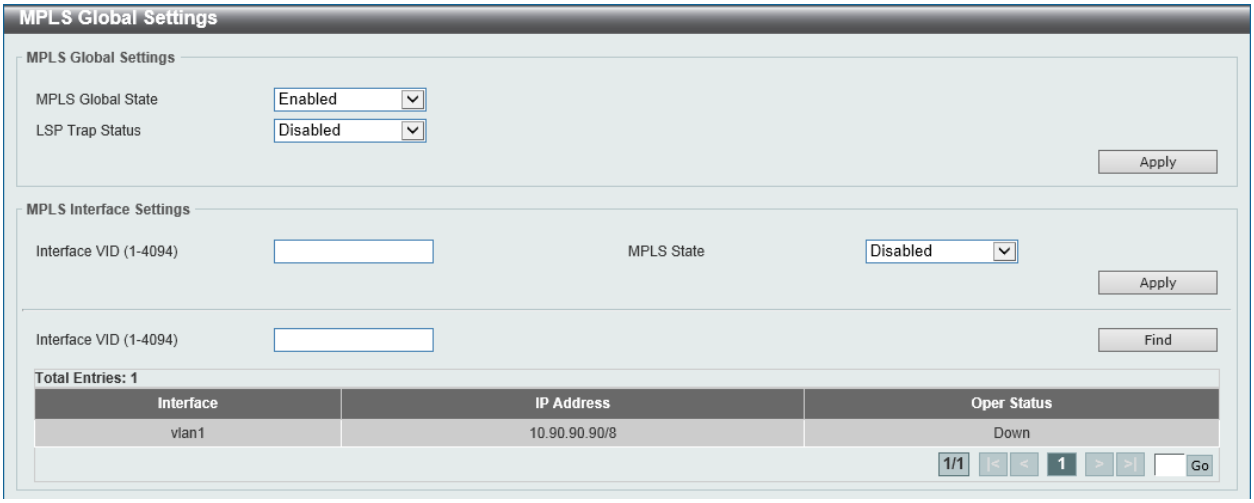



**Figure 11-7 MPLS Global Settings Window**

The fields that can be configured in **MPLS Global Settings** are described below:

| Parameter | Description |
|---|---|
| **MPLS Global State** | Select to globally enable or disable the MPLS feature here. |
| **LSP Trap Status** | Select to enable or disable the MPLS LSP trap feature here. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **MPLS Interface Settings** are described below:

| Parameter | Description |
|---|---|
| **Interface VID** | Enter the interface's VLAN ID that will be used here. The range is from 1 to 4094. |
| **MPLS State** | Select to enable or disable the MPLS feature for the specified interface here. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# MPLS LDP Interface Settings

This window is used to view and configure the MPLS feature's LDP interface settings.

To view the following window, click **MPLS > MPLS LDP Interface Settings**, as shown below:

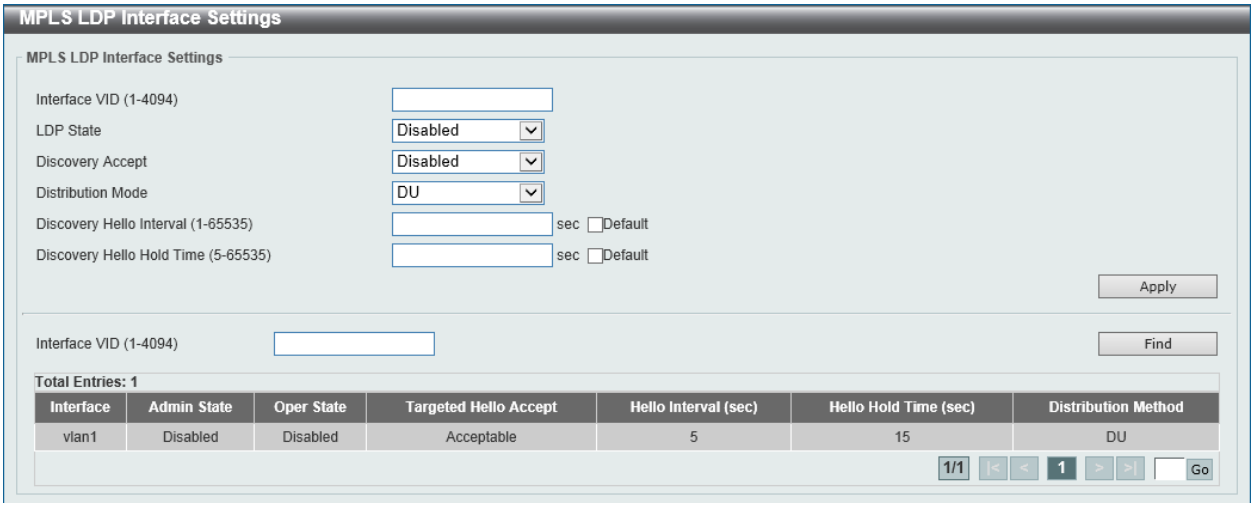



**Figure 11-8 MPLS LDP Interface Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Interface VID** | Enter the interface's VLAN ID used here. The range is from 1 to 4094. |
| **LDP State** | Select to enable or disable the LDP feature on the specified interface here. |
| **Discovery Accept** | Select to enable or disable the discovery accept feature here. If targeted hello message acceptance is disabled in the interface, and if the received targeted hello is not coming from the local configured targeted peer, the message will be ignored. If targeted hello message acceptance is enabled in the interface, LSR will honor the received targeted hello messages sent by all neighbors. |
| **Distribution Mode** | Select the distribution mode here. Options to choose from are **DU** and **DoD**.<br>• **DU:** Specifies the downstream unsolicited distribution mode.<br>• **DoD:** Specifies the downstream on-demand distribution mode. |
| **Discovery Hello Interval** | Enter the discovery hello interval value here. The range is from 1 to 65535 seconds. Select the **Default** option to use the default value, which is 5 seconds. |
| **Discovery Hello Hold Time** | Enter the discovery hello hold-time value here. The range is from 5 to 65535 seconds. Select the **Default** option to use the default value, which is 15 seconds. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# MPLS LDP Session Information

This window is used to find and display the MPLS feature's LDP session information.

To view the following window, click **MPLS > MPLS LDP Session Information**, as shown below:


**Figure 11-9 MPLS LDP Session Information Window**

The fields that can be configured in **MPLS LDP Session Information** are described below:

| Parameter | Description |
|---|---|
| **Peer** | Enter the IP address which is used as the peer LSR ID here. |

Click the **Find** button to locate a specific entry based on the information entered.

# MPLS LDP Statistic

This window is used to display MPLS LDP statistics.

To view the following window, click **MPLS > MPLS LDP Statistic**, as shown below:

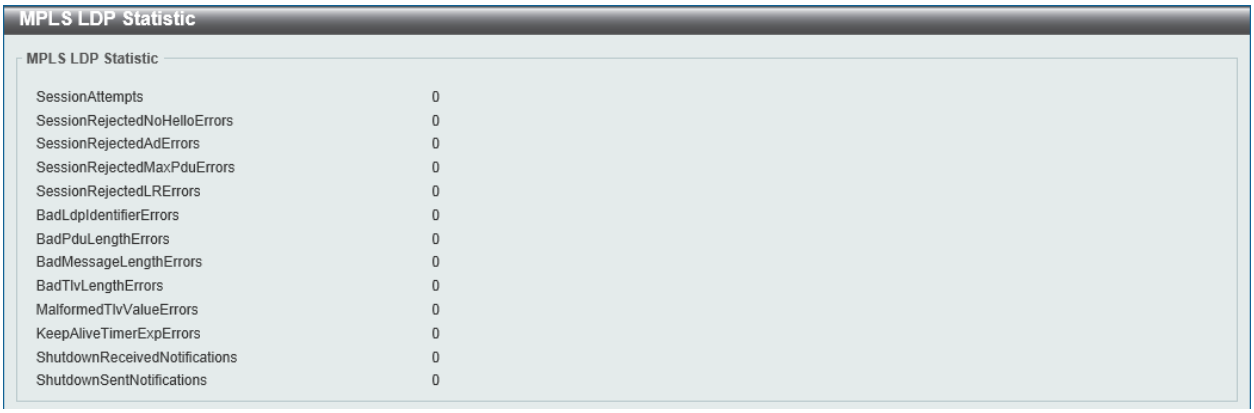



**Figure 11-10 MPLS LDP Statistic Window**

# MPLS LDP Binding Table

This window is used to display the MPLS LDP binding table.

To view the following window, click **MPLS > MPLS LDP Binding Table**, as shown below:

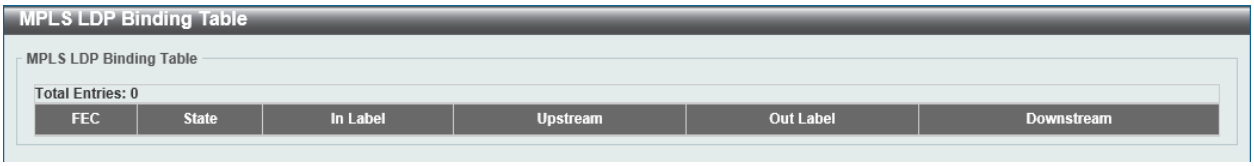



**Figure 11-11 MPLS LDP Binding Table Window**

# MPLS LDP Discovery Information

This window is used to display MPLS LDP discovery information.

To view the following window, click **MPLS > MPLS LDP Discovery Information**, as shown below:

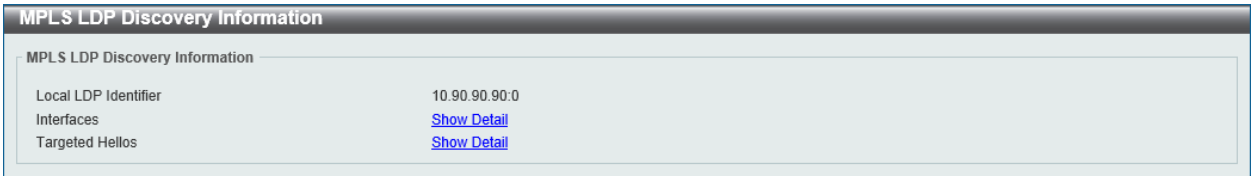



**Figure 11-12 MPLS LDP Discovery Information Window**

Click the Show Detail link to view more detailed information about the feature.

After clicking the Show Detail button next to **Interfaces**, the following page will appear.

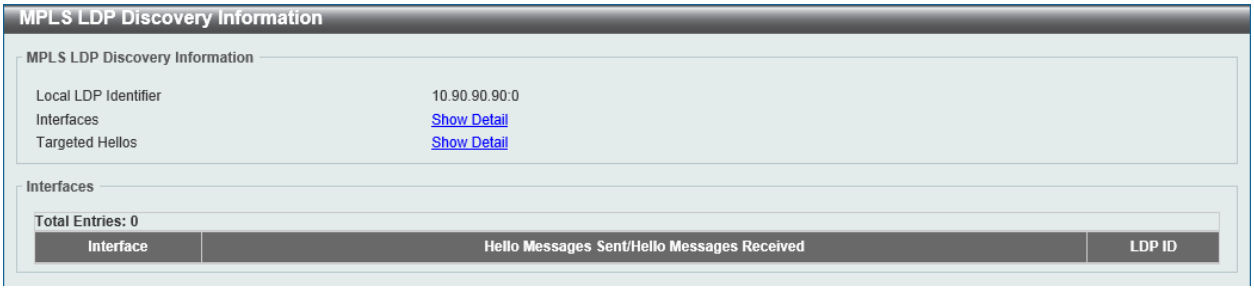



**Figure 11-13 MPLS LDP Discovery Information (Interfaces, Show Detail) Window**

After clicking the Show Detail button next to **Targeted Hellos**, the following page will appear.

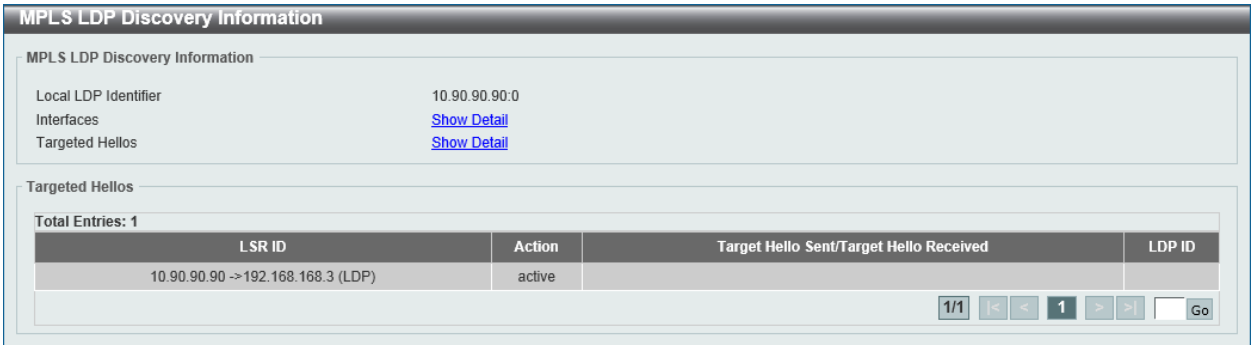



**Figure 11-14 MPLS LDP Discovery Information (Targeted Hellos, Show Detail) Window**

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# MPLS QoS Settings

This window is used to view and configure the MPLS feature's QoS settings.

To view the following window, click **MPLS > MPLS QoS Settings**, as shown below:

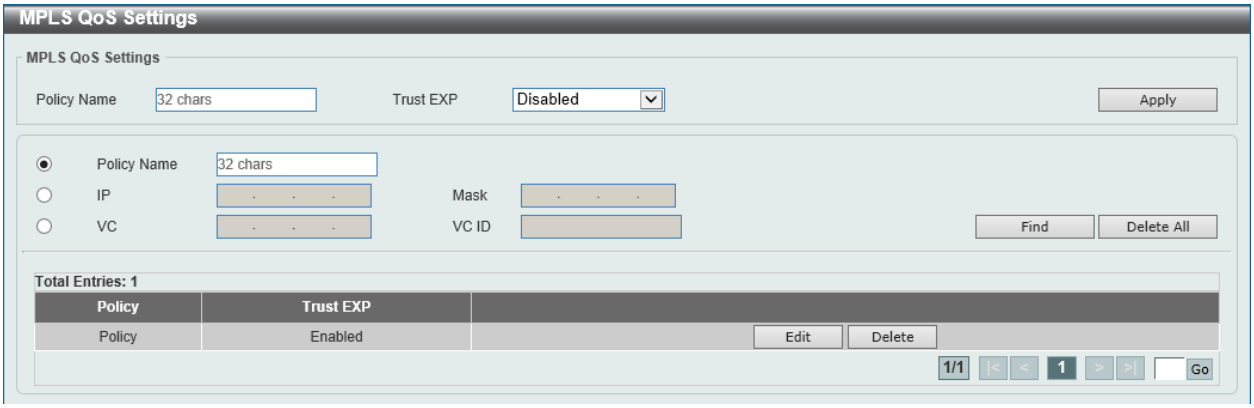



**Figure 11-15 MPLS QoS Settings Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Policy Name** | Enter the MPLS QoS policy's name here. This name can be up to 32 characters long. The MPLS QoS policy can be applied to MPLS FECs. |
| **Trust EXP** | Select to enable or disable the trust EXP feature here. If the EXP is trusted, the matched packets are scheduled according to the EXP to the priority mapping of the MPLS QoS policy. Otherwise, the packets are scheduled according to the 802.1p priority. |
| **IP** | Enter the FEC's IP address here associated with the QoS policy. |
| **Mask** | Enter the FEC's subnet mask here associated with the QoS policy. |
| **VC** | Enter the FEC's VC address here associated with the QoS policy. |
| **VC ID** | Enter the FEC's VC ID here associated with the QoS policy. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Delete All** button to delete all the entries configured.

Click the **Edit** button to modify the specified entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

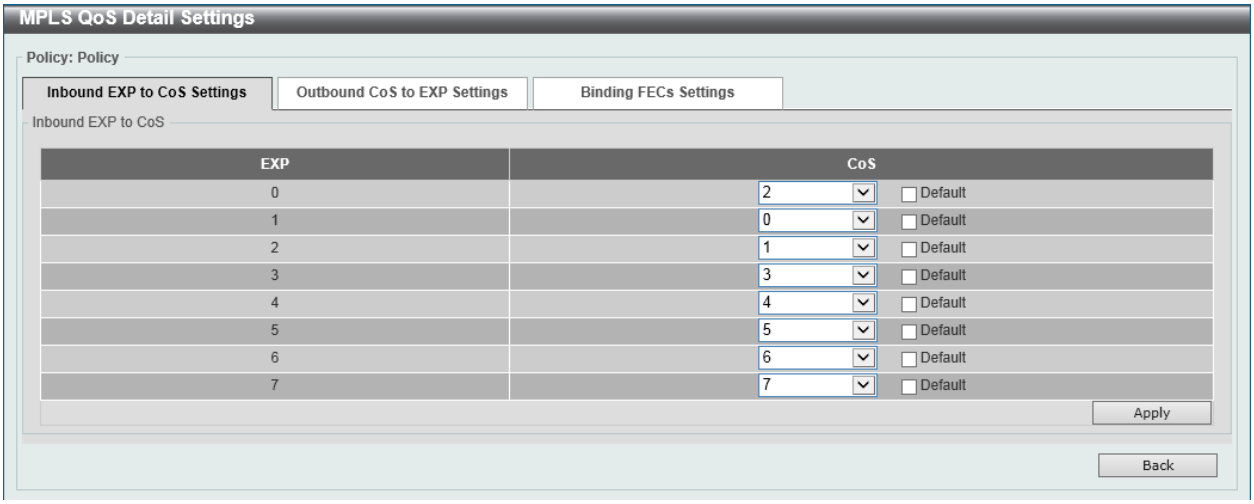



**Figure 11-16 MPLS QoS Settings (Edit, Inbound EXP to CoS Settings) Window**

The fields that can be configured in **Inbound EXP to CoS Settings** are described below:

| Parameter | Description |
|---|---|
| **CoS** | Select the list of CoS values (on the right) to be mapped to EXP values (on the left) here. This feature is used to configure the Class of Service (CoS) to the Experimental bits (EXP) mapping of the policy. The range is from 0 to 7. Select the **Default** option to use the default value. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

After clicking the **Outbound CoS to EXP Settings** tab, the following page will appear.

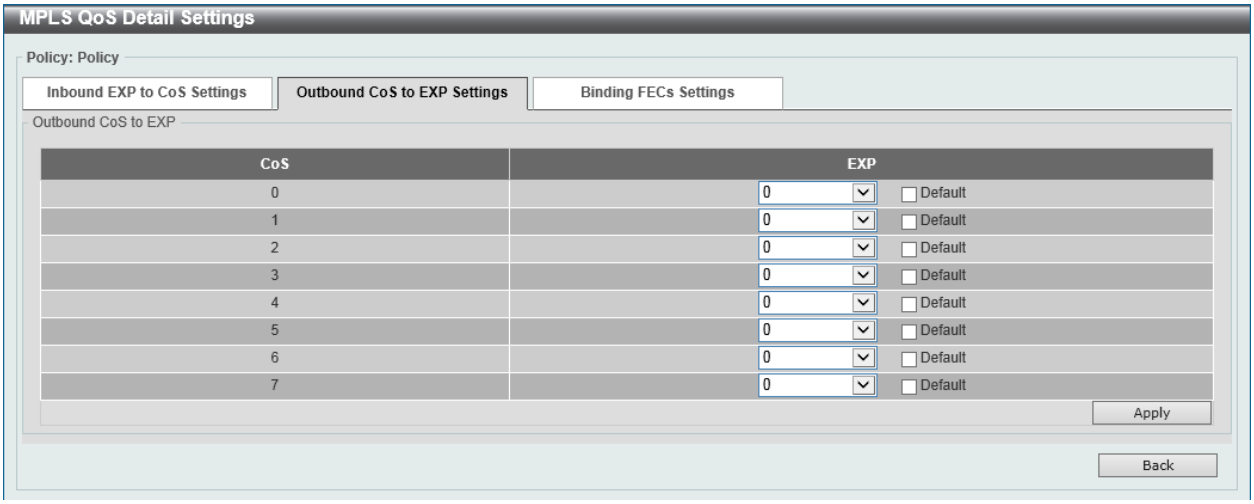



**Figure 11-17 MPLS QoS Settings (Edit, Outbound CoS to EXP Settings) Window**

The fields that can be configured in **Outbound CoS to EXP Settings** are described below:

| Parameter | Description |
|---|---|
| **EXP** | Select the EXPs (on the right) to be mapped to CoS values (on the left) here. This feature is used to configure the class EXP to CoS mapping of the policy. The range is from 0 to 7. Select the **Default** option to use the default value. |

Click the **Apply** button to accept the changes made.

Click the **Back** button to return to the previous window.

After clicking the **Binding FECs Settings** tab, the following page will appear.

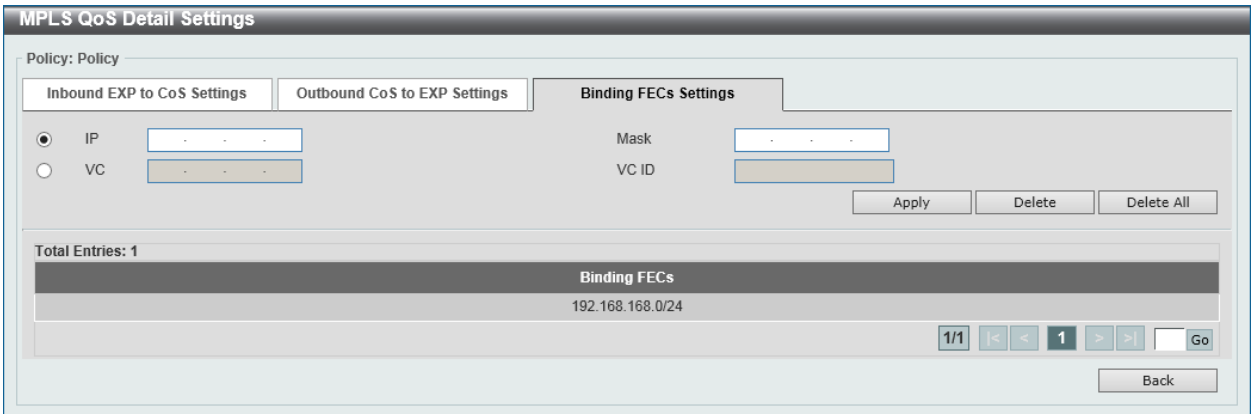



**Figure 11-18 MPLS QoS Settings (Edit, Binding FECs Settings) Window**

The fields that can be configured in **Binding FECs Settings** are described below:

| Parameter | Description |
|---|---|
| **IP** | Enter the FEC's IP address here. Use this feature to apply an MPLS QoS policy to FECs. The QoS policy will be applied to all MPLS packets of the FEC. A FEC can only be bound to at most one policy. |
| **Mask** | Enter the FEC's subnet mask here. |
| **VC** | Enter the FEC's VC address here. |
| **VC ID** | Enter the FEC's VC ID here. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to delete an entry based on the information entered.

Click the **Delete All** button to delete all the entries configured.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

Click the **Back** button to return to the previous window.

# Ping MPLS

This window is used to check the connectivity of the LSP for the specified FEC. If there is no LSP for the specified FEC, the "Destination unreachable" message will be displayed. Otherwise, MPLS echo request messages will be sent out to along with the LSP of the specified FEC. If the egress LSR received the request message, it will reply the request message sender with an MPLS echo reply message. If the sender cannot receive replies before the timeout, the "Request timed out" message will be displayed.

To view the following window, click **MPLS > Ping MPLS**, as shown below:


**Figure 11-19 Ping MPLS Window**

The fields that can be configured in **Ping MPLS** are described below:

| Parameter | Description |
|---|---|
| **IPv4 Address** | Select and enter the FEC's IPv4 address here whose LSP connectivity will be checked. |
| **Mask** | Select and enter the FEC's subnet mask here. |
| **VC** | Select and enter the FEC's VC IP address here. |
| **VC ID** | Select and enter the FEC's VC ID here. |
| **Ping Times** | Enter the ping time amount here. This is the amount of ping packets that will be sent out. The range is from 1 and 255. By default, this value is 4. |
| **Timeout** | Enter the ping timeout value here. The range is from 1 to 99 seconds. By default, this value is 2 seconds. |

Click the **Start** button to initiate the ping.

After clicking the **Start** button, the following page will appear.

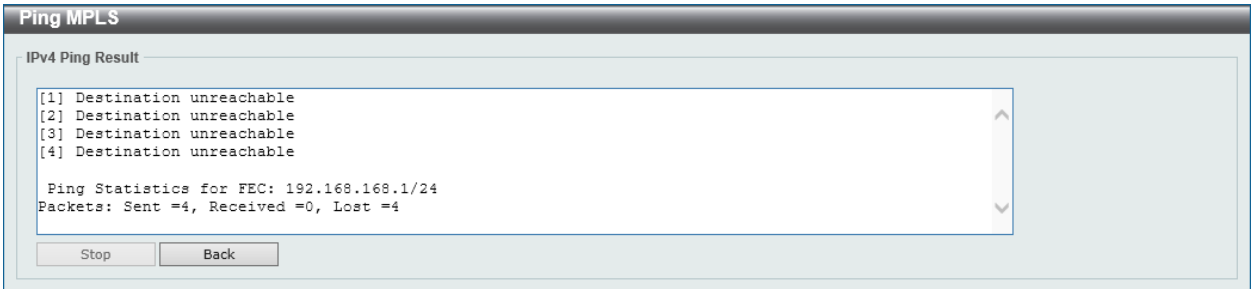



**Figure 11-20 Ping MPLS (Start) Window**

Click the **Stop** button to terminate the ping prematurely.

Click the **Back** button to return to the previous window.

# Traceroute MPLS IPv4

This window is used for hop-by-hop fault localization as well as path tracing the LSP of the specified FEC. If there is no LSP for the specified FEC, the "Destination unreachable" message will be displayed. Otherwise, MPLS echo request messages will be sent out to along the LSP of the specified FEC. The TTL in the outmost label of the MPLS echo requests is set successively to 1, 2, 3, and so on. It forces the

echo request expired at each successive LSR along the LSP. The LSR returns an MPLS echo reply. If the sender cannot receive a reply before the timeout, the trace route will stop.

To view the following window, click **MPLS > Traceroute MPLS IPv4**, as shown below:

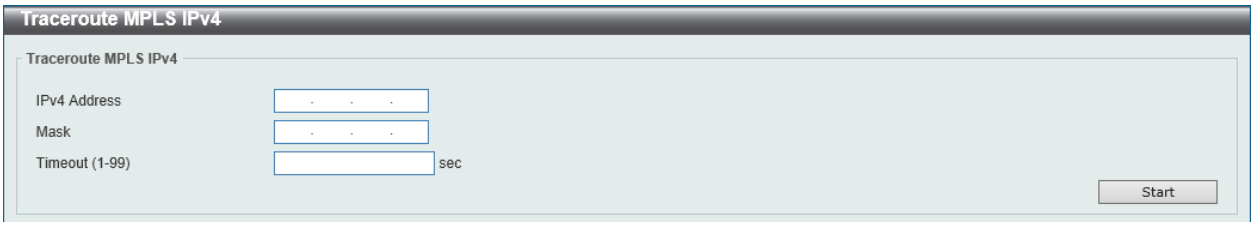



**Figure 11-21 Traceroute MPLS IPv4 Window**

The fields that can be configured in **Traceroute MPLS IPv4** are described below:

| Parameter | Description |
|---|---|
| **IPv4 Address** | Enter the FEC's IPv4 address here whose LSP connectivity will be checked. |
| **Mask** | Select and enter the FEC's subnet mask here. |
| **Timeout** | Enter the trace-route timeout value here. The range is from 1 to 99 seconds. By default, this value is 2 seconds. |

Click the **Start** button to initiate the trace.

After clicking the **Start** button, the following page will appear.

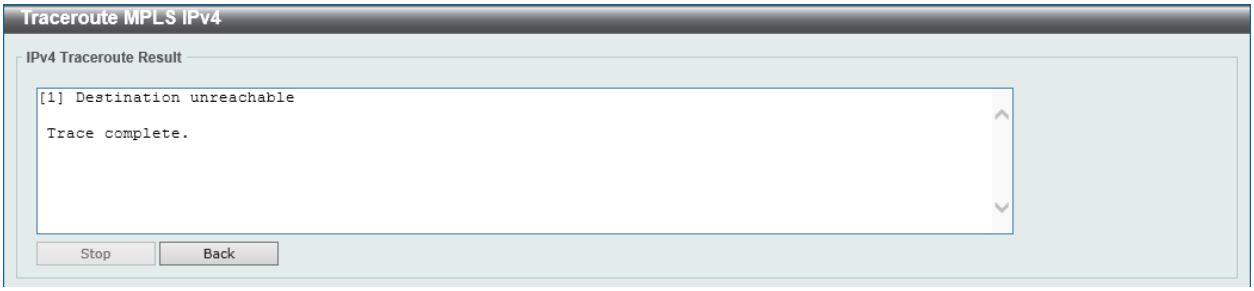



**Figure 11-22 Traceroute MPLS IPv4 (Start) Window**

Click the **Stop** button to terminate the trace prematurely.

Click the **Back** button to return to the previous window.

# 12. MPLS L2VPN

***VPWS Settings***
***L2VC Interface Description***
***VPLS Settings***
***VPLS MAC Address Table***

## VPWS Settings

This window is used to view and configure the Virtual Private Wire Service (VPWS) settings.

