TP-LINK®

CLI Reference Guide

TL-SG3109/TL-SL3428/TL-SL3452 Gigabit Managed Switch Family

Table of Contents

Section 1. Using the CLI

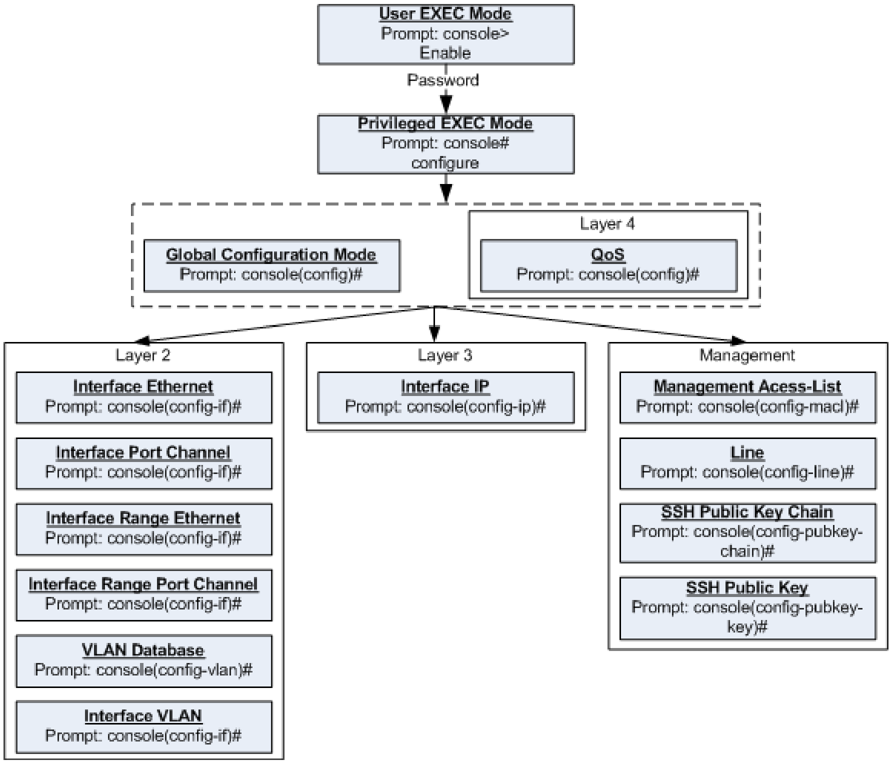
This chapter describes how to start using the CLI and describes implemented command editing features to assist in using the CLI.

1.1 CLI Command Modes

1.1.1 Introduction

To assist in configuring the device, the Command Line Interface (CLI) is divided into different command modes. Each command mode has its own set of specific commands. Entering a question mark "?" at the system prompt (console prompt) displays a list of commands available for that particular command mode.

From each mode, a specific command is used to navigate from one command mode to another. The standard order to access the modes is as follows: *User EXEC* mode, *Privileged EXEC* mode, *Global Configuration* mode, and *Interface Configuration* mode. The following figure illustrates the command mode access path.


User EXEC Mode
Prompt: console>
Enable
Password
Privileged EXEC Mode
Prompt: console#
configure
Global Configuration Mode
Prompt: console(config)#
Layer 4
QoS
Prompt: console(config)#
Layer 2
Interface Ethernet
Prompt: console(config-if)#
Interface Port Channel
Prompt: console(config-if)#
Interface Range Ethernet
Prompt: console(config-if)#
Interface Range Port Channel
Prompt: console(config-if)#
VLAN Database
Prompt: console(config-vlan)#
Interface VLAN
Prompt: console(config-if)#
Layer 3
Interface IP
Prompt: console(config-ip)#
Management
Management Acess-List
Prompt: console(config-macl)#
Line
Prompt: console(config-line)#
SSH Public Key Chain
Prompt: console(config-pubkey-chain)#
SSH Public Key
Prompt: console(config-pubkey-key)#

When starting a session, the initial mode is the User EXEC mode. Only a limited subset of commands is available in User EXEC mode. This level is reserved for tasks that do not change the configuration. To enter the next level, the Privileged EXEC mode, a password is required.

The Privileged EXEC mode gives access to commands that are restricted on User EXEC mode and provides access to the device Configuration mode.

The Global Configuration mode manages the device configuration on a global level.

The Interface Configuration mode configures specific interfaces in the device.

1.1.2 User EXEC Mode

After logging into the device, the user is automatically in User EXEC command mode unless the user is defined as a privileged user. In general, the User EXEC commands allow the user to perform basic tests, and list system information.

The user-level prompt consists of the device host name followed by the angle bracket (>).

```
Console>
```

The default host name is Console unless it has been changed using the **hostname** command in the Global Configuration mode.

1.1.3 Privileged EXEC Mode

Privileged access is password protected to prevent unauthorized use because many of the privileged commands set operating system parameters. The password is not displayed on the screen and is case sensitive.

Privileged users enter directly into the Privileged EXEC mode. To enter the Privileged EXEC mode from the User EXEC mode, perform the following steps:

1. At the prompt enter the **enable** command and press <Enter>. A password prompt is displayed.
2. Enter the password and press <Enter>. The password is displayed as *. The Privileged EXEC mode prompt is displayed. The Privileged EXEC mode prompt consists of the device host name followed by **#**.

```
Console#
```

To return from the Privileged EXEC mode to the User EXEC mode, use the **disable** command. The following example illustrates how to access the Privileged EXEC mode and return to the User EXEC mode:

```
Console> enable
Enter Password: ******
Console#
Console# disable
Console>
```

The **exit** command is used to return from any mode to the previous mode except when returning to the User EXEC mode from the Privileged EXEC mode. For example, the **exit** command is used to return from the Interface Configuration mode to the Global Configuration mode.

1.1.4 Global Configuration Mode

Global Configuration mode commands apply to features that affect the system as a whole, rather than just a specific interface. The **configure** Privileged EXEC mode command is used to enter the Global Configuration mode.

To enter the Global Configuration mode perform the following steps:

1. At the Privileged EXEC mode prompt enter the **configure** command and press <Enter>. The Global Configuration mode prompt is displayed. The Global Configuration mode prompt consists of the device host name followed by (config) and **#**.

```
Console(config)#
```

To return from the Global Configuration mode to the Privileged EXEC mode, the user can use one of the following commands:

- **exit**
- **end**
- **<Ctrl+Z>**

The following example illustrates how to access the Global Configuration mode and return to the Privileged EXEC mode:

```
Console#
Console# configure
Console(config)# exit
Console#
```

1.1.5 Interface Configuration and Specific Configuration Modes

Interface Configuration mode commands modify specific interface operations. The following are the Interface Configuration modes:

- **Line Interface** — Contains commands to configure the management connections. These include commands such as line timeout settings, etc. The **line** Global Configuration mode command is used to enter the Line Configuration command mode.
- **VLAN Database** — Contains commands to create a VLAN as a whole. The **vlan database** Global Configuration mode command is used to enter the VLAN Database Interface Configuration mode.
- **Management Access List** — Contains commands to define management access-lists. The **management access-list** Global Configuration mode command is used to enter the Management Access List Configuration mode.
- **Ethernet** — Contains commands to manage port configuration. The **interface ethernet** Global Configuration mode command is used to enter the Interface Configuration mode to configure an Ethernet type interface.
- **Port Channel** — Contains commands to configure port-channels, for example, assigning ports to a port-channel. Most of these commands are the same as the commands in the Ethernet interface mode, and are used to manage the member ports as a single entity. The **interface port-channel** Global Configuration mode command is used to enter the Port Channel Interface Configuration mode.
- **SSH Public Key-chain** — Contains commands to manually specify other device SSH public keys. The **crypto key pubkey-chain ssh** Global Configuration mode command is used to enter the SSH Public Key-chain Configuration mode.
- **QoS** — Contains commands related to service definitions. The **qos** Global Configuration mode command is used to enter the QoS services configuration mode.

- **MAC Access-List** — Configures conditions required to allow traffic based on MAC addresses. The **mac access-list** Global Configuration mode command is used to enter the MAC access-list configuration mode..

1.2 Starting the CLI

The device can be managed over a direct connection to the device console port or via a Telnet connection. The device is managed by entering command keywords and parameters at the prompt. Using the device command-line interface (CLI) is very similar to entering commands on a UNIX system.

If access is via a Telnet connection, ensure that the device has a defined IP address, corresponding management access is granted, and the workstation used to access the device is connected to the device prior to using CLI commands.

Note

The following steps are for use on the console line only.

To start using the CLI, perform the following steps:

1. Connect the DB9 null-modem or cross over cable to the RS-232 serial port of the device to the RS-232 serial port of the terminal or computer running the terminal emulation application.

Note

The default data rate is 38400.

a) Set the data format to 8 data bits, 1 stop bit, and no parity.

b) Set Flow Control to **none**.

c) Under **Properties**, select **VT100 for Emulation** mode.

d) Select **Terminal keys** for **Function, Arrow, and Ctrl keys**. Ensure that the setting is for **Terminal keys** (not **Windows keys**).

Note

When using HyperTerminal with Microsoft® Windows 2000,ensure that Windows® 2000 Service Pack 2 or later is installed.With Windows 2000 Service Pack 2, the arrow keys function properly in HyperTerminal's VT100 emulation. Go to www.microsoft.com for information on Windows 2000 service packs.

2. Enter the following commands to begin the configuration procedure:

```
Console> enable
Console# configure
Console(config)#
```

3. Configure the device and enter the necessary commands to complete the required tasks.
4. When finished, exit the session with the **exit** command.

When a different user is required to log onto the system, use the **login** Privileged EXEC mode command. This effectively logs off the current user and logs on the new user.

1.3 Editing Features

1.3.1 Entering Commands

A CLI command is a series of keywords and arguments. Keywords identify a command, and arguments specify configuration parameters. For example, in the command **show interfaces status ethernet e8**, **show**, **interfaces** and **status** are keywords, **ethernet** is an argument that specifies the interface type, and **8** specifies the port.

To enter commands that require parameters, enter the required parameters after the command keyword. For example, to set a password for the administrator, enter:

```
Console(config)# username admin password smith
```

When working with the CLI, the command options are not displayed. The command is not selected from a menu, but is manually entered. To see what commands are available in each mode or within an interface configuration, the CLI does provide a method of displaying the available commands, the command syntax requirements and in some instances parameters required to complete the command. The standard command to request help is **?**.

There are two instances where help information can be displayed:

- **Keyword lookup** — The character **?** is entered in place of a command. A list of all valid commands and corresponding help messages are is displayed.
- **Partial keyword lookup** — If a command is incomplete and or the character **?** is entered in place of a parameter. The matched keyword or parameters for this command are displayed.

To assist in using the CLI, there is an assortment of editing features. The following features are described:

- Terminal Command Buffer
- Command Completion
- Keyboard Shortcuts

1.3.1.1 Terminal Command Buffer

Every time a command is entered in the CLI, it is recorded on an internally managed Command History buffer. Commands stored in the buffer are maintained on a *First In First Out (FIFO)* basis. These commands can be recalled, reviewed, modified, and reissued. This buffer is not preserved across device resets.

Keyword	Description
Up-arrow key Ctrl+P	Recalls commands in the history buffer, beginning with the most recent command. Repeats the key sequence to recall successively older commands.
Down-arrow key	Returns to more recent commands in the history buffer after recalling commands with the up-arrow key. Repeating the key sequence will recall successively more recent commands.

By default, the history buffer system is enabled, but it can be disabled at any time. For information about the command syntax to enable or disable the history buffer, see **history**.

There is a standard default number of commands that are stored in the buffer. The standard number of 10 commands can be increased to 216. By configuring 0, the effect is the same as disabling the history buffer system. For information about the command syntax for configuring the command history buffer, see **history size**.

To display the history buffer, see **show history**.

1.3.1.2 Negating the Effect of Commands

For many configuration commands, the prefix keyword ***no*** can be entered to cancel the effect of a command or reset the configuration to the default value. This guide describes the negation effect for all applicable commands.

1.3.1.3 Command Completion

If the command entered is incomplete, invalid or has missing or invalid parameters, then the appropriate error message is displayed. This assists in entering the correct command. By pressing the <Tab> button, an incomplete command is entered. If the characters already entered are not enough for the system to identify a single matching command, press **?** to display the available commands matching the characters already entered.

1.3.1.4 Keyboard Shortcuts

The CLI has a range of keyboard shortcuts to assist in editing the CLI commands. The following table describes the CLI shortcuts.

Keyboard Key	Description
Up-arrow key	Recalls commands from the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Down-arrow key	Returns the most recent commands from the history buffer after recalling commands with the up arrow key. Repeating the key sequence will recall successively more recent commands.
Ctrl+A	Moves the cursor to the beginning of the command line.
Ctrl+E	Moves the cursor to the end of the command line.
Ctrl+Z / End	Returns back to the Privileged EXEC mode from any configuration mode.
Backspace key	Deletes one character left to the cursor position.

1.3.1.5 CLI Command Conventions

When entering commands there are certain command entry standards that apply to all commands. The following table describes the command conventions.

Convention	Description
[ ]	In a command line, square brackets indicates an optional entry.
{ }	In a command line, curly brackets indicate a selection of compulsory parameters separated by the | character. One option must be selected. For example: **flowcontrol {auto|on|off}** means that for the **flowcontrol** command either **auto**, **on** or **off** must be selected.
Italic font	Indicates a parameter.
<Enter>	Any individual key on the keyboard. For example click **<Enter>**.
Ctrl+F4	Any combination keys pressed simultaneously on the keyboard.

`Screen Display`	Indicates system messages and prompts appearing on the console.
all	When a parameter is required to define a range of ports or parameters and **all** is an option, the default for the command is **all** when no parameters are defined. For example, the command **interface range port-channel** has the option of either entering a range of channels, or selecting **all**. When the command is entered without a parameter, it automatically defaults to **all**.

Section 2. AAA Commands

aaa authentication login

The **aaa authentication login** Global Configuration mode command defines login authentication. To return to the default configuration, use the **no** form of this command.

Syntax

aaa authentication login {**default** | *list-name*} *method1* [*method2*...]

no aaa authentication login {**default** | *list-name*}

Parameters

- **default** — Uses the listed authentication methods that follow this argument as the default list of methods when a user logs in.
- *list-name* — Character string used to name the list of authentication methods activated when a user logs in. (Range: 1-12 characters).
- *method1* [*method2*...] — Specify at least one from the following table:

Keyword	Description
enable	Uses the enable password for authentication.
line	Uses the line password for authentication.
local	Uses the local username database for authentication.
none	Uses no authentication.
radius	Uses the list of all RADIUS servers for authentication.

Default Configuration

The local user database is checked. This has the same effect as the command **aaa authentication login** *list-name local.*

Note

On the console, login succeeds without any authentication check if the authentication method is not defined.

Command Mode

Global Configuration mode

User Guidelines

The default and optional list names created with the **aaa authentication login** command are used with the **login authentication** command.

Create a list by entering the **aaa authentication login** *list-name method* command for a particular protocol, where *list-name* is any character string used to name this list. The *method* argument identifies the list of methods that the authentication algorithm tries, in the given sequence.

The additional methods of authentication are used only if the previous method returns an error, not if it fails. To ensure that the authentication succeeds even if all methods return an error, specify **none** as the final method in the command line.

Example

The following example configures the authentication login.

```
Console(config)# aaa authentication login default radius local enable none
```

aaa authentication enable

The **aaa authentication enable** Global Configuration mode command defines authentication method lists for accessing higher privilege levels. To return to the default configuration, use the **no** form of this command.

Syntax

aaa authentication enable {**default** | *list-name*} *method1* [*method2*...]

no aaa authentication enable {**default** | *list-name*}

Parameters

- **default** — Uses the listed authentication methods that follow this argument as the default list of methods, when using higher privilege levels.
- *list-name* — Character string used to name the list of authentication methods activated, when using access higher privilege levels (Range: 1-12 characters).
- *method1* [*method2*...] — Specify at least one from the following table:

Keyword	Description
enable	Uses the enable password for authentication.
line	Uses the line password for authentication.
none	Uses no authentication.
radius	Uses the list of all RADIUS servers for authentication. Uses username $enabx$., where x is the privilege level.

Default Configuration

If the **default** list is not set, only the enable password is checked. This has the same effect as the command **aaa authentication enable** *default enable*.

On the console, the enable password is used if it exists. If no password is set, the process still succeeds. This has the same effect as using the command **aaa authentication enable** *default enable none*.

Command Mode

Global Configuration mode

User Guidelines

The default and optional list names created with the **aaa authentication enable** command are used with the **enable authentication** command.

The additional methods of authentication are used only if the previous method returns an error, not if it fails. To ensure that the authentication succeeds even if all methods return an error, specify **none** as the final method in the command line.

All **aaa authentication enable** *default* requests sent by the device to a RADIUS server include the username $enabx$., where x is the requested privilege level.

Example

The following example sets the enable password for authentication when accessing higher privilege levels.

```
Console(config)# aaa authentication enable default enable
```

login authentication

The **login authentication** Line Configuration mode command specifies the login authentication method list for a remote telnet or console. To return to the default configuration specified by the **aaa authentication login** command, use the **no** form of this command.

Syntax

login authentication {**default** | *list-name*}

no login authentication

Parameters

- **default** — Uses the default list created with the **aaa authentication login** command.
- *list-name* — Uses the indicated list created with the **aaa authentication login** command.

Default Configuration

Uses the default set with the command **aaa authentication login**.

Command Mode

Line Configuration mode

User Guidelines

Changing login authentication from default to another value may disconnect the telnet session.

Example

The following example specifies the default authentication method for a console.

```
Console(config)# line console
Console(config-line)# login authentication default
```

enable authentication

The **enable authentication** Line Configuration mode command specifies the authentication method list when accessing a higher privilege level from a remote telnet or console. To return to the default configuration specified by the **aaa authentication enable** command, use the **no** form of this command.

Syntax

enable authentication {**default** | *list-name*}

no enable authentication

Parameters

- **default** — Uses the default list created with the **aaa authentication enable** command.
- *list-name* — Uses the indicated list created with the **aaa authentication enable** command.

Default Configuration

Uses the default set with the **aaa authentication enable** command.

Command Mode

Line Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example specifies the default authentication method when accessing a higher privilege level from a console.

```
Console(config)# line console
Console(config-line)# enable authentication default
```

ip http authentication

The **ip http authentication** Global Configuration mode command specifies authentication methods for HTTP server users. To return to the default configuration, use the **no** form of this command.

Syntax

ip http authentication *method1* [*method2*...]

no ip http authentication

Parameters

- *method1* [*method2*...] — Specify at least one from the following table:

Keyword	Description
local	Uses the local username database for authentication.
none	Uses no authentication.
radius	Uses the list of all RADIUS servers for authentication.

Default Configuration

The local user database is checked. This has the same effect as the command **ip http authentication** *local.*

Command Mode

Global Configuration mode

User Guidelines

The additional methods of authentication are used only if the previous method returns an error, not if it fails. To ensure that the authentication succeeds even if all methods return an error, specify **none** as the final method in the command line.

Example

The following example configures the HTTP authentication.

```
Console(config)# ip http authentication radius local
```

ip https authentication

The **ip https authentication** Global Configuration mode command specifies authentication methods for HTTPS server users. To return to the default configuration, use the **no** form of this command.

Syntax

ip https authentication *method1* [*method2*...]

no ip https authentication

Parameters

- *method1* [*method2*...] — Specify at least one from the following table:

Keyword	Source or destination
local	Uses the local username database for authentication.
none	Uses no authentication.
radius	Uses the list of all RADIUS servers for authentication.

Default Configuration

The local user database is checked. This has the same effect as the command **ip https authentication** *local*.

Command Mode

Global Configuration mode

User Guidelines

The additional methods of authentication are used only if the previous method returns an error, not if it fails. To ensure that the authentication succeeds even if all methods return an error, specify **none** as the final method in the command line.

Example

The following example configures HTTPS authentication.

```
Console(config)# ip https authentication radius local
```

show authentication methods

The **show authentication methods** Privileged EXEC mode command displays information about the authentication methods.

Syntax

show authentication methods

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the authentication configuration.

```
Console# show authentication methods
Login Authentication Method Lists
---------------------------------
Default: Radius, Local, Line
Console_Login: Line, None

Enable Authentication Method Lists
----------------------------------
Default: Radius, Enable
Console_Enable: Enable, None

Line                         Login Method List           Enable Method List
--------------               -----------------           ------------------
Console                      Console_Login               Console_Enable
Telnet                       Default                     Default
SSH                          Default                     Default

http: Radius, Local
https: Radius, Local
dot1x: Radius
```

password

The **password** Line Configuration mode command specifies a password on a line. To remove the password, use the **no** form of this command.

Syntax

password *password* [**encrypted**]

no password

Parameters

- *password* — Password for this level (Range: 1-159 characters).
- **encrypted** — Encrypted password to be entered, copied from another device configuration.

Default Configuration

No password is defined.

Command Mode

Line Configuration mode

User Guidelines

If a password is defined as encrypted, the required password length is 32 characters.

Example

The following example specifies password **secret** on a console.

```
Console(config)# line console
Console(config-line)# password secret
```

enable password

The **enable password** Global Configuration mode command sets a local password to control access to user and privilege levels. To remove the password requirement, use the **no** form of this command.

Syntax

enable password [**level** *level*] *password* [**encrypted**]

no enable password [**level** *level*]

Parameters

- *password* — Password for this level (Range: 1-159 characters).
- *level* — Level for which the password applies. If not specified the level is 15 (Range: 1-15).
- **encrypted** — Encrypted password entered, copied from another device configuration.

Default Configuration

No enable password is defined.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example sets local level 15 password **secret** to control access to user and privilege levels.

```
Console(config)# enable password level 15 secret
```

username

The **username** Global Configuration mode command creates a user account in the local database. To remove a user name, use the **no** form of this command.

Syntax

username *name* [**password** *password*] [**level** *level*] [**encrypted**]

no username *name*

Parameters

- *name* — The name of the user (Range: 1- 20 characters).
- *password* — The authentication password for the user (Range: 1-159 characters).
- *level* — The user level (Range: 1-15).
- **encrypted** — Encrypted password entered, copied from another device configuration.

Default Configuration

No user is defined.

Command Mode

Global Configuration mode

User Guidelines

User account can be created without a password.

Example

The following example configures user **bob** with password **lee** and user level 15 to the system.

```
Console(config)# username bob password lee level 15
```

Section 3. Address Table Commands

bridge address

The **bridge address** Interface Configuration (VLAN) mode command adds a MAC-layer station source address to the bridge table. To delete the MAC address, use the **no** form of this command.

Syntax

bridge address *mac-address* {**ethernet** *interface* | **port-channel** *port-channel-number*} [**permanent** | **delete-on-reset** | **delete-on-timeout** | **secure**]

no bridge address [*mac-address*]

Parameters

- *mac-address* — A valid MAC address.
- *interface* — A valid Ethernet port.
- *port-channel-number* — A valid port-channel number.
- **permanent —** The address can only be deleted by the **no bridge address** command.
- **delete-on-reset** — The address is deleted after reset.
- **delete-on-timeout —** The address is deleted after "age out" time has expired.
- **secure** — The address is deleted after the port changes mode to unlock learning (**no port security** command). This parameter is only available when the port is in the learning locked mode.

Default Configuration

No static addresses are defined. The default mode for an added address is **permanent**.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

Using the **no** form of the command without specifying a MAC address deletes all static MAC addresses belonging to this VLAN).

Example

The following example adds a permanent static MAC-layer station source address 3aa2.64b3.a245 on port 7 to the bridge table.

```
Console(config)# interface vlan 2
Console(config-if)# bridge address 3aa2.64b3.a245 ethernet e7 permanent
```

bridge multicast filtering

The **bridge multicast filtering** Global Configuration mode command enables filtering multicast addresses. To disable filtering multicast addresses, use the **no** form of this command.

Syntax

bridge multicast filtering

no bridge multicast filtering

Default Configuration

Filtering multicast addresses is disabled. All multicast addresses are flooded to all ports.

Command Mode

Global Configuration mode

User Guidelines

If multicast routers exist on the VLAN, do not change the unregistered multicast addresses state to drop on the switch ports.

If multicast routers exist on the VLAN and IGMP-snooping is not enabled, the **bridge multicast forward-all** command should be used to enable forwarding all multicast packets to the multicast switches.

Example

In this example, bridge multicast filtering is enabled.

```
Console(config)# bridge multicast filtering
```

bridge multicast address

The **bridge multicast address** Interface Configuration (VLAN) mode command registers a MAC-layer multicast address in the bridge table and statically adds ports to the group. To unregister the MAC address, use the **no** form of this command.

Syntax

bridge multicast address {*mac-multicast-address* | *ip-multicast-address*}

bridge multicast address {*mac-multicast-address* | *ip-multicast-address*} [**add** | **remove**] {**ethernet** *interface-list* | **port-channel** *port-channel-number-list*}

no bridge multicast address {*mac-multicast-address* | *ip-multicast-address*}

Parameters

- **add** — Adds ports to the group. If no option is specified, this is the default option.
- **remove** — Removes ports from the group.
- *mac-multicast-address* — A valid MAC multicast address.
- *ip- multicast-address* — A valid IP multicast address.
- *interface-list* — Separate nonconsecutive Ethernet ports with a comma and no spaces; a hyphen is used to designate a range of ports.
- *port-channel-number-list* — Separate nonconsecutive port-channels with a comma and no spaces; a hyphen is used to designate a range of ports.

Default Configuration

No multicast addresses are defined.

Command Mode

Interface configuration (VLAN) mode

User Guidelines

If the command is executed without **add** or **remove**, the command only registers the group in the bridge database.

Static multicast addresses can only be defined on static VLANs.

Examples

The following example registers the MAC address:

```
Console(config)# interface vlan 8
Console(config-if)# bridge multicast address 01:00:5e:02:02:03
```

The following example registers the MAC address and adds ports statically.

```
Console(config)# interface vlan 8
Console(config-if)# bridge multicast address 01:00:5e:02:02:03 add ethernet e1-4, e7
```

bridge multicast forbidden address

The **bridge multicast forbidden address** Interface Configuration (VLAN) mode command forbids adding a specific multicast address to specific ports. Use the **no** form of this command to return to the default configuration.

Syntax

bridge multicast forbidden address {*mac-multicast-address* | *ip-multicast-address*} {**add** | **remove**} {**ethernet** *interface-list* | **port-channel** *port-channel-number-list*}

no bridge multicast forbidden address {*mac-multicast-address* | *ip-multicast-address*}

Parameters

- **add** — Adds ports to the group.
- **remove** — Removes ports from the group.
- *mac-multicast-address* — A valid MAC multicast address.
- *ip- multicast-address* — A valid IP multicast address.
- *interface-list* — Separate nonconsecutive Ethernet ports with a comma and no spaces; hyphen is used to designate a range of ports.
- *port-channel-number-list* — Separate nonconsecutive valid port-channels with a comma and no spaces; a hyphen is used to designate a range of port-channels.

Default Configuration

No forbidden addresses are defined.

Command Modes

Interface Configuration (VLAN) mode

User Guidelines

Before defining forbidden ports, the multicast group should be registered.

Examples

In this example, MAC address 0100.5e02.0203 is forbidden on port 7 within VLAN 8.

```
Console(config)# interface vlan 8
Console(config-if)# bridge multicast address 0100.5e.02.0203
Console(config-if)# bridge multicast forbidden address 0100.5e02.0203 add ethernet e7
```

bridge multicast forward-all

The **bridge multicast forward-all** Interface Configuration (VLAN) mode command enables forwarding all multicast packets on a port. To restore the default configuration, use the **no** form of this command.

Syntax

bridge multicast forward-all {**add** | **remove**} {**ethernet** *interface-list* | **port-channel** *port-channel-number-list*}

no bridge multicast forward-all

Parameters

- **add** — Force forwarding all multicast packets.
- **remove** — Do not force forwarding all multicast packets.
- *interface-list* — Separate nonconsecutive Ethernet ports with a comma and no spaces; a hyphen is used to designate a range of ports.
- *port-channel-number-list* — Separate nonconsecutive port-channels with a comma and no spaces; a hyphen is used to designate a range of port-channels.

Default Configuration

This setting is disabled.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

There are no user guidelines for this command.

Example

In this example, all multicast packets on port 8 are forwarded.

```
Console(config)# interface vlan 2
Console(config-if)# bridge multicast forward-all add ethernet e8
```

bridge multicast forbidden forward-all

The **bridge multicast forbidden forward-all** Interface Configuration (VLAN) mode command forbids a port to be a forward-all-multicast port. To restore the default configuration, use the **no** form of this command.

Syntax

bridge multicast forbidden forward-all {**add** | **remove**} {**ethernet** *interface-list* | **port-channel** *port-channel-number-list*}

no bridge multicast forbidden forward-all

Parameters

- **add** — Forbids forwarding all multicast packets.
- **remove** — Does not forbid forwarding all multicast packets.
- *interface-list* — Separates nonconsecutive Ethernet ports with a comma and no spaces; a hyphen is used to designate a range of ports.
- *port-channel-number-list* — Separates nonconsecutive port-channels with a comma and no spaces; a hyphen is used to designate a range of port-channels.

Default Configuration

This setting is disabled.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

IGMP snooping dynamically discovers multicast router ports. When a multicast router port is discovered, all the multicast packets are forwarded to it unconditionally.

This command prevents a port from becoming a multicast router port.

Example

In this example, forwarding all multicast packets to port 1 with VLAN 2 is forbidden.

```
Console(config)# interface vlan 2
Console(config-if)# bridge multicast forbidden forward-all add ethernet e1
```

bridge aging-time

The **bridge aging-time** Global Configuration mode command sets the address table aging time. To restore the default configuration, use the **no** form of this command.

Syntax

bridge aging-time *seconds*

no bridge aging-time

Parameters

- *seconds* — Time in seconds. (Range: 10-630 seconds)

Default Configuration

The default setting is 300 seconds.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

In this example the bridge aging time is set to 250.

```
Console(config)# bridge aging-time 250
```

clear bridge

The **clear bridge** Privileged EXEC mode command removes any learned entries from the forwarding database.

Syntax

clear bridge

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

In this example, the bridge tables are cleared.

```
Console# clear bridge
```

port security

The **port security** Interface Configuration mode command locks the port, thereby, blocking unknown traffic and preventing the port from learning new addresses. To return to the default configuration, use the **no** form of this command.

Syntax

port security [**forward** | **discard | discard-shutdown**] [**trap** *seconds*]

no port security

Parameters

- **forward** — Forwards packets with unlearned source addresses, but does not learn the address.
- **discard** — Discards packets with unlearned source addresses. This is the default if no option is indicated.
- **discard-shutdown** — Discards packets with unlearned source addresses. The port is also shut down.
- *seconds* — Sends SNMP traps and defines the minimum amount of time in seconds between consecutive traps. (Range: 1-1000000)

Default Configuration

This setting is disabled.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

In this example, port 1 forwards all packets without learning addresses of packets from unknown sources and sends traps every 100 seconds if a packet with an unknown source address is received.

```
Console(config)# interface ethernet e1
Console(config-if)# port security forward trap 100
```

port security routed secure-address

The **port security routed secure-address** Interface Configuration (Ethernet, port-channel) mode command adds a MAC-layer secure address to a routed port. Use the **no** form of this command to delete a MAC address.

Syntax

port security routed secure-address *mac-address*

no port security routed secure-address *mac-address*

Parameters

- *mac-address* — A valid MAC address.

Default Configuration

No addresses are defined.

Command Mode

Interface Configuration (Ethernet, port-channel) mode. Cannot be configured for a range of interfaces (range context).

User Guidelines

The command enables adding secure MAC addresses to a routed port in port security mode. The command is available when the port is a routed port and in port security mode. The address is deleted if the port exits the security mode or is not a routed port.

Example

In this example, the MAC-layer address 66:66:66:66:66:66 is added to port 1.

```
Console(config)# interface ethernet e1
Console(config-if)# port security routed secure-address 66:66:66:66:66:66
```

show bridge address-table

Use the **show bridge address-table** Privileged EXEC command to view entries in the bridge-forwarding database.

Syntax

show bridge address-table [**vlan** *vlan*] [**ethernet** *interface* **| port-channel** *port-channel-number*]] [**address** *mac-address*]

Parameters

- *vlan* — Specific VLAN, such as VLAN 1.
- *interface* — Ethernet port.
- *port-channel-number* — Port-channel number.
- *mac-address*— MAC address.

Parameters Range

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC

User Guidelines

Internal usage VLANs (VLANs that are automatically allocated on routed ports) are presented in the VLAN column by a port number and not by a VLAN ID.

Example

```
Console# show bridge address-table

Aging time is 300 sec

vlan             mac address                    Port           Type
---------        --------------                 ----           -------
3                00:00:00:55:55:66              3              dynamic
3                00:03:47:cc:01:ce              3              dynamic
3                00:06:1b:c9:6f:c5              3              dynamic
3                00:11:11:6b:3a:32              3              dynamic
3                00:80:92:0b:80:80              3              dynamic
```

show bridge address-table static

The **show bridge address-table static** Privileged EXEC mode command displays statically created entries in the bridge-forwarding database.

Syntax

show bridge address-table static [**vlan** *vlan*] [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *vlan* — Specifies a valid VLAN, such as VLAN 1.
- *interface* — A valid Ethernet port.
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

In this example, all static entries in the bridge-forwarding database are displayed.

```
Console# show bridge address-table static

Aging time is 300 sec

vlan          mac address                  port          type
----          -----------------            ----          -----------------
1             00:60:70:4C:73:FF            8             Permanent
1             00:60.70.8C.73:FF            8             delete-on-timeout
200           00:10:0D:48:37:FF            9             delete-on-reset
```

show bridge address-table count

The **show bridge address-table count** Privileged EXEC mode command displays the number of addresses present in the Forwarding Database.

Syntax

show bridge address-table count [**vlan** *vlan*][**ethernet** *interface-number* | **port-channel** *port-channel-number*]

Parameters

- *vlan* — Specifies a valid VLAN, such as VLAN 1.
- *interface* — A valid Ethernet port.
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

In this example, the number of addresses present in all VLANs are displayed.

```
Console# show bridge address-table count

Capacity: 8192
Free: 8083
Used: 109

Secure addresses: 2
Static addresses: 1
Dynamic addresses: 97
Internal addresses: 9
```

show bridge multicast address-table

The **show bridge multicast address-table** User EXEC mode command displays multicast MAC address or IP address table information.

Syntax

show bridge multicast address-table [**vlan** *vlan-id*] [**address** *mac-multicast-address* | *ip-multicast-address*] [**format ip** | **format mac**]

Parameters

- *vlan-id* — A valid VLAN ID value.
- *mac-multicast-address* — A valid MAC multicast address.
- *ip-multicast-address* — A valid IP multicast address.
- **format** *ip*|*mac* — Multicast address format. Can be **ip** or **mac**. If the format is unspecified, the default is **mac**.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

A MAC address can be displayed in IP format only if it is in the range of 0100.5e00.0000-0100.5e7f.ffff.

Example

In this example, multicast MAC address and IP address table information is displayed.

```
Console# show bridge multicast address-table

Vlan          MAC Address                 Type                Ports
----          --------------              -------             ----------
1             01:00:5e:02:02:03           static              1, 2
18            01:00:5e:02:02:08           static              1-3
19            00:00:5e:02:02:08           dynamic             5-7

Forbidden ports for multicast addresses:

Vlan          MAC Address                 Ports
----          --------------              -----
1             01:00:5e:02:02:03           8
19            01:00:5e:02:02:08           8
```

```
Console# show bridge multicast address-table format ip

Vlan          IP/MAC Address                 Type                Ports
----          -----------------              ------              ---------
1             224-239.130|2.2.3              static              1,2
18            224-239.130|2.2.8              static              1-3
19            224-239.130|2.2.8              dynamic             5-7

Forbidden ports for multicast addresses:

Vlan          IP/MAC Address                 Ports
----          -----------------              ------
1             224-239.130|2.2.3              8
19            224-239.130|2.2.8              8
```

Note

A multicast MAC address maps to multiple IP addresses as shown above.

show bridge multicast filtering

The **show bridge multicast filtering** User EXEC mode command displays the multicast filtering configuration.

Syntax

show bridge multicast filtering *vlan-id*

Parameters

- *vlan-id* — VLAN ID value.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

In this example, the multicast configuration for VLAN 1 is displayed.

```
Console# show bridge multicast filtering 1

Filtering: Enabled
VLAN: 1

Port             Forward-Unregistered             Forward-All
                 Static           Status           Static               Status
----             ---------        ---------        ---------            ----------
1                Forbidden        Filter           Forbidden            Filter
2                Forward          Forward(s)       Forward              Forward(s)
3                -                Forward(d)       -                    Forward(d)
```

show ports security

The **show ports security** Privileged EXEC mode command displays the port-lock status.

Syntax

show ports security [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — A valid Ethernet port.
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

In this example, all classes of entries in the port-lock status are displayed:

```
Console# show ports security

Port                    Action          Trap         Frequency
1        Disabled                       -            -
2        Disabled       Discard         Disabled     -
3        Disabled       -               -            -
4        Disabled       -               -            -
5        Disqbled       -               -            -
6        Disabled       -               -            -
7        Disabled       -               -            -
8        Disabled       -               -            -
9        Disabled       -               -            -
10       Disabled       -               -            -
ch1      Disabled
ch2      Disabled
ch3      Disabled
ch4      Disabled
ch5      Disabled
ch6      Disabled
```

```
ch7      Disabled
ch8      Disabled
```

The following tables describes the fields shown above.

Field	Description
Port	Port number
Status	Locked/Unlocked
Action	Action on violation
Trap	Indicates if traps are sent in case of a violation
Frequency	Minimum time between consecutive traps

Section 4. Clock

clock set

The **clock set** Privileged EXEC mode command manually sets the system clock.

Syntax

clock set *hh:mm:ss day month year*

or

clock set *hh:mm:ss month day year*

Parameters

- *hh:mm:ss* — Current time in hours (military format), minutes, and seconds (hh: 0 - 23, mm: 0 - 59, ss: 0 - 59).
- *day* — Current day (by date) in the month (1 - 31).
- *month* — Current month using the first three letters by name (Jan, …, Dec).
- *year* — Current year (2000 - 2097).

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example sets the system time to 13:32:00 on the 7th March 2002.

```
Console# clock set 13:32:00 7 Mar 2002
```

clock source

The **clock source** Global Configuration mode command configures an external time source for the system clock. Use **no** form of this command to disable external time source.

Syntax

clock source {**sntp**}

no clock source

Parameters

- **sntp** — SNTP servers

Default Configuration

No external clock source

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example configures an external time source for the system clock.

```
Console(config)# clock source sntp
```

clock timezone

The **clock timezone** Global Configuration mode command sets the time zone for display purposes. To set the time to the Coordinated Universal Time (UTC), use the **no** form of this command.

Syntax

clock timezone *hours-offset*

no clock timezone

Parameters

- *hours-offset* — Hours difference from UTC. (Range: -12 – ＋13)

Default Configuration

Clock set to UTC.

Command Mode

Global Configuration mode

User Guidelines

The system internally keeps time in UTC, so this command is used only for display purposes and when the time is manually set.

Examples

The following example sets the timezone to 6 hours difference from UTC.

```
Console(config)# clock timezone -6 zone CST
```

clock summer-time

The **clock summer-time** Global Configuration mode command configures the system to automatically switch to summer time (daylight saving time). To configure the software not to automatically switch to summer time, use the **no** form of this command.

Syntax

clock summer-time recurring { | {*week day month hh:mm week day month hh:mm*}} [**offset** *offset*] [**zone** *acronym*]

clock summer-time date *date month year hh:mm date month year hh:mm* [**offset** *offset*] [**zone** *acronym*]

clock summer-time date *month date year hh:mm month date year hh:mm* [**offset** *offset*] [**zone** *acronym*]

no clock summer-time recurring

Parameters

- **recurring** — Indicates that summer time should start and end on the corresponding specified days every year.
- **date** — Indicates that summer time should start on the first specific date listed in the command and end on the second specific date in the command.
- *week* — Week of the month. (Range: 1 - 5, **first**, **last**)
- *day* — Day of the week (Range: first three letters by name, like **sun**)
- *date* — Date of the month. (Range:1 - 31)
- *month* — Month. (Range: first three letters by name, like Jan)
- *year* — year - no abbreviation (Range: 2000 - 2097)
- *hh:mm* — Time in military format, in hours and minutes. (Range: hh: 0 - 23, mm:0 - 59)
- *offset* — Number of minutes to add during summer time. (Range: 1 - 1440)
- *acronym* — The acronym of the time zone to be displayed when summer time is in effect. (Range: Up to 4 characters)

Default Configuration

Summer time is disabled.

offset — Default is 60 minutes.

acronym — If unspecified default to the timezone acronym.

If the timezone has not been defined, the default is UTC.

Command Mode

Global Configuration mode

User Guidelines

In both the **date** and **recurring** forms of the command, the first part of the command specifies when summer time begins, and the second part specifies when it ends. All times are relative to the local time zone. The start time is relative to standard time. The end time is relative to summer time. If the starting month is chronologically after the ending month, the system assumes that you are in the southern hemisphere.

Examples

The following example sets summer time starting on the first Sunday in April at 2 am and finishing on the last Sunday in October at 2 am.

```
Console(config)# clock summer-time recurring first sun apr 2:00 last sun oct 2:00
```

sntp authentication-key

The **sntp authentication-key** Global Configuration mode command defines an authentication key for Simple Network Time Protocol (SNTP). To remove the authentication key for SNTP, use the **no** form of this command.