To view the following window, click **MPLS L2VPN > VPWS Settings**, as shown below:

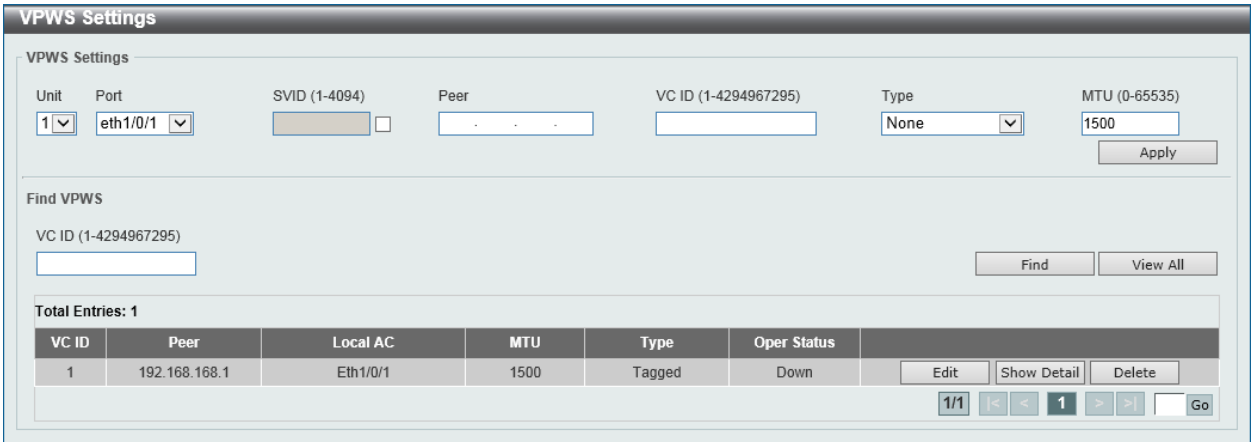



**Figure 12-1 VPWS Settings Window**

The fields that can be configured in **VPWS Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **Port** | Select the port that will be used here. |
| **SVID** | Select and enter the encapsulated VLAN's ID here. The range is from 1 to 4094. |
| **Peer** | Enter the peer's LSR ID here that is used to identify the other end Provider Edge (PE). |
| **VC ID** | Enter the Pseudo-Wire's (PW) service instance ID here. It is used to uniquely identify the VPWS and it must be unique at both PEs. The range is from 1 to 4294967295. |
| **Type** | Select the type here. Options to choose from are **None**, **Manual**, **Raw**, **Tagged**, **Manual Raw**, and **Manual Tagged**. For the raw mode, S-tags will not be sent over the PW. For the tagged mode, S-tags will be sent over the PW. By default, the PW type is in the Ethernet-tag mode. |
| **MTU** | Enter the local CE-PE link's MTU value here that will be advertised to the remote peer. If the MTU is configured as 0, the LDP will not advertise the local MTU. The MTU must be same at both the local and remote devices. The range is from 0 to 65535 bytes. By default, this value is 1500 bytes. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find VPWS** are described below:

| Parameter | Description |
|---|---|
| **VC ID** | Enter the Pseudo-Wire's (PW) service instance ID here. The range is from 1 to 4294967295. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Edit** button to modify the specified entry.

Click the **Show Detail** button to view more detailed information for the specified entry.

Click the **Delete** button to delete the specified entry.

After clicking the **Edit** button, the following page will appear.


**Figure 12-2 VPWS Settings (Edit) Window**

The fields that can be configured in **PW Settings** are described below:

| Parameter | Description |
|---|---|
| **PW Name** | Select and enter the Pseudo-Wire's (PW) name here. This name can be up to 64 characters long. Select the **None** option to use the default setting. |

Click the **Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **PW Redundancy Settings** are described below:

| Parameter | Description |
|---|---|
| **Peer** | Enter the peer's LSR ID here that is used to identify the other end Provider Edge (PE). |
| **VC ID** | Enter the PW's service instance ID here. The range is from 1 to 4294967295. |
| **Delay** | Enter the delay value here. This is to switch back to the primary PW with the specified delay time after the primary PW comes back. The range is from 0 to 180 seconds.<br>Selecting the **Never** option specifies not to switch back to the primary PW even if it comes back. This is the default option. |

Click the **Apply** button to accept the changes made.

After clicking the **Show Detail** button, the following page will appear.


**Figure 12-3 VPWS Settings (Show Detail) Window**

Click the **Back** button to return to the previous window.

# L2VC Interface Description

This window is used to view and configure the Layer 2 Virtual Circuit's (L2VC) interface description.

To view the following window, click **MPLS L2VPN > L2VC Interface Description**, as shown below:

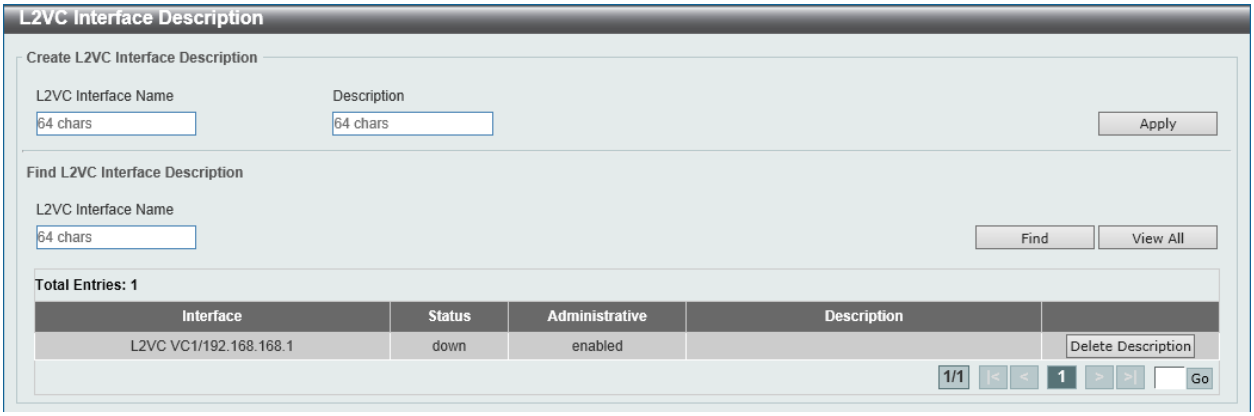



**Figure 12-4 L2VC Interface Description Window**

The fields that can be configured in **Create L2VC Interface Description** are described below:

| Parameter | Description |
|---|---|
| **L2VC Interface Name** | Enter the L2VC interface's name here. This name can be up to 64 characters long. |
| **Description** | Enter the L2VC interface's description here. This name can be up to 64 characters long. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Find L2VC Interface Description** are described below:

| Parameter | Description |
|---|---|
| **L2VC Interface Name** | Enter the L2VC interface's name here. This name can be up to 64 characters long. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

Click the **Delete Description** button to remove the specified L2VC interface's description.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

# VPLS Settings

This window is used to view and configure the Virtual Private LAN Service (VPLS) settings.

To view the following window, click **MPLS L2VPN > VPLS Settings**, as shown below:

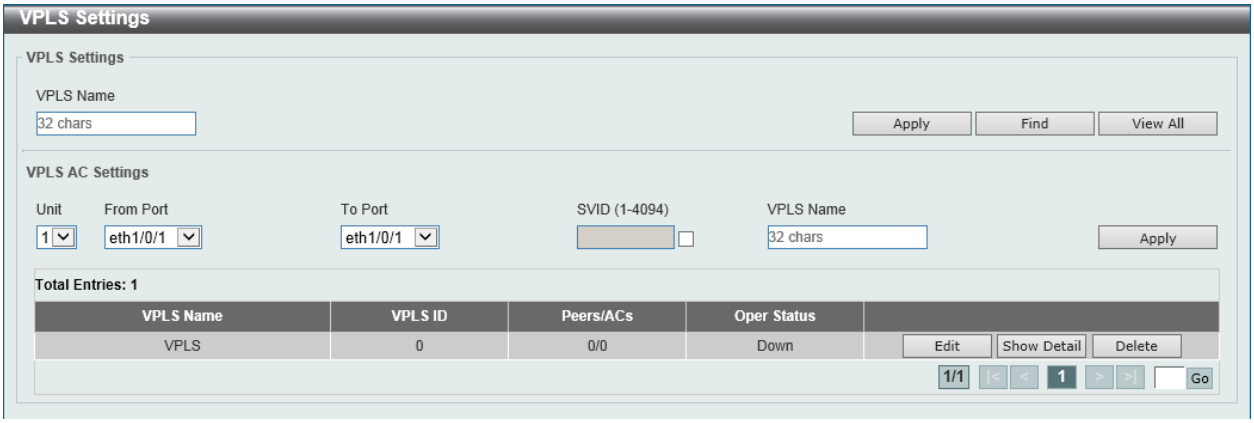



**Figure 12-5 VPLS Settings Window**

The fields that can be configured in **VPLS Settings** are described below:

| Parameter | Description |
|---|---|
| **VPLS Name** | Enter the VPLS instance's name here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **View All** button to display all the entries.

The fields that can be configured in **VPLS AC Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **From Port ~ To Port** | Select the switch's port range that will be used here. |
| **SVID** | Select and enter the SVID here. The range is from 1 to 4094. |
| **VPLS Name** | Enter the VPLS instance's name here. This name can be up to 32 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Edit** button to modify the specified entry.

Click the **Show Detail** button to view more detailed information about the entry.

Click the **Delete** button to delete the specified entry.

Enter a page number and click the **Go** button to navigate to a specific page when multiple pages exist.

After clicking the **Edit** button, the following page will appear.

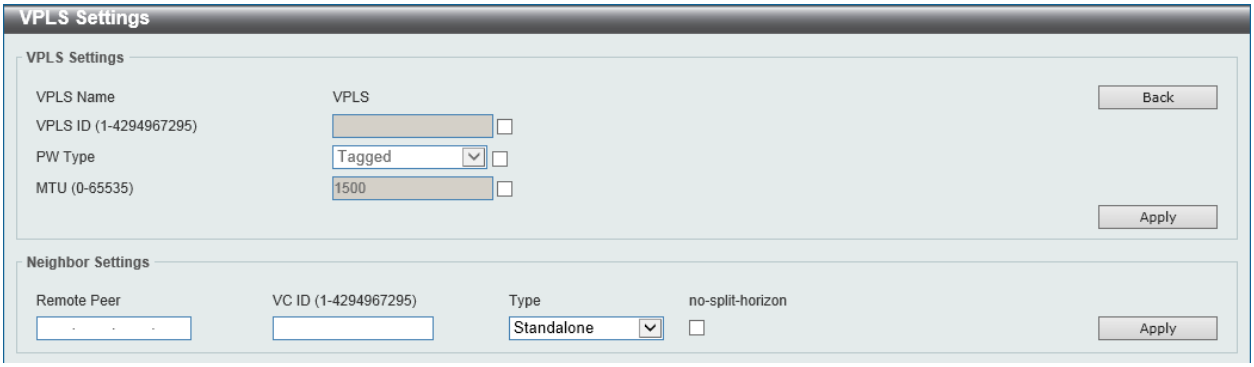



**Figure 12-6 VPLS Settings (Edit) Window**

The fields that can be configured in **VPLS Settings** are described below:

| Parameter | Description |
|---|---|
| **VPLS ID** | Select and enter the VPLS instance's ID here. The range is from 1 to 4294967295. |
| **PW Type** | Select the PW type here. Options to choose from are **Raw** and **Tagged**.<br>• **Raw:** Specifies that the service type is in the Ethernet-raw mode. It means that the encapsulation of all PWs in the VPLS is in the Ethernet-raw mode.<br>• **Tagged:** Specifies that the service type is in the Ethernet-tagged mode. It means that the encapsulation of all PWs in the VPLS is in the Ethernet-tagged mode. |
| **MTU** | Select and enter the local AC link's MTU value of a VPLS that will be advertised to remote peers in this VPLS here. The MTU value must be same at both the local and remote sites to establish the PW. If the MTU is specified as 0, then local the MTU will not be advertised to remote peers in the VPLS. The range is from 0 to 65535 bytes. By default, this value is 1500 bytes. |

Click the **Back** button to return to the previous window.

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Neighbor Settings** are described below:

| Parameter | Description |
|---|---|
| **Remote Peer** | Enter the LSR ID that is used to identify the PE to which the peer belongs to here. |
| **VC ID** | Enter the PW's VC ID here. The range is from 1 to 4294967295. It is used with the IP address to uniquely identify a peer for a VPLS. If not specified, the PW ID is set by the VPN ID of this VPLS. |

| Parameter | Description |
|---|---|
| **Type** | Select the type here. Options to choose from are **Backup** and **Standalone**. Selecting the **Backup** option will create a backup peer for PW redundancy of an H-VPLS. |
| **No-Split-Horizon** | Selecting this option specifies that a peer is used as the spoke PW. The packets from other PWs in the VPLS can be forwarded to this PW and the packets from this PW can be forwarded to other PWs in the VPLS. If this option is not specified, the peer is used as a network PW. The packets from other network PWs in a VPLS must not be forwarded to this PW and the packets from this PW must not be forwarded to other network PWs in the VPLS. |

Click the **Apply** button to accept the changes made.

After clicking the **Show Detail** button, the following page will appear.

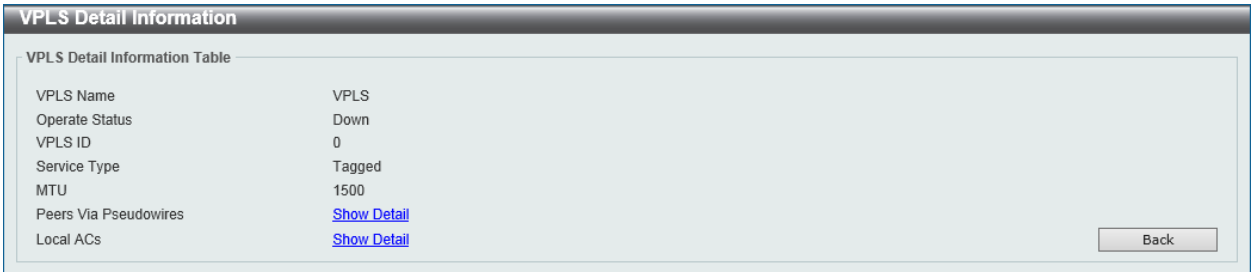



**Figure 12-7 VPLS Settings (Show Detail) Window**

Click the **Back** button to return to the previous window.

After clicking the Show Detail link next to **Peers Via Pseudowires**, the following page will appear.

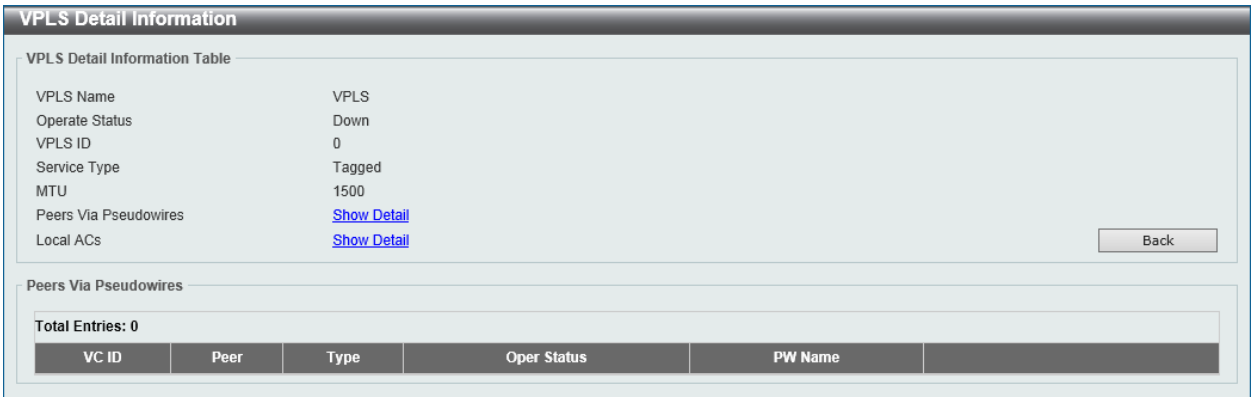



**Figure 12-8 VPLS Settings (Show Detail, Peers, Show Detail) Window**

Click the **Back** button to return to the previous window.

After clicking the Show Detail link next to **Local ACs**, the following page will appear.

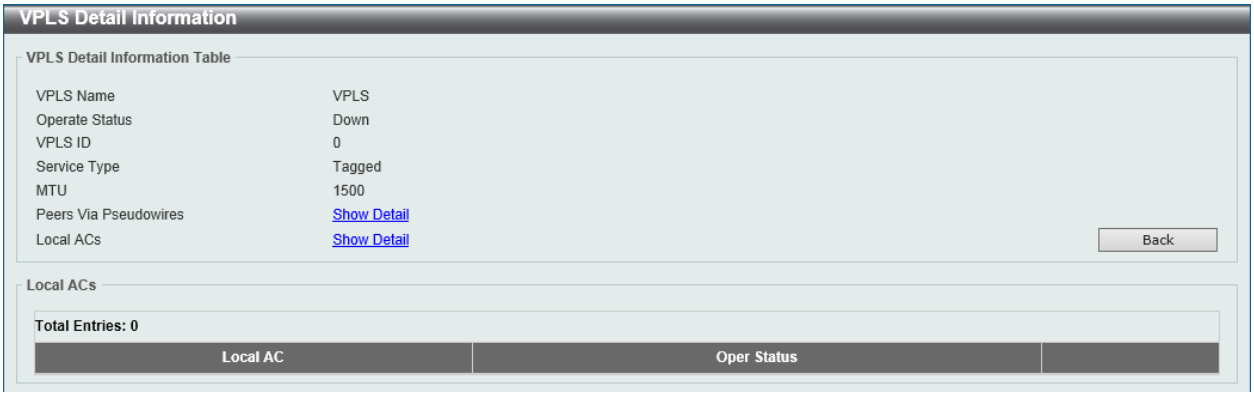



**Figure 12-9 VPLS Settings (Show Detail, Local ACs, Show Detail) Window**

Click the **Back** button to return to the previous window.

# VPLS MAC Address Table

This window is used to clear and display VPLS MAC address information.

To view the following window, click **MPLS L2VPN > VPLS MAC Address Table**, as shown below:

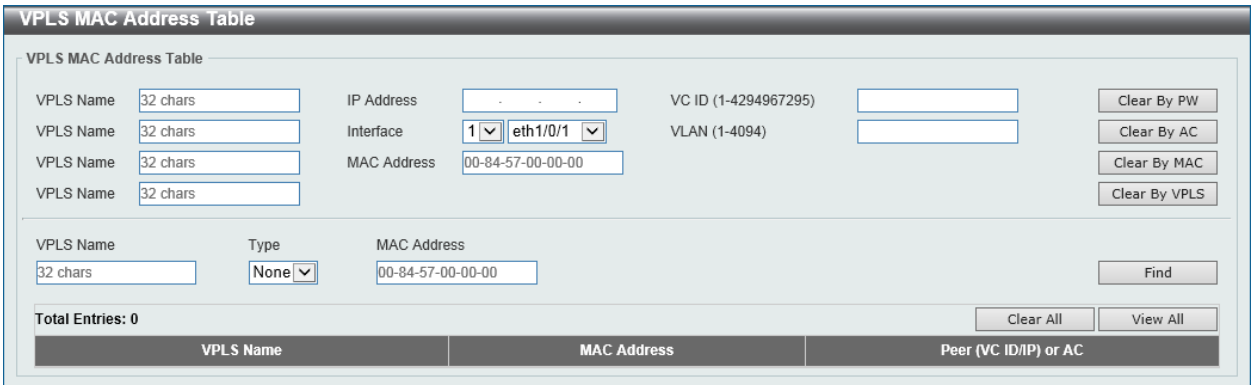



**Figure 12-10 VPLS MAC Address Table Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **VPLS Name** | Enter the VPLS instance's name here. This name can be up to 32 characters long. |
| **IP Address** | Enter the LSR's ID that is used to identify the PE to which the peer belongs to here. |
| **VC ID** | Enter the PW's VC ID here. The range is from 1 to 4294967295. |
| **Interface** | Select the switch's unit ID that will be used here.<br>Select the port that will be used here. |
| **VLAN** | Enter the service VLAN's ID here. The range is from 1 to 4094. |
| **MAC Address** | Enter the MAC address that will be used here. |
| **Type** | Select the type of information to be specified in the search query here. Options to choose from are **None**, **Peer**, and **AC**. |

Click the **Clear by PW** button to clear the MAC addresses associated with the PW.

Click the **Clear by AC** button to clear the MAC addresses associated with the AC.

Click the **Clear by MAC** button to clear the MAC address entered.

Click the **Clear by VPLS** button to clear the MAC addresses associated with the VPLS instance.

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Clear All** button to clear the information associated with all entries.

Click the **View All** button to display all the entries.

# 13. Monitoring

***Mirror Settings***
***Traffic***
***sFlow***
***Device Environment***

## Mirror Settings

This window is used to view and configure the mirror feature's settings. The switch allows users to copy frames transmitted and received on a port and redirect the copies to another port. Attach a monitoring device to the mirroring port, such as a sniffer or an RMON probe, to view details about the packets passing through the first port. This is useful for network monitoring and troubleshooting purposes.

To view the following window, click **Monitoring > Mirror Settings**, as shown below:

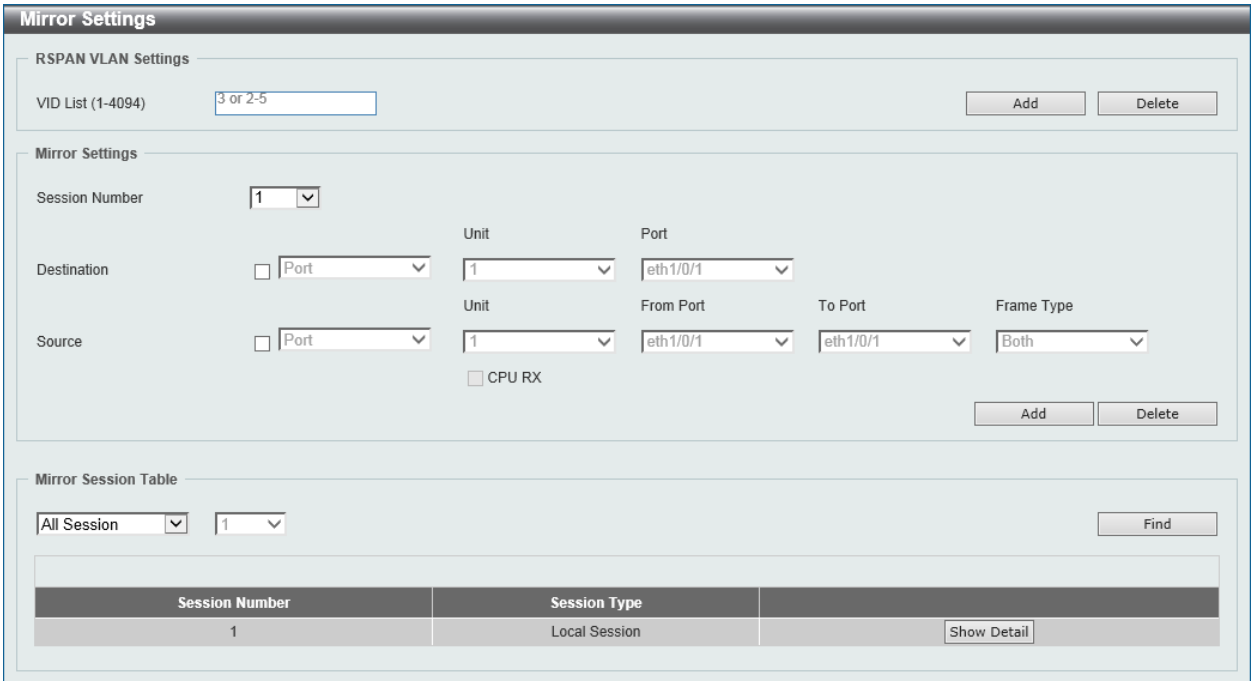



**Figure 13-1 Mirror Settings Window**

The fields that can be configured for **RSPAN VLAN Settings** are described below:

| Parameter | Description |
|---|---|
| **VID List** | Enter the VLAN list's ID(s) that will be associated with this configuration here. |

Click the **Add** button to add the VLAN(s) to the configuration.

Click the **Delete** button to delete the VLAN(s) from the configuration.

The fields that can be configured for **Mirror Settings** are described below:

| Parameter | Description |
|---|---|
| **Session Number** | Select the mirror session number for this entry here. This number is |

| Parameter | Description |
|---|---|
| | between 1 and 4. |
| **Destination** | Tick the checkbox, next to the **Destination** option, to configure the destination for this port mirror entry.<br>In the first drop-down menu select the destination type option. Options to choose from are **Port**, **Remote VLAN**, and **Replace**.<br>• **Port:** After selecting this option, select the switch's unit ID and destination port number from the drop-down menus.<br>• **Remove VLAN:** After selecting this option, select the switch's unit ID and destination port number from the drop-down menus and enter the **VID** in the space provided. The VID must be between 2 and 4094.<br>• **Replace:** After selecting this option, enter the **ACL Access List** name and **VID** (VLAN ID) in the spaces provided. |
| **Source** | Tick the checkbox, next to the **Source** option, to configure the source for this port mirror entry.<br>In the first drop-down menu select the source type option. Options to choose from are **Port**, **ACL**, **VLAN**, and **Remote VLAN**.<br>• **Port:** After selecting this option, select the switch's unit ID, **From Port** and **To Port** numbers from the drop-down menus. Lastly select the **Frame Type** option from the last drop-down menu. Options to choose from are **Both**, **RX**, **TX**, and **TX Forwarding**. When selecting **Both**, traffic in both the incoming and outgoing directions will be mirrored. When selecting **RX**, traffic in only the incoming direction will be mirrored. When selecting **TX**, traffic in only the outgoing direction will be mirrored. When selecting **TX Forwarding**, traffic in only the outgoing direction will be mirrored and forwarded. Select the **CPU RX** option to also monitor CPU traffic.<br>• **ACL:** After selecting this option, enter the ACL name in the space provided.<br>• **VLAN:** After selecting this option, enter the **VID List** in the space provided and select the **Frame Type** from the drop-down menu.<br>• **Remote VLAN:** After selecting this option, enter the **VID** in the space provided. The VID must be between 2 and 4094. |

Click the **Add** button to add the newly configured mirror entry based on the information entered.

Click the **Delete** button to delete an existing mirror entry based on the information entered.

The fields that can be configured for **Mirror Session Table** are described below:

| Parameter | Description |
|---|---|
| **Mirror Session Type** | Select the mirror session type of information that will be displayed from the drop-down menu. Options to choose from are **All Session**, **Session Number**, **Remote Session**, and **Local Session**.<br>After selecting the **Session Number** option, select the session number from the second drop-down menu. This number is from 1 to 4. |

Click the **Find** button to locate a specific entry based on the information entered.

Click the **Show Detail** button to view more detailed information about the mirror session.

After clicking the **Show Detail** button, the following window will appear:

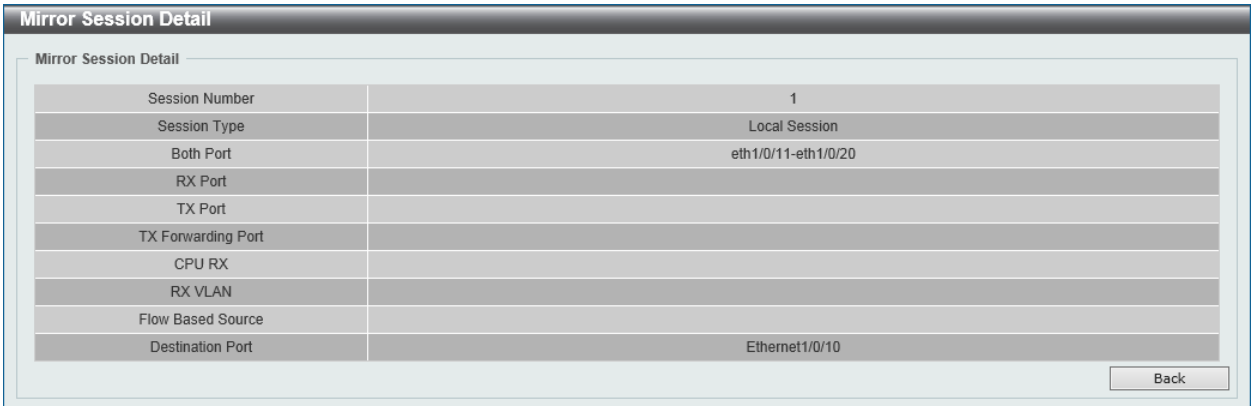



**Figure 13-2 Mirror Settings (Show Detail) Window**

Click the **Back** button to return to the previous page.

# Traffic

To view the following window, click **Monitoring > Traffic**.