Syntax

sntp authentication-key *number* **md5** *value*

no sntp authentication-key *number*

Parameters

- *number* — Key number (Range: 1-4294967295)
- *value* — Key value (Range: 1-8 characters)

Default Configuration

No authentication key is defined.

Command Mode

Global Configuration mode

User Guidelines

Multiple keys can be generated.

Examples

The following example defines the authentication key for SNTP.

```
Console(config)# sntp authentication-key 8 md5 ClkKey
```

sntp authenticate

The **sntp authenticate** Global Configuration mode command grants authentication for received Simple Network Time Protocol (SNTP) traffic from servers. To disable the feature, use the **no** form of this command.

Syntax

sntp authenticate

no sntp authenticate

Default Configuration

No authentication

Command Mode

Global Configuration mode

User Guidelines

The command is relevant for both unicast and broadcast.

Examples

The following example defines the authentication key for SNTP and grants authentication.

```
Console(config)# sntp authentication-key 8 md5 ClkKey
Console(config)# sntp trusted-key 8
Console(config)# sntp authenticate
```

sntp trusted-key

The **sntp trusted-key** Global Configuration mode command authenticates the identity of a system to which Simple Network Time Protocol (SNTP) will synchronize. To disable authentication of the identity of the system, use the **no** form of this command.

Syntax

sntp trusted-key *key-number*

no sntp trusted-key *key-number*

Parameters

- *key-number* — Key number of authentication key to be trusted. (Range: 1 - 4294967295)

Default Configuration

No keys are trusted.

Command Mode

Global Configuration mode

User Guidelines

The command is relevant for both received unicast and broadcast.

If there is at least 1 trusted key, then unauthenticated messages will be ignored.

Examples

The following example authenticates key 8.

```
Console(config)# sntp authentication-key 8 md5 ClkKey
Console(config)# sntp trusted-key 8
Console(config)# sntp authenticate
```

sntp client poll timer

The **sntp client poll timer** Global Configuration mode command sets the polling time for the Simple Network Time Protocol (SNTP) client. To return to default configuration, use the **no** form of this command.

Syntax

sntp client poll timer *seconds*

no sntp client poll timer

Parameters

- *seconds* — Polling interval in seconds (Range: 60-86400)

Default Configuration

Polling interval is 1024 seconds.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example sets the polling time for the Simple Network Time Protocol (SNTP) client to 120 seconds.

```
Console(config)# sntp client poll timer 120
```

sntp broadcast client enable

The **sntp broadcast client enable** Global Configuration mode command enables Simple Network Time Protocol (SNTP) broadcast clients. To disable SNTP broadcast clients, use the **no** form of this command.

Syntax

sntp broadcast client enable

no sntp broadcast client enable

Default Configuration

The SNTP broadcast client is disabled.

Command Mode

Global Configuration mode

User Guidelines

Use the **sntp client enable (Interface)** Interface Configuration mode command to enable the SNTP client on a specific interface.

Examples

The following example enables the SNTP broadcast clients.

```
Console(config)# sntp broadcast client enable
```

sntp anycast client enable

The **sntp anycast client enable** Global Configuration mode command enables SNTP anycast client. To disable the SNTP anycast client, use the **no** form of this command.

Syntax

sntp anycast client enable

no sntp anycast client enable

Default Configuration

The SNTP anycast client is disabled.

Command Mode

Global Configuration mode

User Guidelines

Polling time is determined by the **sntp client poll timer** Global Configuration mode command.

Use the **sntp client enable (Interface)** Interface Configuration mode command to enable the SNTP client on a specific interface.

Examples

The following example enables SNTP anycast clients.

```
console(config)# sntp anycast client enable
```

sntp client enable (Interface)

The **sntp client enable** Interface Configuration (Ethernet, port-channel, VLAN) mode command enables the Simple Network Time Protocol (SNTP) client on an interface. This applies to both receive broadcast and anycast updates. To disable the SNTP client, use the **no** form of this command.

Syntax

sntp client enable

no sntp client enable

Default Configuration

The SNTP client is disabled on an interface.

Command Mode

Interface configuration (Ethernet, port-channel, VLAN) mode

User Guidelines

Use the **sntp broadcast client enable** Global Configuration mode command to enable broadcast clients globally.

Use the **sntp anycast client enable** Global Configuration mode command to enable anycast clients globally.

Examples

The following example enables the SNTP client on Ethernet port 3.

```
Console(config)# interface ethernet e3
Console(config-if)# sntp client enable
```

sntp unicast client enable

The **sntp unicast client enable** Global Configuration mode command enables the device to use the Simple Network Time Protocol (SNTP) to request and accept SNTP traffic from servers. To disable requesting and accepting SNTP traffic from servers, use the **no** form of this command.

Syntax

sntp unicast client enable

no sntp unicast client enable

Default Configuration

The SNTP unicast client is disabled.

Command Mode

Global Configuration mode

User Guidelines

Use the **sntp server** Global Configuration mode command to define SNTP servers.

Examples

The following example enables the device to use the Simple Network Time Protocol (SNTP) to request and accept SNTP traffic from servers.

```
Console(config)# sntp unicast client enable
```

sntp unicast client poll

The **sntp unicast client poll** Global Configuration mode command enables polling for the Simple Network Time Protocol (SNTP) predefined unicast servers. To disable the polling for SNTP client, use the **no** form of this command.

Syntax

sntp unicast client poll

no sntp unicast client poll

Default Configuration

Polling is disabled.

Command Mode

Global Configuration mode

User Guidelines

Polling time is determined by the **sntp client poll timer** Global Configuration mode command.

Examples

The following example enables polling for Simple Network Time Protocol (SNTP) predefined unicast clients.

```
Console(config)# sntp unicast client poll
```

sntp server

The **sntp server** Global Configuration mode command configures the device to use the Simple Network Time Protocol (SNTP) to request and accept SNTP traffic from a specified server. To remove a server from the list of SNTP servers, use the **no** form of this command.

Syntax

sntp server {*ip-address* **|** *hostname***}**[**poll**] [**key** *keyid*]

no sntp server *host*

Parameters

- *ip-address* — IP address of the server.
- *hostname* — Hostname of the server. (Range: 1-158 characters)
- **poll** — Enable polling.
- *keyid* — Authentication key to use when sending packets to this peer.
  (Range:1-4294967295)

Default Configuration

No servers are defined.

Command Mode

Global Configuration mode

User Guidelines

Up to 8 SNTP servers can be defined.

Use the **sntp unicast client enable** Global Configuration mode command to enable predefined unicast clients globally.

To enable polling you should also use the **sntp unicast client poll** Global Configuration mode command for global enabling.

Polling time is determined by the **sntp client poll timer** Global Configuration mode command.

Examples

The following example configures the device to accept SNTP traffic from the server on 192.1.1.1.

```
Console(config)# sntp server 192.1.1.1
```

show clock

The **show clock** User EXEC mode command displays the time and date from the system clock.

Syntax

show clock [detail]

Parameters

- **detail** — Shows timezone and summertime configuration.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

The symbol that precedes the show clock display indicates the following:

Symbol	Description
*	Time is not authoritative.
(blank)	Time is authoritative.
.	Time is authoritative, but SNTP is not synchronized.

Example

The following example displays the time and date from the system clock.

```
Console> show clock
15:29:03 PDT(UTC-7) Jun 17 2002
Time source is SNTP
Console> show clock detail
15:29:03 PDT(UTC-7) Jun 17 2002
Time source is SNTP
Time zone:
Acronym is PST
Offset is UTC-8
Summertime:
Acronym is PDT
Recurring every year.
Begins at first Sunday of April at 2:00.
Ends at last Sunday of October at 2:00.
Offset is 60 minutes.
```

show sntp configuration

The **show sntp configuration** Privileged EXEC mode command shows the configuration of the Simple Network Time Protocol (SNTP).

Syntax

show sntp configuration

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays the current SNTP configuration of the device.

```
Console# show sntp configuration

Polling interval: 7200 seconds

MD5 Authentication keys: 8, 9
Authentication is required for synchronization.
Trusted Keys: 8, 9

Unicast Clients: Enabled
Unicast Clients Polling: Enabled

Server                     Polling              Encryption Key
-----------                -------              --------------
176.1.1.8                  Enabled              9
176.1.8.179                Disabled             Disabled

Broadcast Clients: Enabled
Anycast Clients: Enabled
Broadcast and Anycast Interfaces: 1, 3
```

show sntp status

The **show sntp status** Privileged EXEC mode command shows the status of the Simple Network Time Protocol (SNTP).

Syntax

show sntp status

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example shows the status of the SNTP.

```
Console# show sntp status
Clock is synchronized, stratum 4, reference is 176.1.1.8, unicast
Reference time is AFE2525E.70597B34 (00:10:22.438 PDT Jul 5 1993)

Unicast servers:
Server          Status       Last response                            Offset    Delay
                                                                      [mSec]    [mSec]
-----------     -------      ----------------------------             ------    ------
176.1.1.8       Up           19:58:22.289 PDT Feb 19 2002             7.33      117.79
176.1.8.179     Unknown      12:17.17.987 PDT Feb 19 2002             8.98      189.19

Anycast server:
Server          Interface    Status   Last response                   Offset    Delay
                                                                      [mSec]    [mSec]
---------       -------      -----    -----------------------------   ------    -----
176.1.11.8      VLAN 118     Up       9:53:21.789 PDT Feb 19 2002     7.19      119.89

Broadcast:
Interface       IP address            Last response
---------       ---------             ----------------------------
176.9.1.1       VLAN 119              19:17:59.792 PDT Feb 19 2002
```

Section 5. Configuration and Image Files

copy

The **copy** Privileged EXEC mode command copies files from a source to a destination.

Syntax

copy *source-url destination-url*

Parameters

- *source-url* — The source file location URL or reserved keyword of the source file to be copied. (Range: 1-160 characters)
- *destination-url* — The destination file URL or reserved keyword of the destination file. (Range: 1-160 characters)

The following table displays keywords and URL prefixes:

Keyword	Source or Destination
flash:	Source or destination URL for flash memory. It’s the default in case a URL is specified without a prefix.
running-config	Represents the current running configuration file.
startup-config	Represents the startup configuration file.
image	If the source file, represents the active image file. If the destination file, represents the non-active image file.
boot	Boot file.
tftp://	Source or destination URL for a TFTP network server. The syntax for this alias is **tftp:**//*host/[directory]/filename*. The host can be represented by its IP address or hostname.
xmodem:	Source for the file from a serial connection that uses the Xmodem protocol.
null:	Null destination for copies or files. A remote file can be copied to null to determine its size.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

Up to five backup configuration files are supported on the device.

The location of a file system dictates the format of the source or destination URL.

The entire copying process may take several minutes and differs from protocol to protocol and from network to network.

Understanding Invalid Combinations of Source and Destination

Some invalid combinations of source and destination exist. Specifically, you cannot copy if one of the following conditions exist:

The source file and destination file are the same file.

xmodem: is the destination file. The source file can be copied to **image**, **boot** and **null:** only.

tftp:// is the source file and destination file on the same copy.

The following table describes copy characters:

Character	Description
!	For network transfers, indicates that the copy process is taking place. Each exclamation point indicates successful transfer of ten packets (512 bytes each).
.	For network transfers, indicates that the copy process timed out. Generally, many periods in a row means that the copy process may fail.

Copying an Image File from a Server to Flash Memory

To copy an image file from a server to flash memory, use the **copy** *source-url* **image** command.

Copying a Boot File from a Server to Flash Memory

To copy a boot file from a server to flash memory, enter the **copy** *source-url* **boot** command.

Copying a Configuration File from a Server to the Running Configuration File

To load a configuration file from a network server to the running configuration file of the device, enter the **copy** *source-url* **running-config** command. The commands in the loaded configuration file are added to those in the running configuration file as if the commands were typed in the command-line interface (CLI). Thus, the resulting configuration file is a combination of the previous running configuration and the loaded configuration files with the loaded configuration file taking precedence.

Copying a Configuration File from a Server to the Startup Configuration

To copy a configuration file from a network server to the startup configuration file of the device, enter **copy** *source-url* **startup-config**. The startup configuration file is replaced by the copied configuration file.

Storing the Running or Startup Configuration on a Server

Use the **copy running-config** *destination-url* command to copy the current configuration file to a network server using TFTP. Use the **copy startup-config** *destination-url* command to copy the startup configuration file to a network server.

Saving the Running Configuration to the Startup Configuration

To copy the running configuration to the startup configuration file, enter the **copy running-config startup-config** command.

Backing up the Running or Startup Configuration to a backup file

To copy the running configuration file to a backup configuration file, enter the **copy running-config file** command. To copy the startup configuration file to a backup configuration file, enter the **copy startup-config file** command.

Example

The following example copies system image file1 from the TFTP server 172.16.101.101 to a non-active image file.

```
Console# copy tftp://172.16.101.101/file1 image

Accessing file 'file1' on 172.16.101.101...
Loading file1 from 172.16.101.101:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! [OK]
Copy took 0:01:11 [hh:mm:ss]
```

delete

The **delete** Privileged EXEC mode command deletes a file from a flash memory device.

Syntax

delete *url*

Parameters

- *url* — A reserved keyword of the file to be deleted. (Range: 1-160 characters)

The following table displays the reserved keyword:

Keyword	Source or Destination
startup-config	Represents the startup configuration file.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

*.sys, image file cannot be deleted.

Examples

The following example deletes file **test** from flash memory.

```
Console# delete startup-config
Delete startup-config [y/n]?
```

delete startup-config

The **delete startup-config** Privileged EXEC mode command deletes the startup-config file.

Syntax

delete startup-config

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example deletes the startup-config file.

```
Console# delete startup-config
```

show running-config

The **show running-config** Privileged EXEC mode command displays the contents of the currently running configuration file.

Syntax

show running-config

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays the contents of the running configuration file.

```
Console# show running-config
no spanning-tree
interface ethernet e3
ip address 10.6.39.150 255.255.255.0
exit
username ews password d41d8cd98f00b204e9800998ecf8427e level 15 encrypted
snmp-server engineID local 800000590300132538780O
snmp-server v3-host 10.6.39.23 testUser informs auth
snmp-server group testgroup v3 noauth notify DefaultSuper read DefaultSuper w
rite DefaultSuper
```

show startup-config

The **show startup-config** Privileged EXEC mode command displays the contents of the startup configuration file.

Syntax

show startup-config

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays the contents of the running configuration file.

```
Console# show startup-config


console# show startup-config
no spanning-tree
interface ethernet e3
ip address 10.6.39.150 255.255.255.0
exit
username ews password d41d8cd98f00b204e9800998ecf8427e level 15 encrypted
snmp-server engineID local 8000005903001325387800
snmp-server v3-host 10.6.39.23 testUser informs auth
snmp-server group testgroup v3 noauth notify DefaultSuper read DefaultSuper w
rite DefaultSuper
```

Section 6. Ethernet Configuration Commands

interface ethernet

The **interface ethernet** Global Configuration mode command enters the interface configuration mode to configure an Ethernet type interface.

Syntax

interface ethernet *interface*

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enables configuring Ethernet port 7.

```
Console(config)# interface ethernet e7
```

interface range ethernet

The **interface range ethernet** Global Configuration mode command configures multiple Ethernet type interfaces at the same time.

Syntax

interface range ethernet {*port-range* | **all**}

Parameters

- *port-range* — List of valid ports. Where more than one port is listed, separate nonconsecutive ports with a comma and no spaces, use a hyphen to designate a range of ports and group a list seperated by commas in brackets.
- **all** — All Ethernet ports.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

Commands under the interface range context are executed independently on each active interface in the range. If the command returns an error on one of the active interfaces, it does not stop executing commands on other active interfaces.

Example

The following example shows how ports 1 to 5 and 6 to 8 are grouped to receive the same command.

```
Console(config)# interface range ethernet e1-5, e6-8
Console(config-if)#
```

shutdown

The **shutdown** Interface Configuration (Ethernet, port-channel) mode command disables an interface. To restart a disabled interface, use the **no** form of this command.

Syntax

shutdown

no shutdown

Default Configuration

The interface is enabled.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example disables Ethernet port 5 operations.

```
Console(config)# interface ethernet e5
Console(config-if)# shutdown
```

The following example restarts the disabled Ethernet port.

```
Console(config)# interface ethernet e5
Console(config-if)# no shutdown
```

description

The **description** Interface Configuration (Ethernet, port-channel) mode command adds a description to an interface. To remove the description, use the **no** form of this command.

Syntax

description *string*

no description

Parameters

- *string* — Comment or a description of the port to enable the user to remember what is attached to the port. (Range: 1-64 characters)

Default Configuration

The interface does not have a description.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example adds a description to Ethernet port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# description "RD SW#3"
```

speed

The **speed** Interface Configuration (Ethernet, port-channel) mode command configures the speed of a given Ethernet interface when not using auto-negotiation. To restore the default configuration, use the **no** form of this command.

Syntax

speed {**10** | **100** | **1000** |}

no speed

Parameters

- **10** — Forces10 Mbps operation.
- **100** — Forces 100 Mbps operation.
- **1000** — Forces 1000 Mbps operation.

Default Configuration

Maximum port capability

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

The **no speed** command in a port-channel context returns each port in the port-channel to its maximum capability.

Example

The following example configures the speed operation of Ethernet port 5 to 100 Mbps operation.

```
Console(config)# interface ethernet e5
Console(config-if)# speed 100
```

duplex

The **duplex** Interface Configuration (Ethernet) mode command configures the full/half duplex operation of a given Ethernet interface when not using auto-negotiation. To restore the default configuration, use the **no** form of this command.

Syntax

duplex {**half** | **full**}

Parameters

- **no duplex**
- **half** — Forces half-duplex operation
- **full** — Forces full-duplex operation

Default Configuration

The interface is set to full duplex.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

When configuring a particular duplex mode on the port operating at 10/100 Mbps, disable the auto-negotiation on that port.

Half duplex mode can be set only for ports operating at 10 Mbps or 100 Mbps.

Example

The following example configures the duplex operation of Ethernet port 5 to full duplex operation.

```
Console(config)# interface ethernet e5
Console(config-if)# duplex full
```

negotiation

The **negotiation** Interface Configuration (Ethernet, port-channel) mode command enables auto-negotiation operation for the speed and duplex parameters of a given interface. To disable auto-negotiation, use the **no** form of this command.

Syntax

negotiation *[capability1 [capability2…capability5]]*

no negotiation

Parameters

- *capability* — Specifies the capabilities to advertise. (Possible values: 10h, 10f, 100h,100f, 1000f)

Default Configuration

Auto-negotiation is enabled.

If unspecified, the default setting is to enable all capabilities of the port.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

If capabilities were specified when auto-negotiation was previously entered, not specifying capabilities when currently entering auto-negotiation overrides the previous configuration and enables all capabilities.

Example

The following example enables auto-negotiation on Ethernet port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# negotiation
```

flowcontrol

The **flowcontrol** Interface Configuration (Ethernet, port-channel) mode command configures flow control on a given interface. To disable flow control, use the **no** form of this command.

Syntax

flowcontrol {**auto | on** | **off**}

no flowcontrol

Parameters

- **auto** — Indicates auto-negotiation
- **on** — Enables flow control.
- **off** — Disables flow control.

Default Configuration

Flow control is off.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

Negotiation should be enabled for **flow control auto**.

Example

In the following example, flow control is enabled on port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# flowcontrol on
```

mdix

The **mdix** Interface Configuration (Ethernet) mode command enables cable crossover on a given interface. To disable cable crossover, use the **no** form of this command.

Syntax

mdix {on | auto}

no mdix

Parameters

- **on** — Manual mdix
- **auto** — Automatic mdi/mdix

Default Configuration

The default setting is **on**.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

Auto: All possibilities to connect a PC with cross or normal cables are supported and are automatically detected.

On: It is possible to connect to a PC only with a normal cable and to connect to another device only with a cross cable.

No: It is possible to connect to a PC only with a cross cable and to connect to another device only with a normal cable.

Example

In the following example, automatic crossover is enabled on port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# mdix auto
```

back-pressure

The **back-pressure** Interface Configuration (Ethernet, port-channel) mode command enables back pressure on a given interface. To disable back pressure, use the **no** form of this command.

Syntax

back-pressure

no back-pressure

Default Configuration

Back pressure is enabled.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

In the following example back pressure is enabled on port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# back-pressure
```

clear counters

The **clear counters** User EXEC mode command clears statistics on an interface.

Syntax

clear counters [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

In the following example, the counters for interface 1 are cleared.

```
Console> clear counters ethernet e1
```

set interface active

The **set interface active** Privileged EXEC mode command reactivates an interface that was shutdown.

Syntax

set interface active {**ethernet** *interface* | **port-channel** *port-channel-number*}

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

This command is used to activate interfaces that were configured to be active, but were shutdown by the system for some reason (e.g., **port security)**.

Example

The following example reactivates interface 5.

```
Console# set interface active ethernet e5
```

show interfaces advertise

The **show interfaces advertise** Privileged EXEC mode command displays autonegotiation data.

Syntax

show interfaces advertise [ethernet *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Modes

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following examples display autonegotiation information.

```
Console# show interfaces advertise

Port      Type                Neg                Operational Link Advertisement
----      -----------         -------            ------------------------------
1         100M-Copper         Enabled            --
2         100M-Copper         Enabled            --
3         100M-Copper         Enabled            --
4         100M-Copper         Enabled            --
5         100M-Copper         Enabled            100f, 100h, 10f, 10h
6         100M-Copper         Enabled            --
7         100M-Copper         Enabled            --
8         100M-Copper         Enabled            --
9         1G-Copper           Enabled
19        1G-Fiber            Enabled

Port      Type                Neg                Operational Link Advertisement
----      -----------         -------            ------------------------------
ch1                           Enabled
ch2                           Enabled
```

```
ch3                                 Enabled
ch4                                 Enabled
ch5                                 Enabled
ch6                                 Enabled
```

show interfaces configuration

The **show interfaces configuration** Privileged EXEC mode command displays the configuration for all configured interfaces.

Syntax

show interfaces configuration [ethernet *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Modes

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the configuration of all configured interfaces:

```
Console# show interfaces configuration


Port   Type          Duplex   Speed   Neg       Flow   Link    Back       Mdix
                                                Ctrl   State   Pressure   Mode
----   -----------   ------   -----   -------   ----   -----   --------   ----
1      100M-Copper   Full     100     Enabled   Off    Up      Disabled   Auto
2      100M-Copper   Full     100     Enabled   Off    Up      Disabled   Auto
3      100M-Copper   Full     100     Enabled   Off    Up      Disabled   Auto
4      100M-Copper   Full     100     Enabled   Off    Up      Disabled   Auto
5      100M-Copper   Full     100     Enabled   Off    Up      Disabled   Auto
6      100M-Copper   Full     100     Enabled   Off    Up      Disabled   Auto
7      100M-Copper   Full     100     Enabled   Off    Up      Disabled   Auto
8      100M-Copper   Full     100     Enabled   Off    Up      Disabled   Auto
9      1G-Copper     Full     1000    Enabled   Off    Up      Disabled   Auto
10     100M-Fiber    Full     100     Enabled   Off    Up      Disabled   Auto
```

show interfaces status

The **show interfaces status** Privileged EXEC mode command displays the status of all configured interfaces.

Syntax

show interfaces status [ethernet *interface*| **port-channel** *port-channel-number*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the status of all configured interfaces:

```
Console# show interfaces status

Port    Type             Duplex    Speed    Neg         Flow   Link     Back         Mdix
                                                        Ctrl   State    Pressure     Mode
----    -----------      ------    -----    -------     ----   -----    --------     ----
1       100M-Copper      --        --       --          --     Down     --           --
2       100M-Copper      --        --       --          --     Down     --           --
3       100M-Copper      --        --       --          --     Down     --           --
4       100M-Copper      --        --       --          --     Down     --           --
5       100M-Copper      Full      100      Enabled     Off    Up       Disabled     Auto
6       100M-Copper      --        --       --          --     Down     --           --
7       100M-Copper      --        --       --          --     Down     --           --
8       100M-Copper      --        --       --          --     Down     --           --
9       1G-Copper        --        --       --          --     Down     --           --
10      1G-Fiber         --        --       --          --     Down     --           --

Port    Type             Duplex    Speed    Neg         Flow   Link
                                                        Ctrl   State
----    -----------      ------    -----    -------     ----   -----
```

```
ch1                                                            Not Present
ch2                                                            Not Present
ch3                                                            Not Present
ch4                                                            Not Present
ch5                                                            Not Present
ch6                                                            Not Present
```

show interfaces description

The **show interfaces description** Privileged EXEC mode command displays the description for all configured interfaces.

Syntax

show interfaces description [ethernet *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Modes

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays descriptions of configured interfaces.

```
Console# show interfaces description

Port           Description
----           -----------
1              lab
2
3
4
5
6
ch1
ch2
```

show interfaces counters

The **show interfaces counters** User EXEC mode command displays traffic seen by the physical interface.

Syntax

show interfaces counters [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Modes

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays traffic seen by the physical interface:

```
Console# show interfaces counters


Port       InOctets            InUcastPkts           InMcastPkts          InBcastPkts
----       --------            -----------           -----------          -----------
1          183892              0                     0                    0
2          0                   0                     0                    0
3          123899              0                     0                    0
4          0                   0                     0                    0
5          0                   0                     0                    0
6          0                   0                     0                    0
7          9188                0                     0                    0
8          0                   0                     0                    0
9          8789                0                     0                    0
10         0                   0                     0                    0

Ch         OutOctets           OutUcastPkts          OutMcastPkts         OutBcastPkts
---        ---------           ------------          ------------         ------------
1          0                   0                     0                    0
2          27889               0                     0                    0
```

```
3         0                   0                     0                   0
4         0                   0                     0                   0
5         0                   0                     0                   0
6         0                   0                     0                   0
7         23739               0                     0                   0
```

The following example displays counters for Ethernet port 1.

```
Console# show interfaces counters ethernet e1

Port      InOctets          InUcastPkts          InMcastPkts          InBcastPkts
------    -----------       --------------       -----------          -----------
1         183892            0                    0                    0

Port      OutOctets         OutUcastPkts         OutMcastPkts         OutBcastPkts
------    -----------       --------------       ------------         ------------
1         9188              0                    0                    0

FCS Errors: 0
Single Collision Frames: 0
Late Collisions: 0
Excessive Collisions: 0
Oversize Packets: 0
Internal MAC Rx Errors: 0
Received Pause Frames: 0
Transmitted Pause Frames: 0
```

The following table describes the fields shown in the display:

Field	Description
InOctets	Counted received octets.
InUcastPkts	Counted received unicast packets.
InMcastPkts	Counted received multicast packets.
InBcastPkts	Counted received broadcast packets.
OutOctets	Counted transmitted octets.
OutUcastPkts	Counted transmitted unicast packets.
OutMcastPkts	Counted transmitted multicast packets.
OutBcastPkts	Counted transmitted broadcast packets.
FCS Errors	Counted received frames that are an integral number of octets in length but do not pass the FCS check.

Single Collision Frames	Counted frames that are involved in a single collision, and are subsequently transmitted successfully.
Late Collisions	Number of times that a collision is detected later than one slotTime into the transmission of a packet.
Oversize Packets	Counted frames received that exceed the maximum permitted frame size.
Internal MAC Rx Errors	Counted frames for which reception fails due to an internal MAC sublayer receive error.
Received Pause Frames	Counted MAC Control frames received with an opcode indicating the PAUSE operation.
Transmitted Pause Frames	Counted MAC Control frames transmitted on this interface with an opcode indicating the PAUSE operation.

port storm-control include-multicast

The **port storm-control include-multicast** Interface Configuration (Ethernet) mode command counts multicast packets in broadcast storm control. To disable counting multicast packets, use the **no** form of this command.

Syntax

port storm-control include-multicast [unknown-unicast]

no port storm-control include-multicast

Parameters

- **unknown-unicast** — Specifies also counting unknown unicast packets.

Default Configuration

Multicast packets are not counted.

Command Modes

Interface Configuration (Ethernet) mode

User Guidelines

To control multicasts storms, use the **port storm-control broadcast enable** and **port storm-control broadcast rate** commands.

Example

The following example enables counting broadcast and multicast packets on Ethernet port 3.

```
Console(config)# interface ethernet e3
Console(config-if)# port storm-control include-multicast
```

port storm-control broadcast enable

The **port storm-control broadcast enable** Interface Configuration (Ethernet) mode command enables broadcast storm control. To disable broadcast storm control, use the **no** form of this command.

Syntax

port storm-control broadcast enable

no port storm-control broadcast enable

Default Configuration

Broadcast storm control is disabled.

Command Modes

Interface Configuration (Ethernet) mode

User Guidelines

Use the **port storm-control broadcast rate** Interface Configuration (Ethernet) mode command, to set the maximum allowable broadcast rate.

Use the **port storm-control include-multicast** Interface Configuration (Ethernet) mode command to enable counting multicast packets and optionally unknown unicast packets in the storm control calculation.

The command can be enabled on a specific port only if **rate-limit** interface configuration command is not enabled on that port.

Example

The following example enables broadcast storm control on Ethernet port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# port storm-control broadcast enable
```

port storm-control broadcast rate

The **port storm-control broadcast rate** Interface Configuration (Ethernet) mode command configures the maximum broadcast rate. To return to the default configuration, use the **no** form of this command.

Syntax

port storm-control broadcast rate *rate*

no port storm-control broadcast rate

Parameters

- *rate* — Maximum kilobits per second of broadcast and multicast traffic on a port

  Possible values are:

  - 70K - 1M in steps of at least 10K
  - 1M-10M in steps of at least 1M
  - 10M-250M in steps based on the requested rate

Default Configuration

The default storm control broadcast rate is 100 Kbits/Sec.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

Use the **port storm-control broadcast enable** Interface Configuration mode command to enable broadcast storm control.

Since granularity depends on the requested rate, the software displays the actual rate.

Example

The following example configures the maximum storm control broadcast rate at 900 Kbits/Sec on Ethernet port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# port storm-control broadcast rate 900
```

show ports storm-control

The **show ports storm-control** Privileged EXEC mode command displays the storm control configuration.

Syntax

show ports storm-control [*interface*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Modes

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the storm control configuration.

```
Console# show ports storm-control


Port         State         Rate [Kbits/Sec]    Included
----         --------      ----------------    --------------------------------------
1            Enabled       100                 Broadcast
2            Enabled       100                 Broadcast
3            Enabled       100                 Broadcast
4            Enabled       100                 Broadcast
5            Enabled       100                 Broadcast
6            Enabled       100                 Broadcast
7            Enabled       100                 Broadcast
8            Enabled       100                 Broadcast
9            Enabled       1000                Broadcast
10           Disabled      1000                Broadcast
```

Section 7. GVRP Commands

gvrp enable (Global)

GARP VLAN Registration Protocol (GVRP) is an industry-standard protocol designed to propagate VLAN information from device to device. With GVRP, a single device is manually configured with all desired VLANs for the network, and all other devices on the network learn these VLANs dynamically.

The **gvrp enable** Global Configuration mode command enables GVRP globally. To disable GVRP on the device, use the **no** form of this command.

Syntax

gvrp enable

no gvrp enable

Default Configuration

GVRP is globally disabled.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enables GVRP globally on the device.

```
Console(config)# gvrp enable
```

gvrp enable (Interface)

The **gvrp enable** Interface Configuration (Ethernet, port-channel) mode command enables GVRP on an interface. To disable GVRP on an interface, use the **no** form of this command.

Syntax

gvrp enable

no gvrp enable

Default Configuration

GVRP is disabled on all interfaces.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

An access port does not dynamically join a VLAN because it is always a member in only one VLAN.

Membership in an untagged VLAN is propagated in the same way as in a tagged VLAN. That is, the PVID is manually defined as the untagged VLAN VID.

Example

The following example enables GVRP on Ethernet port 6.

```
Console(config)# interface ethernet e6
Console(config-if)# gvrp enable
```

garp timer

The **garp timer** Interface Configuration (Ethernet, Port channel) mode command adjusts the values of the join, leave and leaveall timers of GARP applications. To return to the default configuration, use the **no** form of this command.

Syntax

garp timer {**join** | **leave** | **leaveall**} *timer_value*

no garp timer

Parameters

- {**join** | **leave** | **leaveall**} — Indicates the type of timer.
- *timer_value* — Timer values in milliseconds in multiples of 10. (Range: 10-2147483647)

Default Configuration

Following are the default timer values:

- Join timer — 200 milliseconds
- Leave timer — 600 milliseconds
- Leavall timer — 10000 milliseconds

Command Mode

Interface configuration (Ethernet, port-channel) mode

User Guidelines

The following relationship must be maintained between the timers:

Leave time must be greater than or equal to three times the join time.

Leave-all time must be greater than the leave time.

Set the same GARP timer values on all Layer 2-connected devices. If the GARP timers are set differently on Layer 2-connected devices, the GARP application will not operate successfully.

Example

The following example sets the leave timer for Ethernet port 6 to 900 milliseconds.

```
Console(config)# interface ethernet e6
Console(config-if)# garp timer leave 900
```

gvrp vlan-creation-forbid

The **gvrp vlan-creation-forbid** Interface Configuration (Ethernet, port-channel) mode command disables dynamic VLAN creation or modification. To enable dynamic VLAN creation or modification, use the **no** form of this command.

Syntax

gvrp vlan-creation-forbid

no gvrp vlan-creation-forbid

Default Configuration

Dynamic VLAN creation or modification is enabled.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

This command forbids dynamic VLAN creation from the interface. The creation or modification of dynamic VLAN registration entries as a result of the GVRP exchanges on an interface are restricted only to those VLANs for which static VLAN registration exists.

Example

The following example disables dynamic VLAN creation on Ethernet port 6.

```
Console(config)# interface ethernet e6
Console(config-if)# gvrp vlan-creation-forbid
```

gvrp registration-forbid

The **gvrp registration-forbid** Interface Configuration (Ethernet, port-channel) mode command deregisters all dynamic VLANs on a port and prevents VLAN creation or registration on the port. To allow dynamic registration of VLANs on a port, use the **no** form of this command.

Syntax

gvrp registration-forbid

no gvrp registration-forbid

Default Configuration

Dynamic registration of VLANs on the port is allowed.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example forbids dynamic registration of VLANs on Ethernet port 6.

```
Console(config)# interface ethernet e6
Console(config-if)# gvrp registration-forbid
```

clear gvrp statistics

The **clear gvrp statistics** Privileged EXEC mode command clears all GVRP statistical information.

Syntax

clear gvrp statistics [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example clears all GVRP statistical information on Ethernet port 6.

```
Console# clear gvrp statistics ethernet e6
```

show gvrp configuration

The **show gvrp configuration** User EXEC mode command displays GVRP configuration information, including timer values, whether GVRP and dynamic VLAN creation is enabled, and which ports are running GVRP.

Syntax

show gvrp configuration [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays GVRP configuration information:

```
Console> show gvrp configuration


GVRP Feature is currently enabled on the device.


                                                       Timers (milliseconds)
Port(s)    Status     Registration      Dynamic VLAN       Join     Leave    Leave All
                                        Creation
------     -------    ------------      -----------        ----     -----    ---------
1          Enabled    Normal            Enabled            200      600      10000
4          Enabled    Normal            Enabled            200      600      10000
```

show gvrp statistics

The **show gvrp statistics** User EXEC mode command displays GVRP statistics.

Syntax

show gvrp statistics [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example shows GVRP statistical information:

```
Console> show gvrp statistics


GVRP Statistics:
Legend:
rJE  :     Join Empty Received              rJIn:      Join In Received
rEmp :     Empty Received                   rLIn:      Leave In Received
rLE  :     Leave Empty Received             rLA :      Leave All Received
sJE  :     Join Empty Sent                  sJIn:      Join In Sent
sEmp :     Empty Sent                       sLIn:      Leave In Sent
sLE  :     Leave Empty Sent                 sLA :      Leave All Sent
Port   rJE  rJIn  rEmp  rLIn   rLE   rLA   sJE  sJIn  sEmp  sLIn   sLE   sLA
```

show gvrp error-statistics

The **show gvrp error-statistics** User EXEC mode command displays GVRP error statistics.

Syntax

show gvrp error-statistics [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays GVRP statistical information.

```
Console> show gvrp error-statistics
GVRP Error Statistics:
Legend:
INVPROT :    Invalid Protocol Id             INVALEN :     Invalid Attribute Length
INVATYP :    Invalid Attribute Type          INVEVENT:     Invalid Event
INVAVAL :    Invalid Attribute Value
 Port INVPROT INVATYP INVAVAL INVALEN INVEVENT
```

Section 8. IGMP Snooping Commands

ip igmp snooping (Global)

The **ip igmp snooping** Global Configuration mode command enables Internet Group Management Protocol (IGMP) snooping. To disable IGMP snooping, use the **no** form of this command.

Syntax

ip igmp snooping

no ip igmp snooping

Default Configuration

IGMP snooping is disabled.

Command Mode

Global Configuration mode

User Guidelines

IGMP snooping can only be enabled on static VLANs.

Example

The following example enables IGMP snooping.

```
Console(config)# ip igmp snooping
```

ip igmp snooping (Interface)

The **ip igmp snooping** Interface Configuration (VLAN) mode command enables Internet Group Management Protocol (IGMP) snooping on a specific VLAN. To disable IGMP snooping on a VLAN interface, use the **no** form of this command.

Syntax

ip igmp snooping

no ip igmp snooping

Default Configuration

IGMP snooping is disabled .

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

IGMP snooping can only be enabled on static VLANs.

Example

The following example enables IGMP snooping on VLAN 2.

```
Console(config)# interface vlan 2
Console(config-if)# ip igmp snooping
```

ip igmp snooping host-time-out

The **ip igmp snooping host-time-out** Interface Configuration (VLAN) mode command configures the host-time-out. If an IGMP report for a multicast group was not received for a host-time-out period from a specific port, this port is deleted from the member list of that multicast group. To return to the default configuration, use the **no** form of this command.

Syntax

ip igmp snooping host-time-out *time-out*

no ip igmp snooping host-time-out

Parameters

- *time-out* — Host timeout in seconds. (Range: 1 - 2147483647)

Default Configuration

The default host-time-out is 260 seconds.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

The timeout should be at least greater than 2*query_interval+max_response_time of the IGMP router.

Example

The following example configures the host timeout to 300 seconds.

```
Console(config)# interface vlan 2
Console(config-if)# ip igmp snooping host-time-out 300
```

ip igmp snooping mrouter-time-out

The **ip igmp snooping mrouter-time-out** Interface Configuration (VLAN) mode command configures the mrouter-time-out. The **ip igmp snooping mrouter-time-out** Interface Configuration (VLAN) mode command is used for setting the aging-out time after multicast router ports are automatically learned. To return to the default configuration, use the **no** form of this command.

Syntax

ip igmp snooping mrouter-time-out *time-out*

no ip igmp snooping mrouter-time-out

Parameters

- *time-out* — Multicast router timeout in seconds (Range: 1 - 2147483647)

Default Configuration

The default value is 300 seconds.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the multicast router timeout to 200 seconds.

```
Console(config)# interface vlan 2
Console(config-if)# ip igmp snooping mrouter-time-out 200
```

ip igmp snooping leave-time-out

The **ip igmp snooping leave-time-out** Interface Configuration (VLAN) mode command configures the leave-time-out. If an IGMP report for a multicast group was not received for a leave-time-out period after an IGMP Leave was received from a specific port, this port is deleted from the member list of that multicast group.To return to the default configuration, use the **no** form of this command.

Syntax

ip igmp snooping leave-time-out {*time-out* | **immediate-leave**}

no ip igmp snooping leave-time-out

Parameters

- *time-out* — Specifies the leave-time-out in seconds for IGMP queries. (Range: 0-2147483647)
- **immediate-leave** — Indicates that the port should be immediately removed from the members list after receiving IGMP Leave.

Default Configuration

The default leave-time-out configuration is 10 seconds.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

The leave timeout should be set greater than the maximum time that a host is allowed to respond to an IGMP query.

Use **immediate leave** only where there is just one host connected to a port.

Example

The following example configures the host leave-time-out to 60 seconds.

```
Console(config)# interface vlan 2
Console(config-if)# ip igmp snooping leave-time-out 60
```

show ip igmp snooping mrouter

The **show ip igmp snooping mrouter** User EXEC mode command displays information on dynamically learned multicast router interfaces.

Syntax

show ip igmp snooping mrouter [**interface** *vlan-id*]

Parameters

- *vlan-id* — VLAN number.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays multicast router interfaces in VLAN 1000.

```
Console> show ip igmp snooping mrouter interface 1000


VLAN               Ports
----               -----
1000               1


Detected multicast routers that are forbidden statically:
VLAN               Ports
----               -----
1000               9
```

show ip igmp snooping interface

The **show ip igmp snooping interface** User EXEC mode command displays IGMP snooping configuration.

Syntax

show ip igmp snooping interface *vlan-id*

Parameters

- *vlan-id* — VLAN number.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays IGMP snooping information on VLAN 1000.

```
Console> show ip igmp snooping interface 1000
IGMP Snooping is globaly enabled
IGMP Snooping is enabled on VLAN 1000
IGMP host timeout is 300 sec
IGMP Immediate leave is disabled. IGMP leave timeout is 10 sec
IGMP mrouter timeout is 200 sec
Automatic learning of multicast router ports is enabled
```

show ip igmp snooping groups

The **show ip igmp snooping groups** User EXEC mode command displays multicast groups learned by IGMP snooping.

Syntax

show ip igmp snooping groups [**vlan** *vlan-id*] [**address** *ip-multicast-address*]

Parameters

- *vlan-id* — VLAN number.
- *ip-multicast-address* — IP multicast address.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

To see the full multicast address table (including static addresses) use the **show bridge multicast address-table** Privileged EXEC command.

Example

The following example shows IGMP snooping information on multicast groups.