## Traffic Monitoring by Direction

This window is used to monitor traffic, per-port, in a certain direction. The two directions, that can by selected, are received (**RX**) or transmitted (**TX**) packets. After selecting a **Port** number and then selecting the **Direction** option from the drop-down list, click the **Apply** button to view the page below:

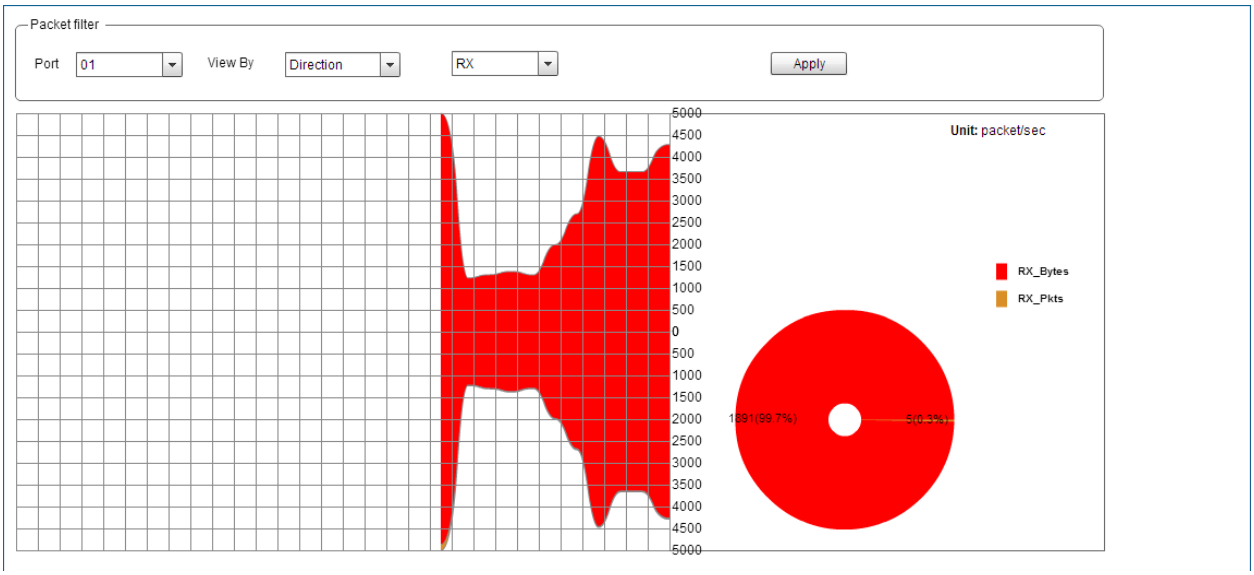



**Figure 13-3 Traffic Monitoring by Direction Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Port** | Select the port number to display. |
| **View By** | Select the **View By** option here. Options to choose from are **Direction**, **Type**, **Size**, and **Error**. |
| **Direction** | Select the direction information to display for the port selected. Options |

| Parameter | Description |
|---|---|
| | to choose from are received (**RX)** and transmitted (**TX)**. |

Click the **Apply** button to initiate the display information based to the selections made.

# Traffic Monitoring by Type

This window is used to monitor traffic, per-port, of a certain type. After selecting a **Port** number and then selecting the **Type** option from the drop-down list, click the **Apply** button to view the page below:

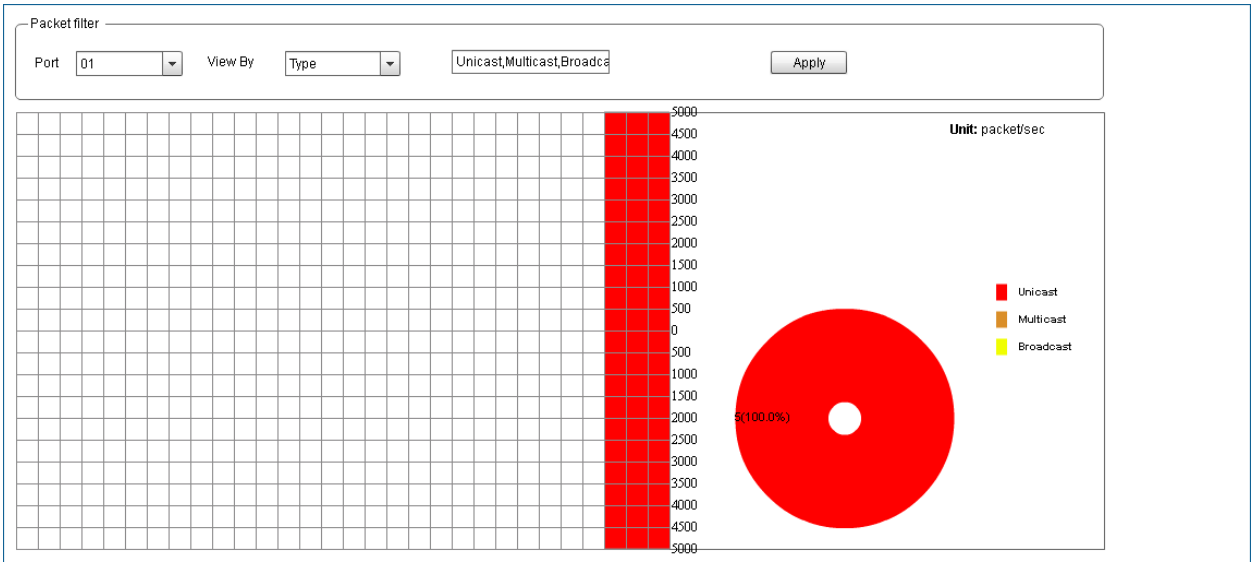



**Figure 13-4 Traffic Monitoring by Type Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Port** | Select the port number to display. |
| **View By** | Select the **View By** option here. Options to choose from are **Direction**, **Type**, **Size**, and **Error**. |
| **Type** | Select the type of information to display for the port selected. Options to choose from are **Unicast**, **Multicast**, **Broadcast**, and **All**. |

Click the **Apply** button to initiate the display information based to the selections made.

# Traffic Monitoring by Size

This window is used to monitor traffic, per-port, of a certain packet size. After selecting a **Port** number and then selecting the **Size** option from the drop-down list, click the **Apply** button to view the page below:

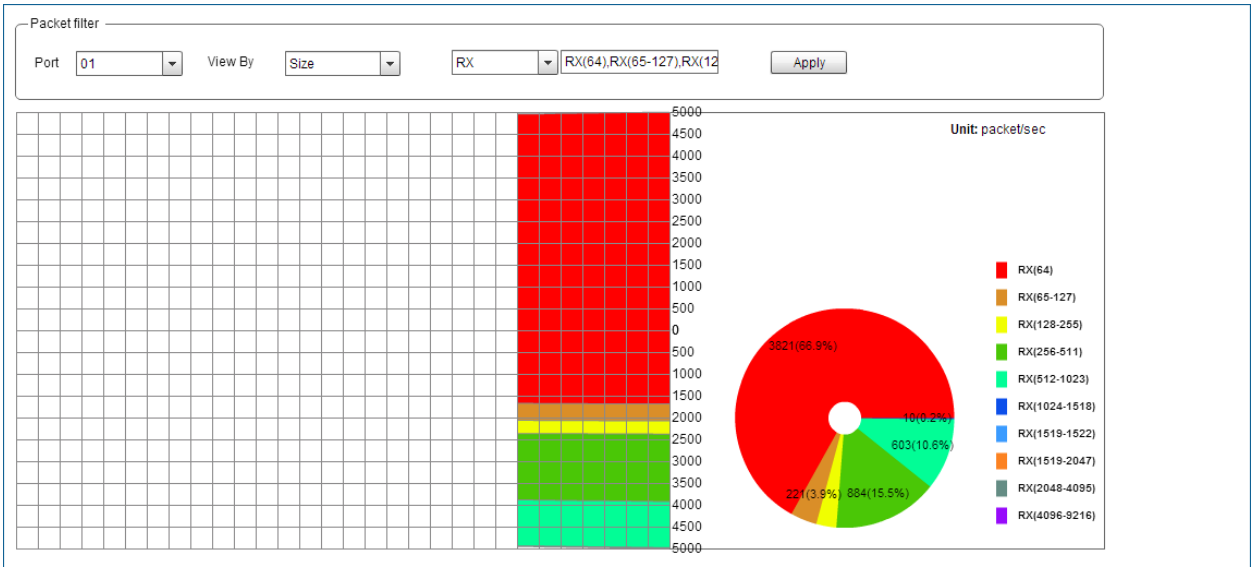



**Figure 13-5 Traffic Monitoring by Size Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Port** | Select the port number to display. |
| **View By** | Select the **View By** option here. Options to choose from are **Direction**, **Type**, **Size**, and **Error**. |
| **Direction** | Select the direction of the traffic that will be monitored. Options to choose from are received (**RX**) and transmitted (**TX**). |
| **Size** | Select the size of the information to display for the port selected. Options to choose from are **64**, **65-127**, **128-255**, **256-511**, **512-1023**, **1024-1518**, **1519-1522**,**1519-2047**, **2048-4095**, **4096-9216**, and **All**. |

Click the **Apply** button to initiate the display information based to the selections made.

## Traffic Monitoring by Error

This window is used to monitor traffic, per-port, of a certain error type and direction. After selecting a **Port** number and then selecting the **Error** option from the drop-down list, click the **Apply** button to view the page below:

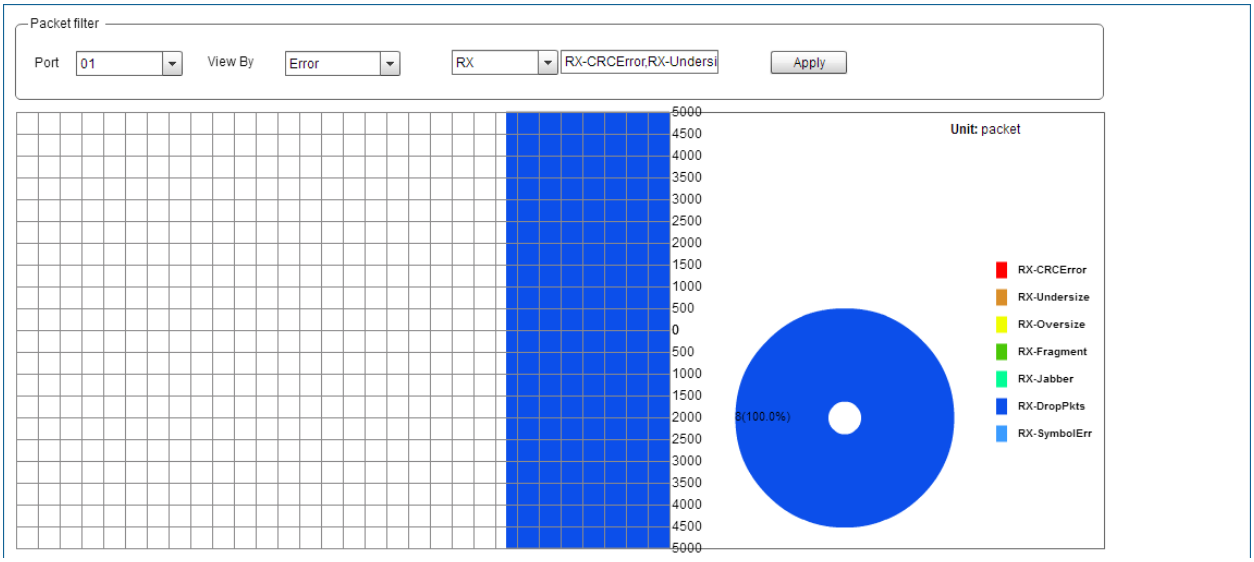



**Figure 13-6 Traffic Monitoring by Error Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Port** | Select the port number to display. |
| **View By** | Select the **View By** option here. Options to choose from are **Direction**, **Type**, **Size**, and **Error**. |
| **Direction** | Select the error direction of the information to display for the port selected. Options to choose from are received (**RX)** and transmitted (**TX)**. |
| **Error Type** | Select the error type of the information to display for the port selected. |

Click the **Apply** button to initiate the display information based to the selections made.

# sFlow

## sFlow Agent Information

This window is used to view the sFlow agent information.

To view the following window, click **Monitoring > sFlow > sFlow Agent Information**, as shown below:

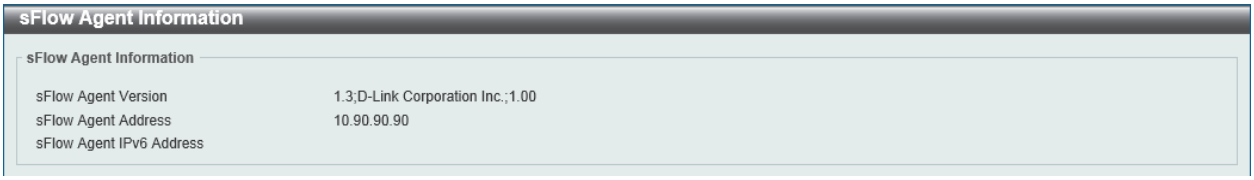



**Figure 13-7 sFlow Agent Information Window**

## sFlow Receiver Settings

This window is used to view and configure receivers for the sFlow agents. Receivers cannot be added to or removed from the sFlow agent.

To view the following window, click **Monitoring > sFlow > sFlow Receiver Settings**, as shown below:

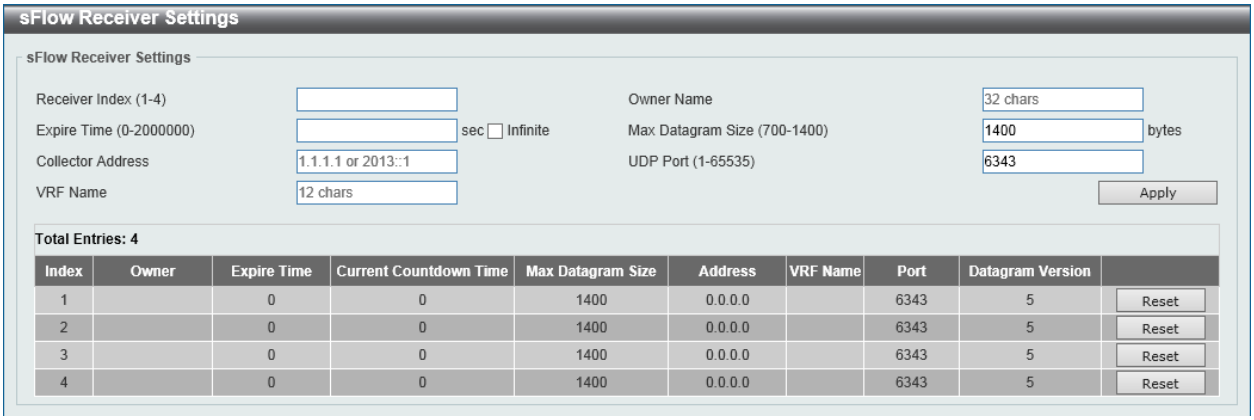



**Figure 13-8 sFlow Receiver Settings Window**

The fields that can be configured in **sFlow Receiver Settings** are described below:

| Parameter | Description |
|---|---|
| **Receiver Index** | Enter the index number of the receiver here. This number must be between 1 and 4. |
| **Owner Name** | Enter the owner name of the receiver here. This name can be up to 32 characters long. |
| **Expire Time** | Enter the expiration time for the entry here. The parameters of the entry will reset when the timer expired. The range is from 0 to 2000000 seconds. Selecting **Infinite** specifies that the entry will not expire. |
| **Max Datagram Size** | Enter the maximum number of data bytes of a single sFlow datagram here. The range is from 700 to 1400 bytes. By default, this value is 1400 bytes. |
| **Collector Address** | Enter the remote sFlow collector's IPv4 or IPv6 address here. |
| **UDP Port** | Enter the remote sFlow collector's UDP port number here. This number must be between 1 and 65535. By default, this value is 6343. |
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration here. This name can be up to 12 characters long. |

Click the **Apply** button to accept the changes made.

Click the **Reset** button to reset the specified entry's settings to the default settings.

# sFlow Sampler Settings

This window is used to view and configure the sFlow sampler settings.

To view the following window, click **Monitoring > sFlow > sFlow Sampler Settings**, as shown below:

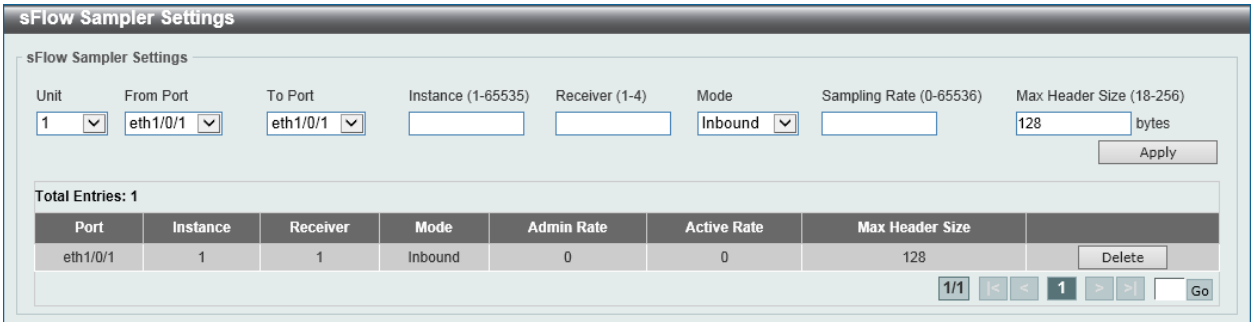



**Figure 13-9 sFlow Sampler Settings Window**

The fields that can be configured in **sFlow Sampler Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Instance** | Enter the instance's index number if multiple samplers are associated with one interface. The valid range is from 1 to 65535. |
| **Receiver** | Enter the receiver's index for this sampler. If not specified, the value is 0. This value must be between 1 and 4. |
| **Mode** | Select the mode here. Options to choose from are **Inbound** and **Outbound**.<br>• Selecting **Inbound** specifies to sample ingress packets. This is the default direction of a sampler.<br>• Selecting **Outbound** specifies to sample egress packets. |
| **Sampling Rate** | Enter packet sampling rate here. This value must be between 0 and 65536. Entering 0 will disable this function. If not specified, the default value is 0. |
| **Max Header Size** | Enter the maximum number of bytes that should be copied from sampled packets. This value must be between 18 and 256 bytes. By default, this value is 128 bytes. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# sFlow Poller Settings

This window is used to view and configure the sFlow poller settings.

To view the following window, click **Monitoring > sFlow > sFlow Poller Settings**, as shown below:

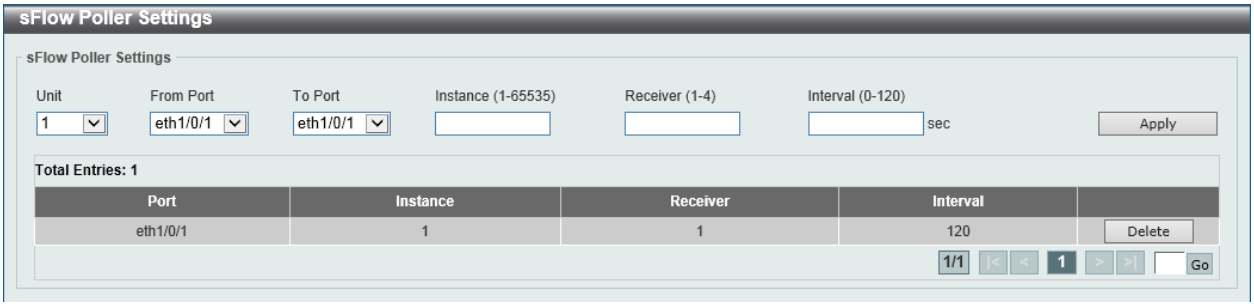



**Figure 13-10 sFlow Poller Settings Window**

The fields that can be configured in **sFlow Poller Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Instance** | Enter the instance's index number if multiple samplers are associated with one interface. The valid range is from 1 to 65535. |
| **Receiver** | Enter the receiver's index value for this poller here. This value must be between 1 and 4. |
| **Interval** | Enter the maximum number of seconds between successive polling samples. This value must be between 0 and 120 seconds. Entering 0 will disable this feature. By default this value is 0. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# Device Environment

The device environment feature displays the Switch internal temperature status.

To view the following window, click **Monitoring > Device Environment**, as shown below:

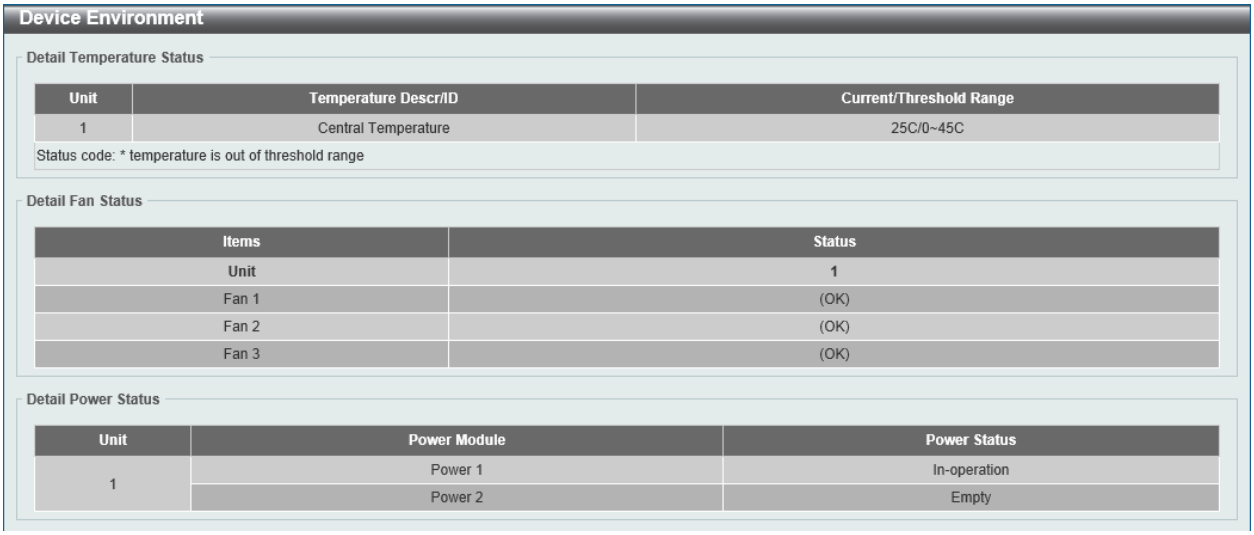



**Figure 13-11 Device Environment Window**

# 14. Green

***Power Saving***
***EEE***

## Power Saving

This window is used to configure the power saving settings of the Switch.

To view the following window, click **Green > Power Saving**, as shown below:

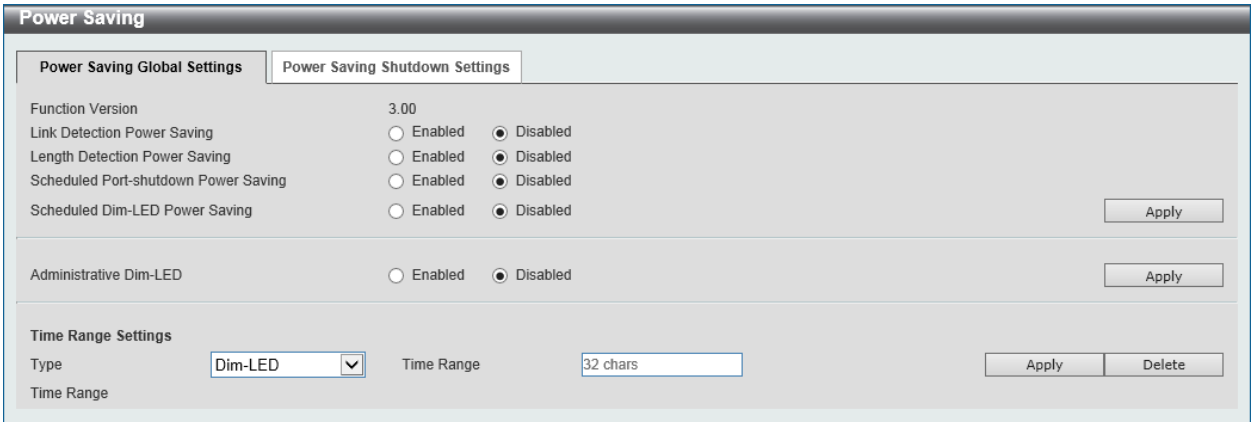



**Figure 14-1 Power Saving Global Settings Window**

The fields that can be configured in **Power Saving Global Settings** are described below:

| Parameter | Description |
|---|---|
| **Link Detection Power Saving** | Select this option to enable or disable the link detection state. When enabled, a port which has a link down status will be turned off to save power to the Switch. This will not affect the port's capabilities when the port status is link up. |
| **Length Detection Power Saving** | Select this option to enable or disable the cable length detection power saving feature. This feature will allow the switch to automatically detect the cable length connected to the port and increase or reduce the required power to this port accordingly to save power. |
| **Scheduled Port-shutdown Power Saving** | Select this option to enable or disable applying the power saving by scheduled port shutdown. |
| **Scheduled Dim-LED Power Saving** | Select this option to enable or disable applying the power saving by scheduled dimming LEDs. |
| **Administrative Dim-LED** | Select this option to enable or disable the port LED function. |

Click the **Apply** button to accept the changes made.

The fields that can be configured in **Time Range Settings** are described below:

| Parameter | Description |
|---|---|
| **Type** | Select the type of power saving. Options to choose from are **Dim-LED** and **Hibernation**. |
| **Time Range** | Enter the name of the time range to associate with the power saving type. |

Click the **Apply** button to accept the changes made for each individual section.

Click the **Delete** button to remove the specified entry.

**NOTE:** The **hibernation** feature can only be configured when physical stacking is disabled on this switch.

After clicking the **Power Saving Shutdown Settings** tab, the following page will appear.

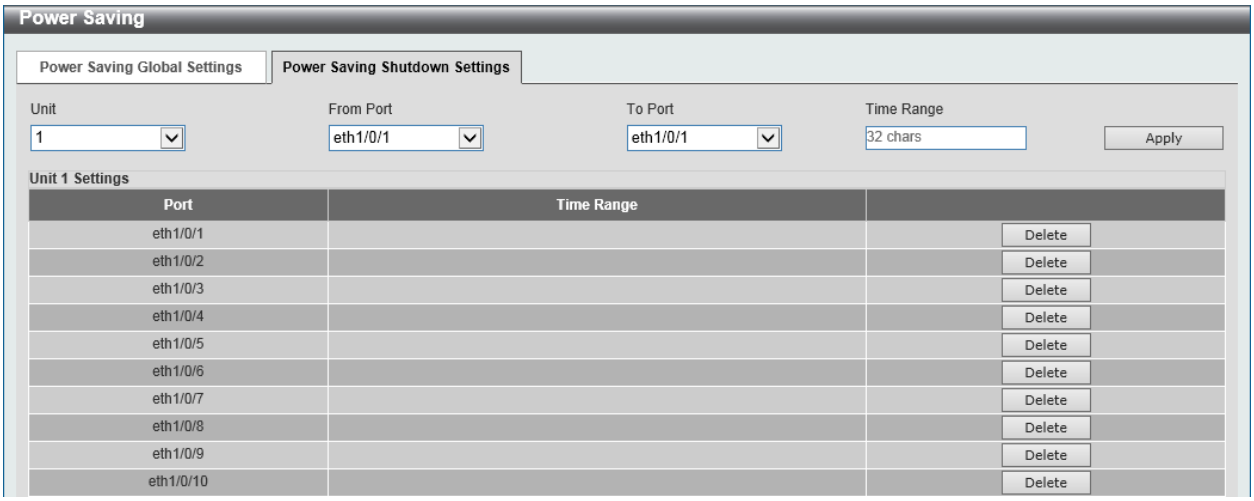



**Figure 14-2 Power Saving Shutdown Settings Window**

The fields that can be configured in **Power Saving Shutdown Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **Time Range** | Enter the name of the time range to associate with the ports. |

Click the **Apply** button to accept the changes made.

Click the **Delete** button to remove the specified entry.

# EEE

Energy Efficient Ethernet (EEE) is defined in IEEE 802.3az. It is designed to reduce the energy consumption of a link when no packets are being sent.

To view the following window, click **Green > EEE**, as shown below:

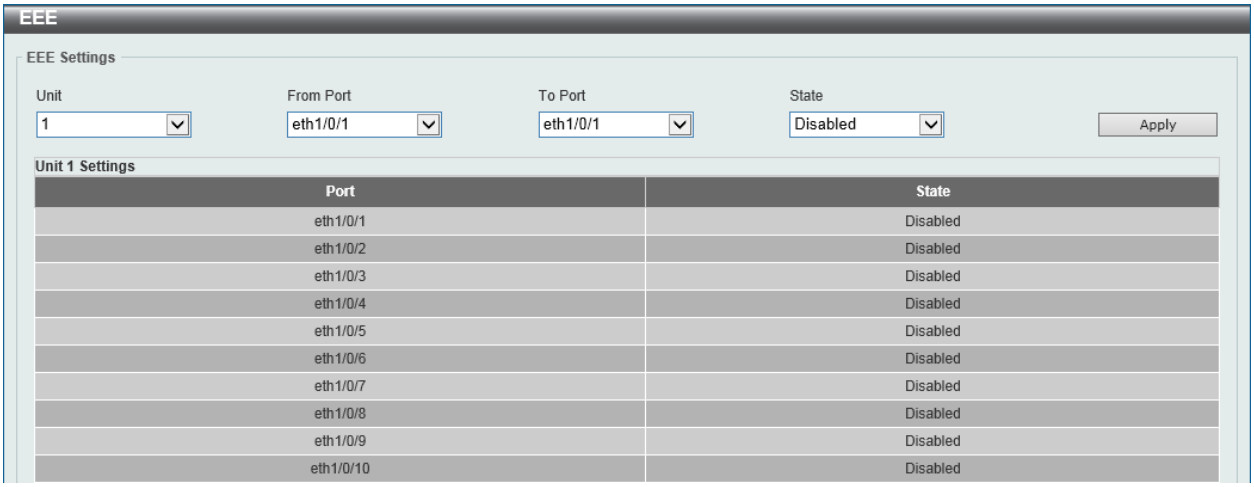



**Figure 14-3 EEE Window**

The fields that can be configured in **EEE Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **From Port ~ To Port** | Select the appropriate port range used for the configuration here. |
| **State** | Select this option to enable or disable the state of this feature here. |

Click the **Apply** button to accept the changes made.