```
Console> show ip igmp snooping groups

Vlan            IP Address                Querier           Ports
----            -----------------         -------           ----------
1               224-239.130|2.2.3         Yes               1, 2
8               224-239.130|2.2.8         Yes               3-5

IGMP Reporters that are forbidden statically:
---------------------------------------------
Vlan            IP Address                Ports
----            -----------------         -----
1               224-239.130|2.2.3         7
```

Section 9. IP Addressing Commands

ip address

The **ip address** Interface Configuration (Ethernet, VLAN, port-channel) mode command sets an IP address. To remove an IP address, use the **no** form of this command.

Syntax

ip address *ip-address* {*mask* | *prefix-length*}

no ip address [*ip-address*]

Parameters

- *ip-address* —Valid IP address
- *mask* — Valid network mask of the IP address.
- *prefix-length* — Specifies the number of bits that comprise the IP address prefix. The prefix length must be preceded by a forward slash (/). (Range: 8 -30)

Default Configuration

No IP address is defined for interfaces.

Command Mode

Interface Configuration (Ethernet, VLAN, port-channel) mode

User Guidelines

An IP address cannot be configured for a range of interfaces (range context).

Example

The following example configures VLAN 1 with IP address 131.108.1.27 and subnet mask 255.255.255.0.

```
Console(config)# interface vlan 1
Console(config-if)# ip address 131.108.1.27 255.255.255.0
```

ip address dhcp

The **ip address dhcp** Interface Configuration (Ethernet, VLAN, port-channel) mode command acquires an IP address for an Ethernet interface from the Dynamic Host Configuration Protocol (DHCP) server. To deconfigure an acquired IP address, use the **no** form of this command.

Syntax

ip address dhcp [**hostname** *host-name*]

no ip address dhcp

Parameters

- *host-name* — Specifies the name of the host to be placed in the DHCP option 12 field. This name does not have to be the same as the host name specified in the **hostname** Global Configuration mode command. (Range: 1-20 characters)

Default Configuration

This command has no default configuration.

Command Mode

Interface Configuration (Ethernet, VLAN, port-channel) mode

User Guidelines

The **ip address dhcp** command allows any interface to dynamically learn its IP address by using the DHCP protocol.

Some DHCP servers require that the DHCPDISCOVER message have a specific host name. The **ip address dhcp hostname** *host-name* command is most typically used when the host name is provided by the system administrator.

If the device is configured to obtain its IP address from a DHCP server, it sends a DHCPDISCOVER message to provide information about itself to the DHCP server on the network.

If the **ip address dhcp** command is used with or without the optional keyword, the DHCP option 12 field (host name option) is included in the DISCOVER message. By default, the specified DHCP host name is the globally configured host name of the device. However, the **ip address dhcp hostname** *host-name* command can be used to place a different host name in the DHCP option 12 field.

The **no ip address dhcp** command deconfigures any IP address that was acquired, thus sending a DHCPRELEASE message.

Example

The following example acquires an IP address for Ethernet port 4 from DHCP.

```
Console(config)# interface ethernet e4
Console(config-if)# ip address dhcp
```

ip default-gateway

The **ip default-gateway** Global Configuration mode command defines a default gateway (router). To return to the default configuration, use the **no** form of this command.

Syntax

ip default-gateway *ip-address*

no ip default-gateway

Parameters

- *ip-address* — Valid IP address of the default gateway.

Default Configuration

No default gateway is defined.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example defines default gateway 192.168.1.1.

```
Console(config)# ip default-gateway 192.168.1.1
```

show ip interface

The **show ip interface** Privileged EXEC mode command displays the usability status of configured IP interfaces.

Syntax

show ip interface [**ethernet** *interface-number* | **vlan** *vlan-id* | **port-channel** *port-channel number.*]

Parameters

- *interface-number* — Valid Ethernet port.
- *vlan-id* — Valid VLAN number.
- *port-channel number.* — Valid Port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example the displays the configured IP interfaces and their types.

```
Console# show ip interface

Gateway IP Address            Type                     Activity status
------------------            ------                   ---------------
10.7.1.1                      Static                   Active



IP address                    Interface                Type
-------------                 ---------                -------
10.7.1.192/24                 VLAN 1                   Static
10.7.2.192/24                 VLAN 2                   DHCP
```

arp

The **arp** Global Configuration mode command adds a permanent entry in the Address Resolution Protocol (ARP) cache. To remove an entry from the ARP cache, use the **no** form of this command.

Syntax

arp *ip_addr hw_addr* {**ethernet** i*nterface-number* | **vlan** *vlan-id* | **port-channel** *port-channel number.*}

no arp *ip_addr* {**ethernet** i*nterface-number* | **vlan** *vlan-id* | **port-channel** *port-channel number.*}

Parameters

- *ip_addr* — Valid IP address or IP alias to map to the specified MAC address.
- *hw_addr* — Valid MAC address to map to the specified IP address or IP alias.
- *interface-number* — Valid Ethernet port.
- *vlan-id* — Valid VLAN number**.**
- *port-channel number.* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

The software uses ARP cache entries to translate 32-bit IP addresses into 48-bit hardware addresses. Because most hosts support dynamic resolution, static ARP cache entries do not generally have to be specified.

Example

The following example adds IP address 198.133.219.232 and MAC address 00:00:0c:40:0f:bc to the ARP table.

```
Console(config)# arp 198.133.219.232 00:00:0c:40:0f:bc ethernet e6
```

arp timeout

The **arp timeout** Global Configuration mode command configures how long an entry remains in the ARP cache. To return to the default configuration, use the **no** form of this command.

Syntax

arp timeout *seconds*

no arp timeout

Parameters

- *seconds* — Time (in seconds) that an entry remains in the ARP cache. (Range: 1 - 40000000)

Default Configuration

The default timeout is 60000 seconds.

Command Mode

Global Configuration mode

User Guidelines

It is recommended not to set the timeout value to less than 3600.

Example

The following example configures the ARP timeout to 12000 seconds.

```
Console(config)# arp timeout 12000
```

clear arp-cache

The **clear arp-cache** Privileged EXEC mode command deletes all dynamic entries from the ARP cache.

Syntax

clear arp-cache

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example deletes all dynamic entries from the ARP cache.

```
Console# clear arp-cache
```

show arp

The **show arp** Privileged EXEC mode command displays entries in the ARP table.

Syntax

show arp

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays entries in the ARP table.

```
Console# show arp
ARP timeout: 80000 Seconds

Interface        IP address             HW address                Status
---------        ----------             -----------------         -------
1                10.7.1.102             00:10:B5:04:DB:4B         Dynamic
2                10.7.1.135             00:50:22:00:2A:A4         Static
```

ip domain-name

The **ip domain-name** Global Configuration mode command defines a default domain name used by the software to complete unqualified host names (names without a dotted-decimal domain name). To remove the default domain name, use the **no** form of this command.

Syntax

ip domain-name *name*

no ip domain-name

Parameters

- *name* — Specifies the default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. (Range: 1-158 characters)

Default Configuration

A default domain name is not defined.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

ip name-server

The **ip name-server** Global Configuration mode command defines the available name servers. To remove a name server, use the **no** form of this command.

Syntax

ip name-server *server-address* [*server-address2 … server-address8*]

no ip name-server [*server-address1 … server-address8*]

Parameters

- *server-address* — Specifies IP addresses of the name server.

Default Configuration

No name server addresses are specified.

Command Mode

Global Configuration mode

User Guidelines

The preference of the servers is determined by the order in which they were entered.

Up to 8 servers can be defined using one command or using multiple commands.

Examples

The following example sets the available name server.

```
Console(config)# ip name-server 176.16.1.18
```

ip host

The **ip host** Global Configuration mode command defines static host name-to-address mapping in the host cache. To remove the name-to-address mapping, use the **no** form of this command.

Syntax

ip host *name address*

no ip host *name*

Parameters

- *name* — Name of the host (Range: 1-158 characters)
- *address* — Associated IP address.

Default Configuration

No host is defined.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

clear host

The **clear host** Privileged EXEC mode command deletes entries from the host name-to-address cache.

Syntax

clear host {*name* | *****}

Parameters

- *name* — Specifies the host entry to be removed. (Range: 1-158 characters)
- ***** — Removes all entries.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example deletes all entries from the host name-to-address cache.

```
Console# clear host *
```

clear host dhcp

The **clear host dhcp** Privileged EXEC mode command deletes entries from the host name-to-address mapping received from Dynamic Host Configuration Protocol (DHCP).

Syntax

clear host dhcp {*name* | *****}

Parameters

- *name* — Specifies the host entry to be removed. (Range: 1-158 characters)
- * — Removes all entries.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

This command deletes the host name-to-address mapping temporarily until the next renewal of the IP address.

Examples

The following example deletes all entries from the host name-to-address mapping.

```
Console# clear host dhcp *
```

show hosts

The **show hosts** Privileged EXEC mode command displays the default domain name, a list of name server hosts, the static and the cached list of host names and addresses.

Syntax

show hosts [*name*]

Parameters

- *name* — Specifies the host name. (Range: 1-158 characters)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays host information.

```
Console# show hosts
Host name: Device
Default domain is gm.com, sales.gm.com, usa.sales.gm.com(DHCP)
Name/address lookup is enabled
Name servers (Preference order): 176.16.1.18 176.16.1.19

Configured host name-to-address mapping:
Host                                       Addresses
----                                       ---------
accounting.gm.com                          176.16.8.8 176.16.8.9 (DHCP)

Cache:                  TTL(Hours)
Host                    Total    Elapsed    Type        Addresses
----                    -----    -------    ------      ---------
www.stanford.edu        72       3          IP          171.64.14.203
```

Section 10. LACP Commands

lacp system-priority

The **lacp system-priority** Global Configuration mode command configures the system priority. To return to the default configuration, use the **no** form of this command.

Syntax

lacp system-priority *value*

no lacp system-priority

Parameters

- *value* — Specifies system priority value. (Range: 1 - 65535)

Default Configuration

The default system priority is 1.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the system priority to 120.

```
Console(config)# lacp system-priority 120
```

lacp port-priority

The **lacp port-priority** Interface Configuration (Ethernet) mode command configures physical port priority. To return to the default configuration, use the **no** form of this command.

Syntax

lacp port-priority *value*

no lacp port-priority

Parameters

- *value* — Specifies port priority. (Range: 1 - 65535)

Default Configuration

The default port priority is 1.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example defines the priority of Ethernet port 6 as 247.

```
Console(config)# interface ethernet e6
Console(config-if)# lacp port-priority 247
```

lacp timeout

The **lacp timeout** Interface Configuration (Ethernet) mode command assigns an administrative LACP timeout. To return to the default configuration, use the **no** form of this command.

Syntax

lacp timeout {**long | short**}

no lacp timeout

Parameters

- **long** — Specifies the long timeout value.
- **short** — Specifies the short timeout value.

Default Configuration

The default port timeout value is **long**.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example assigns a long administrative LACP timeout to Ethernet port 6 .

```
Console(config)# interface ethernet e6
Console(config-if)# lacp timeout long
```

show lacp ethernet

The **show lacp ethernet** Privileged EXEC mode command displays LACP information for Ethernet ports.

Syntax

show lacp ethernet *interface* [**parameters** | **statistics** | **protocol-state**]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)
- **parameters** — Link aggregation parameter information.
- **statistics** — Link aggregation statistics information.
- **protocol-state** — Link aggregation protocol-state information.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example display LACP information for Ethernet port 1.

```
Console# show lacp ethernet e1

Port e1 LACP parameters:
      Actor
               system priority:                 1
               system mac addr:                 00:00:12:34:56:78
               port Admin key:                  30
               port Oper key:                   30
               port Oper number:                21
               port Admin priority:             1
               port Oper priority:              1
               port Admin timeout:              LONG
               port Oper timeout:               LONG
               LACP Activity:                   ACTIVE
               Aggregation:                     AGGREGATABLE
               synchronization:                 FALSE
               collecting:                      FALSE
               distributing:                    FALSE
               expired:                         FALSE
      Partner
               system priority:                 0
               system mac addr:                 00:00:00:00:00:00
               port Admin key:                  0
               port Oper key:                   0
               port Oper number:                0
               port Admin priority:             0
               port Oper priority:              0
               port Oper timeout:               LONG
               LACP Activity:                   PASSIVE
               Aggregation:                     AGGREGATABLE
               synchronization:                 FALSE
               collecting:                      FALSE
               distributing:                    FALSE
               expired:                         FALSE

Port e1 LACP Statistics:
LACP PDUs sent:                                 2
LACP PDUs received:                             2

Port e1 LACP Protocol State:
      LACP State Machines:
               Receive FSM:                     Port Disabled State
               Mux FSM:                         Detached State
               Periodic Tx FSM:                 No Periodic State
      Control Variables:
               BEGIN:                           FALSE
               LACP_Enabled:                    TRUE
               Ready_N:                         FALSE
               Selected:                        UNSELECTED
               Port_moved:                      FALSE
               NNT:                             FALSE
               Port_enabled:                    FALSE
      Timer counters:
               periodic tx timer:               0
               current while timer:             0
               wait while timer:                0
```

show lacp port-channel

The **show lacp port-channel** Privileged EXEC mode command displays LACP information for a port-channel.

Syntax

show lacp port-channel [*port_channel_number*]

Parameters

- *port_channel_number* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays LACP information about port-channel 1.

```
Console# show lacp port-channel 1
Port-Channel 1: Port Type 1000 Ethernet
       Actor
                    System Priority:         1
                    MAC Address:              00:02:85:0E:1C:00
                    Admin Key:                29
                    Oper Key:                 29

        Partner
                    System Priority:         0
                    MAC Address:              00:00:00:00:00:00
                    Oper Key:                 14
```

Section 11. Line Commands

line

The **line** Global Configuration mode command identifies a specific line for configuration and enters the Line Configuration command mode.

Syntax

line {**console** | **telnet** | **ssh**}

Parameters

- **console** — Console terminal line.
- **telnet** — Virtual terminal for remote console access (Telnet).
- **ssh** — Virtual terminal for secured remote console access (SSH).

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example configures the device as a virtual terminal for remote console access.

```
Console(config)# line telnet
Console(config-line)#
```

speed

The **speed** Line Configuration mode command sets the line baud rate. To return to the default configuration, use the **no** form of the command.

Syntax

speed *bps*

no speed

Parameters

- *bps*—Baud rate in bits per second (bps). Possible values are 2400, 4800, 9600, 19200 and 38400.

Default Configuration

The default speed is 38400 bps.

Command Mode

Line Configuration (console) mode.

User Guidelines

This command is available only on the line console.

Examples

The following example configures the line baud rate to 38400.

```
Console(config)# line console
Console(config-line)# speed 38400
```

exec-timeout

The **exec-timeout** Line Configuration mode command sets the interval that the system waits until user input is detected. To return to the default configuration, use the **no** form of this command.

Syntax

exec-timeout *minutes* [*seconds*]

no exec-timeout

Parameters

- *minutes* — Specifies the number of minutes. (Range: 0 - 65535)
- *seconds* — Specifies additional time intervals in seconds. (Range: 0 - 59)

Default Configuration

The default configuration is 10 minutes.

Command Mode

Line Configuration mode

User Guidelines

To specify no timeout, enter the **exec-timeout** 0 command.

Examples

The following example configures the interval that the system waits until user input is detected to 20 minutes.

```
Console(config)# line console
Console(config-line)# exec-timeout 20
```

history

The **history** Line Configuration mode command enables the command history function. To disable the command history function, use the **no** form of this command.

Syntax

history

no history

Default Configuration

The command history function is enabled.

Command Mode

Line Configuration mode

User Guidelines

This command enables the command history function for a specified line. To enable or disable the command history function for the current terminal session, use the **terminal history** user EXEC mode command.

Example

The following example enables the command history function for telnet.

```
Console(config)# line telnet
Console(config-line)# history
```

history size

The **history size** Line Configuration mode command configures the command history buffer size for a particular line. To reset the command history buffer size to the default configuration, use the **no** form of this command.

Syntax

history size *number-of-commands*

no history size

Parameters

- *number-of-commands*—Number of commands that the system records in its history buffer. (Range: 10 - 216)

Default Configuration

The default history buffer size is 10.

Command Mode

Line Configuration mode

User Guidelines

This command configures the command history buffer size for a particular line. To configure the command history buffer size for the current terminal session, use the **terminal history size** User EXEC mode command.

Example

The following example changes the command history buffer size to 100 entries for a particular line.

```
Console(config-line)# history size 100
```

terminal history

The **terminal history** user EXEC command enables the command history function for the current terminal session. To disable the command history function, use the **no** form of this command.

Syntax

terminal history

no terminal history

Default Configuration

The default configuration for all terminal sessions is defined by the **history** line configuration command.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example disables the command history function for the current terminal session.

```
Console# no terminal history
```

terminal history size

The **terminal history size** user EXEC command configures the command history buffer size for the current terminal session. To reset the command history buffer size to the default setting, use the **no** form of this command..

Syntax

terminal history size *number-of-commands*

terminal no history size

Parameters

- *number-of-commands*—Specifies the number of commands the system may record in its command history buffer. (Range: 10-216)

Default Configuration

The default command history buffer size is 10.

Command Mode

User EXEC mode

User Guidelines

The **terminal history size** user EXEC command configures the size of the command history buffer for the current terminal session. To change the default size of the command history buffer, use the **history** line configuration command.

The maximum number of commands in all buffers is 256.

Examples

The following example configures the command history buffer size to 20 commands for the current terminal session.

```
Console# terminal history size 20
```

show line

The **show line** User EXEC mode command displays line parameters.

Syntax

show line [console | **telnet** | **ssh**]

Parameters

- **console** — Console terminal line.
- **telnet** — Virtual terminal for remote console access (Telnet).
- **ssh** — Virtual terminal for secured remote console access (SSH).

Default Configuration

If the line is not specified, the default value is console.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays the line configuration.

```
Console> show line

Console configuration:
            Interactive timeout: Disabled
            History: 10
            Baudrate: 9600
            Databits: 8
            Parity: none
            Stopbits: 1

Telnet configuration:
            Interactive timeout: 10 minutes 10 seconds
            History: 10

SSH configuration:
            Interactive timeout: 10 minutes 10 seconds
            History: 10
```

Section 12. Management ACL

management access-list

The **management access-list** Global Configuration mode command configures a management access list and enters the Management Access-list Configuration command mode. To delete an access list, use the **no** form of this command.

Syntax

management access-list *name*

no management access-list *name*

Parameters

- *name* — Access list name. (Range: 1-32 characters)

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

Use this command to configure a management access list. The command enters the Access-list Configuration mode, where permit and deny access rules are defined using the **permit (Management)** and **deny (Management)** commands.

If no match criteria are defined, the default is deny.

If you reenter an access list context, the new rules are entered at the end of the access list.

Use the **management access-class** command to select the active access list.

The active management list cannot be updated or removed.

Management ACL requires a valid management interface, which is a port, VLAN, or port-channnel with an IP address or console interface. Management ACL only restricts access to the device for management configuration or viewing.

Examples

The following example creates a management access list called mlist, configures management Ethernet interfaces 1 and 6 and makes the new access list the active list.

```
Console(config)# management access-list mlist
Console(config-macl)# permit ethernet 1
Console(config-macl)# permit ethernet 6
Console(config-macl)# exit
Console(config)# management access-class mlist
```

The following example creates a management access list called mlist, configures all interfaces to be management interfaces except Ethernet interfaces 1 and 6 and makes the new access list the active list.

```
Console(config)# management access-list mlist
Console(config-macl)# deny ethernet e1
Console(config-macl)# deny ethernet e6
Console(config-macl)# permit
Console(config-macl)# exit
Console(config)# management access-class mlist
```

permit (Management)

The **permit** Management Access-List Configuration mode command defines a permit rule.

Syntax

permit [**ethernet** *interface-number* | **vlan** *vlan-id* | **port-channel** *port-channel-number*]

permit ip-source *ip-address* [**mask** *mask* | *prefix-length*] [**ethernet** *interface-number* | **vlan** *vlan-id* | **port-channel** *port-channel-number*]

Parameters

- *interface-number* — A valid Ethernet port number.
- *vlan-id* — A valid VLAN number.
- *port-channel-number* — A valid port channel index.
- *ip-address* — A valid source IP address.
- *mask* — A valid network mask of the source IP address.
- *prefix-length* — Number of bits that comprise the source IP address prefix. The prefix length must be preceded by a forward slash (/). (Range: 0 - 32)

Default Configuration

If no permit rule is defined, the default is set to deny**.**

Command Mode

Management Access-list Configuration mode

User Guidelines

Rules with Ethernet, VLAN and port-channel parameters are valid only if an IP address is defined on the appropriate interface.

The system supports up to 128 management access rules.

Example

The following example permits all ports in the mlist access list.

```
Console(config)# management access-list mlist
Console(config-macl)# permit
```

deny (Management)

The **deny** Management Access-List Configuration mode command defines a deny rule.

Syntax

deny [**ethernet** *interface-number* | **vlan** *vlan-id* | **port-channel** *port-channel-number*]

deny ip-source *ip-address* [**mask** *mask* | *prefix-length*] [**ethernet** *interface-number* | **vlan** *vlan-id* | **port-channel** *port-channel-number*]

Parameters

- *interface-number* — A valid Ethernet port number.
- *vlan-id* — A valid VLAN number.
- *port-channel-number* — A valid port-channel number.
- *ip-address* — A valid source IP address.
- *mask* — A valid network mask of the source IP address.
- **mask** *prefix-length* — Specifies the number of bits that comprise the source IP address prefix. The prefix length must be preceded by a forward slash (/). (Range: 0-32)

Default Configuration

This command has no default configuration.

Command Mode

Management Access-list Configuration mode

User Guidelines

Rules with Ethernet, VLAN and port-channel parameters are valid only if an IP address is defined on the appropriate interface.

The system supports up to 128 management access rules.

Example

The following example denies all ports in the access list called mlist.

```
Console(config)# management access-list mlist
Console(config-macl)# deny
```

management access-class

The **management access-class** Global Configuration mode command restricts management connections by defining the active management access list. To disable this restriction, use the **no** form of this command.

Syntax

management access-class {**console-only** | *name*}

no management access-class

Parameters

- **console-only** — Indicates that the device can be managed only from the console.
- *name* — Specifies the name of the access list to be used. (Range: 1-32 characters)

Default Configuration

If no access list is specified, an empty access list is used.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures an access list called mlist as the management access list.

```
Console(config)# management access-class mlist
```

show management access-list

The **show management access-list** Privileged EXEC mode command displays management access-lists.

Syntax

show management access-list [*name*]

Parameters

- *name* — Specifies the name of a management access list. (Range: 1 - 32 characters)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the mlist management access list.

```
Console# show management access-list mlist
mlist
-----
         permit ethernet e1
         permit ethernet e2
! (Note: all other access implicitly denied)
```

show management access-class

The **show management access-class** Privileged EXEC mode command displays the active management access list.

Syntax

show management access-class

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays information about the active management access list.

```
Console# show management access-class
Management access-class is enabled, using access list mlist
```

Section 13. PHY Diagnostics Commands

test copper-port tdr

The **test copper-port tdr** Privileged EXEC mode command uses Time Domain Reflectometry (TDR) technology to diagnose the quality and characteristics of a copper cable attached to a port.

Syntax

test copper-port tdr *interface*

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

The port to be tested should be shut down during the test, unless it is a combination port with fiber port active.

The maximum length of the cable for the TDR test is 120 meter.

Examples

The following example results in a report on the cable attached to port 3.

```
Console# test copper-port tdr 3
Cable is open at 64 meters
Console# test copper-port tdr 3
Can’t perform this test on fiber ports
```

show copper-ports tdr

The **show copper-ports tdr** User EXEC mode command displays information on the last Time Domain Reflectometry (TDR) test performed on copper ports.

Syntax

show copper-ports tdr [*interface*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

The maximum length of the cable for the TDR test is 120 meter.

Example

The following example displays information on the last TDR test performed on all copper ports.

```
Console> show copper-ports tdr

Port      Result         Length [meters]     Date
----      ------         ---------------     ----
1         OK
2         Short          50                  13:32:00 23 July 2005
3         Not Tested
4         Open           64                  13:32:00 23 July 2005
5         Open                               13:32:00 23 July 2005
6         Open                               13:32:00 23 July 2005
7         Open                               13:32:00 23 July 2005
8         Open                               13:32:00 23 July 2005
9         Open                               13:32:00 23 July 2005
10        Fiber          -                   -
```

show copper-ports cable-length

The **show copper-ports cable-length** User EXEC mode command displays the estimated copper cable length attached to a port.

Syntax

show copper-ports cable-length [*interface*]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

The port must be active and working in 100M or 1000M mode.

Example

The following example displays the estimated copper cable length attached to all ports.

```
Console> show copper-ports cable-length

Port           Length [meters]
----           ---------------------
1              < 50
2              Copper not active
3              110-140
10             Fiber
```

show fiber-ports optical-transceiver

The **show fiber-ports optical-transceiver** Privileged EXEC command displays the optical transceiver diagnostics.

Syntax

show fiber-ports optical-transceiver [*interface*] [**detailed**]

Parameters

- *interface* — A valid Ethernet port. (Full syntax: *port*)
- **detailed** — Detailed diagnostics.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

To test optical transceivers, ensure a fiber link is present.

Examples

The following examples display the optical transceiver diagnostics.

```
Console# show fiber-ports optical-transceiver


                                               Power
Port       Temp       Voltage     Current     Output     Input      TX Fault     LOS
----       ----       -------     -------     ------     -----      -------      ---
10         OK         OK          OK          OK         OK         E            OK


Temp – Internally measured transceiver temperature.
Voltage - Internally measured supply voltage.
Current – Measured TX bias current.
Output Power – Measured TX output power.
Input Power – Measured RX  received power.
Tx Fault – Transmitter fault
LOS – Loss of signal
N/A - Not Available, N/S - Not Supported, W - Warning, E - Error
```

Section 14. Port Channel Commands

interface port-channel

The **interface port-channel** Global Configuration mode command enters the interface configuration mode to configure a specific port-channel.

Syntax

interface port-channel *port-channel-number*

Parameters

- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

Six aggregated links can be defined, each can have up to eight member ports per port-channel. The aggregated links' valid IDs are 1-8.

Example

The following example enters the context of port-channel number 1.

```
Console(config)# interface port-channel 1
```

interface range port-channel

The **interface range port-channel** Global Configuration mode command enters the interface configuration mode to configure multiple port-channels.

Syntax

interface range port-channel {*port-channel-range* | **all**}

Parameters

- *port-channel-range* — List of valid port-channels to add. Separate nonconsecutive port-channels with a comma and no spaces. A hyphen designates a range of port-channels.
- **all** — All valid port-channels.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

Commands under the interface range context are executed independently on each interface in the range.

Example

The following example groups port-channels 1, 2 and 6 to receive the same command.

```
Console(config)# interface range port-channel 1-2,6
```

channel-group

The **channel-group** Interface Configuration (Ethernet) mode command associates a port with a port-channel. To remove a port from a port-channel, use the **no** form of this command.

Syntax

channel-group *port-channel-number* **mode** {**on** | **auto**}

no channel-group

Parameters

- *port-channel_number* — Specifies the number of the valid port-channel for the current port to join.
- **on** — Forces the port to join a channel without an LACP operation.
- **auto** — Allows the port to join a channel as a result of an LACP operation.

Default Configuration

The port is not assigned to a port-channel.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example forces port 1 to join port-channel 1 without an LACP operation.

```
Console(config)# interface ethernet e1
Console(config-if)# channel-group 1 mode on
```

show interfaces port-channel

The **show interfaces port-channel** Privileged EXEC mode command displays port-channel information.

Syntax

show interfaces port-channel [*port-channel-number*]

Parameters

- *port-channel-number* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays information on all port-channels.

```
Console# show interfaces port-channel

Channel                 Ports
-------                 ---------------------------------
1                       Active: 1, 2
2                       Active: 2, 7 Inactive: 1
3                       Active: 3, 8
```

Section 15. Port Monitor Commands

port monitor

The **port monitor** Interface Configuration mode command starts a port monitoring session. To stop a port monitoring session, use the **no** form of this command.

Syntax

port monitor *src-interface* **[rx | tx]**

no port monitor *src-interface*

Parameters

- *src-interface*—Valid Ethernet port. (Full syntax: *port*)
- **rx—**Monitors received packets only.
- **tx—**Monitors transmitted packets only.

Default Configuration

Monitors both received and transmitted packets.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

This command enables traffic on one port to be copied to another port, or between the source port (src-interface) and a destination port (port being configured).

The following restrictions apply to ports configured as destination ports:

The port cannot be already configured as a source port.

The port cannot be a member in a port-channel.

An IP interface is not configured on the port.

GVRP is not enabled on the port.

The port is not a member of a VLAN, except for the default VLAN (will automatically be removed from the default VLAN).

The following restrictions apply to ports configured to be source ports:

The port cannot be already configured as a destination port.

Example

The following example copies traffic on port 8 (source port) to port 1 (destination port).

```
Console(config)# interface ethernet e1
Console(config-if)# port monitor e8
```

port monitor vlan-tagging

The **port monitor** Interface Configuration (Ethernet) mode command transmits tagged ingress mirrored packets. To transmit untagged ingress mirrored packets, use the **no** form of this command.

Syntax

port monitor vlan-tagging

no port monitor vlan-tagging

Default Configuration

Ingress mirrored packets are transmitted untagged.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures all ingress mirrored packets from port 9 to be transmitted as tagged packets.

```
Console (config)# interface ethernet e9
Console (config-if)# port monitor vlan-tagging
```

show ports monitor

The **show ports monitor** User EXEC mode command displays the port monitoring status.

Syntax

show ports monitor

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example shows how the port monitoring status is displayed.

```
Console> show ports monitor
Source Port       Destination Port        Type      Status      VLAN Tagging
-----------       ----------------        -----     -------     ------------
1                 8                       RX,TX     Active      No
2                 8                       RX,TX     Active      No
6                 8                       RX        Active      No
```

Section 16. QoS Commands

qos

The **qos** Global Configuration mode command enables quality of service (QoS) on the device. To disable QoS on the device, use the **no** form of this command.

Syntax

qos

no qos

Default Configuration

QoS is disabled on the device.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enables QoS on the device.

```
Console(config)# qos
```

show qos

The **show qos** User EXEC mode command displays quality of service (QoS) for the device.

Syntax

show qos

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays QoS attributes when QoS is disabled on the device.

```
Console> show qos
Qos: disable
Trust: dscp
```

priority-queue out num-of-queues

The **priority-queue out num-of-queues** Global Configuration mode command configures the number of expedite queues. To return to the default configuration, use the **no** form of this command.

Syntax

priority-queue out num-of-queues *number-of-queues*

no priority-queue out num-of-queues

Parameters

- *number-of-queues* — Specifies the number of expedite queues. The expedite queues would be the queues with higher indexes. (Range: 0-3)

Default Configuration

All queues are expedite queues.

Command Mode

Global Configuration mode

User Guidelines

When the specified number of expedite queues is 0, no SP is used and weights are defined as 1, 2, 4 and 8.

When the specified number of expedite queues is 4, the Strict Priority scheduling method is used.

Example

The following example configures the number of expedite queues as 0.

```
Console(config)# priority-queue out num-of-queues 0
```

show qos interface

The **show qos interface** User EXEC mode command displays interface QoS information.

Syntax

show qos interface [**ethernet** *interface-number* | **vlan** *vlan-id* **| port-channel** *number*] [**queueing | rate-limit**]

Parameters

- *interface-number* — Valid Ethernet port number.
- *vlan-id*— Valid VLAN ID.
- *number* — Valid port-channel number.
- **queuing** — Indicates the queue strategy (WRR or EF), the weight for WRR queues, the CoS to queue map and the EF priority.

Default Configuration

There is no default configuration for this command.

Command Mode

User EXEC mode

User Guidelines

If no keyword is specified, port QoS information (e.g., DSCP trusted, CoS trusted, untrusted, etc.) is displayed.

If no interface is specified, QoS information about all interfaces is displayed.

Examples

The following example displays QoS information about Ethernet port 7.

```
Console> show qos interface queuing ethernet e7
Ethernet   e7
wrr bandwidth weights and EF priority:

qid          weights              Ef             Priority
1            25                   dis            N/A
2            25                   dis            N/A
3            25                   dis            N/A
4            25                   dis            N/A

Cos-queue map:
cos          qid
0            2
1            1
2            1
```

```
3           2
4           3
5           3
6           4
7           4
```

traffic-shape

Set shaper on egress port/queue. Use **no** form in order to disable the shaper.

traffic-shape { *committed-rate* } [*queue-id*]

no traffic-shape [*queue-id***]**

Syntax

committed-rate – The average traffic rate (CIR) in **b**its **p**er **s**econd(bps).

queue-id – [optional] Assign shaper to the specified queue.

no traffic-shape – disable the shaper on the interface, or use queue-id to disable the shaper on the specified queue.

Command Mode

Interface configuration (Ethernet, Port-Channel).

Usage guidelines

Use this command in interface configuration mode to active shaper on egress port or egress queue.

For egress port, enter the interface configuration mode with the port number, and use traffic-shape without the queue-id option; the CIRis applied on the specified port.

To activate shaper for specific queue, add the queue id to the line.

Default value

No shape is defined.

wrr-queue cos-map

The **wrr-queue cos-map** Global Configuration mode command maps Class of Service (CoS) values to a specific egress queue. To return to the default configuration, use the **no** form of this command.

Syntax

wrr-queue cos-map *queue-id cos1...cos8*

no wrr-queue cos-map [*queue-id*]

Parameters

- *queue-id* — Specifies the queue number to which the CoS values are mapped.
- *cos1...cos8* — Specifies CoS values to be mapped to a specific queue. (Range: 0-7)

Default Configuration

The map default values for 4 queues:

- CoS value 1 select queue 1
- CoS value 2 select queue 1
- CoS value 0 select queue 2
- CoS value 3 select queue 2
- CoS value 4 select queue 3
- CoS value 5 select queue 3
- CoS value 6 select queue 4
- CoS value 7 select queue 4

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example maps CoS 7 to queue 2.

```
Console(config)# wrr-queue cos-map 2 7
```

qos map dscp-queue

The **qos map dscp-queue** Global Configuration mode command modifies the DSCP to CoS map. To return to the default map, use the **no** form of this command.

Syntax

qos map dscp-queue *dscp-list* **to** *queue-id*

no qos map dscp-queue [d*scp-list*]

Parameters

- *dscp-list* — Specifies up to 8 DSCP values separated by a space. (Range: 0 - 63)
- *queue-id* — Specifies the queue number to which the DSCP values are mapped.

Default Configuration

The following table describes the default map.

DSCP value	0-15	16-39	40-63
Queue-ID	1	2	3

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example maps DSCP values 33, 40 and 41 to queue 1.

```
Console(config)# qos map dscp-queue 33 40 41 to 1
```

qos trust (Global)

The **qos trust** Global Configuration mode command configures the system to the basic mode and trust state. To return to the untrusted state, use the **no** form of this command.

Syntax

qos trust {**cos** | **dscp**}

no qos trust

Parameters

- **cos** — Indicates that ingress packets are classified with packet CoS values. Untagged packets are classified with the default port CoS value.
- **dscp** — Indicates that ingress packets are classified with packet DSCP values.

Default Configuration

CoS is the default trust mode.

Command Mode

Global Configuration mode

User Guidelines

Packets entering a quality of service (QoS) domain are classified at the edge of the QoS domain. When packets are classified at the edge, the switch port within the QoS domain can be configured to one of the trusted states because there is no need to classify the packets at every device in the domain.

Use this command to specify whether the port is trusted and which fields of the packet to use to classify traffic.

When the system is configured as trust DSCP, traffic is mapped to a queue according to the DSCP-queue map.

Example

The following example configures the system to the DSCP trust state.

```
Console(config)# qos trust dscp
```

qos trust (Interface)

The **qos trust** Interface Configuration (Ethernet, port-channel) mode command enables each port trust state while the system is in the basic QoS mode. To disable the trust state on each port, use the **no** form of this command.

Syntax

qos trust

no qos trust

Default Configuration

qos trust is enabled on each port.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures Ethernet port 4 to the default trust state.

```
console(config)# interface ethernet e4
console(config-if) qos trust
```

qos cos

The **qos cos** Interface Configuration (Ethernet, port-channel) mode command defines the default CoS value of a port. To return to the default configuration, use the **no** form of this command.

Syntax

qos cos *default-cos*

no qos cos

Parameters

- *default-cos* — Specifies the default CoS value of the port. (Range: 0 - 7)

Default Configuration

Default CoS value of a port is 0.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

If the port is trusted, the default CoS value of the port is used to assign a CoS value to all untagged packets entering the port.

Example

The following example configures port 4 default CoS value to 3.

```
Console(config)# interface ethernet e4
Console(config-if) qos cos 3
```

show qos map

The show qos map User EXEC mode command displays all QoS maps.

Syntax

show qos map [**dscp-queue**]

Parameters

- **dscp-queue** — Indicates the DSCP to queue map.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the DSCP port-queue map.

```
Console> show qos map
Dscp-queue map:

d1    :   d2      0      1      2      3      4      5      6      7      8      9
--    :   --     --     --     --     --     --     --     --     --     --     --
0     :          01     01     01     01     01     01     01     01     01     01
1     :          01     01     01     01     01     01     02     02     02     02
2     :          02     02     02     02     02     02     02     02     02     02
3     :          02     02     03     03     03     03     03     03     03     03
4     :          03     03     03     03     03     03     03     03     04     04
5     :          04     04     04     04     04     04     04     04     04     04
6     :          04     04     04     04
```

The following table describes the significant fields shown above.

Column	Description
d1	Decimal Bit 1 of DSCP
d2	Decimal Bit 2 of DSCP
01 - 04	Queue numbers

Section 17. Radius Commands

radius-server host

The **radius-server host** Global Configuration mode command specifies a RADIUS server host. To delete the specified RADIUS host, use the **no** form of this command.

Syntax

radius-server host {*ip-address* | *hostname*} [**auth-port** *auth-port-number*] [**timeout** *timeout*] [**retransmit** *retries*] [**deadtime** *deadtime*] [**key** *key-string*] [**source** *source*] [**priority** *priority*] [**usage** *type*]

no radius-server host {*ip-address* | *hostname*}

Parameters

- *ip-address* — IP address of the RADIUS server host.
- *hostname* — Hostname of the RADIUS server host. (Range: 1-158 characters)
- *auth-port-number* — Port number for authentication requests. The host is not used for authentication if the port number is set to 0. (Range: 0-65535)
- *timeout* — Specifies the timeout value in seconds. (Range: 1-30)
- *retries* — Specifies the retransmit value. (Range: 1-10)
- *deadtime* — Length of time in minutes during which a RADIUS server is skipped over by transaction requests. (Range: 0-2000)
- *key-string* — Specifies the authentication and encryption key for all RADIUS communications between the device and the RADIUS server. This key must match the encryption used on the RADIUS daemon. To specify an empty string, enter "". (Range: 0-128 characters)
- *source* — Specifies the source IP address to use for communication. 0.0.0.0 is interpreted as request to use the IP address of the outgoing IP interface.
- *priority* — Determines the order in which servers are used, where 0 has the highest priority. (Range: 0-65535)
- *type* — Specifies the usage type of the server. Possible values: **login**, **dot.1x** or **all**.

Default Configuration

No RADIUS server host is specified.

The port number for authentication requests is 1812.

The usage type is **all**.

Command Mode

Global Configuration mode

User Guidelines

To specify multiple hosts, multiple **radius-server host** commands can be used.

If no host-specific timeout, retries, deadtime or key-string values are specified, global values apply to each RADIUS server host.

The address type of the source parameter must be the same as the **ip-address** parameter.

Example

The following example specifies a RADIUS server host with IP address 192.168.10.1, authentication request port number 20 and a 20-second timeout period.

```
Console(config)# radius-server host 192.168.10.1 auth-port 20 timeout 20
```

radius-server key

The **radius-server key** Global Configuration mode command sets the authentication and encryption key for all RADIUS communications between the device and the RADIUS daemon. To return to the default configuration, use the **no** form of this command.

Syntax

radius-server key [*key-string*]

no radius-server key

Parameters

- *key-string* — Specifies the authentication and encryption key for all RADIUS communications between the device and the RADIUS server. This key must match the encryption used on the RADIUS daemon. (Range: 0-128 characters)

Default Configuration

The key-string is an empty string.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example sets the authentication and encryption key for all RADIUS communications between the device and the RADIUS daemon as default.

```
Console(config)# radius-server key
```

radius-server retransmit

The **radius-server retransmit** Global Configuration mode command specifies the number of times the software searches the list of RADIUS server hosts. To reset the default configuration, use the **no** form of this command.

Syntax

radius-server retransmit *retries*

no radius-server retransmit

Parameters

- *retries* — Specifies the retransmit value. (Range: 1 - 10)

Default Configuration

The software searches the list of RADIUS server hosts 3 times.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the number of times the software searches the list of RADIUS server hosts to 5 times.

```
console(config)# radius-server retransmit 5
```

radius-server source-ip

The **radius-server source-ip** Global Configuration mode command specifies the source IP address used for communication with RADIUS servers. To return to the default configuration, use the **no** form of this command.

Syntax

radius-server source-ip *source*

no radius-source-ip *source*

Parameters

- *source* — Specifies a valid source IP address.

Default Configuration

The source IP address is the IP address of the outgoing IP interface.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the source IP address used for communication with RADIUS servers to 10.1.1.1.