# 15. Save and Tools

***Save Configuration***
***Firmware Upgrade & Backup***
***Configuration Restore & Backup***
***Log Backup***
***Ping***
***Trace Route***
***Reset***
***Reboot System***
***DLMS Settings***

## Save Configuration

This window is used to save the running configuration to the start-up configuration. This is to prevent the loss of configuration in the event of a power failure.

To view the following window, click **Save > Save Configuration**, as shown below:

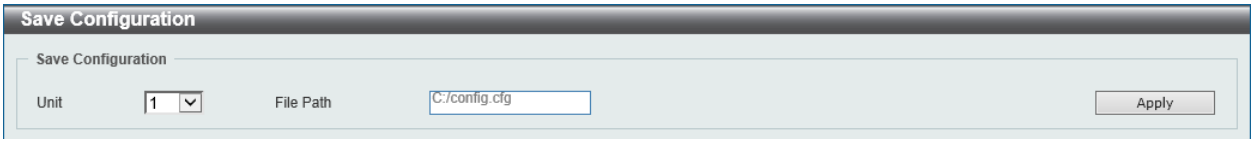



**Figure 15-1 Save Configuration Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **File Path** | Enter the filename and path in the space provided. |

Click the **Apply** button to save the configuration.

## Firmware Upgrade & Backup

### Firmware Upgrade from HTTP

This window is used to initiate a firmware upgrade from a local PC using HTTP.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from HTTP**, as shown below:

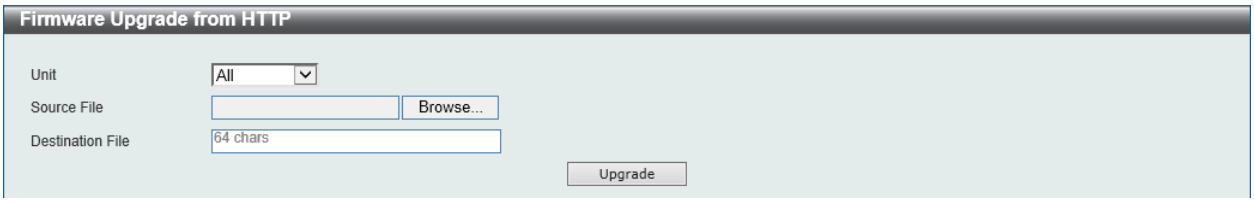



**Figure 15-2 Firmware Upgrade from HTTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Source File** | In this field the source firmware file's filename and path will be displayed after selection. To navigate to the location of the firmware file located on the local PC, either double click in the text box or click the **Browse** button. |
| **Destination File** | Enter the destination path and location where the new firmware should be stored on the switch. This field can be up to 64 characters long. |

Click the **Upgrade** button to initiate the firmware upgrade.

# Firmware Upgrade from TFTP

This window is used to initiate a firmware upgrade from a TFTP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from TFTP**, as shown below:

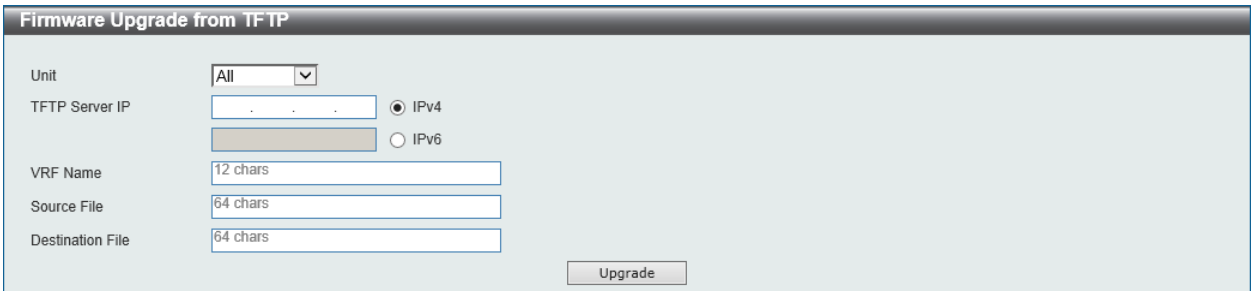



**Figure 15-3 Firmware Upgrade from TFTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **TFTP Server IP** | Enter the TFTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the firmware file located on the TFTP server here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination path and location where the new firmware should be stored on the switch. This field can be up to 64 characters long. |

Click the **Upgrade** button to initiate the firmware upgrade.

# Firmware Upgrade from FTP

This window is used to initiate a firmware upgrade from an FTP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from FTP**, as shown below:

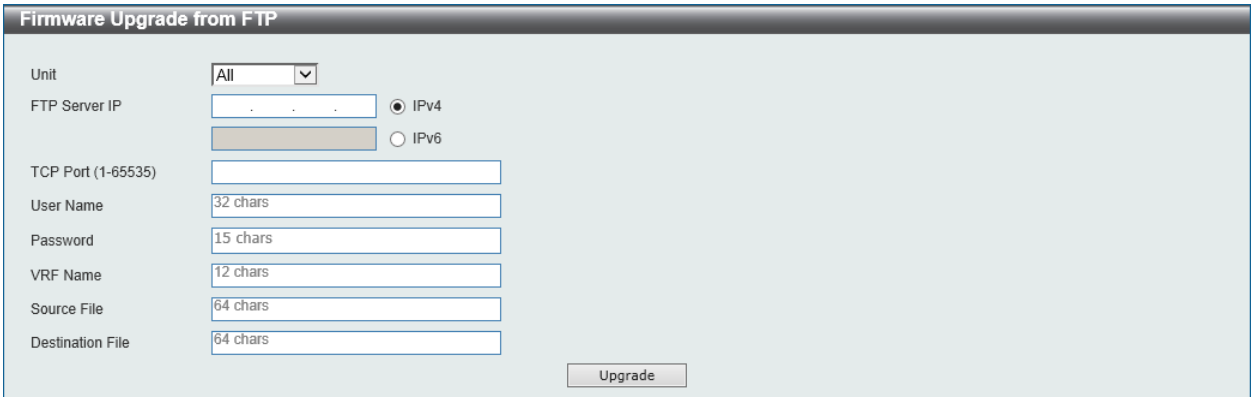



**Figure 15-4 Firmware Upgrade from FTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **FTP Server IP** | Enter the FTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided. |
| **TCP Port** | Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535. |
| **User Name** | Enter the user name used for the FTP connection here. This name can be up to 32 characters long. |
| **Password** | Enter the password used for the FTP connection here. This password can be up to 15 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the firmware file located on the FTP server here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination path and location where the new firmware should be stored on the switch. This field can be up to 64 characters long. |

Click the **Upgrade** button to initiate the firmware upgrade.

## Firmware Upgrade from RCP

This window is used to initiate a firmware upgrade from an RCP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Upgrade from RCP**, as shown below:

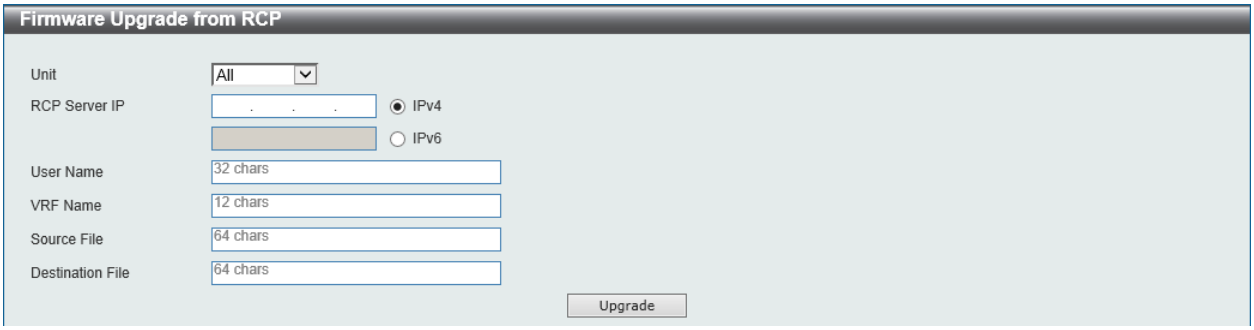



**Figure 15-5 Firmware Upgrade from RCP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **RCP Server IP** | Enter the RCP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the RCP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the RCP server in the space provided. |
| **User Name** | Enter the user name used for the RCP connection here. This name can be up to 32 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the firmware file located on the RCP server here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination path and location where the new firmware should be stored on the switch. This field can be up to 64 characters long. |

Click the **Upgrade** button to initiate the firmware upgrade.

# Firmware Backup to HTTP

This window is used to initiate a firmware backup to a local PC using HTTP.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to HTTP**, as shown below:

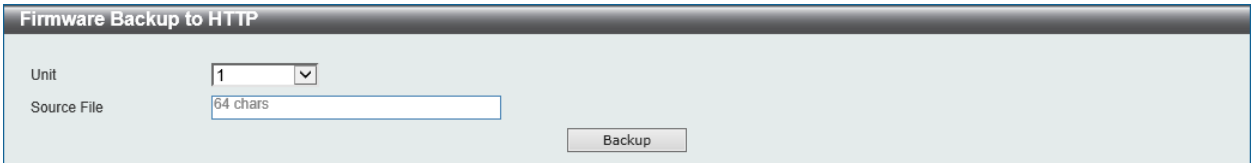



**Figure 15-6 Firmware Backup to HTTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Source File** | Enter the source filename and path of the firmware file located on the switch here. This field can be up to 64 characters long. |

Click the **Backup** button to initiate the firmware backup.

# Firmware Backup to TFTP

This window is used to initiate a firmware backup to a TFTP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to TFTP**, as shown below:

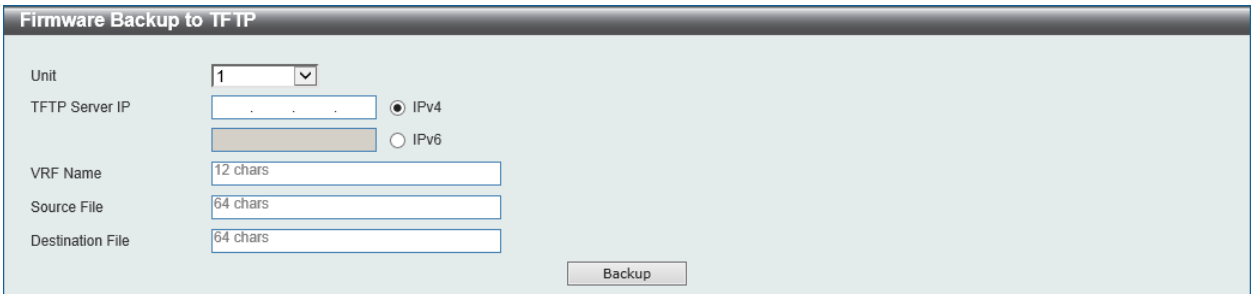



**Figure 15-7 Firmware Backup to TFTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **TFTP Server IP** | Enter the TFTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the firmware file located on the switch here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination filename and path of the firmware file to be backed up to the TFTP server here. This field can be up to 64 characters long. |

Click the **Backup** button to initiate the firmware backup.

# Firmware Backup to FTP

This window is used to initiate a firmware backup to an FTP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to FTP**, as shown below:

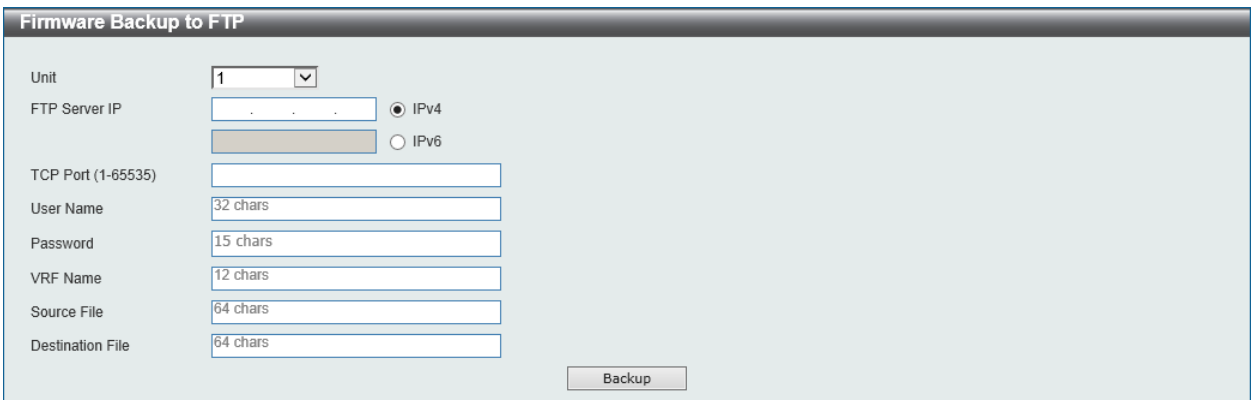



**Figure 15-8 Firmware Backup to FTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **FTP Server IP** | Enter the FTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided. |
| **TCP Port** | Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535. |
| **User Name** | Enter the user name used for the FTP connection here. This name can be up to 32 characters long. |
| **Password** | Enter the password used for the FTP connection here. This password can be up to 15 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the firmware file located on the switch here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination filename and path of the firmware file to be backed up to the FTP server here. This field can be up to 64 characters long. |

Click the **Backup** button to initiate the firmware backup.

# Firmware Backup to RCP

This window is used to initiate a firmware backup to an RCP server.

To view the following window, click **Tools > Firmware Upgrade & Backup > Firmware Backup to RCP**, as shown below:

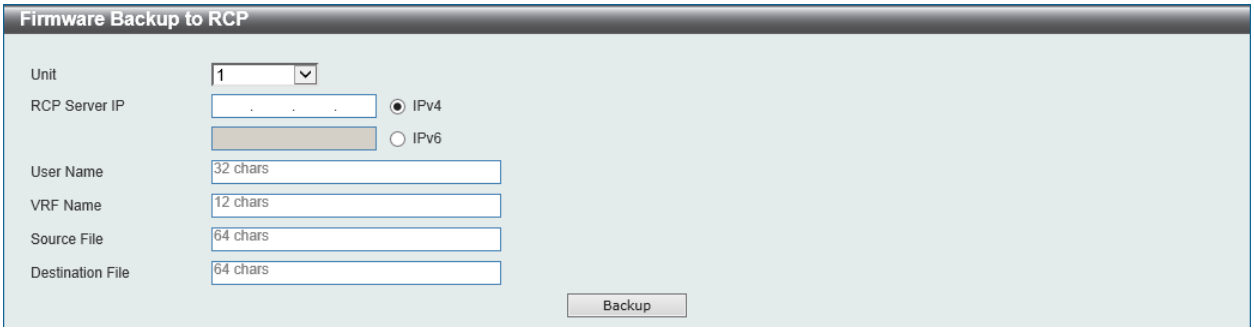



**Figure 15-9 Firmware Backup to RCP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **RCP Server IP** | Enter the RCP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the RCP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the RCP server in the space provided. |
| **User Name** | Enter the user name used for the RCP connection here. This name |

| Parameter | Description |
|---|---|
| | can be up to 32 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the firmware file located on the switch here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination filename and path of the firmware file to be backed up to the RCP server here. This field can be up to 64 characters long. |

Click the **Backup** button to initiate the firmware backup.

# Configuration Restore & Backup

## Configuration Restore from HTTP

This window is used to initiate a configuration restore from a local PC using HTTP.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from HTTP**, as shown below:


**Figure 15-10 Configuration Restore from HTTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Source File** | In this field the source configuration file's filename and path will be displayed after selection. To navigate to the location of the configuration file located on the local PC, either double click in the text box or click the **Browse** button. |
| **Destination File** | Enter the destination path and location where the configuration file should be stored on the switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the switch. |
| **Replace** | Select this option to replace the configuration file on the switch with this one. |

Click the **Restore** button to initiate the configuration restore.

## Configuration Restore from TFTP

This window is used to initiate a configuration restore from a TFTP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from TFTP**, as shown below:


**Figure 15-11 Configuration Restore from TFTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **TFTP Server IP** | Enter the TFTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the configuration file located on the TFTP server here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination path and location where the configuration file should be stored on the switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the switch. |
| **Replace** | Select this option to replace the configuration file on the switch with this one. |

Click the **Restore** button to initiate the configuration restore.

# Configuration Restore from FTP

This window is used to initiate a configuration restore from an FTP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from FTP**, as shown below:

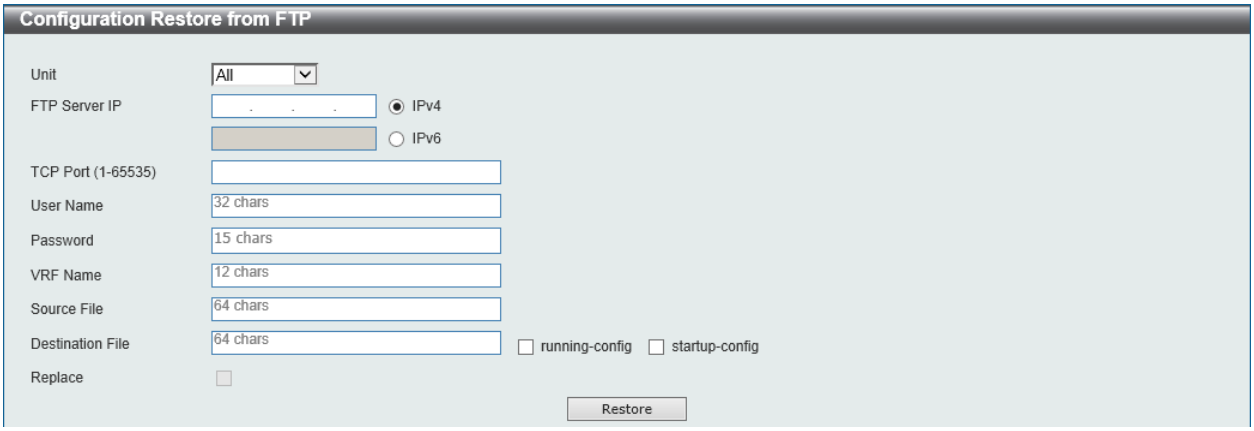



**Figure 15-12 Configuration Restore from FTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **FTP Server IP** | Enter the FTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided. |
| **TCP Port** | Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535. |
| **User Name** | Enter the user name used for the FTP connection here. This name can be up to 32 characters long. |
| **Password** | Enter the password used for the FTP connection here. This password can be up to 15 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the configuration file located on the FTP server here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination path and location where the configuration file should be stored on the switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the switch. |
| **Replace** | Select this option to replace the configuration file on the switch with this one. |

Click the **Restore** button to initiate the configuration restore.

# Configuration Restore from RCP

This window is used to initiate a configuration restore from an RCP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Restore from RCP**, as shown below:


**Figure 15-13 Configuration Restore from RCP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **RCP Server IP** | Enter the RCP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the RCP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the RCP server in the space provided. |
| **User Name** | Enter the user name used for the RCP connection here. This name can be up to 32 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the configuration file located on the RCP server here. This field can be up to 64 characters long. |
| **Destination File** | Enter the destination path and location where the configuration file should be stored on the switch. This field can be up to 64 characters long. Select the **running-config** option to restore and overwrite the running configuration file on the switch. Select the **startup-config** option to restore and overwrite the start-up configuration file on the switch. |
| **Replace** | Select this option to replace the configuration file on the switch with this one. |

Click the **Restore** button to initiate the configuration restore.

# Configuration Backup to HTTP

This window is used to initiate a configuration file backup to a local PC using HTTP.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to HTTP**, as shown below:

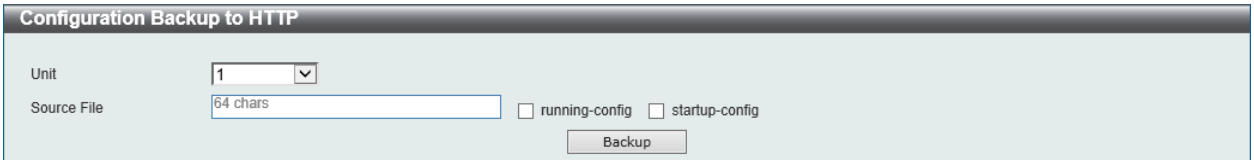



**Figure 15-14 Configuration Backup to HTTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **Source File** | Enter the source filename and path of the configuration file located on the switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the switch. Select the **startup-config** option to back up the start-up configuration file from the switch. |

Click the **Backup** button to initiate the configuration file backup.

# Configuration Backup to TFTP

This window is used to initiate a configuration file backup to a TFTP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to TFTP**, as shown below:

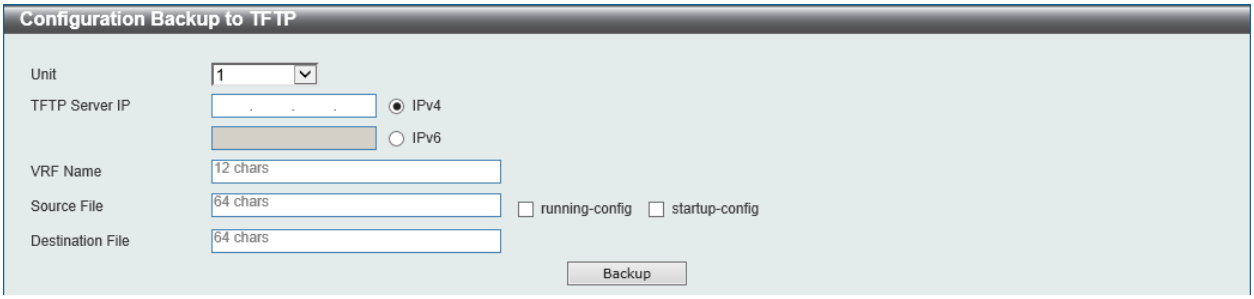



**Figure 15-15 Configuration Backup to TFTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **TFTP Server IP** | Enter the TFTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the configuration file located on the switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the switch. Select the **startup-config** option to back up the start-up configuration file from the switch. |
| **Destination File** | Enter the destination path and location where the configuration file should be stored on the TFTP server. This field can be up to 64 characters long. |

Click the **Backup** button to initiate the configuration file backup.

# Configuration Backup to FTP

This window is used to initiate a configuration file backup to an FTP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to FTP**, as shown below:

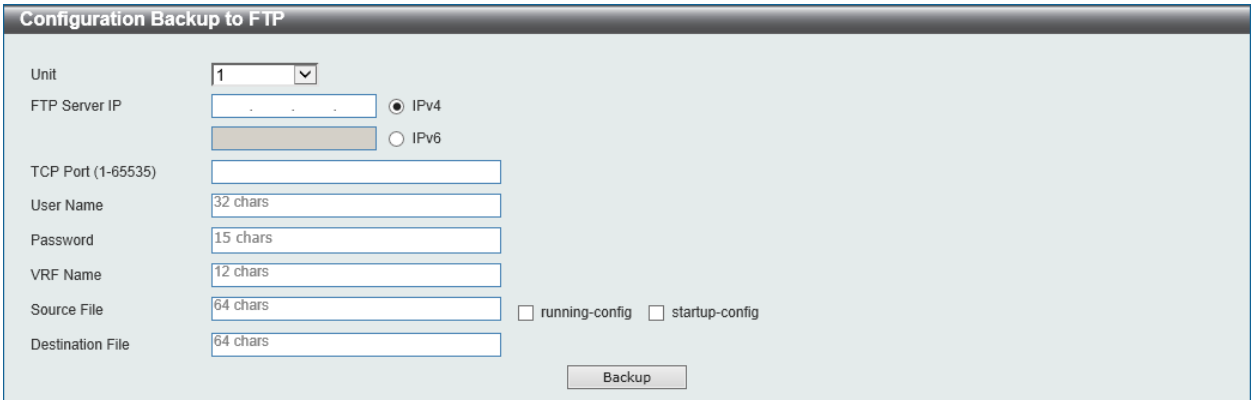



**Figure 15-16 Configuration Backup to FTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **FTP Server IP** | Enter the FTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the FTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the FTP server in the space provided. |
| **TCP Port** | Enter the TCP port number used for the FTP connection here. The range is from 1 to 65535. |
| **User Name** | Enter the user name used for the FTP connection here. This name can be up to 32 characters long. |
| **Password** | Enter the password used for the FTP connection here. This password can be up to 15 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the configuration file located on the switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the switch. Select the **startup-config** option to back up the start-up configuration file from the switch. |
| **Destination File** | Enter the destination path and location where the configuration file should be stored on the FTP server. This field can be up to 64 characters long. |

Click the **Backup** button to initiate the configuration file backup.

# Configuration Backup to RCP

This window is used to initiate a configuration file backup to an RCP server.

To view the following window, click **Tools > Configuration Restore & Backup > Configuration Backup to RCP**, as shown below:

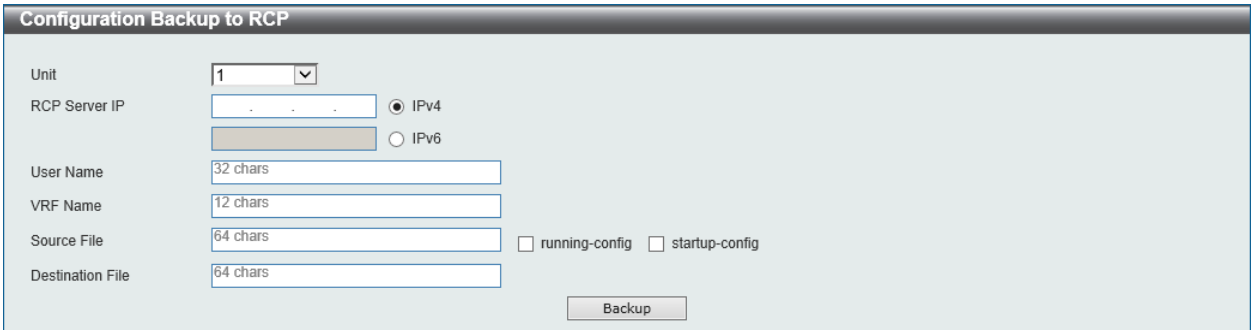



**Figure 15-17 Configuration Backup to RCP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch unit that will be used for this configuration here. |
| **RCP Server IP** | Enter the RCP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the RCP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the RCP server in the space provided. |
| **User Name** | Enter the user name used for the RCP connection here. This name can be up to 32 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Source File** | Enter the source filename and path of the configuration file located on the switch here. This field can be up to 64 characters long. Select the **running-config** option to back up the running configuration file from the switch. Select the **startup-config** option to back up the start-up configuration file from the switch. |
| **Destination File** | Enter the destination path and location where the configuration file should be stored on the RCP server. This field can be up to 64 characters long. |

Click the **Backup** button to initiate the configuration file backup.

# Log Backup

## Log Backup to HTTP

This window is used to initiate a system log backup to a local PC using HTTP.

To view the following window, click **Tools > Log Backup > Log Backup to HTTP**, as shown below:

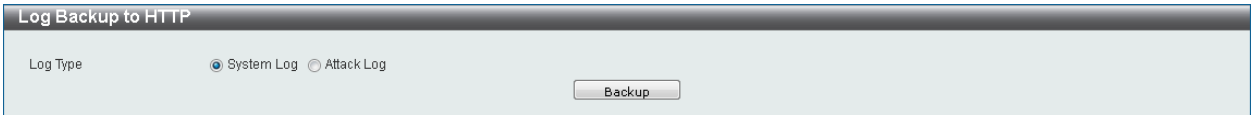



**Figure 15-18 Log Backup to HTTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **Log Type** | Select the log type that will be backed up to the local PC using HTTP. |

| Parameter | Description |
|---|---|
| | When the **System Log** option is selected, the system log will be backed up. When the **Attack Log** is selected, the attack log will be backed up. |

Click the **Backup** button to initiate the system log backup.

# Log Backup to TFTP

This window is used to initiate a system log backup to a TFTP server.

To view the following window, click **Tools > Log Backup > Log Backup to TFTP**, as shown below:

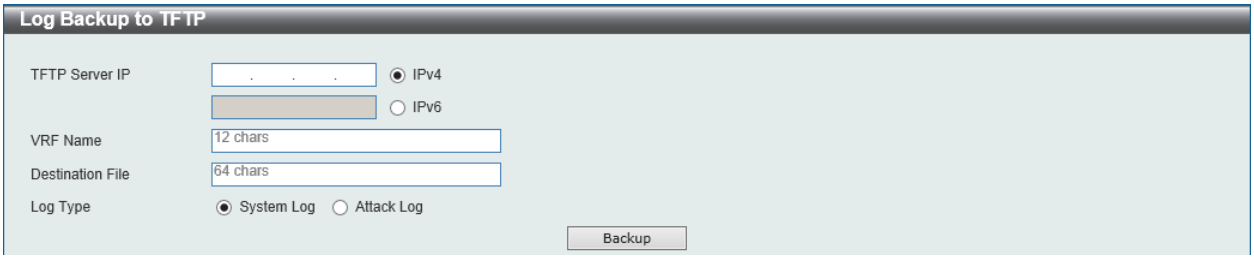



**Figure 15-19 Log Backup to TFTP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **TFTP Server IP** | Enter the TFTP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the TFTP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the TFTP server in the space provided. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Destination File** | Enter the destination path and location where the log file should be stored on the TFTP server. This field can be up to 64 characters long. |
| **Log Type** | Select the log type that will be backed up to the TFTP server. When the **System Log** option is selected, the system log will be backed up. When the **Attack Log** is selected, the attack log will be backed up. |

Click the **Backup** button to initiate the system log backup.