```
console(config)# radius-server source-ip 10.1.1.1
```

radius-server timeout

The **radius-server timeout** Global Configuration mode command sets the interval during which the device waits for a server host to reply. To return to the default configuration, use the **no** form of this command.

Syntax

radius-server timeout *timeout*

no radius-server timeout

Parameters

- *timeout* — Specifies the timeout value in seconds. (Range: 1 - 30)

Default Configuration

The timeout value is 3 seconds.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the timeout interval to 5 seconds.

```
Console(config)# radius-server timeout 5
```

radius-server deadtime

The **radius-server deadtime** Global Configuration mode command improves RADIUS response time when servers are unavailable. The command is used to cause the unavailable servers to be skipped. To return to the default configuration, use the **no** form of this command.

Syntax

radius-server deadtime *deadtime*

no radius-server deadtime

Parameters

- *deadtime* — Length of time in minutes during which a RADIUS server is skipped over by transaction requests. (Range: 0 - 2000)

Default Configuration

The deadtime setting is 0.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example sets the deadtime to 10 minutes.

```
Console(config)# radius-server deadtime 10
```

show radius-servers

The **show radius-servers** Privileged EXEC mode command displays the RADIUS server settings.

Syntax

show radius-servers

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays RADIUS server settings.

```
Console# show radius-servers


IP address    Port    TimeOut    Retransmit    DeadTime    Source IP   Priority    Usage
              Auth
---------     ----    -------    ----------    ------      --------    --------    -----
172.16.1.1    1645    Global     Global        Global      -           1           All
172.16.1.2    1645    11         8             Global      Global      2           All


Global values
-------------
TimeOut: 3
Retransmit: 3
Deadtime: 0
Source IP: 172.16.8.1
```

Section 18. RMON Commands

show rmon statistics

The **show rmon statistics** User EXEC mode command displays RMON Ethernet statistics.

Syntax

show rmon statistics {**ethernet** *interface number* | **port-channel** *port-channel-number*}

Parameters

- *interface number* — Valid Ethernet port.
- *port-channel-number* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays RMON Ethernet statistics for Ethernet port 1.

```
Console> show rmon statistics ethernet e1
Port: e1
Octets: 878128                    Packets: 978
Broadcast: 7                      Multicast: 1
CRC Align Errors: 0               Collisions: 0
Undersize Pkts: 0                 Oversize Pkts: 0
Fragments: 0                      Jabbers: 0
64 Octets: 98                     65 to 127 Octets: 0
128 to 255 Octets: 0              256 to 511 Octets: 0
512 to 1023 Octets: 491           1024 to 1518 Octets: 389
```

The following table describes significant fields shown above:

Field	Description
Octets	The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets).
Packets	The total number of packets (including bad packets, broadcast packets, and multicast packets) received.
Broadcast	The total number of good packets received and directed to the broadcast address. This does not include multicast packets.
Multicast	The total number of good packets received and directed to a multicast address. This number does not include packets directed to the broadcast address.
CRC Align Errors	The total number of packets received with a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but with either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
Collisions	The best estimate of the total number of collisions on this Ethernet segment.
Undersize Pkts	The total number of packets received less than 64 octets long (excluding framing bits, but including FCS octets) and otherwise well formed.
Oversize Pkts	The total number of packets received longer than 1518 octets (excluding framing bits, but including FCS octets) and otherwise well formed.
Fragments	The total number of packets received less than 64 octets in length (excluding framing bits but including FCS octets) and either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
Jabbers	The total number of packets received longer than 1518 octets (excluding framing bits, but including FCS octets), and either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
64 Octets	The total number of packets (including bad packets) received that are 64 octets in length (excluding framing bits but including FCS octets).
65 to 127 Octets	The total number of packets (including bad packets) received that are between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
128 to 255 Octets	The total number of packets (including bad packets) received that are between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
256 to 511 Octets	The total number of packets (including bad packets) received that are between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
512 to 1023 Octets	The total number of packets (including bad packets) received that are between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
1024 to 1518 Octets	The total number of packets (including bad packets) received that are between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

rmon collection history

The **rmon collection history** Interface Configuration (Ethernet, port-channel) mode command enables a Remote Monitoring (RMON) MIB history statistics group on an interface. To remove a specified RMON history statistics group, use the **no** form of this command.

Syntax

rmon collection history *index* [**owner** *ownername*] [**buckets** *bucket-number*] [**interval** *seconds*]

no rmon collection history *index*

Parameters

- *index* — Specifies the statistics group index . (Range: 1-65535)
- *ownername* — Specifies the RMON statistics group owner name.
- *bucket-number* — Number of buckets specified for the RMON collection history group of statistics. If unspecified, defaults to 50. (Range:1-65535)
- *seconds* — Number of seconds in each polling cycle. (Range: 1-3600)

Default Configuration

RMON statistics group owner name is an empty string.

Number of buckets specified for the RMON collection history statistics group is 50.

Number of seconds in each polling cycle is 1800.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

Cannot be configured for a range of interfaces (range context).

Example

The following example enables a Remote Monitoring (RMON) MIB history statistics group on Ethernet port 1 with index number 1 and a polling interval period of 2400 seconds.

```
Console(config)# interface ethernet e1
Console(config-if)# rmon collection history 1 interval 2400
```

show rmon collection history

The **show rmon collection history** User EXEC mode command displays the requested RMON history group statistics.

Syntax

show rmon collection history [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)
- *port-channel-number* — Valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays all RMON history group statistics.

```
Console> show rmon collection history

Index     Interface      Interval     Requested      Granted       Owner
                                      Samples        Samples
-----     ---------      --------     ---------      -------       -------
1         3              30           50             50            CLI
2         3              1800         50             50            Manager
```

The following table describes significant fields shown above:

Field	Description
Index	An index that uniquely identifies the entry.
Interface	The sampled Ethernet interface
Interval	The interval in seconds between samples.
Requested Samples	The requested number of samples to be saved.
Granted Samples	The granted number of samples to be saved.
Owner	The entity that configured this entry.

show rmon history

The **show rmon history** User EXEC mode command displays RMON Ethernet history statistics.

Syntax

show rmon history *index* {**throughput** | **errors | other**} [**period** *seconds*]

Parameters

- *index* — Specifies the requested set of samples. (Range: 1 - 65535)
- **throughput** — Indicates throughput counters.
- **errors** — Indicates error counters.
- **other** — Indicates drop and collision counters.
- *seconds* — Specifies the period of time in seconds. (Range: 1-4294967295)

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following examples displays RMON Ethernet history statistics for index 1.

```
Console> show rmon history 1 throughput
Sample Set: 1                         Owner: CLI
Interface: 1                          Interval: 1800
Requested samples: 50                 Granted samples: 50

Maximum table size: 500

Time                    Octets        Packets      Broadcast     Multicast      Util
--------------------    ---------     -------      ----------    ---------      -----
Jan 18 2002 21:57:00    303595962     357568       3289          7287           19%
Jan 18 2002 21:57:30    287696304     275686       2789          5878           20%

Console> show rmon history 1 errors
Sample Set: 1                         Owner: Me
Interface: 1                          Interval: 1800
Requested samples: 50                 Granted samples: 50
```

```
Maximum table size: 500 (800 after reset)

Time                    CRC Align     Undersize    Oversize      Fragments     Jabbers
----------              ---------     ---------    --------      ---------     -------
Jan 18 2002 21:57:00    1             1            0             49            0
Jan 18 2002 21:57:30    1             1            0             27            0

Console> show rmon history 1 other
Sample Set: 1                         Owner: Me
Interface: 1                          Interval: 1800
Requested samples: 50                 Granted samples: 50

Maximum table size: 500

Time                                  Dropped      Collisions
--------------------                  --------     ----------
Jan 18 2002 21:57:00                  3            0
Jan 18 2002 21:57:30                  3            0
```

The following table describes significant fields shown above:

Field	Description
Time	Date and Time the entry is recorded.
Octets	The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets).
Packets	The number of packets (including bad packets) received during this sampling interval.
Broadcast	The number of good packets received during this sampling interval that were directed to the broadcast address.
Multicast	The number of good packets received during this sampling interval that were directed to a multicast address. This number does not include packets addressed to the broadcast address.
Util	The best estimate of the mean physical layer network utilization on this interface during this sampling interval, in hundredths of a percent.
CRC Align	The number of packets received during this sampling interval that had a length (excluding framing bits but including FCS octets) between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
Undersize	The number of packets received during this sampling interval that were less than 64 octets long (excluding framing bits but including FCS octets) and were otherwise well formed.
Oversize	The number of packets received during this sampling interval that were longer than 1518 octets (excluding framing bits but including FCS octets) but were otherwise well formed.

Fragments	The total number of packets received during this sampling interval that were less than 64 octets in length (excluding framing bits but including FCS octets) had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error), or a bad FCS with a non-integral number of octets (AlignmentError). It is normal for etherHistoryFragments to increment because it counts both runts (which are normal occurrences due to collisions) and noise hits.
Jabbers	The number of packets received during this sampling interval that were longer than 1518 octets (excluding framing bits but including FCS octets), and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
Dropped	The total number of events in which packets were dropped by the probe due to lack of resources during this sampling interval. This number is not necessarily the number of packets dropped, it is just the number of times this condition has been detected.
Collisions	The best estimate of the total number of collisions on this Ethernet segment during this sampling interval.

rmon alarm

The **rmon alarm** Global Configuration mode command configures alarm conditions. To remove an alarm, use the **no** form of this command.

Syntax

rmon alarm *index variable interval rthreshold fthreshold revent fevent* [**type** *type*] [**startup** *direction*] [**owner** *name*]

no rmon alarm *index*

Parameters

- *index* — Specifies the alarm index. (Range: 1-65535)
- *variable* — Specifies the object identifier of the variable to be sampled.
- *interval* — Specifies the interval in seconds during which the data is sampled and compared with rising and falling thresholds. (Range: 1-4294967295)
- *rthreshold* — Specifies the rising threshold. (Range: 0-4294967295)
- *fthreshold* — Specifies the falling threshold. (Range: 0-4294967295)
- *revent* — Specifies the event index used when a rising threshold is crossed.
  (Range: 1-65535)
- *fevent* — Specifies the event index used when a falling threshold is crossed.
  (Range: 1-65535)
- *type* — Specifies the method used for sampling the selected variable and calculating the value to be compared against the thresholds. Possible values are **absolute** and **delta**.

  If the method is **absolute**, the value of the selected variable is compared directly with the thresholds at the end of the sampling interval. If the method is **delta**, the selected variable value of the last sample is subtracted from the current value, and the difference is compared with the thresholds.
- *direction* — Specifies the alarm that may be sent when this entry is first set to valid. Possible values are **rising**, **rising-falling** and **falling**.

  If the first sample (after this entry becomes valid) is greater than or equal to *rthreshold* and *direction* is equal to **rising** or **rising-falling**, a single rising alarm is generated. If the first sample (after this entry becomes valid) is less than or equal to *fthreshold* and *direction* is equal to **falling** or **rising-falling**, a single falling alarm is generated.
- *name* — Specifies the name of the person who configured this alarm. If unspecified, the name is an empty string.

Default Configuration

The type is **absolute**.

The startup direction is **rising-falling**.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the following alarm conditions:

- Alarm index — 1000
- Sample interval — 360000 seconds
- Rising threshold — 1000000
- Falling threshold — 1000000
- Rising threshold event index — 10
- Falling threshold event index — 20 show rmon alarm-table

The **show rmon alarm-table** User EXEC mode command displays the alarms table.

Syntax

show rmon alarm-table

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the alarms table.

```
Console> show rmon alarm-table

Index       OID                         Owner
-----       ---------------------       -------
1           1.3.6.1.2.1.2.2.1.10.1      CLI
2           1.3.6.1.2.1.2.2.1.10.1      Manager
3           1.3.6.1.2.1.2.2.1.10.9      CLI
```

The following table describes significant fields shown above:

Field	Description
Index	An index that uniquely identifies the entry.
OID	Monitored variable OID.
Owner	The entity that configured this entry.

show rmon alarm

The **show rmon alarm** User EXEC mode command displays alarm configuration.

Syntax

show rmon alarm *number*

Parameters

- *number* — Specifies the alarm index. (Range: 1 - 65535)

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays RMON 1 alarms.

```
Console> show rmon alarm 1
Alarm 1
-------
OID: 1.3.6.1.2.1.2.2.1.10.1
Last sample Value: 878128
Interval: 30
Sample Type: delta
Startup Alarm: rising
Rising Threshold: 8700000
Falling Threshold: 78
Rising Event: 1
Falling Event: 1
Owner: CLI
```

The following table describes the significant fields shown in the display:

Field	Description
Alarm	Alarm index.
OID	Monitored variable OID.
Last Sample Value	The statistic value during the last sampling period. For example, if the sample type is **delta**, this value is the difference between the samples at the beginning and end of the period. If the sample type is **absolute**, this value is the sampled value at the end of the period.

Interval	The interval in seconds over which the data is sampled and compared with the rising and falling thresholds.
Sample Type	The method of sampling the variable and calculating the value compared against the thresholds. If the value is **absolute**, the value of the variable is compared directly with the thresholds at the end of the sampling interval. If the value is **delta**, the value of the variable at the last sample is subtracted from the current value, and the difference compared with the thresholds.
Startup Alarm	The alarm that may be sent when this entry is first set. If the first sample is greater than or equal to the rising threshold, and startup alarm is equal to rising or rising and falling, then a single rising alarm is generated. If the first sample is less than or equal to the falling threshold, and startup alarm is equal falling or rising and falling, then a single falling alarm is generated.
Rising Threshold	A sampled statistic threshold. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval is less than this threshold, a single event is generated.
Falling Threshold	A sampled statistic threshold. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval is greater than this threshold, a single event is generated.
Rising Event	The event index used when a rising threshold is crossed.
Falling Event	The event index used when a falling threshold is crossed.
Owner	The entity that configured this entry.

rmon event

The **rmon event** Global Configuration mode command configures an event. To remove an event, use the **no** form of this command.

Syntax

rmon event *index type* [**community** *text*] [**description** *text*] [**owner** *name*]

no rmon event *index*

Parameters

- *index* — Specifies the event index. (Range: 1 - 65535)
- *type* — Specifies the type of notification generated by the device about this event. Possible values: **none**, **log**, **trap**, **log-trap**.
- **community** *text* — If the specified notification type is **trap**, an SNMP trap is sent to the SNMP community specified by this octet string. (Range: 0-127 characters)
- **description** *text* — Specifies a comment describing this event. (Range: 0-127 characters)
- *name* — Specifies the name of the person who configured this event. If unspecified, the name is an empty string.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

If **log** is specified as the notification type, an entry is made in the log table for each event. If **trap** is specified, an SNMP trap is sent to one or more management stations.

Example

The following example configures an event identified as index 10 and for which the device generates a notification in the log table.

```
Console(config)# rmon event 10 log
```

show rmon events

The **show rmon events** User EXEC mode command displays the RMON event table.

Syntax

show rmon events

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the RMON event table.

```
Console> show rmon events

Index    Description       Type        Community     Owner      Last time sent
-----    --------------    --------    ---------     -------    --------------------
1        Errors            Log                       CLI        Jan 18 2002 23:58:17
2        High Broadcast    Log-Trap    device        Manager    Jan 18 2002 23:59:48
```

The following table describes significant fields shown above:

Field	Description
Index	An index that uniquely identifies the event.
Description	A comment describing this event.
Type	The type of notification that the device generates about this event. Can have the following values: **none**, **log**, **trap**, **log-trap**. In the case of log, an entry is made in the log table for each event. In the case of trap, an SNMP trap is sent to one or more management stations.
Community	If an SNMP trap is to be sent, it is sent to the SNMP community specified by this octet string.
Owner	The entity that configured this event.
Last time sent	The time this entry last generated an event. If this entry has not generated any events, this value is zero.

show rmon log

The **show rmon log** User EXEC mode command displays the RMON log table.

Syntax

show rmon log [*event*]

Parameters

- *event* — Specifies the event index. (Range: 0 - 65535)

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the RMON log table.

```
Console> show rmon log
Maximum table size: 500
Event       Description           Time
-------     --------------        ---------
1           Errors                Jan 18 2002 23:48:19
1           Errors                Jan 18 2002 23:58:17
2           High Broadcast        Jan 18 2002 23:59:48

Console> show rmon log
Maximum table size: 500 (800 after reset)
Event       Description           Time
-------     --------------        ---------
1           Errors                Jan 18 2002 23:48:19
1           Errors                Jan 18 2002 23:58:17
2           High Broadcast        Jan 18 2002 23:59:48
```

The following table describes the significant fields shown in the display:

Field	Description
Event	An index that uniquely identifies the event.
Description	A comment describing this event.
Time	The time this entry was created.

rmon table-size

The **rmon table-size** Global Configuration mode command configures the maximum size of RMON tables. To return to the default configuration, use the **no** form of this command.

Syntax

rmon table-size {**history** *entries* | **log** *entries*}

no rmon table-size {**history** | **log**}

Parameters

- **history** *entries* — Maximum number of history table entries. (Range: 20 -32767)
- **log** *entries* — Maximum number of log table entries. (Range: 20-32767)

Default Configuration

History table size is 270.

Log table size is 200.

Command Mode

Global Configuration mode

User Guidelines

The configured table size taskes effect after the device is rebooted.

Example

The following example configures the maximum RMON history table sizes to 100 entries.

```
Console(config)# rmon table-size history 100
```

Section 19. SNMP Commands

snmp-server community

The **snmp-server community** Global Configuration mode command configures the community access string to permit access to the SNMP protocol. To remove the specified community string, use the **no** form of this command.

Syntax

snmp-server community *community* [**ro** | **rw** | **su**] [*ip-address*][**view** *view-name*]

snmp-server community-group *community group-name* [*ip-address*]

no snmp-server community *community* [*ip-address*]

Parameters

- *community* — Community string that acts like a password and permits access to the SNMP protocol. (Range: 1-20 characters)
- **ro** — Indicates read-only access (default).
- **rw** — Indicates read-write access.
- **su** — Indicates SNMP administrator access.
- *ip-address* — Specifies the IP address of the management station.
- *group-name* — Specifies the name of a previously defined group. A group defines the objects available to the community. (Range: 1-30 characters)
- *view-name* — Specifies the name of a previously defined view. The view defines the objects available to the community. (Range: 1-30 characters)

Default Configuration

No communities are defined.

Command Mode

Global Configuration mode

User Guidelines

The **view-name** parameter cannot be specified for **su**, which has access to the whole MIB.

The **view-name** parameter can be used to restrict the access rights of a community string. When it is specified:

An internal security name is generated.

The internal security name for SNMPv1 and SNMPv2 security models is mapped to an internal group name.

The internal group name for SNMPv1 and SNMPv2 security models is mapped to a view-name (read-view and notify-view always, and for **rw** for write-view also)

The **group-name** parameter can also be used to restrict the access rights of a community string. When it is specified:

An internal security name is generated.

The internal security name for SNMPv1 and SNMPv2 security models is mapped to the group name.

Examples

The following example defines community access string **public** to permit administrative access to SNMP protocol at an administrative station with IP address 192.168.1.20.

```
Console(config)# snmp-server community public su 192.168.1.20
```

snmp-server view

The **snmp-server view** Global Configuration mode command creates or updates a Simple Network Management Protocol (SNMP) server view entry. To remove a specified SNMP server view entry, use the **no** form of this command.

Syntax

snmp-server view *view-name oid-tree* **{included | excluded}**

no snmp-server view *view-name* [*oid-tree*]

Parameters

- *view-name*—Specifies the label for the view record that is being created or updated. The name is used to reference the record. (Range: 1-30 characters)
- *oid-tree*—Specifies the object identifier of the ASN.1 subtree to be included or excluded from the view. To identify the subtree, specify a text string consisting of numbers, such as 1.3.6.2.4, or a word, such as system. Replace a single subidentifier with the asterisk (*) wildcard to specify a subtree family; for example 1.3.*.4.
- **included**—Indicates that the view type is included.
- **excluded**—Indicates that the view type is excluded.

Default Configuration

No view entry exists.

Command Mode

Global Configuration mode

User Guidelines

This command can be entered multiple times for the same view record.

The number of views is limited to 64.

No check is made to determine that a MIB node corresponds to the "starting portion" of the OID until the first wildcard.

Examples

The following example creates a view that includes all objects in the MIB-II system group except for sysServices (System 7) and all objects for interface 1 in the MIB-II interface group.