# Log Backup to RCP

This window is used to initiate a system log backup to an RCP server.

To view the following window, click **Tools > Log Backup > Log Backup to RCP**, as shown below:

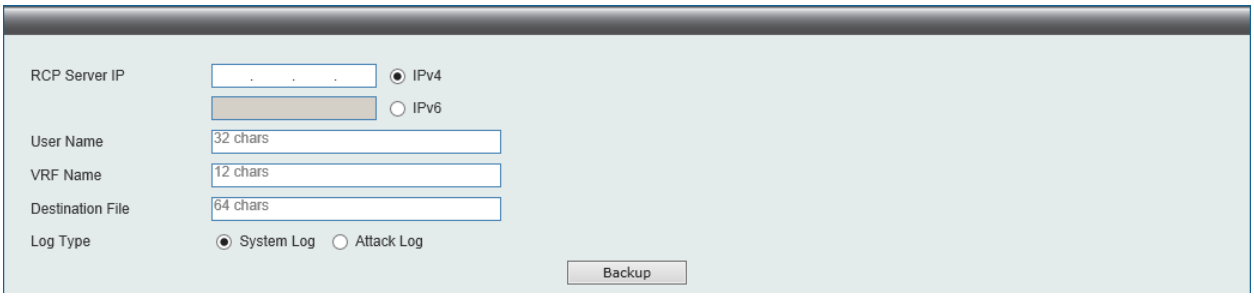



**Figure 15-20 Log Backup to RCP Window**

The fields that can be configured are described below:

| Parameter | Description |
|---|---|
| **RCP Server IP** | Enter the RCP server's IP address here. When select the **IPv4** option, enter the IPv4 address of the RCP server in the space provided. When the **IPv6** option is selected, enter the IPv6 address of the RCP server in the space provided. |
| **User Name** | Enter the user name used for the RCP connection here. This name can be up to 32 characters long. |
| **VRF Name** | Enter the VRF name here. This name can be up to 12 characters long. |
| **Destination File** | Enter the destination path and location where the log file should be stored on the RCP server. This field can be up to 64 characters long. |
| **Log Type** | Select the log type that will be backed up to the RCP server. When the **System Log** option is selected, the system log will be backed up. When the **Attack Log** is selected, the attack log will be backed up. |

Click the **Backup** button to initiate the system log backup.

# Ping

Ping is a small program that sends ICMP Echo packets to the IP address you specify. The destination node then responds to or "echoes" the packets sent from the Switch. This is very useful to verify connectivity between the Switch and other nodes on the network.

To view the following window, click **Tools > Ping**, as shown below:

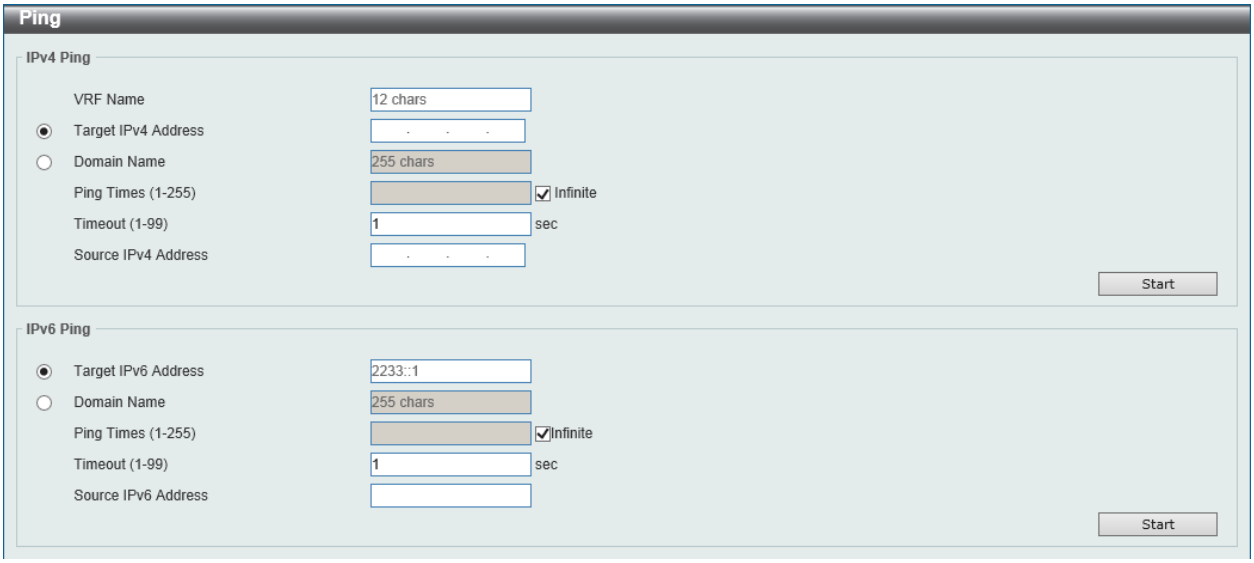



**Figure 15-21 Ping Window**

The fields that can be configured in **IPv4 Ping** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration here. This name can be up to 12 characters long. |
| **Target IPv4 Address** | Select and enter an IP address to be pinged. |

| Parameter | Description |
|---|---|
| **Domain Name** | Select and enter the domain name of the system to discover. |
| **Ping Times** | Enter the number of times desired to attempt to Ping the IPv4 address configured in this window. Users may enter a number of times between 1 and 255. Tick the **Infinite** check box to keep sending ICMP Echo packets to the specified IP address until the program is stopped. |
| **Timeout** | Select a timeout period between 1 and 99 seconds for this Ping message to reach its destination. If the packet fails to find the IP address in this specified time, the Ping packet will be dropped. |
| **Source IPv4 Address** | Enter the source IPv4 address. If the current switch has more than one IP address, you can enter one of them to this field. When entered, this IPv4 address will be used as the packets' source IP address sent to the remote host, or as primary IP address. |

Click the **Start** button to initiate the Ping Test for each individual section.

The fields that can be configured in **IPv6 Ping** are described below:

| Parameter | Description |
|---|---|
| **Target IPv6 Address** | Enter an IPv6 address to be pinged. |
| **Domain Name** | Select and enter the domain name of the system to discover. |
| **Ping Times** | Enter the number of times desired to attempt to Ping the IPv6 address configured in this window. Users may enter a number of times between 1 and 255. Tick the **Infinite** check box to keep sending ICMP Echo packets to the specified IPv6 address until the program is stopped. |
| **Timeout** | Select a timeout period between 1 and 99 seconds for this Ping message to reach its destination. If the packet fails to find the IP address in this specified time, the Ping packet will be dropped. |
| **Source IPv6 Address** | Enter the source IPv6 address. If the current switch has more than one IPv6 address, you can enter one of them to this field. When entered, this IPv6 address will be used as the packets' source IP address sent to the remote host, or as primary IP address. |

Click the **Start** button to initiate the Ping Test for each individual section.

After clicking the **Start** button in **IPv4 Ping** section, the following **IPv4 Ping Result** section will appear:

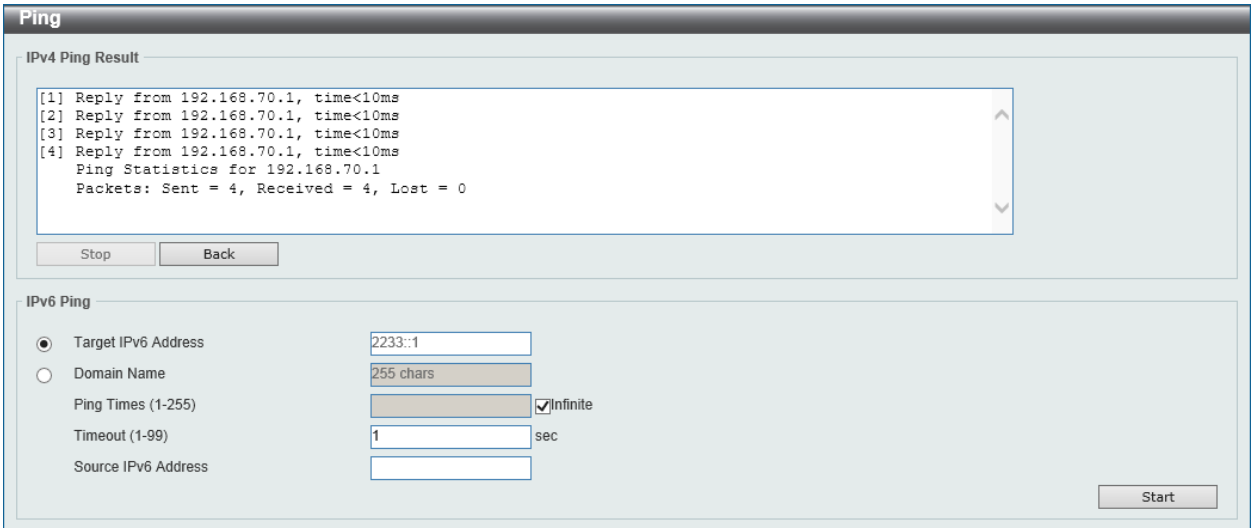



**Figure 15-22 Ping (Start) Window**

Click the **Stop** button to halt the Ping Test.

Click the **Back** button to return to the IPv4 Ping section.

# Trace Route

The trace route page allows the user to trace a route between the Switch and a given host on the network.

To view the following window, click **Tools > Trace Route**, as shown below:

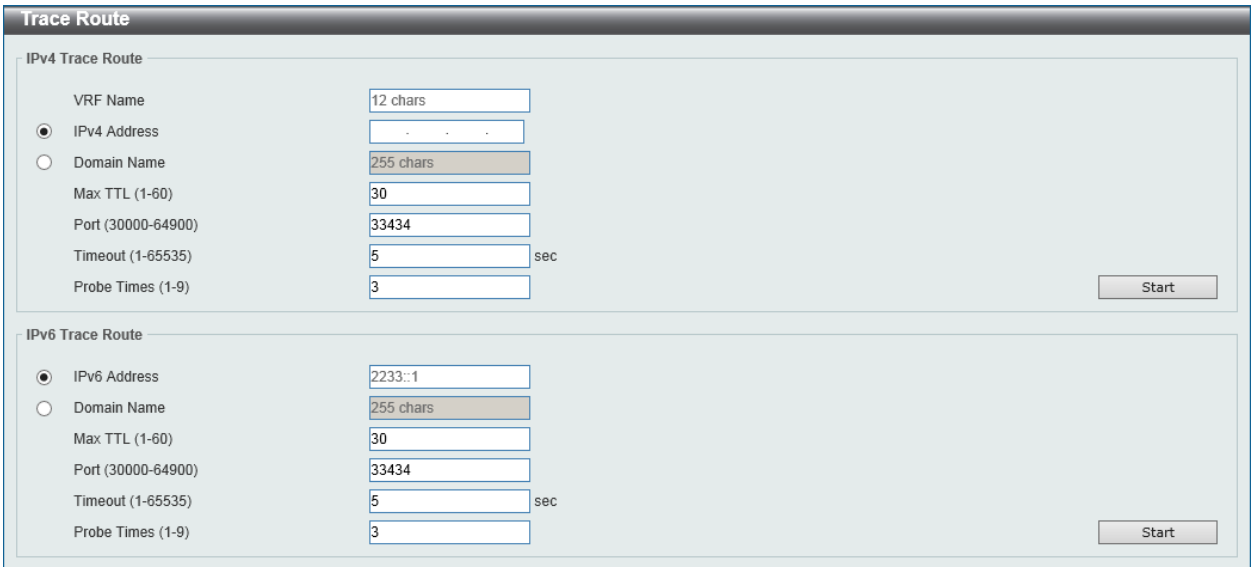



**Figure 15-23 Trace Route Window**

The fields that can be configured in **IPv4 Trace Route** are described below:

| Parameter | Description |
|---|---|
| **VRF Name** | Enter the VRF instance's name that will be used in this configuration here. This name can be up to 12 characters long. |
| **IPv4 Address** | Select and enter the IPv4 address of the destination here. |

| Parameter | Description |
|---|---|
| **Domain Name** | Select and enter the domain name of the destination here. |
| **Max TTL** | Enter the Time-To-Live (TTL) value of the trace route request here. This is the maximum number of routers that a trace route packet can pass. The trace route option will cross while seeking the network path between two devices. The range for the TTL is 1 to 60 hops. |
| **Port** | Enter the port number here. The value range is from 30000 to 64900. |
| **Timeout** | Enter the timeout period while waiting for a response from the remote device here. A value of 1 to 65535 seconds can be specified. The default is 5 seconds. |
| **Probe Times** | Enter the probe time number here. The range is from 1 to 9. If unspecified, the default value is 1. |

Click the **Start** button to initiate the route trace for each individual section.

The fields that can be configured in **IPv6 Trace Route** are described below:

| Parameter | Description |
|---|---|
| **IPv6 Address** | Select and enter the IPv6 address of the destination here. |
| **Domain Name** | Select and enter the domain name of the destination here. |
| **Max TTL** | Enter the Time-To-Live (TTL) value of the trace route request here. This is the maximum number of routers that a trace route packet can pass. The trace route option will cross while seeking the network path between two devices. The range for the TTL is 1 to 60 hops. |
| **Port** | Enter the port number here. The value range is from 30000 to 64900. |
| **Timeout** | Enter the timeout period while waiting for a response from the remote device here. A value of 1 to 65535 seconds can be specified. The default is 5 seconds. |
| **Probe Times** | Enter the probe time number here. The range is from 1 to 9. If unspecified, the default value is 1. |

Click the **Start** button to initiate the route trace for each individual section.

After clicking the **Start** button in **IPv4 Trace Route** section, the following **IPv4 Trace Route Result** section will appear:

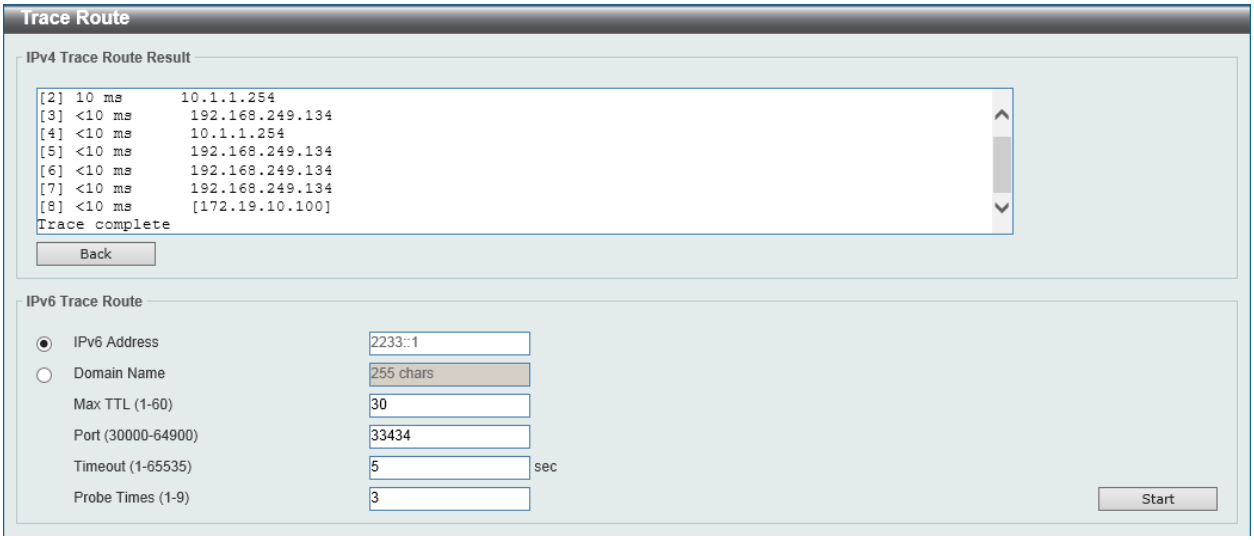



**Figure 15-24 Trace Route (Start) Window**

Click the **Back** button to stop the trace route and return to the IPv4 Trace Route section.

# Reset

This window is used to reset the switch's configuration to the factory default settings.

To view the following window, click **Tools > Reset**, as shown below:

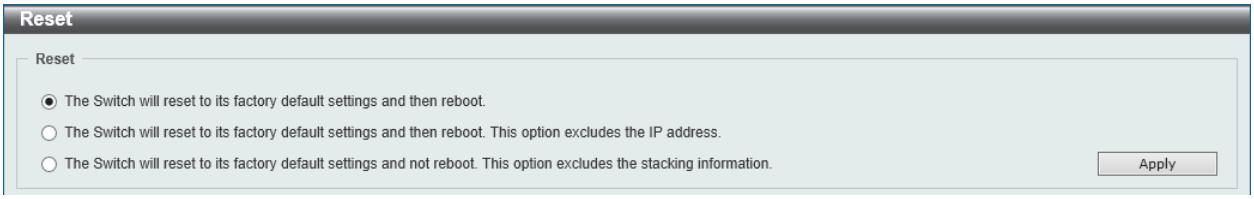



**Figure 15-25 Reset Window**

Select one of the following options:

- The Switch will reset to its factory default settings and then reboot.
- The Switch will reset to its factory default settings and then reboot. This option excludes the IP address.
- The Switch will reset to its factory default settings and not reboot. This option excludes the stacking information.

Click the **Apply** button to initiate the reset.

# Reboot System

This window is used to reboot the switch and alternatively save the configuration before doing so.

To view the following window, click **Tools > Reboot System**, as shown below:

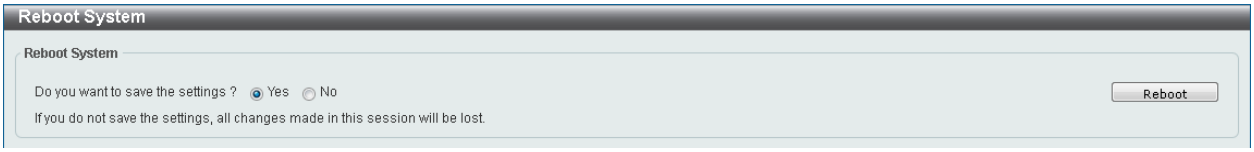



**Figure 15-26 Reboot System Window**

When rebooting the switch, any configuration changes that was made during this session, will be lost unless the **Yes** option is selected when asked to save the settings.

Click the **Reboot** button to alternatively save the settings and reboot the switch.

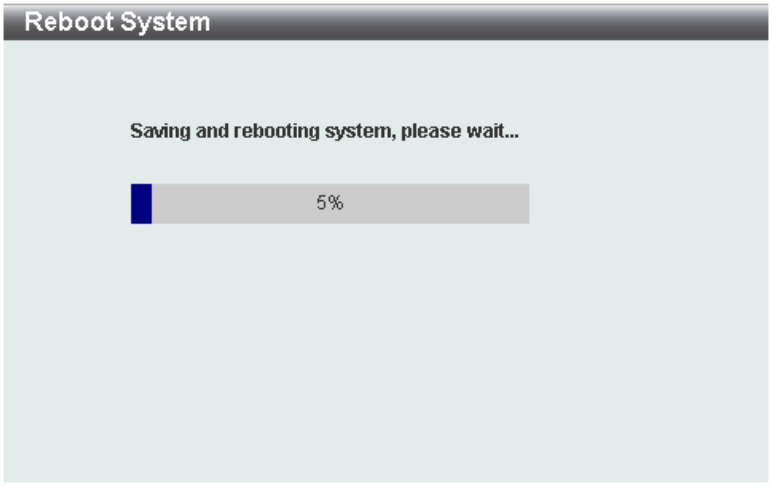



**Figure 15-27 Reboot System (Rebooting) Window**

# DLMS Settings

This window is used to view and configure the D-Link License Management System (DLMS) settings.

The license specifies the feature options that are enabled on the switch. License keys are sold in the market. It may be printed on a physical package or be displayed in an e-mail or a portal.

The user needs register the license key on the Global Registration Portal to get the activation code. Install the proper activation code rather than license key to activate/unlock some features.

After the activation code was installed successfully, reboot the switch to activate the license.

To view the following window, click **Tools > DLMS Settings**, as shown below:


**Figure 15-28 DLMS Settings Window**

The fields that can be configured in **DLMS Settings** are described below:

| Parameter | Description |
|---|---|
| **Unit** | Select the switch's unit ID that will be used here. |
| **DLMS Activation Code** | Enter the DLMS activation code. This code should be 25 characters long. |

Click the **Apply** button to accept the changes made.

# Appendix A - Password Recovery Procedure

This section describes the procedure for resetting passwords on the D-Link DXS-3600 Series switch.

Authenticating any user who tries to access networks is necessary and important. The basic authentication method used to accept qualified users is through a local login, utilizing a Username and Password. Sometimes, passwords will be forgotten or destroyed, so network administrators need to reset these passwords. This section will explain how the **Password Recovery** feature can help network administrators reach this goal.

The following steps explain how to use the Password Recovery feature on this switch to easily recover passwords. Complete these steps to reset the password:

- For security reasons, the Password Recovery feature requires the user to physically access the device. Therefore this feature is only applicable when there is a direct connection to the console port of the device. It is necessary for the user needs to attach a terminal or PC with terminal emulation to the console port of the switch.
- Power on the Switch. After the **UART init** is loaded to 100%, the switch will allow 2 seconds for the user to press the hotkey [**^**] (**Shift+6**) to enter the “Password Recovery Mode.” Once the Switch enters the “Password Recovery Mode,” all ports on the Switch will be disabled.

```
  Boot Procedure                                          V1.10.008
-------------------------------------------------------------------------------

  Power On Self Test ....................................  100 %

  MAC Address    : 00-17-9A-14-6B-10
  H/W Version    : B1

  Please Wait, Loading V2.00.012 Runtime Image ..............  100 %
  UART init .................................................  100 %
```

```
Password Recovery Mode
Switch(reset-config)#
```

In the “Password Recovery Mode” only the following commands can be used.

| Command | Description |
|---|---|
| `no enable password` | This command is used to delete all account level passwords. |
| `no login password` | This command is used to clear the local login methods. |
| `no username` | This command is used to delete all local user accounts. |
| `password-recovery` | This command is used to initiate the password recovery procedure. |
| `reload` | This command is used to save and reboot the switch. |
| `reload clear running-config` | This command is used to reset the running configuration to the factory default settings and then reboot the switch. |
| `show running-config` | This command is used to display the current running configuration. |
| `show username` | This command is used to display local user account information. |

# Appendix B - System Log Entries

The following table lists all possible entries and their corresponding meanings that will appear in the System Log of this switch.

## 802.1X

| Log Description | Severity |
|---|---|
| Event description: 802.1X Authentication failure.<br>Log Message: 802.1X authentication fail [due to <reason>] from (Username: <username>, <interface-id>, MAC: <mac-address>)<br>Parameters description:<br>reason: The reason for the failed authentication.<br>username: The user that is being authenticated..<br>interface-id: The interface name.<br>macaddr: The MAC address of thr authenticated device. | Warning |
| Event description: 802.1X authentication success (Username: <username>, <interface-id>, MAC: <mac-address>)<br>Parameters description:<br>username: The user that is being authenticated.<br>interface-id: The interface name.<br>macaddr: The MAC address of the authenticated device. | Informational |

## AAA

| Log Description | Severity |
|---|---|
| Event description: This log will be generated when AAA global state is enabled or disabled.<br>Log Message: AAA is <status>.<br>Parameters description:<br>status: The status indicates the AAA enabled or disabled. | Informational |
| Event description: This log will be generated when login successfully.<br>Log Message: Successful login through <exec-type> <from client-ip> authenticated by AAA <aaa-method> <server-ip> (Username: <username>).<br>Parameters description:<br>exec-type: It indicates the EXEC types, e.g.: Console, Telnet, SSH, Web, Web(SSL).<br>client-ip: It indicates the client's IP address if valid through IP protocol.<br>aaa-method: It indicates the authentication method, e.g.: none, local, server.<br>server-ip: It indicates the AAA server IP address if authentication method is remote server.<br>Username: It indicates the username for authentication. | Informational |
| Event description: This log will be generated when login failure.<br>Log Message: Login failed through <exec-type> <from client-ip> authenticated by AAA <aaa-method> <server-ip> (Username: <username>).<br>Parameters description:<br>exec-type: It indicates the EXEC types, e.g.: Console, Telnet, SSH, Web, | Warning |

| Log Description | Severity |
|---|---|
| Web(SSL).<br>client-ip: It indicates the client's IP address if valid through IP protocol.<br>aaa-method: It indicates the authentication method, e.g.: local, server.<br>server-ip: It indicates the AAA server IP address if authentication method is remote server.<br>username: It indicates the username for authentication. | |
| Event description: This log will be generated when the remote server does not respond to the login authentication request.<br>Log Message: Login failed through <exec-type> <from client-ip> due to AAA server <server-ip> timeout (Username: <username>).<br>Parameters description:<br>exec-type: It indicates the EXEC types, e.g.: Console, Telnet, SSH, Web, Web(SSL).<br>client-ip: It indicates the client's IP address if valid through IP protocol.<br>server-ip: It indicates the AAA server IP address.<br>username: It indicates the username for authentication. | Warning |
| Event description: This log will be generated when enable privilege successfully.<br>Log Message: Successful enable privilege through <exec-type> <from client-ip> authenticated by AAA <aaa-method> <server-ip> (Username: <username>).<br>Parameters description:<br>exec-type: It indicates the EXEC types, e.g.: Console, Telnet, SSH, Web, Web(SSL).<br>client-ip: It indicates the client's IP address if valid through IP protocol.<br>aaa-method: It indicates the authentication method, e.g.: none, local, server.<br>server-ip: It indicates the AAA server IP address if authentication method is remote server.<br>Username: It indicates the username for authentication. | Informational |
| Event description: This log will be generated when enable privilege failure.<br>Log Message: Enable privilege failed through <exec-type> <from client-ip> authenticated by AAA <aaa-method> <server-ip> (Username: <username>).<br>Parameters description:<br>exec-type: It indicates the EXEC types, e.g.: Console, Telnet, SSH, Web, Web(SSL).<br>client-ip: It indicates the client's IP address if valid through IP protocol.<br>aaa-method: It indicates the authentication method, e.g.: local, server.<br>server-ip: It indicates the AAA server IP address if authentication method is remote server.<br>username: It indicates the username for authentication. | Warning |
| Event description: This log will be generated when the remote server does not respond to the enable password authentication request.<br>Log Message: Enable privilege failed through <exec-type> <from client-ip> due to AAA server <server-ip> timeout (Username: <username>).<br>Parameters description:<br>exec-type: It indicates the EXEC types, e.g.: Console, Telnet, SSH, Web, Web(SSL).<br>client-ip: It indicates the client's IP address if valid through IP protocol.<br>server-ip: It indicates the AAA server IP address.<br>username: It indicates the username for authentication. | Warning |

| Log Description | Severity |
|---|---|
| Event description: This log will be generated when RADIUS assigned a valid VLAN ID attributes.<br>Log Message: RADIUS server <server-ip> assigned VID: <vid> to port <interface-id> (Username: <username>)<br>Parameters description:<br>server-ip: It indicates the RADIUS server IP address.<br>vid: The assign VLAN ID that authorized by from RADIUS server.<br>interface–id: It indicates the port number of the client authenticated.<br>username: It indicates the username for authentication. | Informational |
| Event description: This log will be generated when RADIUS assigned a valid bandwidth attributes.<br>Log Message: RADIUS server <server-ip> assigned <direction> bandwidth: <threshold> to port < interface -id> (Username: <username>)<br>Parameters description:<br>server-ip: It indicates the RADIUS server IP address.<br>Direction: It indicates the direction for bandwidth control, e.g.: ingress or egress.<br>Threshold: The assign threshold of bandwidth that authorized by from RADIUS server.<br>interface–id: It indicates the port number of the client authenticated.<br>username: It indicates the username for authentication. | Informational |
| Event description: This log will be generated when RADIUS assigned a valid priority attributes.<br>Log Message: RADIUS server <server-ip> assigned 802.1p default priortiy: <priority> to port < interface -id> (Username: <username>)<br>Parameters description:<br>server-ip: It indicates the RADIUS server IP address.<br>priority: The assign priority that authorized by from RADIUS server.<br>interface–id: It indicates the port number of the client authenticated.<br>username: It indicates the username for authentication. | Informational |
| Event description: This log will be generated when RADIUS assigned ACL script but fails to apply to the system due to insufficient resource.<br>Log Message: RADIUS server <server-ip> assigns <username> ACL failure at port < interface -id> (<acl-script>)<br>Parameters description:<br>server-ip: It indicates the RADIUS server IP address.<br>username: It indicates the username for authentication.<br>interface-id: It indicates the port number of the client authenticated.<br>acl-script: The assign ACL script that authorized by from RADIUS server. | Warning |

## BGP

| Log Description | Severity |
|---|---|
| Event description: BGP FSM with Peer has gone to the successfully established state.<br>Log Message: BGP-6-ESTABLISH: BGP connection is successfully established (Peer:<ipaddr>).<br>Parameters description: | Informational |

| Log Description | Severity |
|---|---|
| ipaddr: IP address of BGP peer. | |
| Event description: BGP connection is normally closed.<br>Log Message: BGP-6-NORMALCLOSE: BGP connection is normally closed (Peer:<ipaddr>).<br>Parameters description:<br>ipaddr: IP address of BGP peer. | Informational |
| Event description: BGP connection is closed due to error (Error Code, Error Subcode and Data fields Refer to RFC).<br>Log Message: BGP-4-ERRCLOSE: BGP connection is closed due to error (Code:<num> Subcode:<num> Field:<field> Peer:<ipaddr>).<br>Parameters description:<br>num: Error Code or Error Subcode is defined in RFC 4271 etc.<br>field: field value when an error happen.<br>ipaddr: IP address of the BGP peer. | Warning |
| Event description: Receive a BGP notify packet with an undefined error code or sub error code in RFC 4271.<br>Log Message: BGP-4-RCVUNKOWNERR: BGP Notify: unkown Error code(num), Sub Error code(num), Peer:<ipaddr>.<br>Parameters description:<br>num: Error Code or Error Subcode is defined in RFC 4271 etc.<br>ipaddr: IP address of BGP peer. | Warning |
| Event description: Receive a BGP update packet but the next_hop points to a local interface.<br>Log Message: BGP-4-BADNHOP: BGP Update Attr NHop: Erroneous NHop <ipaddr> Peer:<ipaddr>.<br>Parameters description:<br>ipaddr: IP address of BGP peer. | Warning |
| Event description: BGP connection is closed due to some events happens. (Event refer to RFC)<br>Log Message: BGP-4-EVENTCLOSE: BGP connection is closed due to Event: <num> (Peer:<ipaddr>).<br>Parameters description:<br>num: Event is defined in RFC 4271 etc.<br>ipaddr: IP address of BGP peer. | Warning |
| Event description: BGP connection is closed due to receive notify packet. (Error Code and Error Subcode refer to RFC)<br>Log Message: BGP-4-NOTIFYCLOSE: BGP connection is closed due to Notify: Code <num> Subcode <num> (Peer:<ipaddr>).<br>Parameters description:<br>num: Error Code or Error Subcode is defined in RFC 4271 etc.<br>ipaddr: IP address of BGP peer. | Warning |
| Event description: The number of bgp prefix received from this neighbor reaches the threshold.<br>Log Message: BGP-6-PEERPFXMAX: The number of prefix received reaches <num>, max <limit> (Peer < ipaddr >).<br>Parameters description:<br>num: The number of prefix received.<br>limit: Max number of prefix allowed to receive. | Information |

| Log Description | Severity |
|---|---|
| ipaddr: IP address of BGP peer. | |
| Event description: The total bgp prefix number received exceeds the limit.<br>Log Message: BGP-6-TOTALPFXMAX: The total number of prefix received reaches max prefix limit. | Information |
| Event description: BGP received unnecessary AS4-PATH attribute from new (4-bytes AS) BGP peer<br>Log Message: BGP-4-RCVUNNECEAS4PATH: Received AS4-PATH attribute from new (4-bytes AS) peer. (Peer <ipaddr>).<br>Parameters description:<br>ipaddr: IP address of BGP peer. | Warning |
| Event description: BGP received unnecessary AS4-AGGREGATOR attribute from new (4-bytes AS) BGP peer<br>Log Message: BGP-4-RCVUNNECEAS4AGGRE: Received AS4-AGGREGATOR attribute from new (4-bytes AS) peer. (Peer <ipaddr>).<br>Parameters description:<br>ipaddr: IP address of BGP peer. | Warning |
| Event description: BGP received AS_CONFED_SEQUENCE or AS_CONFED_SET path segment type in AS4-PATH attribute.<br>Log Message: BGP-4-RCVASCONFEDINAS4PATH: Received AS_CONFED_SEQUENCE or AS_CONFED_SET path segment type in AS4-PATH attribute. (Peer <ipaddr>).<br>Parameters description:<br>ipaddr: IP address of BGP peer. | Warning |
| Event description: BGP received invalid AS4-PATH attribute.<br>Log Message: BGP-4-RCVBADAS4PATH: Received invalid AS4-PATH attribute. Value : <STRING> (Peer <ipaddr>).<br>Parameters description:<br>STRING: Detailed description about the invalid attribute.<br>ipaddr: IP address of BGP peer. | Warning |
| Event description: BGP received invalid AS4- AGGREGATOR attribute.<br>Log Message: BGP-4-RCVBADAS4AGGRE: Received invalid AS4-AGGREGATOR attribute. Value : <STRING> (Peer <ipaddr>).<br>Parameters description:<br>STRING: Detailed description about the invalid attribute.<br>ipaddr: IP address of BGP peer. | Warning |

## BPDU Protection

| Log Description | Severity |
|---|---|
| Event description: Record the event when the BPDU attack happened.<br>Log Message: <interface-id> enter STP BPDU under protection state (mode: <mode>)<br>Parameters description:<br>interface-id: Interface on which detected STP BPDU attack.<br>mode: BPDU Protection mode of the interface.<br>Mode can be drop, block, or shutdown | Informational |
| Event description: Record the event when the STP BPDU attack recovered. | Informational |

| Log Description | Severity |
|---|---|
| Log Message: <interface-id> recover from BPDU under protection state.<br>Parameters description:<br>interface-id: Interface on which detected STP BPDU attack. | |

## CFM

| Log Description | Severity |
|---|---|
| Event description: Cross-connect is detected<br>Log Message: CFM cross-connect. VLAN:<vlanid>, Local(MD Level:<mdlevel>, Port <[unitID:]portNum>, Direction:<mepdirection>) Remote(MEPID:<mepid>, MAC:<macaddr>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents the MD level of the MEP.<br>unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Can be "inward" or "outward".<br>mepid: Represents the MEPID of the MEP. The value 0 means unknown MEPID.<br>macaddr: Represents the MAC address of the MEP. The value all zeros mean unknown MAC address.<br>Note: In CFM hardware mode, remote MEP information (mepid and macaddr) is unknown. | Critical |
| Event description: Error CFM CCM packet is detected<br>Log Message: CFM error ccm. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>) Remote(MEPID:<mepid>, MAC:<macaddr>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents MD level of the MEP.<br>unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Can be "inward" or "outward".<br>mepid: Represents the MEPID of the MEP. The value 0 means unknown MEPID.<br>macaddr: Represents the MAC address of the MEP. The value all zeros means unknown MAC address.<br>Note: In CFM hardware mode, remote MEP information (mepid and macaddr) is unknown. | Warning |
| Event description: cannot receive the remote MEP's CCM packet<br>Log Message: CFM remote down. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents the MD level of the MEP.<br>unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Represents the MEP direction, which can be "inward" or "outward". | Warning |

| Log Description | Severity |
|---|---|
| mepid: Represents the MEPID of the MEP.<br>macaddr: Represents the MAC address of the MEP. | |
| Event description: Remote MEP's MAC reports an error status<br>Log Message: CFM remote MAC error. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents the MD level of the MEP.<br>unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Represents the MEP direction, which can be "inward" or "outward".<br>mepid: Represents the MEPID of the MEP.<br>macaddr: Represents the MAC address of the MEP. | Warning |
| Event description: Remote MEP detects CFM defects<br>Log Message: CFM remote detects a defect. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents the MD level of the MEP.<br>unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Represents the MEP direction, which can be "inward" or "outward".<br>mepid: Represents the MEPID of the MEP.<br>macaddr: Represents the MAC address of the MEP. | Informational |

## CFM Extension

| Log Description | Severity |
|---|---|
| Event description: AIS condition detected<br>Log Message: AIS condition detected. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>, MEPID:<mepid>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents the MD level of the MEP.<br>unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Represents the direction of the MEP. This can be "inward" or "outward".<br>mepid: Represents the MEPID of the MEP. | Notice |
| Event description: AIS condition cleared<br>Log Message: AIS condition cleared. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>, MEPID:<mepid>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents the MD level of the MEP. | Notice |

| Log Description | Severity |
|---|---|
| unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Represents the direction of the MEP. This can be "inward" or "outward".<br>mepid: Represents the MEPID of the MEP. | |
| Event description: LCK condition detected<br>Log Message: LCK condition detected. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>, MEPID:<mepid>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents the MD level of the MEP.<br>unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Represents the direction of the MEP. This can be "inward" or "outward".<br>mepid: Represents the MEPID of the MEP. | Notice |
| Event description: LCK condition cleared<br>Log Message: LCK condition cleared. MD Level:<mdlevel>, VLAN:<vlanid>, Local(Port <[unitID:]portNum>, Direction:<mepdirection>, MEPID:<mepid>)<br>Parameters description:<br>vlanid: Represents the VLAN identifier of the MEP.<br>mdlevel: Represents the MD level of the MEP.<br>unitID: Represents the ID of the device in the stacking system.<br>portNum: Represents the logical port number of the MEP.<br>mepdirection: Represents the direction of the MEP. This can be "inward" or "outward".<br>mepid: Represents the MEPID of the MEP. | Notice |

## Configuration/Firmware

| Log Description | Severity |
|---|---|
| Event description: Firmware upgraded successfully.<br>Log Message: [Unit <unitID>, ]Firmware upgraded by <session> successfully (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>])<br>Parameters description:<br>unitID: The unit ID.<br>session: The user's session.<br>username: Represent current login user.<br>ipaddr: Represent client IP address.<br>macaddr : Represent client MAC address. | Informational |
| Event description: Firmware upgraded unsuccessfully.<br>Log Message: [Unit <unitID>, ]Firmware upgraded by <session> unsuccessfully (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>])<br>Parameters description:<br>unitID: The unit ID.<br>session: The user's session.<br>username: Represent current login user. | Warning |

| Log Description | Severity |
|---|---|
| ipaddr: Represent client IP address.<br>macaddr : Represent client MAC address. | |
| Event description: Firmware uploaded successfully.<br>Log Message: [Unit <unitID>, ]Firmware uploaded by <session> successfully (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>])<br>Parameters description:<br>unitID: The unit ID.<br>session: The user's session.<br>username: Represent current login user.<br>ipaddr: Represent client IP address.<br>macaddr : Represent client MAC address. | Informational |
| Event description: Firmware uploaded unsuccessfully.<br>Log Message: [Unit <unitID>, ]Firmware uploaded by <session> unsuccessfully (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>])<br>Parameters description:<br>unitID: The unit ID.<br>session: The user's session.<br>username: Represent current login user.<br>ipaddr: Represent client IP address.<br>macaddr : Represent client MAC address. | Warning |
| Event description: Configuration downloaded successfully.<br>Log Message: [Unit <unitID>, ]Configuration downloaded by <session> successfully. (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>])<br>Parameters description:<br>unitID: The unit ID.<br>session: The user's session.<br>username: Represent current login user.<br>ipaddr: Represent client IP address.<br>macaddr : Represent client MAC address. | Informational |
| Event description: Configuration downloaded unsuccessfully.<br>Log Message: [Unit <unitID>, ]Configuration downloaded by <session> unsuccessfully. (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>])<br>Parameters description:<br>unitID: The unit ID.<br>session: The user's session.<br>username: Represent current login user.<br>ipaddr: Represent client IP address.<br>macaddr : Represent client MAC address. | Warning |
| Event description: Configuration uploaded successfully.<br>Log Message: [Unit <unitID>, ]Configuration uploaded by <session> successfully. (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>])<br>Parameters description:<br>unitID: The unit ID.<br>session: The user's session.<br>username: Represent current login user.<br>ipaddr: Represent client IP address.<br>macaddr : Represent client MAC address. | Informational |

| Log Description | Severity |
|---|---|
| Event description: Configuration uploaded unsuccessfully.<br>Log Message: [Unit <unitID>, ]Configuration uploaded by <session> unsuccessfully. (Username: <username>[, IP: <ipaddr>, MAC: <macaddr>])<br>Parameters description:<br>unitID: The unit ID.<br>session: The user's session.<br>username: Represent current login user.<br>ipaddr: Represent client IP address.<br>macaddr : Represent client MAC address. | Warning |

## DDM

| Log Description | Severity |
|---|---|
| Event description: DDM exceeded or recover from DDM alarm threshold<br>Log Message: Optical transceiver <interface-id> [component] [high-low] alarm threshold [exceedType]<br>Parameters description:<br>interface-id: The port number.<br>component: the DDM threshold type. The value should be one of the following values: temperature, supply voltage, bias current, TX power, RX power.<br>high-low: High or low threshold.<br>exceedType: indicate exceed threshold or recover to normal event, the value should be "exceeded" or "exceeding back to normal" | Critical |
| Event description: DDM exceeded or recover from DDM warning threshold<br>Log Message: Optical transceiver <interface-id> [component] [high-low] warning threshold [exceedType]<br>Parameters description:<br>interface-id: The port number.<br>component: the DDM threshold type. The value should be one of the following values: temperature, supply voltage, bias current, TX power, RX power.<br>high-low: High or low threshold.<br>exceedType: indicate exceed threshold or recover to normal event, the value should be "exceeded" or "exceeding back to normal" | Warning |

## DHCPv6 Client

| Log Description | Severity |
|---|---|
| Event description: DHCPv6 client interface administrator state changed.<br>Log Message: DHCPv6 client on interface <ipif-name> changed state to [enabled \| disabled].<br>Parameters description:<br><ipif-name>: Name of the DHCPv6 client interface. | Informational |
| Event description: DHCPv6 client obtains an ipv6 address from a DHCPv6 server.<br>Log Message: DHCPv6 client obtains an ipv6 address < ipv6address > on interface <ipif-name>.<br>Parameters description: | Informational |

| Log Description | Severity |
|---|---|
| ipv6address: ipv6 address obtained from a DHCPv6 server.<br>ipif-name: Name of the DHCPv6 client interface. | |
| Event description: The ipv6 address obtained from a DHCPv6 server starts renewing.<br>Log Message: The IPv6 address < ipv6address > on interface <ipif-name> starts renewing.<br>Parameters description:<br>ipv6address: ipv6 address obtained from a DHCPv6 server.<br>ipif-name: Name of the DHCPv6 client interface. | Informational |
| Event description: The ipv6 address obtained from a DHCPv6 server renews success.<br>Log Message: The IPv6 address < ipv6address > on interface <ipif-name> renews success.<br>Parameters description:<br>ipv6address: ipv6 address obtained from a DHCPv6 server.<br>ipif-name: Name of the DHCPv6 client interface. | Informational |
| Event description: The ipv6 address obtained from a DHCPv6 server starts rebinding<br>Log Message: The IPv6 address < ipv6address > on interface <ipif-name> starts rebinding.<br>Parameters description:<br>ipv6address: ipv6 address obtained from a DHCPv6 server.<br>ipif-name: Name of the DHCPv6 client interface. | Informational |
| Event description: The ipv6 address obtained from a DHCPv6 server rebinds success<br>Log Message: The IPv6 address < ipv6address > on interface <ipif-name> rebinds success.<br>Parameters description:<br>ipv6address: ipv6 address obtained from a DHCPv6 server.<br>ipif-name: Name of the DHCPv6 client interface.. | Informational |
| Event description: The ipv6 address from a DHCPv6 server was deleted.<br>Log Message: The IPv6 address < ipv6address > on interface <ipif-name> was deleted.<br>Parameters description:<br>ipv6address: ipv6 address obtained from a DHCPv6 server.<br>ipif-name: Name of the DHCPv6 client interface. | Informational |
| Event description: DHCPv6 client PD interface administrator state changed.<br>Log Message: DHCPv6 client PD on interface <intf-name> changed state to <enabled \| disabled><br>Parameters description:<br>intf-name: Name of the DHCPv6 client PD interface. | Informational |
| Event description: DHCPv6 client PD obtains an IPv6 prefix from a delegation router.<br>Log Message: DHCPv6 client PD obtains an ipv6 prefix < ipv6networkaddr> on interface <intf-name><br>Parameters description:<br>ipv6networkaddr: ipv6 preifx obtained from a delegation router.<br>intf-name: Name of the DHCPv6 client PD interface. | Informational |

| Log Description | Severity |
|---|---|
| Event description: The IPv6 prefix obtained from a delegation router starts renewing.<br>Log Message: The IPv6 prefix < ipv6networkaddr > on interface <intf-name> starts renewing.<br>Parameters description:<br>ipv6networkaddr: IPv6 prefix obtained from a delegation router.<br>intf-name: Name of the DHCPv6 client PD interface. | Informational |
| Event description: The IPv6 prefix obtained from a delegation router renews success.<br>Log Message: The IPv6 prefix < ipv6networkaddr > on interface <intf-name> renews success.<br>Parameters description:<br>ipv6anetworkaddr: IPv6 prefix obtained from a delegation router.<br>intf-name: Name of the DHCPv6 client PD nterface. | Informational |
| Event description: The IPv6 prefix obtained from a delegation router starts rebinding.<br>Log Message: The IPv6 prefix < ipv6networkaddr > on interface <intf-name> starts rebinding.<br>Parameters description:<br>ipv6address: IPv6 prefix obtained from a delegation router.<br>intf-name: Name of the DHCPv6 client PD interface. | Informational |
| Event description: The IPv6 prefix obtained from a delegation router rebinds success.<br>Log Message: The IPv6 prefix < ipv6networkaddr > on interface <intf-name> rebinds success.<br>Parameters description:<br>ipv6address: IPv6 prefix obtained from a delegation router.<br>intf-name: Name of the DHCPv6 client PD interface. | Informational |
| Event description: The IPv6 prefix from a delegation router was deleted.<br>Log Message: The IPv6 prefix < ipv6networkaddr > on interface <intf-name> was deleted.<br>Parameters description:<br>ipv6address: IPv6 prefix obtained from a delegation router.<br>intf-name: Name of the DHCPv6 client PD interface. | Informational |

## DHCPv6 Relay

| Log Description | Severity |
|---|---|
| Event description: DHCPv6 relay on a specify interface's administrator state changed<br>Log Message: DHCPv6 relay on interface <ipif-name> changed state to [enabled \| disabled]<br>Parameters description:<br><ipif-name>: Name of the DHCPv6 relay agent interface. | Informational |

## DHCPv6 Server

| Log Description | Severity |
|---|---|
| Event description: The address of the DHCPv6 Server pool is used up<br>Log Message: The address of the DHCPv6 Server pool <pool-name> is used up.<br>Parameters description:<br><pool-name>: Name of the DHCPv6 Server pool. | Informational |
| Event description: The number of allocated ipv6 addresses is equal to 4096<br>Log Message: The number of allocated ipv6 addresses of the DHCPv6 Server pool is equal to 4096.<br>Parameters description: | Informational |

## DLMS

| Log Description | Severity |
|---|---|
| Event Description: Input an illegal activation code.<br>Log Message: Illegal activation code (AC: <string25>).<br>Parameters Description:<br><string25>: Activation Code | Informational |
| Event Description: License Expired.<br>Log Message: License expired (license:<license-model>, AC: <string25>).<br>Parameters Description:<br><license-model>: License Model Name.<br><string25>: Activation Code | Critical |
| Event Description: License successfully installed.<br>Log Message: License successfully installed (license:<license-model>, AC: <string25>).<br>Parameters Description:<br><license-model>: License Model Name.<br><string25>: Activation Code | Informational |
| Event Description:When a license is going to expire, it will be logged before 30 days.<br>Log Message: License will expire in 30 days. (license:<license-model>, AC: <string25>).<br>Parameters Description:<br><license-model>: License Model Name.<br><string25>: Activation Code | Informational |

## DOS Prevention

| Log Description | Severity |
|---|---|
| Event description: Record the event if any attacking packet is received in the interval.<br>Log Message: <dos-type> is dropped from (IP :< ip-address> Port: <interface-id>).<br>Parameters description:<br>dos-type: The type of DoS attack will be one of the followings.<br>ip-address: IP address of attacker.<br>interface-id: the attacked interface. | Notice |

## DULD

| Log Description | Severity |
|---|---|
| Event description: A unidirectional link has been detected on this port<br>Log Message: <interface-id> is unidirectional.<br>Parameters description:<br>unitID: the unit ID<br>portNum: port number | Informational |

## Dynamic ARP Inspection

| Log Description | Severity |
|---|---|
| Event description: This log will be generated when DAI detect invalid ARP packet.<br>Log Message: Illegal ARP <type> packets (IP: <ip-address>, MAC: <mac-address>, VLAN <vlan-id>, on <interface-id>).<br>Parameters description:<br>type: The type of ARP packet, it indicates that ARP packet is request or ARP response. | Warning |
| Event description: This log will be generated when DAI detect valid ARP packet.<br>Log Message: Legal ARP <type> packets (IP: <ip-address>, MAC: <mac-address>, VLAN <vlan-id>, on <interface-id>).<br>Parameters description:<br>type: The type of ARP packet, it indicates that ARP packet is request or ARP response. | Informational |

## ERPS

| Log Description | Severity |
|---|---|
| Event description: Signal failure detected<br>Log Message: Signal failure detected on node <macaddr><br>Parameters description:<br>macaddr: The system MAC address of the node | Notice |
| Event description: Signal failure cleared<br>Log Message: Signal failure cleared on node <macaddr><br>Parameters description:<br>macaddr: The system MAC address of the node. | Notice |
| Event description: RPL owner conflict<br>Log Message: RPL owner conflicted on the ring <macaddr><br>Parameters description:<br>macaddr: The system MAC address of the node | Warning |

## Interface

| Log Description | Severity |
|---|---|
| Event description: Port link up.<br>Log Message: Port < interface-id > link up, <link state><br>Parameters description: | Informational |

| Log Description | Severity |
|---|---|
| portNum: 1.Interger value;2.Represent the logic port number of the device.<br>link state: for ex: , 100Mbps FULL duplex | |
| Event description: Port link down.<br>Log Message: Port < interface-id > link down<br>Parameters description:<br>portNum: 1.Interger value;2.Represent the logic port number of the device. | Informational |

## IP Directed-Broadcast

| Log Description | Severity |
|---|---|
| Event description: IP Directed-broadcast rate exceed 50 packets per second on a certain subnet.<br>Log Message: IP Directed Broadcast packet rate is high on subnet. [(IP: <ipaddr>)]<br>Parameters description:<br>IP: the Broadcast IP destination address. | Informational |
| Event description: IP Directed-broadcast rate exceed 100 packets per second<br>Log Message: IP Directed Broadcast rate is high.<br>Parameters description: | Informational |

## LACP

| Log Description | Severity |
|---|---|
| Event description: Link Aggregation Group link up.<br>Log Message: Link Aggregation Group < group_id > link up.<br>Parameters description:<br>group_id: The group id of the link down aggregation group. | Informational |
| Event description: Link Aggregation Group link down.<br>Log Message: Link Aggregation Group < group_id > link down.<br>Parameters description:<br>group_id: The group id of the link down aggregation group. | Informational |
| Event description: Member port attach to Link Aggregation Group.<br>Log Message: <ifname> attach to Link Aggregation Group <group_id>.<br>Parameters description:<br>ifname: The interface name of the port that attach to aggregation group.<br>group_id: The group id of the aggregation group that port attach to. | Informational |
| Event description: Member port detach from Link Aggregation Group.<br>Log Message: <ifname> detach from Link Aggregation Group <group_id>.<br>Parameters description:<br>ifname: The interface name of the port that detach from aggregation group.<br>group_id: The group id of the aggregation group that port detach from. | Informational |

## LBD

| Log Description | Severity |
|---|---|
| Event description: Record the event when an interface detect loop. | Critical |

| Log Description | Severity |
|---|---|
| Log Message: <interface-id> LBD loop occurred.<br><interface-id > VLAN <vlan-id> LBD loop occurred.<br>Parameters description:<br>interface-id: Interface on which loop is detected.<br>vlan-id: VLAN on which loop is detected. | |
| Event description: Record the event when an interface loop recovered.<br>Log Message: <interface-id> LBD loop recovered.<br><interface-id> VLAN <vlan-id> LBD loop recovered.<br>Parameters description:<br>nterface-id: Interface on which loop is detected.<br>vlan-id: VLAN on which loop is detected. | Critical |
| Event description: Record the event when the number of VLANs that loop back has occurred exceeds a reserved number.<br>Log Message: Loop VLAN numbers overflow.<br>Parameters description: | Critical |

## LLDP-MED

| Log Description | Severity |
|---|---|
| Event description: LLDP-MED topology change detected<br>Log Message: LLDP-MED topology change detected (on port <portNum>. chassis id: <chassisType>, <chassisID>, port id: <portType>, <portID>, device class: <deviceClass>)<br>Parameters description:<br>portNum: The port number.<br>chassisType: chassis ID subtype.<br>Value list:<br>1. chassisComponent(1)<br>2. interfaceAlias(2)<br>3. portComponent(3)<br>4. macAddress(4)<br>5. networkAddress(5)<br>6. interfaceName(6)<br>7. local(7)<br>chassisID: chassis ID.<br>portType: port ID subtype.<br>Value list:<br>1. interfaceAlias(1)<br>2. portComponent(2)<br>3. macAddress(3)<br>4. networkAddress(4)<br>5. interfaceName(5)<br>6. agentCircuitId(6)<br>7. local(7)<br>portID: port ID.<br>deviceClass: LLDP-MED device type. | Notice |
| Event description: Conflict LLDP-MED device type detected | Notice |

| Log Description | Severity |
|---|---|
| Log Message: Conflict LLDP-MED device type detected ( on port < portNum >, chassis id: < chassisType>, <chassisID>, port id: < portType>, <portID>, device class: <deviceClass>)<br>Parameters description:<br>portNum: The port number.<br>chassisType: chassis ID subtype.<br>Value list:<br>1. chassisComponent(1)<br>2. interfaceAlias(2)<br>3. portComponent(3)<br>4. macAddress(4)<br>5. networkAddress(5)<br>6. interfaceName(6)<br>7. local(7)<br>chassisID: chassis ID.<br>portType: port ID subtype.<br>Value list:<br>1. interfaceAlias(1)<br>2. portComponent(2)<br>3. macAddress(3)<br>4. networkAddress(4)<br>5. interfaceName(5)<br>6. agentCircuitId(6)<br>7. local(7)<br>portID: port ID.<br>deviceClass: LLDP-MED device type. | |
| Event description: Incompatible LLDP-MED TLV set detected<br>Log Message: Incompatible LLDP-MED TLV set detected ( on port < portNum >, chassis id: < chassisType>, <chassisID>, port id: < portType>, <portID>, device class: <deviceClass>)<br>Parameters description:<br>portNum: The port number.<br>chassisType: chassis ID subtype.<br>Value list:<br>1. chassisComponent(1)<br>2. interfaceAlias(2)<br>3. portComponent(3)<br>4. macAddress(4)<br>5. networkAddress(5)<br>6. interfaceName(6)<br>7. local(7)<br>chassisID: chassis ID.<br>portType: port ID subtype.<br>Value list:<br>1. interfaceAlias(1)<br>2. portComponent(2)<br>3. macAddress(3)<br>4. networkAddress(4) | Notice |

| Log Description | Severity |
|---|---|
| 5. interfaceName(5)<br>6. agentCircuitId(6)<br>7. local(7)<br>portID: port ID.<br>deviceClass: LLDP-MED device type. | |

## Login/Logout CLI

| Log Description | Severity |
|---|---|
| Event description: Login through console successfully.<br>Log Message: [Unit <unitID>, ]Successful login through Console (Username: <username>)<br>Parameters description:<br>unitID: The unit ID.<br>username: Represent current login user. | Informational |
| Event description: Login through console unsuccessfully.<br>Log Message: [Unit <unitID>, ] Login failed through Console (Username: <username>)<br>Parameters description:<br>unitID: The unit ID.<br>username: Represent current login user. | Warning |
| Event description: Console session timed out.<br>Log Message: [Unit <unitID>, ] Console session timed out (Username: <username>)<br>Parameters description:<br>unitID: The unit ID.<br>username: Represent current login user. | Informational |
| Event description: Logout through console.<br>Log Message: [Unit <unitID>, ] Logout through Console (Username: <username>)<br>Parameters description:<br>unitID: The unit ID.<br>username: Represent current login user. | Informational |
| Event description: Login through telnet successfully.<br>Log Message: Successful login through Telnet (Username: <username>, IP: <ipaddr>)<br>Parameters description:<br>username: Represent current login user.<br>ipaddr: Represent client IP address. | Informational |
| Event description: Login through telnet unsuccessfully.<br>Log Message: Login failed through Telnet (Username: <username>, IP: <ipaddr>)<br>Parameters description:<br>username: Represent current login user.<br>ipaddr: Represent client IP address. | Warning |
| Event description: Telnet session timed out.<br>Log Message: Telnet session timed out (Username: <username>, IP: <ipaddr>)<br>Parameters description: | Informational |

| Log Description | Severity |
|---|---|
| username: Represent current login user.<br>ipaddr: Represent client IP address. | |
| Event description: Logout through telnet.<br>Log Message: Logout through Telnet (Username: <username>, IP: <ipaddr>)<br>Parameters description:<br>username: Represent current login user.<br>ipaddr: Represent client IP address. | Informational |
| Event description: Login through SSH successfully.<br>Log Message: Successful login through SSH (Username: <username>, IP: <ipaddr>)<br>Parameters description:<br>username: Represent current login user.<br>ipaddr: Represent client IP address. | Informational |
| Event description: Login through SSH unsuccessfully.<br>Log Message: Login failed through SSH (Username: <username>, IP: <ipaddr>)<br>Parameters description:<br>username: Represent current login user.<br>ipaddr: Represent client IP address. | Critical |
| Event description: SSH session timed out.<br>Log Message: SSH session timed out (Username: <username>, IP: <ipaddr>)<br>Parameters description:<br>username: Represent current login user.<br>ipaddr: Represent client IP address. | Informational |
| Event description: Logout through SSH.<br>Log Message: Logout through SSH (Username: <username>, IP: <ipaddr>)<br>Parameters description:<br>username: Represent current login user.<br>ipaddr: Represent client IP address. | Informational |

## MAC

| Log Description | Severity |
|---|---|
| Event description: the host has passed MAC authentication<br>Log Message: MAC-based Access Control host login success (MAC: <mac-address>, <interface-id>, VID: <vlan-id>)<br>Parameters description:<br>mac-address: the host MAC addresses.<br>interface-id: the interface on which the host is authenticated.<br>vlan-id: the VLAN ID on which the host exists. | Informational |
| Event description: the host has aged out.<br>Log Message: MAC-based Access Control host aged out (MAC: <mac-address>, <interface-id>, VID: <vlan-id>)<br>Parameters description:<br>mac-address: the host MAC addresses.<br>interface-id: the interface on which the host is authenticated.<br>vlan-id: the VLAN ID on which the host exists. | Informational |

| Log Description | Severity |
|---|---|
| Event description: the host failed to pass the authentication.<br>Log Message: MAC-based Access Control host login fail (MAC: <mac-address>, <interface-id>, VID: <vlan-id>)<br>Parameters description:<br>mac-address: the host MAC addresses.<br>interface-id: the interface on which the host is authenticated.<br>vlan-id: the VLAN ID on which the host exists. | Critical |
| Event description: the authorized user number on the whole device has reached the maximum user limit.<br>Log Message: MAC-based Access Control enters stop learning state.. | Warning |
| Event description: the authorized user number on the whole device is below the maximum user limit in a time interval.<br>Log Message: MAC-based Access Control recovers from stop learning state. | Warning |
| Event description: the authorized user number on an interface has reached the maximum user limit.<br>Log Message: <interface-id> enters MAC-based Access Control stop learning state<br>Parameters description:<br>interface-id: the interface on which the host is authenticated. | Warning |
| Event description: the authorized user number on an interface is below the maximum user limit in a time interval.<br>Log Message: <interface-id> recovers from MAC-based Access Control stop learning state.<br>Parameters description:<br>interface-id: the interface on which the host is authenticated. | Warning |

## Management Port

| Log Description | Severity |
|---|---|
| Event description: Record the event if any error frames which can affect management port<br>Notice: Connectivity, such as CRC errors, alignment and jabber errors, is detected every two minutes.<br>Log Message: Detected <counter> <error-counter-name> on <interface-id>.<br>Parameters description:<br>counter: The error frame counters.<br>error-counter-name: Error counter name, include: rxFCSErrorPkts, rxAlignmentErrorPkts, rxCodeErrorPkts, rxUndersizedPkts, rxOversizedPkts, rxFragmentPkts, rxJabbers,rxDropPkts, txExcessiveDeferralPkts, txFCSErrorPkts, txLateCollisionPkts, txExcessiveCollisionPkts and txDropPkts counter.<br>interface-id: Out of band management interface. | Notice |

## Module

| Log Description | Severity |
|---|---|
| Event Description: Module inserts and can works.<br>Log Message: Module <module-type> is inserted. | Informational |

| Log Description | Severity |
|---|---|
| Parameters Description:<br>module-type: the expansion module name. | |
| Event Description: Module inserts and can't works.<br>Log Message: Module < module-type > inserts but can't work except reboot device.<br>Parameters Description:<br>module-type: the expansion module name. | Warning |
| Event Description: Module hot removes.<br>Log Message: Module < module-type > is removed.<br>Parameters Description:<br>module-type: the expansion module name. | Informational |

## MPLS

| Log Description | Severity |
|---|---|
| Event description: LSP is up<br>Log Message: LSP <lsp_id> is up<br>Parameters description:<br>lsp_id: The established LSP ID | Informational |
| Event description: LSP is down<br>Log Message: LSP <lsp_id> is down<br>Parameters description:<br>lsp_id: The deleted LSP ID | Informational |

## MSTP Debug Enhancement

| Log Description | Severity |
|---|---|
| Event description: Topology changed.<br>Log Message: Topology changed [( [Instance:<InstanceID> ] , <interface-id> ,MAC: <macaddr>)]<br>Parameters description:<br>InstanceID: Instance ID.<br>portNum:Port ID<br>macaddr: MAC address | Notice |
| Event description: Spanning Tree new Root Bridge<br>Log Message: [CIST \| CIST Regional \| MSTI Regional] New Root bridge selected( [Instance: <InstanceID> ]MAC: <macaddr> Priority :<value>)<br>Parameters description:<br>InstanceID: Instance ID.<br>macaddr: Mac address<br>value: priority value | Informational |
| Event description: Spanning Tree Protocol is enabled<br>Log Message: Spanning Tree Protocol is enabled | Informational |
| Event description: Spanning Tree Protocol is disabled<br>Log Message: Spanning Tree Protocol is disabled | Informational |
| Event description: New root port | Notice |

| Log Description | Severity |
|---|---|
| Log Message: New root port selected [( [Instance:<InstanceID> ], <interface-id>)]<br>Parameters description:<br>InstanceID: Instance ID.<br>portNum:Port ID | |
| Event description: Spanning Tree port status changed<br>Log Message: Spanning Tree port status change [( [Instance:<InstanceID> ], <interface-id>)] <old_status> -> <new_status><br>Parameters description:<br>InstanceID: Instance ID.<br>portNum: Port ID<br>old_status: Old status<br>new_status: New status | Notice |
| Event description: Spanning Tree port role changed.<br>Log Message: Spanning Tree port role change. [( [Instance:<InstanceID> ], <interface-id>)] <old_role> -> <new_role><br>Parameters description:<br>InstanceID: Instance ID.<br>portNum:Port ID/<br>old_role: Old role<br>new_status:New role | Informational |
| Event description: Spannnig Tree instance created.<br>Log Message: Spanning Tree instance create. Instance:<InstanceID><br>Parameters description:<br>InstanceID: Instance ID. | Informational |
| Event description: Spannnig Tree instance deleted.<br>Log Message: Spanning Tree instance delete. Instance:<InstanceID><br>Parameters description:<br>InstanceID: Instance ID. | Informational |
| Event description: Spanning Tree Version changed.<br>Log Message: Spanning Tree version change. New version:<new_version><br>Parameters description:<br>new_version: New STP version. | Informational |
| Event description: Spanning Tree MST configuration ID name and revision level changed.<br>Log Message: Spanning Tree MST configuration ID name and revision level change (name:<name> ,revision level <revision_level>).<br>Parameters description:<br>name : New name.<br>revision_level:New revision level. | Informational |
| Event description: Spanning Tree MST configuration ID VLAN mapping table deleted.<br>Log Message: Spanning Tree MST configuration ID VLAN mapping table change (instance: <InstanceID> delete vlan <startvlanid> [- <endvlanid>]).<br>Parameters description:<br>InstanceID: Instance ID.<br>startvlanid- endvlanid:VLANlist | Informational |

| Log Description | Severity |
|---|---|
| Event description: Spanning Tree MST configuration ID VLAN mapping table added.<br>Log Message: Spanning Tree MST configuration ID VLAN mapping table changed (instance: <InstanceID> add vlan <startvlanid> [- <endvlanid>]).<br>Parameters description:<br>InstanceID: Instance ID.<br>startvlanid- endvlanid:VLANlist | Informational |

## OSPFv2 Enhancement

| Log Description | Severity |
|---|---|
| Event description: OSPF interface link state changed.<br>Log Message: OSPF-6-INTFSTATECHANGE: OSPF interface <intf-name> changed state to [Up \| Down]<br>Parameters description:<br>intf-name: Name of OSPF interface. | Informational |
| Event description: OSPF interface administrator state changed.<br>Log Message: OSPF-6-INTFADMINCHANGE: OSPF protocol on interface <intf-name> changed state to [Enabled \| Disabled<br>Parameters description:<br>intf-name: Name of OSPF interface. | Informational |
| Event description: One OSPF interface changed from one area to another.<br>Log Message: OSPF-6-INTFAREACHANGE: OSPF interface <intf-name> changed from area <area-id> to area <area-id><br>Parameters description:<br>intf-name: Name of OSPF interface.<br>area-id: OSPF area ID. | Informational |
| Event description: One OSPF neighbor state changed from Loading to Full.<br>Log Message: OSPF-5-NBRLOADINGTOFULL: OSPF nbr <nbr-id> on interface <intf-name> changed state from Loading to Full<br>Parameters description:<br>intf-name: Name of OSPF interface.<br>nbr-id: Neighbor's router ID. | Notice |
| Event description: One OSPF neighbor state changed from Full to Down.<br>Log Message: OSPF-5-NBRFULLTODOWN: OSPF nbr <nbr-id> on interface <intf-name> changed state from Full to Down<br>Parameters description:<br>intf-name: Name of OSPF interface.<br>nbr-id: Neighbor's router ID. | Notice |
| Event description: One OSPF neighbor state's dead timer expired.<br>Log Message: OSPF-5-DTIMEXPIRED: OSPF nbr <nbr-id> on interface <intf-name> dead timer expired<br>Parameters description:<br>intf-name: Name of OSPF interface.<br>nbr-id: Neighbor's router ID. | Notice |
| Event description: One OSPF virtual neighbor state changed from Loading to Full.<br>Log Message: OSPF-5-VNBRLOADINGTOFULL: OSPF nbr <nbr-id> on virtual link | Notice |

| Log Description | Severity |
|---|---|
| changed state from Loading to Full<br>Parameters description:<br>nbr-id: Neighbor's router ID. | |
| Event description: One OSPF virtual neighbor state changed from Full to Down.<br>Log Message: OSPF-5-VNBRFULLTODOWN: OSPF nbr <nbr-id> on virtual link changed state from Full to Down<br>Parameters description:<br>nbr-id: Neighbor's router ID. | Notice |
| Event description: OSPF router ID was changed.<br>Log Message: OSPF-6-RIDCHANGE: OSPF router ID changed to <router-id><br>Parameters description:<br>router-id: OSPF router ID. | Informational |
| Event description: Enable OSPF.<br>Log Message: OSPF-6-STATECHANGE: OSPF state changed to [Enabled \| Disabled] | Informational |

## Peripheral

| Log Description | Severity |
|---|---|
| Event description: Fan Recovered.<br>Log Message: Unit <id>, <fan-descr> back to normal.<br>Parameters description:<br>Unit <id>: The unit ID.<br>fan-descr: The FAN ID and position. | Critical |
| Event description: Fan Fail<br>Log Message: Unit <id> <fan-descr> failed<br>Parameters description:<br>Unit <id>: The unit ID.<br>fan-descr: The FAN ID and position. | Critical |
| Event description: Temperature sensor enters alarm state.<br>Log Message: Unit <unit-id> <thermal-sensor-descr> detects abnormal temperature <degree><br>Parameters description:<br>unitID: The unit ID.<br>thermal-sensor-descr: The sensor ID and position.<br>degree: The current temperature. | Critical |
| Event description: Temperature recovers to normal.<br>Log Message: Unit <unit-id> <thermal-sensor-descr> temperature back to normal<br>Parameters description:<br>unitID: The unit ID.<br>thermal-sensor-descr: The sensor ID and position. | Critical |
| Event description: Power failed.<br>Log Message: Unit <unit-id> <power-descr> failed<br>Parameters description:<br>unitID: The unit ID.<br>power-descr: The power position and ID. | Critical |

| Log Description | Severity |
|---|---|
| Event description: Power is recovered.<br>Log Message: Unit <unit-id> <power-descr> back to normal<br>Parameters description:<br>unitID: The unit ID.<br>power-descr: The power position and ID. | Critical |
| Event description: Air flow abnormal.<br>Log Message: Unit <unit-id> detecting abnormal air flow.<br>Parameters description:<br>unitID: The unit ID. | Critical |
| Event description: Air flow recovered.<br>Log Message: Unit <unit-id> abnormal air flow back to normal.<br>Parameters description:<br>unitID: The unit ID. | Critical |

## Port Security

| Log Description | Severity |
|---|---|
| Event description: Address full on a port<br>Log Message: MAC address <macaddr> causes port security violation on <interface-id><br>Parameters description:<br>macaddr: The violation MAC address.<br>interface-id: The interface name. | Warning |
| Event description: Address full on system<br>Log Message: Limit on system entry number has been exceeded. | Warning |

## RIPng

| Log Description | Severity |
|---|---|
| Event description: The RIPng state of interface changed<br>Log Message: RIPng-6-INTFSTATECHANGE :RIPng protocol on interface <intf-name> changed state to <enabled \| disabled><br>Parameters description:<br>intf-name: Interface name. | Informational |

## Safeguard

| Log Description | Severity |
|---|---|
| Event description: When the CPU utilization is over the rising threshold, the switch enters exhausted mode.<br>Log Message: Unit <unit-id>, Safeguard Engine enters EXHAUSTED mode.<br>Parameters description:<br>unit-id: the unit ID | Warning |
| Event description: When the CPU utilization is lower than the falling threshold, the switch enters normal mode. | Informational |

| Log Description | Severity |
|---|---|
| Log Message: Unit <unit-id>, Safeguard Engine enters NORMAL mode.<br>Parameters description:<br>unit_id: the unit ID. | |

## SNMP

| Log Description | Severity |
|---|---|
| Event Description: SNMP request received with invalid community string<br>Log Message: SNMP request received from <ipaddr> with invalid community string.<br>Parameters Description:<br>ipaddr: The IP address. | Informational |

## SSH

| Log Description | Severity |
|---|---|
| Event description: SSH server is enabled.<br>Log Message: SSH server is enabled | Informational |
| Event description: SSH server is disabled.<br>Log Message: SSH server is disabled | Informational |
| Event description: This log will be generated when SSH log failed (not via AAA method).<br>Log Message: Login failed through SSH (Username: <username>, IP: <ipaddr \| ipv6address>).<br>Parameters description:<br>username: User name which logs in fail.<br>ipaddr: IP address of host from which the user logged in.<br>ipv6address: IPv6 address of host from which the user logged in. | Critical |

## Stacking

| Log Description | Severity |
|---|---|
| Event description: Hot insertion.<br>Log Message: Unit: <unitID>, MAC: <macaddr> Hot insertion.<br>Parameters description:<br>unitID: Box ID.<br>macaddr: MAC address. | Informational |
| Event description: Hot removal.<br>Log Message: Unit: <unitID>, MAC: <macaddr> Hot removal.<br>Parameters description:<br>unitID: Box ID.<br>macaddr: MAC address. | Informational |
| Event description: Stacking topology change.<br>Log Message: Stacking topology is <Stack_TP_TYPE>. Master(Unit <unitID>, MAC:<macaddr>). | Informational |

| Log Description | Severity |
|---|---|
| Parameters description:<br>Stack_TP_TYPE: The stacking topology type is one of the following:<br>1. Ring,<br>2. Chain.<br>unitID: Box ID.<br>macaddr: MAC address. | |
| Event description: Backup master changed to master.<br>Log Message: Backup master changed to master. Master (Unit: <unitID>).<br>Parameters description:<br>unitID: Box ID. | Informational |
| Event description: Slave changed to master<br>Log Message: Slave changed to master. Master (Unit: <unitID>).<br>Parameters description:<br>unitID: Box ID. | Informational |
| Event description: Box ID conflict.<br>Log Message: Hot insert failed, box ID conflict: Unit <unitID> conflict (MAC: <macaddr> and MAC: <macaddr>).<br>Parameters description:<br>unitID: Box ID.<br>macaddr: The MAC addresses of the conflicting boxes. | Critical |

## Traffic Control

| Log Description | Severity |
|---|---|
| Event description: Broadcast storm occurrence.<br>Log Message: <interface-id> Broadcast storm is occurring.<br>Parameters description:<br>interface-id: The interface name. | Warning |
| Event description: Broadcast storm cleared.<br>Log Message: <interface-id> Broadcast storm has cleared.<br>Parameters description:<br>interface-id: The interface name. | Informational |
| Event description: Multicast storm occurrence.<br>Log Message: <interface-id> Multicast storm is occurring.<br>Parameters description:<br>interface-id: The interface name. | Warning |
| Event description: Multicast Storm cleared.<br>Log Message: <interface-id>Multicast storm has cleared.<br>Parameters description:<br>interface-id: The interface name. | Informational |
| Event description: Storm us occured.<br>Log Message: <Broadcast \| Multicast \| Unicast> storm is occurring on <interface-id>.<br>Parameters description:<br>Broadcast: Storm is resulted by broadcast packets(DA = FF:FF:FF:FF:FF:FF). | Warning |

| Log Description | Severity |
|---|---|
| Multicast: Storm is resulted by multicast packets, including unknown L2 multicast, known L2 multicast, unknown IP multicast and known IP multicast.<br>Unicast: Storm is resulted by unicast packets, including both known and unknown unicast packets<br>interface-id: The interface ID on which a storm is occurring. | |
| Event description: Storm is cleared.<br>Log Message: <Broadcast \| Multicast \| Unicast> storm is cleared on <interface-id>.<br>Parameters description:<br>Broadcast: Broadcast storm is cleared.<br>Multicast: Multicast storm is cleared.<br>Unicast: Unicast storm (including both known and unknown unicast packets) is cleared.<br>interface-id: The interface ID on which a storm is cleared. | Informational |
| Event description: Port shut down due to a packet storm<br>Log Message: <interface-id> is currently shut down due to the <Broadcast \| Multicast \| Unicast> storm.<br>Parameters description:<br>interface-id: The interface name.<br>Broadcast: The interface is disabled by broadcast storm.<br>Multicast: The interface is disabled by multicast storm.<br>Unicast: The interface is disabled by unicast storm (including both known and unknown unicast packets). | Warning |

## VPLS

| Log Description | Severity |
|---|---|
| Event description: VPLS link up<br>Log Message: VPLS <vpls_name> link up<br>Parameters description:<br>vpls_name: The name of the link up VPLS | Informational |
| Event description: VPLS link down<br>Log Message: VPLS <vpls_name> link down<br>Parameters description:<br>vpls_name: The name of the link down VPLS | Informational |

## VPWS

| Log Description | Severity |
|---|---|
| Event description: Pseudo-wire link down<br>Log Message: Pseudo-wire id <vc_id> peer ip <ipaddr> link down<br>Parameters description:<br>vc_id: The link down Pseudo-wire ID<br>ipaddr: The peer IP address of the link down Pseudo-wire | Informational |
| Event description: Pseudo-wire link up<br>Log Message: Pseudo-wire id <vc_id> peer ip <ipaddr> link up | Informational |

| Log Description | Severity |
|---|---|
| Parameters description:<br>vc_id: The link up Pseudo-wire ID<br>ipaddr: The peer IP address of the link up Pseudo-wire | |
| Event description: Pseudo-wire is deleted<br>Log Message: Pseudo-wire id <vc_id> peer ip <ipaddr> is deleted<br>Parameters description:<br>vc_id: The deleted Pseudo-wire ID<br>ipaddr: The peer IP address of the deleted Pseudo-wire | Informational |
| Event description: Pseudo-wire link standby<br>Log Message: Pseudo-wire id <vc_id> peer ip <ipaddr> link standby<br>Parameters description:<br>vc_id: The link standby Pseudo-wire ID<br>ipaddr: The peer IP address of the link standby Pseudo-wire | Informational |

## VRRP Debug Enhancement

| Log Description | Severity |
|---|---|
| Event description: One virtual router state becomes Master.<br>Log Message: VRRP-6-STATEMASTER:VR <vr-id> at interface <intf-name> switch to Master<br>Parameters description:<br>vr-id: VRRP virtual router ID.<br>intf-name: Interface name on which virtual router is based. | Informational |
| Event description: One virtual router state becomes Backup.<br>Log Message: VRRP-6-STATEBACKUP: VR <vr-id> at interface <intf-name> switch to Backup<br>Parameters description:<br>vr-id: VRRP virtual router ID.<br>intf-name: Interface name on which virtual router is based. | Informational |
| Event description: One virtual router state becomes Init.<br>Log Message: VRRP-6-STATEINIT: VR <vr-id> at interface <intf-name> switch to Init<br>Parameters description:<br>vr-id: VRRP virtual router ID.<br>intf-name: Interface name on which virtual router is based. | Informational |
| Event description: Authentication type mismatch of one received VRRP advertisement message.<br>Log Message: VRRP-4-AUTHTYPEMIS:Authentication type mismatch on VR <vr-id> at interface <intf-name><br>Parameters description:<br>vr-id: VRRP virtual router ID.<br>intf-name: Interface name on which virtual router is based. | Warning |
| Event description: Authentication checking fail of one received VRRP advertisement message.<br>Log Message: VRRP-4-AUTHFAIL: Authentication fail on VR <vr-id> at interface <intf-name>. Auth type <auth-type><br>Parameters description: | Warning |

| Log Description | Severity |
|---|---|
| vr-id: VRRP virtual router ID.<br>intf-name: Interface name on which virtual router is based.<br>Auth-type: VRRP interface authentication type. | |
| Event description: Checksum error of one received VRRP advertisement message.<br>Log Message: VRRP-4-BADCHK:Received an ADV msg with incorrect checksum on VR <vr-id> at interface <intf-name><br>Parameters description:<br>vr-id: VRRP virtual router ID.<br>intf-name: Interface name on which virtual router is based. | Warning |
| Event description: Virtual router ID mismatch of one received VRRP advertisement message.<br>Log Message: VRRP-4-VRIDMIS: Received ADV msg virtual router ID mismatch. VR <vr-id> at interface <intf-name><br>Parameters description:<br>vr-id: VRRP virtual router ID.<br>intf-name: Interface name on which virtual router is based. | Warning |
| Event description: Advertisement interval mismatch of one received VRRP advertisement message.<br>Log Message: VRRP-4-ADVMIS: Received ADV msg adv interval mismatch. VR <vr-id> at interface <intf-name><br>Parameters description:<br>vr-id: VRRP virtual router ID.<br>intf-name: Interface name on which virtual router is based. | Warning |
| Event description: A virtual MAC address is added into switch L2 table<br>Log Message: VRRP-5-MACADD: Added a virtual MAC <vrrp-mac-addr> into L2 table<br>Parameters description:<br>vrrp-mac-addr: VRRP virtual MAC address | Notice |
| Event description: A virtual MAC address is deleted from switch L2 table.<br>Log Message: VRRP-5-MACDEL: Deleted a virtual MAC <vrrp-mac-addr> from L2 table<br>Parameters description:<br>vrrp-mac-addr: VRRP virtual MAC address | Notice |
| Event description: A virtual MAC address is adding into switch L3 table.<br>Log Message: VRRP-5-MACL3ADD: Added a virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table<br>Parameters description:<br>vrrp-ip-addr: VRRP virtual IP address<br>vrrp-mac-addr: VRRP virtual MAC address | Notice |
| Event description: A virtual MAC address is deleting from switch L3 table.<br>Log Message: VRRP-5-MACL3DEL: Deleted a virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> from L3 table<br>Parameters description:<br>vrrp-ip-addr: VRRP virtual IP address<br>vrrp-mac-addr: VRRP virtual MAC address | Notice |
| Event description: Failed when adding a virtual MAC into switch chip L2 table.<br>Log Message: VRRP-3-MACADDFAIL:Failed to add virtual MAC <vrrp-mac-addr> | Error |

| Log Description | Severity |
|---|---|
| into chip L2 table. Errcode <vrrp-errcode><br>Parameters description:<br>vrrp-mac-addr: VRRP virtual MAC address<br>vrrp-errcode: Errcode of VRRP protocol behavior. | |
| Event description: Failed when deleting a virtual MAC from switch chip L2 table.<br>Log Message: VRRP-3-MACDELFAIL:Failed to delete virtual MAC <vrrp-mac-addr> from chip L2 table. Errcode <vrrp-errcode><br>Parameters description:<br>vrrp-mac-addr: VRRP virtual MAC address<br>vrrp-errcode: Errcode of VRRP protocol behaviour. | Error |
| Event description: Failed when adding a virtual MAC into switch L3 table. The L3 table is full.<br>Log Message: VRRP-3-MACL3FULL: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table. L3 table is full<br>Parameters description:<br>vrrp-ip-addr: VRRP virtual IP address<br>vrrp-mac-addr: VRRP virtual MAC address | Error |
| Event description: Failed when adding a virtual MAC into switch L3 table. The port where the MAC is learned from is invalid.<br>Log Message: VRRP-3-BADMAC: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table. Port <mac-port> is invalid<br>Parameters description:<br>vrrp-ip-addr: VRRP virtual IP address<br>vrrp-mac-addr: VRRP virtual MAC address<br>mac-port: port number of VRRP virtual MAC. | Error |
| Event description: Failed when adding a virtual MAC into switch L3 table. The interface where the MAC is learned from is invalid.<br>Log Message: VRRP-3-BADINTF: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table. Interface <mac-intf> is invalid<br>Parameters description:<br>vrrp-ip-addr: VRRP virtual IP address<br>vrrp-mac-addr: VRRP virtual MAC address<br>mac-intf: interface id on which VRRP virtual MAC address is based. | Error |
| Event description: Failed when adding a virtual MAC into switch L3 table. The box where the MAC is learned from is invalid.<br>Log Message: VRRP-3-BADUNIT: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into L3 table. Box id <mac-box> is invalid<br>Parameters description:<br>vrrp-ip-addr: VRRP virtual IP address<br>vrrp-mac-addr: VRRP virtual MAC address<br>mac-box: stacking box number of VRRP virtual MAC. | Error |
| Event description: Failed when adding a virtual MAC into switch chip's L3 table.<br>Log Message: VRRP-3-MACL3ADDFAIL: Failed to add virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> into chip L3 table. Errcode <vrrp-errcode><br>Parameters description:<br>vrrp-ip-addr: VRRP virtual IP address<br>vrrp-mac-addr: VRRP virtual MAC address<br>vrrp-errcode: Err code of VRRP protocol behavior. | Error |

| Log Description | Severity |
|---|---|
| Event description: Failed when deleting a virtual MAC from switch chip's L3 table.<br>Log Message: VRRP-3-MACL3DELFAIL: Failed to delete virtual IP <vrrp-ip-addr> MAC <vrrp-mac-addr> from chip L3 table. Errcode <vrrp-errcode><br>Parameters description:<br>vrrp-ip-addr: VRRP virtual IP address<br>vrrp-mac-addr: VRRP virtual MAC address<br>vrrp-errcode: Err code of VRRP protocol behavior. | Error |

## Web

| Log Description | Severity |
|---|---|
| Event description: Successful login through Web.<br>Log Message: Successful login through Web (Username: <username>, IP: <ipaddr>).<br>Parameters description:<br>username: The use name that used to login HTTP server.<br>ipaddr: The IP address of HTTP client. | Informational |
| Event description: Login failed through Web.<br>Log Message: Login failed through Web (Username: <username>, IP: <ipaddr>).<br>Parameters description:<br>username: The use name that used to login HTTP server.<br>ipaddr: The IP address of HTTP client. | Warning |
| Event description: Web session timed out.<br>Log Message: Web session timed out (Username: <username>, IP: <ipaddr>).<br>Parameters description:<br>username: The use name that used to login HTTP server.<br>ipaddr: The IP address of HTTP client. | Informational |
| Event description: Logout through Web.<br>Log Message: Logout through Web (Username: <username>, IP: <ipaddr>).<br>Parameters description:<br>username: The use name that used to login HTTP server.<br>ipaddr: The IP address of HTTP client. | Informational |
| Event description: Successful login through Web (SSL).<br>Log Message: Successful login through Web (SSL) (Username: <username>, IP: <ipaddr>).<br>Parameters description:<br>username: The use name that used to login SSL server.<br>ipaddr: The IP address of SSL client. | Informational |
| Event description: Login failed through Web (SSL).<br>Log Message: Login failed through Web (SSL) (Username: <username>, IP: <ipaddr>).<br>Parameters description:<br>username: The use name that used to login SSL server.<br>ipaddr: The IP address of SSL client. | Warning |
| Event description: Web (SSL) session timed out.<br>Log Message: Web (SSL) session timed out (Username: <username>, IP: | Informational |

| Log Description | Severity |
|---|---|
| <ipaddr>).<br>Parameters description:<br>username: The use name that used to login SSL server.<br>ipaddr: The IP address of SSL client. | |
| Event description: Logout through Web(SSL).<br>Log Message: Logout through Web(SSL) (Username: <username>, IP: <ipaddr>).<br>Parameters description:<br>username: The use name that used to login SSL server.<br>ipaddr: The IP address of SSL client. | Informational |

## Web-Authentication

| Log Description | Severity |
|---|---|
| Event description: The log message occurs when a host passed the authentication.<br>Log Message: Web-Authentication host login success (Username: <username>, IP: <ipaddr >, MAC: <mac-address>, <interface-id>, VID: <vlan-id>).<br>Parameters description:<br>username: The host username.<br>ipaddr: The host IP address, either an IPv4 or IPv6 address.<br>mac-address: The host MAC addresses.<br>interface-id: The interface on which the host is authenticated.<br>vlan-id: The VLAN ID on which the host exists. | Informational |
| Event description: The log message occurs when a host failed to pass the authentication.<br>Log Message: Web-Authentication host login fail (Username: <username>, IP: <ipaddr >, MAC: <mac-address>, <interface-id>, VID: <vlan-id>).<br>Parameters description:<br>username: The host username.<br>ipaddr: The host IP address, either an IPv4 or IPv6 address.<br>mac-address: The host MAC addresses.<br>interface-id: The interface on which the host is authenticated.<br>vlan-id: The VLAN ID on which the host exists. | Critical |

# Appendix C - Trap Entries

The following table lists all possible trap log entries and their corresponding meanings that will appear in the switch.

### 802.1X

| Trap Name | Description | OID |
|---|---|---|
| dDot1xExtLoggedSuccess | The trap is sent when a host has successfully logged in (passed 802.1X authentication).<br>Binding objects:<br>(1) ifIndex,<br>(2) dnaSessionClientMacAddress<br>(3) dnaSessionAuthVlan<br>(4) dnaSessionAuthUserName | 1.3.6.1.4.1.17 1.14.30.0.1 |
| dDot1xExtLoggedFail | The trap is sent when a host failed to pass 802.1X authenitcation (login failed).<br>Binding objects:<br>(1) ifIndex,<br>(2) dnaSessionClientMacAddress<br>(3) dnaSessionAuthVlan<br>(4) dnaSessionAuthUserName<br>(5) dDot1xExtNotifyFailReason | 1.3.6.1.4.1.17 1.14.30.0.2 |

### Authentication Fail

| Trap Name | Description | OID |
|---|---|---|
| authenticationFailure | An authenticationFailure trap signifies that the SNMPv2 entity, acting in an agent role, has received a protocol message that is not properly authenticated. While all implementations of the SNMPv2 must be capable of generating this trap, the snmpEnableAuthenTraps object indicates whether this trap will be generated. | 1.3.6.1.6.3.1. 1.5.5 |

### BPDU Protection

| Trap Name | Description | OID |
|---|---|---|
| dBpduProtectionAttackOccur | This trap is sent when the BPDU attack happened on an interface.<br>Binding objects:<br>1: ifIndex<br>2: dBpduProtectionIfCfgMode | 1.3.6.1.4.1.17 1.14.47.0.1 |
| dBpduProtectionAttackRecover | This trap is sent when the BPDU attack recovered on an interface.<br>Binding objects:<br>1: ifIndex | 1.3.6.1.4.1.17 1.14.47.0.2 |

## CFM

| Trap Name | Description | OID |
|---|---|---|
| dot1agCfmFaultAlarm | This trap is initiated when a connectivity defect is detected.<br>Binding objects:<br>(1) dot1agCfmMepHighestPrDefect | 1.3.111.2.802.1.1.8.0.1 |

## CFM Extension

| Trap Name | Description | OID |
|---|---|---|
| dCfmAisOccurred | A notification is generated when MEP detects the AIS defect condition.<br>Binding objects:<br>(1) dCfmEventMdIndex<br>(2) dCfmEventMaIndex<br>(3) dCfmEventMepIdentifier | 1.3.6.1.4.1.171.14.86.0.1 |
| dCfmAisCleared | A notification is generated when MEP clears the AIS defect condition.<br>Binding objects:<br>(1) dCfmEventMdIndex<br>(2) dCfmEventMaIndex<br>(3) dCfmEventMepIdentifier | 1.3.6.1.4.1.171.14.86.0.2 |
| dCfmLockOccurred | A notification is generated when MEP detects the LCK condition.<br>Binding objects:<br>(1) dCfmEventMdIndex<br>(2) dCfmEventMaIndex<br>(3) dCfmEventMepIdentifier | 1.3.6.1.4.1.171.14.86.0.3 |
| dCfmLockCleared | A notification is generated when MEP clears the LCK condition.<br>Binding objects:<br>(1) dCfmEventMdIndex<br>(2) dCfmEventMaIndex<br>(3) dCfmEventMepIdentifier | 1.3.6.1.4.1.171.14.86.0.4 |

## DHCP Server Screen Prevention

| Trap Name | Description | OID |
|---|---|---|
| dDhcpFilterAttackDetected | When DHCP Server Screen is enabled, if the switch received the forge DHCP Server packet, the switch will trap the event if any attacking packet is received..<br>Binding objects:<br>(1) dDhcpFilterLogBufServerIpAddr<br>(2) dDhcpFilterLogBufClientMacAddr<br>(3) dDhcpFilterLogBufferVlanId<br>(4) dDhcpFilterLogBufferOccurTime | 1.3.6.1.4.1.171.14.133.0.1 |

## DOS Prevention

| Trap Name | Description | OID |
|---|---|---|
| dDosPreveAttackDetectedPacket | The trap is sent when detect DOS attack.<br>Binding objects:<br>(1) dDoSPrevCtrlAttackType<br>(2) dDosPrevNotiInfoDropIpAddr<br>(3) dDosPrevNotiInfoDropPortNumber | 1.3.6.1.4.1.17 1.14.59.0.2 |

## ERPS

| Trap Name | Description | OID |
|---|---|---|
| dErpsFailuredetectedNotif | A dErpsFailureNotification is sent when dErpsNotificationEnabled is 'true' and a signal failure is detected. | 1.3.6.1.4.1.17 1.14.78.0.1 |
| dErpsFailureClearedNotif | A dErpsFailureClearedNotif is sent when dErpsNotificationEnabled is 'true' and a signal failure is cleared. | 1.3.6.1.4.1.17 1.14.78.0.2 |
| dErpsRPLOwnerConflictNotif | A dErpsOwnerConflictNotif is sent when dErpsNotificationEnabled is 'true' and RPL owner conflict is detected | 1.3.6.1.4.1.17 1.14.78.0.3 |

## Gratuitous ARP

| Trap Name | Description | OID |
|---|---|---|
| agentGratuitousARPTrap | The trap is sent when IP address conflicted.<br>Binding objects:<br>(1) ipaddr<br>(2) macaddr<br>(3) portNumber<br>(4) agentGratuitousARPInterfaceName | 1.3.6.1.4.1.17 1.14.75.1.2.5 |

## IP-MAC-Port Binding

| Trap Name | Description | OID |
|---|---|---|
| dImpbViolationTrap | The address violation notification is generated when IP-MAC-Port Binding address violation is detected.<br>Binding objects:<br>ifIndex<br>dImpbViolationIpAddrType<br>dImpbViolationIpAddress<br>dImpbViolationMacAddress<br>dImpbViolationVlan | 1.3.6.1.4.1.17 1.14.22.0.1 |

## LACP

| Trap Name | Description | OID |
|---|---|---|
| linkUp | A linkUp trap signifies that the SNMP entity, acting in | 1.3.6.1.6.3.1. |

| Trap Name | Description | OID |
|---|---|---|
| | an agent role, has detected that the ifOperStatus object for one of its communication links left the down state and transitioned into some other state (but not into the notPresent state). This other state is indicated by the included value of ifOperStatus.<br>Binding objects:<br>(1) ifIndex,<br>(2) if AdminStatus<br>(3) ifOperStatu | 1.5.4 |
| linkDown | A linkDown trap signifies that the SNMP entity, acting in an agent role, has detected that the ifOperStatus object for one of its communication links is about to enter the down state from some other state (but not from the notPresent state). This other state is indicated by the included value of ifOperStatus.<br>Binding objects:<br>(1) ifIndex,<br>(2) if AdminStatus<br>(3) ifOperStatu | 1.3.6.1.6.3.1.1.5.3 |

## LBD

| Trap Name | Description | OID |
|---|---|---|
| dLbdLoopOccurred | This trap is sent when an interface loop occurs.<br>Binding objects:<br>dLbdNotifyInfoIfIndex | 1.3.6.1.4.1.171.14.46.0.1 |
| dLbdLoopRestart | This trap is sent when an interface loop restarts after the interval time.<br>Binding objects:<br>dLbdNotifyInfoIfIndex | 1.3.6.1.4.1.171.14.46.0.2 |
| dLbdVlanLoopOccurred | This trap is sent when an interface with a VID loop occurs.<br>Binding objects:<br>dLbdNotifyInfoIfIndex<br>dLbdNotifyInfoVlanId | 1.3.6.1.4.1.171.14.46.0.3 |
| dLbdVlanLoopRestart | This trap is sent when an interface loop with a VID restarts after the interval time.<br>Binding objects:<br>dLbdNotifyInfoIfIndex<br>dLbdNotifyInfoVlanId | 1.3.6.1.4.1.171.14.46.0.4 |

## LDP

| Trap Name | Description | OID |
|---|---|---|
| mplsLdpInitSessionThresholdExceeded | This notification is generated when the backoff is enabled, and the number of Session Initialization messages exceeds the value of the 'mplsLdpEntityInitSessionThreshold' | 1.3.6.1.2.1.10.166.4.0.1 |

| Trap Name | Description | OID |
|---|---|---|
| mplsLdpPathVectorLimitMismatch | This notification is sent when the'mplsLdpEntityPathVectorLimit' does NOT match the value of the 'mplsLdpPeerPathVectorLimit' for a specific Entity. | 1.3.6.1.2.1.10.166.4.0.2 |
| mplsLdpSessionUp | If this notification is sent when the value of 'mplsLdpSessionState' enters the 'operational(5)' state | 1.3.6.1.2.1.10.166.4.0.3 |
| mplsLdpSessionDown | This notification is sent when the value of 'mplsLdpSessionState' leaves the 'operational(5)' state | 1.3.6.1.2.1.10.166.4.0.4 |

## LLDP

| Trap Name | Description | OID |
|---|---|---|
| lldpRemTablesChange | A lldpRemTablesChange notification is sent when the value of lldpStatsRemTableLastChangeTime changes.It can be utilized by an NMS to trigger LLDP remote systems table maintenance polls.<br>Binding:<br>1. lldpStatsRemTablesInserts<br>2. lldpStatsRemTablesDeletes<br>3. lldpStatsRemTablesDrops<br>4. lldpStatsRemTablesAgeouts | 1.0.8802.1.1.2.0.0.1 |
| lldpXMedTopologyChangeDetected | A notification generated by the local device sensing a change in the topology that indicates that a new remote device attached to a local port, or a remote device disconnected or moved from one port to another.<br>Binding:<br>1. lldpRemChassisIdSubtype<br>2. lldpRemChassisId<br>3. lldpXMedRemDeviceClass | 1.0.8802.1.1.2.1.5.4795.0.1 |

## MAC-based Access Control

| Trap Name | Description | OID |
|---|---|---|
| dMacAuthLoggedSuccess | The trap is sent when a MAC-based Access Control host is successfully logged in.<br>Binding objects:<br>(1) ifIndex,<br>(2) dnaSessionClientMacAddress<br>(3) dnaSessionAuthVlan | 1.3.6.1.4.1.171.14.153.0.1 |
| dMacAuthLoggedFail | The trap is sent when a MAC-based Access Control host login fails.<br>Binding objects:<br>(1) ifIndex,<br>(2) dnaSessionClientMacAddress<br>(3) dnaSessionAuthVlan | 1.3.6.1.4.1.171.14.153.0.2 |

| Trap Name | Description | OID |
|---|---|---|
| dMacAuthLoggedAgesOut | The trap is sent when a MAC-based Access Control host ages out.<br>Binding objects:<br>(1) ifIndex,<br>(2) dnaSessionClientMacAddress<br>(3) dnaSessionAuthVlan | 1.3.6.1.4.1.17 1.14.153.0.3 |

## MAC Notification

| Trap Name | Description | OID |
|---|---|---|
| swL2macNotification | This trap indicate the MAC addresses variation in the address table.<br>Binding objects:<br>(1) swL2macNotifyInfo | 1.3.6.1.4.1.17 1.11.127.1.2. 100.1.2.0.1 |

## MPLS

| Trap Name | Description | OID |
|---|---|---|
| mplsXCUp | This notification is generated when the mplsXCOperStatus object for one or more contiguous entries in the mplsXCTable is about to enter the up state from another state. | 1.3.6.1.2.1.10 .166.2.0.1 |
| mplsXCDown | This notification is generated when the mplsXCOperStatus object for one or more contiguous entries in the mplsXCTable is about to enter the up state from another state. | 1.3.6.1.2.1.10 .166.2.0.2 |

## MSTP

| Trap Name | Description | OID |
|---|---|---|
| newRoot | The newRoot trap indicates that the sending agent has become the new root of the Spanning Tree; the trap is sent by a bridge soon after its election as the new root, e.g., upon expiration of the Topology Change Timer, immediately subsequent to its election. Implementation of this trap is optional. | 1.3.6.1.2.1.17 .0.1 |
| topologyChange | A topologyChange trap is sent by a bridge when any of its configured ports transitions from the Learning state to the Forwarding state, or from the Forwarding state to the Blocking state. The trap is not sent if a newRoot trap is sent for the same transition. Implementation of this trap is optional | 1.3.6.1.2.1.17 .0.2 |

## Port

| Trap Name | Description | OID |
|---|---|---|
| linkUp | A notification is generated when port linkup.<br>Binding objects: | 1.3.6.1.6.3.1. 1.5.4 |

| Trap Name | Description | OID |
|---|---|---|
| | (1) ifIndex,<br>(2) if AdminStatus<br>(3) ifOperStatu | |
| linkDown | A notification is generated when port linkdown.<br>Binding objects:<br>(1) ifIndex,<br>(2) if AdminStatus<br>(3) ifOperStatu | 1.3.6.1.6.3.1.1.5.3 |

## Port Security

| Trap Name | Description | OID |
|---|---|---|
| dPortSecMacAddrViolation | When the port security trap is enabled, new MAC addresses that violate the pre-defined port security configuration will trigger trap messages to be sent out.<br>Binding objects:<br>(1) ifIndex,<br>(2) dPortSecIfCurrentStatus<br>(3) dPortSecIfLastMacAddress | 1.3.6.1.4.1.171.14.8.0.1 |

## RMON

| Trap Name | Description | OID |
|---|---|---|
| risingAlarm | The SNMP trap that is generated when an alarm entry crosses its rising threshold and generates an event that is configured for sending SNMP traps.<br>Binding objects:<br>(1)alarmIndex<br>(2)alarmVariable<br>(3)alarmSampleType<br>(4) alarmValue<br>(5) alarmRisingThreshold | 1.3.6.1.2.1.16.0.1 |
| fallingAlarm | The SNMP trap that is generated when an alarm entry crosses its falling threshold and generates an event that is configured for sending SNMP traps.<br>Binding objects:<br>(1)alarmIndex<br>(2) alarmVariable<br>(3)alarmSampleType<br>(4)alarmValue<br>(5) alarmFallingThreshold | 1.3.6.1.2.1.16.0.2 |

## Safeguard

| Trap Name | Description | OID |
|---|---|---|
| dSafeguardChgToExhausted | This trap indicates System change operation mode | 1.3.6.1.4.1.17 |

| Trap Name | Description | OID |
|---|---|---|
| | from normal to exhaust.<br>Binding objects:<br>(1) dSafeguardEngineCurrentMode | 1.14.19.1.1.0.1 |
| dSafeguardChgToNormal | This trap indicates system change operation mode from exhausted to normal.<br>Binding objects:<br>(1) dSafeguardEngineCurrentMode | 1.3.6.1.4.1.17 1.14.19.1.1.0.2 |

## Stack

| Trap Name | Description | OID |
|---|---|---|
| dStackInsertNotification | Unit Hot Insert notification.<br>Binding objects:<br>(1)dStackNotifyInfoBoxId<br>(2)dStackInfoMacAddr | 1.3.6.1.4.1.17 1.14.9.0.1 |
| dStackRemoveNotification | Unit Hot Remove notification.<br>Binding objects:<br>(1)dStackNotifyInfoBoxId<br>(2)dStackInfoMacAddr | 1.3.6.1.4.1.17 1.14.9.0.2 |
| dStackFailureNotification | Unit Failure notification.<br>Binding objects:<br>(1)dStackNotifyInfoBoxId | 1.3.6.1.4.1.17 1.14.9.0.3 |
| dStackTPChangeNotification | The stacking topology change notification.<br>Binding objects:<br>(1)dStackNotifyInfoTopologyType<br>(2)dStackNotifyInfoBoxId<br>(3)dStackInfoMacAddr | 1.3.6.1.4.1.17 1.14.9.0.4 |
| dStackRoleChangeNotification | The stacking unit role change notification.<br>Binding objects:<br>(1)dStackNotifyInfoRoleChangeType<br>(2)dStackNotifyInfoBoxId | 1.3.6.1.4.1.17 1.14.9.0.5 |

## Start

| Trap Name | Description | OID |
|---|---|---|
| coldStart | A coldStart trap signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself and that its configuration may have been altered. | 1.3.6.1.6.3.1.1.5.1 |
| warmStart | A warmStart trap signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself such that its configuration is unaltered. | 1.3.6.1.6.3.1.1.5.2 |

## Storm Control

| Trap Name | Description | OID |
|---|---|---|
| dStormCtrlOccurred | This trap is sent when dStormCtrlNotifyEnable is 'stormOccurred' or 'both' and a storm is detected.<br>Binding objects:<br>(1) ifIndex,<br>(2) dStormCtrlNotifyTrafficType | 1.3.6.1.4.1.17 1.14.25.0.1 |
| dStormCtrlStormCleared | This trap is sent when dStormCtrlNotifyEnable is 'stormCleared' or 'both' and a storm is cleared.<br>Binding objects:<br>(1) ifIndex,<br>(2) dStormCtrlNotifyTrafficType | 1.3.6.1.4.1.17 1.14.25.0.2 |

## VPWS

| Trap Name | Description | OID |
|---|---|---|
| pwUp | This notification is generated when the pwOperStatus object for one or more contiguous entries in the pwTable which are about to enter the up(1) state from some other state except the notPresent(5) state and given that the pwDown notification issued for these entries. | 1.3.6.1.2.1.10 .246.0.1 |
| pwDown | This notification is generated when the pwOperStatus object for one or more contiguous entries in the pwTable which are about to enter the down(2) or lowerLayerDown(6) state from any other state, except for transition from the notPresent(5) state. | 1.3.6.1.2.1.10 .246.0.2 |
| pwDeleted | This notification is generated when the PW has been deleted, i.e., when the pwRowStatus has been set destroy(6) or the PW has been deleted by a non-MIB application or due to an auto-discovery process. | 1.3.6.1.2.1.10 .246.0.3 |

## VRRP

| Trap Name | Description | OID |
|---|---|---|
| vrrpTrapNewMaster | The newMaster trap indicates that the sending agent has transitioned to 'Master' state.<br>Binding objects:<br>(1) vrrpOperMasterIpAddr | 1.3.6.1.2.1.68 .0.1 |
| vrrpTrapAuthFailure | A vrrpAuthFailure trap signifies that a packet has been received from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication type. Implementation of this trap is optional.<br>Binding objects:<br>(1) vrrpTrapPacketSrc<br>(2) vrrpTrapAuthErrorType | 1.3.6.1.2.1.68 .0.2 |

## Web Authentication

| Trap Name | Description | OID |
|---|---|---|
| dWebAuthLoggedSuccess | The trap is sent when a host has successfully logged in (passed Web-Authentication).<br>Binding objects:<br>ifIndex<br>dnaSessionAuthVlan<br>dnaSessionClientMacAddress<br>dnaSessionClientAddrType<br>dnaSessionClientAddress<br>dnaSessionAuthUserName | 1.3.6.1.4.1.17<br>1.14.154.0.1 |
| dWebAuthLoggedFail | The trap is sent when a host has failed to pass Web-Authentication (login failed).<br>Binding objects:<br>ifIndex<br>dnaSessionAuthVlan<br>dnaSessionClientMacAddress<br>dnaSessionClientAddrType<br>dnaSessionClientAddress<br>dnaSessionAuthUserName | 1.3.6.1.4.1.17<br>1.14.154.0.2 |

# Appendix D - RADIUS Attributes Assignment

The RADIUS Attributes Assignment on the DXS-3600 is used in the following modules: Console, Telnet, SSH, Web, 802.1X, MAC-based Access Control, and WAC.

The description that follows explains the following RADIUS Attributes Assignment types:

- Privilege Level
- Ingress/Egress Bandwidth
- 802.1p Default Priority
- VLAN
- ACL

To assign the **Privilege Level** by the RADIUS server, the proper parameters should be configured on the RADIUS server. The table below shows the parameters for the bandwidth.

The parameters of the Vendor-Specific attributes are:

| Vendor-Specific Attribute | Description | Value | Usage |
|---|---|---|---|
| Vendor-ID | Defines the vendor. | 171 (DLINK) | Required |
| Vendor-Type | Defines the attribute. | 1 | Required |
| Attribute-Specific Field | Used to assign the privilege level of the user to operate the switch. | Range (1-15) | Required |

If the user has configured the privilege level attribute of the RADIUS server (for example, level 15) and the Console, Telnet, SSH, and Web authentication is successful, the device will assign the privilege level (according to the RADIUS server) to this access user. However, if the user does not configure the privilege level attribute and authenticates successfully, the device will not assign any privilege level to the access user. If the privilege level is configured less than the minimum supported value or greater than the maximum supported value, the privilege level will be ignored.

To assign the **Ingress/Egress Bandwidth** by the RADIUS server, the proper parameters should be configured on the RADIUS Server. The table below shows the parameters for bandwidth.

The parameters of the Vendor-Specific attributes are:

| Vendor-Specific Attribute | Description | Value | Usage |
|---|---|---|---|
| Vendor-ID | Defines the vendor. | 171 (DLINK) | Required |
| Vendor-Type | Defines the attribute. | 2 (for ingress bandwidth)<br>3 (for egress bandwidth) | Required |
| Attribute-Specific Field | Used to assign the bandwidth of a port. | Unit (Kbits) | Required |

If the user has configured the bandwidth attribute of the RADIUS server (for example, ingress bandwidth 1000Kbps) and 802.1X authentication is successful, the device will assign the bandwidth (according to the RADIUS server) to the port. However, if the user does not configure the bandwidth attribute and authenticates successfully, the device will not assign any bandwidth to the port. If the bandwidth attribute

is configured on the RADIUS server with a value of “0”, the effective bandwidth will be set “no_limited”, and if the bandwidth is configured less than “0” or greater than maximum supported value, the bandwidth will be ignored.

To assign the **802.1p Default Priority** by the RADIUS server, the proper parameters should be configured on the RADIUS server. The table below shows the parameters for 802.1p default priority.

The parameters of the Vendor-Specific attributes are:

| Vendor-Specific Attribute | Description | Value | Usage |
|---|---|---|---|
| Vendor-ID | Defines the vendor. | 171 (DLINK) | Required |
| Vendor-Type | Defines the attribute. | 4 | Required |
| Attribute-Specific Field | Used to assign the 802.1p default priority of the port. | 0 to 7 | Required |

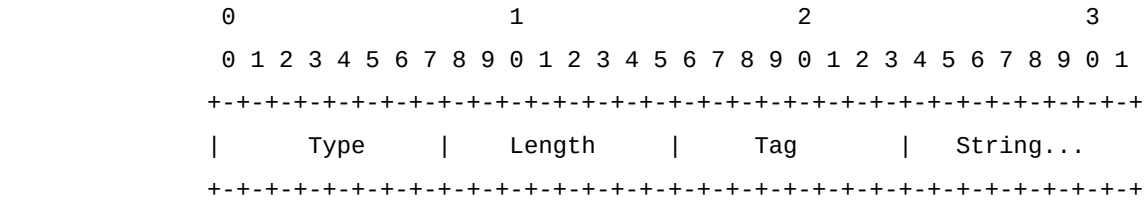
If the user has configured the 802.1p priority attribute of the RADIUS server (for example, priority 7) and the 802.1X, or MAC based authentication is successful, the device will assign the 802.1p default priority (according to the RADIUS server) to the port. However, if the user does not configure the priority attribute and authenticates successfully, the device will not assign a priority to this port. If the priority attribute is configured on the RADIUS server is a value out of range (>7), it will not be set to the device.

To assign the **VLAN** by the RADIUS server, the proper parameters should be configured on the RADIUS server. To use VLAN assignment, RFC 3580 defines the following tunnel attributes in RADIUS packets.

The table below shows the parameters for a VLAN:

| RADIUS Tunnel Attribute | Description | Value | Usage |
|---|---|---|---|
| Tunnel-Type | This attribute indicates the tunneling protocol(s) to be used (in the case of a tunnel initiator) or the tunneling protocol in use (in the case of a tunnel terminator). | 13 (VLAN) | Required |
| Tunnel-Medium-Type | This attribute indicates the transport medium being used. | 6 (802) | Required |
| Tunnel-Private-Group-ID | This attribute indicates group ID for a particular tunneled session. | A string (VID) | Required |

A summary of the Tunnel-Private-Group-ID Attribute format is shown below.




The table below shows the definition of Tag field (different with RFC 2868):

| Tag field value | String field format |
|---|---|
| 0x01 | VLAN name (ASCII) |
| 0x02 | VLAN ID (ASCII) |
| Others<br>(0x00, 0x03 ~ 0x1F, >0x1F) | When the switch receives the VLAN setting string, it will think it is the VLAN ID first. In other words, the switch will check all existing VLAN IDs and check if there is one matched. If the switch can find one matched, it will move to that VLAN. If the switch cannot find the matched VLAN ID, it will think the VLAN setting string as a “VLAN Name”. Then it will check that it can find out a matched VLAN Name. |

**NOTE:** A tag field of greater than 0x1F is interpreted as the first octet of the following field.

If the user has configured the VLAN attribute of the RADIUS server (for example, VID 3) and the 802.1X, or MAC based Access Control, or WAC authentication is successful, the port will be assigned to VLAN 3. However if the user does not configure the VLAN attributes, when the port is not guest VLAN member, it will be kept in its current authentication VLAN, and when the port is guest VLAN member, it will be assigned to its original VLAN.

To assign the **ACL** by the RADIUS server, the proper parameters should be configured on the RADIUS server. The table below shows the parameters for an ACL.

The parameters of the Vendor-Specific Attribute are:

| RADIUS Tunnel Attribute | Description | Value | Usage |
|---|---|---|---|
| Vendor-ID | Defines the vendor. | 171 (DLINK) | Required |
| Vendor-Type | Defines the attribute. | 14 (for ACL script) | Required |
| Attribute-Specific Field | Used to assign the ACL script. The format is based on **Access Control List (ACL) Commands**. | ACL Script<br>For example:<br>**ip access-list a1;permit host 10.90.90.100;exit; mac access-list extended m1;permit host 00-00-00-01-90-10 any; exit;** | Required |

If the user has configured the ACL attribute of the RADIUS server (for example, ACL script: ip access-list a1;permit host 10.90.90.100;exit; mac access-list extended m1;permit host 00-00-00-01-90-10 any; exit;), and the 802.1X or MAC-based Access Control WAC is successful, the device will assign the ACL script according to the RADIUS server. The enter **Access-List Configuration Mode** and exit **Access-List Configuration Mode** must be a pair, otherwise the ACP script will be reject. For more information about the ACL module, please refer to **Access Control List (ACL) Commands** chapter.

# Appendix E - IETF RADIUS Attributes Support

Remote Authentication Dial-In User Service (RADIUS) attributes carry specific authentication, authorization, information and configuration details for the request and reply. This appendix lists the RADIUS attributes currently supported by the switch.

RADIUS attributes are supported by the IETF standard and Vendor-Specific Attribute (VSA). VSA allows the vendor to create an additionally owned RADIUS attribute. For more information about D-Link VSA, refer to the **RADIUS Attributes Assignment** Appendix.

IETF standard RADIUS attributes are defined in the RFC 2865 Remote Authentication Dial-In User Service (RADIUS), RFC 2866 RADIUS Accounting, RFC 2868 RADIUS Attributes for Tunnel Protocol Support, and RFC 2869 RADIUS Extensions.

The following table lists the IETF RADIUS attributes supported by the D-Link switch.

**RADIUS Authentication Attributes:**

| Number | IETF Attribute |
|---|---|
| 1 | User-Name |
| 2 | User-Password |
| 3 | CHAP-Password |
| 4 | NAS-IP-Address |
| 5 | NAS-Port |
| 6 | Service-Type |
| 7 | Framed-Protocol |
| 8 | Framed-IP-Address |
| 12 | Framed-MTU |
| 18 | Reply-Message |
| 24 | State |
| 26 | Vendor-Specific |
| 27 | Session-Timeout |
| 29 | Termination-Action |
| 30 | Called-Station-ID |
| 31 | Calling-Station-ID |
| 32 | NAS-Identifier |
| 60 | CHAP-Challenge |
| 61 | NAS-Port-Type |
| 64 | Tunnel-Type |
| 65 | Tunnel-Medium-Type |
| 77 | Connect-Info |
| 79 | EAP-Message |
| 80 | Message-Authenticator |
| 81 | Tunnel-Private-Group-ID |
| 85 | Acct-Interim-Interval |

| Number | IETF Attribute |
|---|---|
| 87 | NAS-Port-ID |
| 95 | NAS-IPv6-Address |

**RADIUS Accounting Attributes:**

| Number | IETF Attribute |
|---|---|
| 1 | User-Name |
| 4 | NAS-IP-Address |
| 5 | NAS-Port |
| 6 | Service-Type |
| 8 | Framed-IP-Address |
| 31 | Calling-Station-ID |
| 32 | NAS-Identifier |
| 40 | Acct-Status-Type |
| 41 | Acct-Delay-Time |
| 42 | Acct-Input-Octets |
| 43 | Acct-Output-Octets |
| 44 | Acct-Session-ID |
| 45 | Acct-Authentic |
| 46 | Acct-Session-Time |
| 47 | Acct-Input-Packets |
| 48 | Acct-Output-Packets |
| 49 | Acct-Terminate-Cause |
| 52 | Acct-Input-Gigawords |
| 53 | Acct-Output-Gigawords |
| 61 | NAS-Port-Type |
| 95 | NAS-IPv6-Address |