```
Console(config)# snmp-server view user-view system included
Console(config)# snmp-server view user-view system.7 excluded
Console(config)# snmp-server view user-view ifEntry.*.1 included
```

snmp-server group

The **snmp-server group** Global Configuration mode command configures a new Simple Management Protocol (SNMP) group or a table that maps SNMP users to SNMP views. To remove a specified SNMP group, use the **no** form of this command.

Syntax

snmp-server group *groupname* **{v1 | v2 | v3 {noauth | auth | priv} [notify** *notifyview* **] } [read** *readview***] [write** *writeview***]**

no snmp-server group *groupname* **{v1 | v2 | v3 [noauth | auth | priv]}**

Parameters

- *groupname* — Specifies the name of the group.
- **v1** — Indicates the SNMP Version 1 security model.
- **v2** — Indicates the SNMP Version 2 security model.
- **v3** — Indicates the SNMP Version 3 security model.
- **noauth** — Indicates no authentication of a packet. Applicable only to the SNMP Version 3 security model.
- **auth** — Indicates authentication of a packet without encrypting it. Applicable only to the SNMP Version 3 security model.
- **priv** — Indicates authentication of a packet with encryption. Applicable only to the SNMP Version 3 security model.
- *name* — Specifies the context of a packet. The following contexts is supported: Router. If the context name is unspecified, all contexts are defined.
- *readview* — Specifies a string that is the name of the view that enables only viewing the contents of the agent. If unspecified, all objects except for the community-table and SNMPv3 user and access tables are available.
- *writeview* — Specifies a string that is the name of the view that enables entering data and configuring the contents of the agent. If unspecified, nothing is defined for the write view.
- *notifyview* — Specifies a string that is the name of the view that enables specifying an inform or a trap. If unspecified, nothing is defined for the notify view. Applicable only to the SNMP Version 3 security model.

Default Configuration

No group entry exists.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example attaches a group called user-group to SNMPv3 and assigns to the group the privacy security level and read access rights to a view called user-view.

```
Console(config)# snmp-server group user-group v3 priv read user-view
```

snmp-server user

The **snmp-server user** Global Configuration mode command configures a new SNMP Version 3 user. To remove a user, use the **no** form of this command.

Syntax

snmp-server user *username groupname* **[remote** *engineid-string***] [auth-md5** *password* **| auth-sha** *password* **| auth-md5-key** *md5-des-keys* **| auth-sha-key** *sha-des-keys* **]**

no snmp-server user *username* **[remote** *engineid-string***]**

Parameters

- *username*—Specifies the name of the user on the host that connects to the agent. (Range: 1-30 characters)
- *groupname*—Specifies the name of the group to which the user belongs. (Range: 1-30 characters)
- *engineid-string*—Specifies the engine ID of the remote SNMP entity to which the user belongs. The engine ID is a concatenated hexadecimal string. Each byte in the hexadecimal character string is two hexadecimal digits. Each byte can be separated by a period or colon. (Range: 5-32 characters)
- **auth-md5** *password*—Indicates the HMAC-MD5-96 authentication level. The user should enter a password for authentication and generation of a DES key for privacy. (Range: 1-32 characters)
- **auth-sha** *password*—Indicates the HMAC-SHA-96 authentication level. The user should enter a password for authentication and generation of a DES key for privacy. (Range: 1-32 characters)
- **auth-md5-key** *md5-des-keys*—Indicates the HMAC-MD5-96 authentication level. The user should enter a concatenated hexadecimal string of the MD5 key (MSB) and the privacy key (LSB). If authentication is only required, 16 bytes should be entered; if authentication and privacy are required, 32 bytes should be entered. Each byte in the hexadecimal character string is two hexadecimal digits. Each byte can be separated by a period or colon. (16 or 32 bytes)
- **auth-sha-key** *sha-des-keys*—Indicates the HMAC-SHA-96 authentication level. The user should enter a concatenated hexadecimal string of the SHA key (MSB) and the privacy key (LSB). If authentication is only required, 20 bytes should be entered; if authentication and privacy are required, 36 bytes should be entered. Each byte in the hexadecimal character string is two hexadecimal digits. Each byte can be separated by a period or colon. (20 or 36 bytes)

Default Configuration

No group entry exists.

Command Mode

Global Configuration mode

User Guidelines

If auth-md5 or auth-sha is specified, both authentication and privacy are enabled for the user.

When a **show running-config** Privileged EXEC mode command is entered, a line for this user will not be displayed. To see if this user has been added to the configuration, type the **show snmp users** Privileged EXEC mode command.

An SNMP EngineID has to be defined to add SNMP users to the device. Changing or removing the SNMP EngineID value deletes SNMPv3 users from the device’s database.

The remote engineid designates the remote management station and should be defined to enable the device to receive informs.

Examples

The following example configures an SNMPv3 user **John** in group **user-group**.

```
Console(config)# snmp-server user John user-group
```

snmp-server engineID local

The **snmp-server engineID local** Global Configuration mode command specifies the Simple Network Management Protocol (SNMP) engineID on the local device. To remove the configured engine ID, use the **no** form of this command.

Syntax

snmp-server engineID local {*engineid-string* | **default**}

no snmp-server engineID local

Parameters

- *engineid-string*—Specifies a character string that identifies the engine ID. (Range: 5-32 characters)
- **default**—The engine ID is created automatically based on the device MAC address.

Default Configuration

The engine ID is not configured.

If SNMPv3 is enabled using this command, and the default is specified, the default engine ID is defined per standard as:

- First 4 octets — first bit = 1, the rest is IANA Enterprise number = 674.
- Fifth octet — set to 3 to indicate the MAC address that follows.
- Last 6 octets — MAC address of the device.

Command Mode

Global Configuration mode

User Guidelines

To use SNMPv3, you have to specify an engine ID for the device. You can specify your own ID or use a default string that is generated using the MAC address of the device.

If the SNMPv3 engine ID is deleted or the configuration file is erased, SNMPv3 cannot be used. By default, SNMPv1/v2 are enabled on the device. SNMPv3 is enabled only by defining the Local Engine ID.

If you want to specify your own ID, you do not have to specify the entire 32-character engine ID if it contains trailing zeros. Specify only the portion of the engine ID up to the point where just zeros remain in the value. For example, to configure an engine ID of 123400000000000000000000, you can specify snmp-server engineID local 1234.

Since the engine ID should be unique within an administrative domain, the following is recommended:

For a standalone device, use the default keyword to configure the engine ID.

Changing the value of the engine ID has the following important side-effect. A user's password (entered on the command line) is converted to an MD5 or SHA security digest. This digest is based on both the password and the local engine ID. The user’s command line password is then destroyed, as required by RFC 2274. As a result, the security digests of SNMPv3 users become invalid if the local value of the engine ID change, and the users will have to be reconfigured.

You cannot specify an engine ID that consists of all 0x0, all 0xF or 0x000000001.

The **show running-config** Privileged EXEC mode command does not display the SNMP engine ID configuration. To see the SNMP engine ID configuration, enter the **snmp-server engineID local** GlobalConfiguration mode command.

Examples

The following example enables SNMPv3 on the device and sets the local engine ID of the device to the default value.

```
Console(config) # snmp-server engineID local default
```

snmp-server enable traps

The **snmp-server enable traps** Global Configuration mode command enables the device to send SNMP traps. To disable SNMP traps, use the **no** form of the command.

Syntax

snmp-server enable traps

no snmp-server enable traps

Default Configuration

SNMP traps are enabled.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example enables SNMP traps.

```
Console(config)# snmp-server enable traps
```

snmp-server filter

The **snmp-server filter** Global Configuration mode command creates or updates a Simple Network Management Protocol (SNMP) server filter entry. To remove the specified SNMP server filter entry, use the **no** form of this command.

Syntax

snmp-server filter *filter-name oid-tree* {**included | excluded**}

no snmp-server filter *filter-name* [*oid-tree*]

Parameters

- *filter-name*—Specifies the label for the filter record that is being updated or created. The name is used to reference the record. (Range: 1-30 characters)
- *oid-tree*—Specifies the object identifier of the ASN.1 subtree to be included or excluded from the view. To identify the subtree, specify a text string consisting of numbers, such as 1.3.6.2.4, or a word, such as system. Replace a single subidentifier with the asterisk (*) wildcard to specify a subtree family; for example, 1.3.*.4.
- **included**—Indicates that the filter type is included.
- **excluded**—Indicates that the filter type is excluded.

Default Configuration

No filter entry exists.

Command Mode

Global Configuration mode

User Guidelines

This command can be entered multiple times for the same filter record. Later lines take precedence when an object identifier is included in two or more lines.

Examples

The following example creates a filter that includes all objects in the MIB-II system group except for sysServices (System 7) and all objects for interface 1 in the MIB-II interfaces group.

```
Console(config)# snmp-server filter filter-name system included
Console(config)# snmp-server filter filter-name system.7 excluded
Console(config)# snmp-server filter filter-name ifEntry.*.1 included
```

snmp-server host

The **snmp-server host** Global Configuration mode command specifies the recipient of Simple Network Management Protocol Version 1 or Version 2 notifications. To remove the specified host, use the **no** form of this command.

Syntax

snmp-server host {*ip-address* **|** *hostname*} *community-string* [**traps | informs**] [**1 | 2**] [**udp-port** *port*] [**filter** *filtername*] [**timeout** *seconds*] [**retries** *retries*]

no snmp-server host {*ip-address* **|** *hostname*} [**traps | informs**]

Parameters

- *ip-address* — Specifies the IP address of the host (targeted recipient).
- *hostname* — Specifies the name of the host. (Range:1-158 characters)
- *community-string* — Specifies a password-like community string sent with the notification operation. (Range: 1-20)
- **traps** — Indicates that SNMP traps are sent to this host. If unspecified, SNMPv2 traps are sent to the host.
- **informs** — Indicates that SNMP informs are sent to this host. Not applicable to SNMPv1.
- **1** — Indicates that SNMPv1 traps will be used.
- **2** — Indicates that SNMPv2 traps will be used.
- *port* — Specifies the UDP port of the host to use. If unspecified, the default UDP port number is 162. (Range:1-65535)
- *filtername* — Specifies a string that defines the filter for this host. If unspecified, nothing is filtered. (Range: 1-30 characters)
- *seconds* — Specifies the number of seconds to wait for an acknowledgment before resending informs. If unspecified, the default timeout period is 15 seconds. (Range: 1-300)
- retries — Specifies the maximum number of times to resend an inform request. If unspecified, the default maximum number of retries is 3. (Range: 1-255)

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

When configuring an SNMPv1 or SNMPv2 notification recipient, a notification view for that recipient is automatically generated for all the MIB.

When configuring an SNMPv1 notification recipient, the **Inform** option cannot be selected.

If a trap and inform are defined on the same target, and an inform was sent, the trap is not sent.

Example

The following example enables SNMP traps for host 10.1.1.1 with community string "management" using SNMPv2.

```
Console(config)# snmp-server host 10.1.1.1 management 2
```

snmp-server v3-host

The **snmp-server v3-host** Global Configuration mode command specifies the recipient of Simple Network Management Protocol Version 3 notifications. To remove the specified host, use the **no** form of this command.

Syntax

snmp-server v3-host {*ip-address* **|** *hostname***}** *username* **[traps | informs] {noauth | auth | priv} [udp-port** *port***] [filter** *filtername***] [timeout** *seconds***] [retries** *retries***]**

no snmp-server host {*ip-address* **|** *hostname***}** *username* **[traps | informs]**

Parameters

- *ip-address*—Specifies the IP address of the host (targeted recipient).
- *hostname*—Specifies the name of the host. (Range:1-158 characters)
- *username*—Specifies the name of the user to use to generate the notification. (Range: 1-25)
- **traps**—Indicates that SNMP traps are sent to this host.
- **informs**—Indicates that SNMP informs are sent to this host.
- **noauth**—Indicates no authentication of a packet.
- **auth**—Indicates authentication of a packet without encrypting it.
- **priv**—Indicates authentication of a packet with encryption.
- *port*—Specifies the UDP port of the host to use. If unspecified, the default UDP port number is 162. (Range: 1-65535)
- *filtername*—Specifies a string that defines the filter for this host. If unspecified, nothing is filtered. (Range: 1-30 characters)
- *seconds*—Specifies the number of seconds to wait for an acknowledgment before resending informs. If unspecified, the default timeout period is 15 seconds. (Range: 1-300)
- *retries*—Specifies the maximum number of times to resend an inform request. If unspecified, the default maximum number of retries is 3. (Range: 1-255)

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

A user and notification view are not automatically created. Use the **snmp-server user**, **snmp-server group** and **snmp-server view** Global Configuration mode commands to generate a user, group and notify group, respectively.

Example

The following example configures an SNMPv3 host.

```
Console(config)# snmp-server v3-host 192.168.0.20 john noauth
```

snmp-server trap authentication

The **snmp-server trap authentication** Global Configuration mode command enables the device to send SNMP traps when authentication fails. To disable SNMP failed authentication traps, use the **no** form of this command.

Syntax

snmp-server trap authentication

no snmp-server trap authentication

Default Configuration

SNMP failed authentication traps are enabled.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example enables SNMP failed authentication traps.

```
Console(config)# snmp-server trap authentication
```

snmp-server contact

The **snmp-server contact** Global Configuration mode command configures the system contact (sysContact) string. To remove system contact information, use the **no** form of the command.

Syntax

snmp-server contact *text*

no snmp-server contact

Parameters

- *text* — Specifies the string that describes system contact information. (Range: 0-160 characters)

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

Do not include spaces in the text string or place text that includes spaces inside quotation marks.

Examples

The following example configures the system contact as “administrator”.

```
Console(config)# snmp-server contact administrator
```

snmp-server location

The **snmp-server location** Global Configuration mode command configures the system location string. To remove the location string, use the **no** form of this command.

Syntax

snmp-server location *text*

no snmp-server location

Parameters

- *text* — Specifies a string that describes system location information. (Range: 0-160 characters)

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

Do not include spaces in the text string or place text that includes spaces inside quotation marks.

Example

The following example defines the device location as **New_York**.

```
Console(config)# snmp-server location New_York
```

snmp-server set

The **snmp-server set** Global Configuration mode command defines the SNMP MIB value.

Syntax

snmp-server set *variable-name name1 value1* [*name2 value2 …*]

Parameters

- *variable-name* — MIB variable name.
- *name value* — List of name and value pairs. In the case of scalar MIBs, only a single pair of name values. In the case of an entry in a table, at least one pair of name and value followed by one or more fields.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

Although the CLI can set any required configuration, there might be a situation where a SNMP user sets a MIB variable that does not have an equivalent command. In order to generate configuration files that support those situations, the **snmp-server set** command is used.

This command is case-sensitive.

show snmp

The **show snmp** Privileged EXEC mode command displays the SNMP status.

Syntax

show snmp

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the SNMP communications status.

```
Console# show snmp

Community-    Community-      View name        IP
String        Access                           address
----------    ----------      ---------        --------
public        read only       user-view        All
private       read write      Default          172.16.1.1
private       su              DefaultSuper     172.17.1.1

Community-string              Group name       IP address
----------------              ----------       ----------
public                        user-group       all

Traps are enabled.
Authentication trap is enabled.

Version 1,2 notifications
Target Address       Type     Community        Version    UDP     Filter    TO     Retries
                                                          Port    Name      Sec
--------------       -----    ---------        -------    ----    ------    ---    -------
192.122.173.42       Trap     public           2          162               15     3
192.122.173.42       Inform   public           2          162               15     3
```

```
Version 3 notifications
Target Address      Type    Username          Security  UDP    Filter   TO    Retries
                                              Level     Port   Name     Sec
--------------      -----   ---------         -------   ----   ------   ---   -------
192.122.173.42      Inform  Bob               Priv      162             15    3

System Contact: Robert
System Location: Marketing
```

The following table describes significant fields shown above.

Field	Description
Community-string	Community access string to permit access to the SNMP protocol.
Community-access	Type of access — read-only, read-write, super access
IP Address	Management station IP Address.
Trap-Rec-Address	Targeted Recipient
Trap-Rec-Community	Statistics sent with the notification operation.
Version	SNMP version for the sent trap 1 or 2.

show snmp engineid

The **show snmp engineID** Privileged EXEC mode command displays the ID of the local Simple Network Management Protocol (SNMP) engine.

Syntax

show snmp engineID

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the SNMP engine ID.

```
Console# show snmp engineID
Local SNMP engineID: 08009009020C0B099C075878
```

show snmp views

The **show snmp views** Privileged EXEC mode command displays the configuration of views.

Syntax

show snmp views [*viewname***]**

Parameters

- *viewname* — Specifies the name of the view. (Range: 1-30)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the configuration of views.

```
Console# show snmp views


Name            OID Tree                       Type
-----------     -----------------------        ---------
user-view       1.3.6.1.2.1.1                  Included
user-view       1.3.6.1.2.1.1.7                Excluded
user-view       1.3.6.1.2.1.2.2.1.*.1          Included
```

show snmp groups

The **show snmp groups** Privileged EXEC mode command displays the configuration of groups.

Syntax

show snmp groups [*groupname*]

Parameters

- *groupname*—Specifies the name of the group. (Range: 1-30)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the configuration of views.

```
Console# show snmp groups


Name                  Security                               Views
                     Model     Level          Read        Write       Notify
--------------       -----     -----          -------     -------     -------
user-group           V3        priv           Default     ""          ""
managers-group       V3        priv           Default     Default     ""
managers-group       V3        priv           Default     ""          ""
```

The following table describes significant fields shown above.

Field		Description
Name		Name of the group.
Security Model		SNMP model in use (v1, v2 or v3).
Security Level		Authentication of a packet with encryption. Applicable only to the SNMP v3 security model.
Views	Read	Name of the view that enables only viewing the contents of the agent. If unspecified, all objects except the community-table and SNMPv3 user and access tables are available.

Write	Name of the view that enables entering data and managing the contents of the agent.
Notify	Name of the view that enables specifying an inform or a trap.

show snmp filters

The **show snmp filters** Privileged EXEC mode command displays the configuration of filters.

Syntax

show snmp filters [*filtername*]

Parameters

- *filtername*—Specifies the name of the filter. (Range: 1-30)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the configuration of filters.

```
Console# show snmp filters

Name               OID Tree                          Type
-----------        -----------------------           ---------
user-filter        1.3.6.1.2.1.1                     Included
user-filter        1.3.6.1.2.1.1.7                   Excluded
user-filter        1.3.6.1.2.1.2.2.1.*.1             Included
```

show snmp users

The **show snmp users** Privileged EXEC mode command displays the configuration of users.

Syntax

show snmp users [*username***]**

Parameters

- *username*—Specifies the name of the user. (Range: 1-30)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the configuration of users.

```
Console# show snmp users


Name         Group name         Auth Method          Remote
------       ------------       ---------            -------------------------
John         user-group         md5
John         user-group         md5                  08009009020C0B099C075879
```

Section 20. Spanning-Tree Commands

spanning-tree

The **spanning-tree** Global Configuration mode command enables spanning-tree functionality. To disable spanning-tree functionality, use the **no** form of this command.

Syntax

spanning-tree

no spanning-tree

Default Configuration

Spanning-tree is enabled.

Command Modes

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enables spanning-tree functionality.

```
Console(config)# spanning-tree
```

spanning-tree mode

The **spanning-tree mode** Global Configuration mode command configures the spanning-tree protocol. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree mode {**stp** | **rstp**| **mstp**}

no spanning-tree mode

Parameters

- **stp** — Indicates that the Spanning Tree Protocol (STP) is enabled.
- **rstp** — Indicates that the Rapid Spanning Tree Protocol (RSTP) is enabled.
- **mstp** — Indicates that the Multiple Spanning Tree Protocol (RSTP) is enabled.

Default Configuration

RSTP is enabled.

Command Modes

Global Configuration mode

User Guidelines

In RSTP mode, the device uses STP when the neighbor device uses STP.

In MSTP mode, the device uses RSTP when the neighbor device uses RSTP and uses STP when the neighbor device uses STP.

Example

The following example configures the spanning-tree protocol to RSTP.

```
console(config)# spanning-tree mode rstp
```

spanning-tree forward-time

The **spanning-tree forward-time** Global Configuration mode command configures the spanning-tree bridge forward time, which is the amount of time a port remains in the listening and learning states before entering the forwarding state. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree forward-time *seconds*

no spanning-tree forward-time

Parameters

- *seconds* — Time in seconds. (Range: 4 - 30)

Default Configuration

The default forwarding time for the IEEE Spanning Tree Protocol (STP) is 15 seconds.

Command Modes

Global Configuration mode

User Guidelines

When configuring the forwarding time, the following relationship should be kept:

2*(Forward-Time - 1) >= Max-Age

Example

The following example configures the spanning tree bridge forwarding time to 25 seconds.

```
Console(config)# spanning-tree forward-time 25
```

spanning-tree hello-time

The **spanning-tree hello-time** Global Configuration mode command configures the spanning tree bridge hello time, which is how often the device broadcasts hello messages to other devices.To return to the default configuration, use the **no** form of this command.

Syntax

s**panning-tree hello-time** *seconds*

no spanning-tree hello-time

Parameters

- *seconds* — Time in seconds. (Range: 1 - 10)

Default Configuration

The default hello time for IEEE Spanning Tree Protocol (STP) is 2 seconds.

Command Modes

Global Configuration mode

User Guidelines

When configuring the hello time, the following relationship should be kept:

Max-Age >= 2*(Hello-Time + 1)

Example

The following example configures spanning tree bridge hello time to 5 seconds.

```
Console(config)# spanning-tree hello-time 5
```

spanning-tree max-age

The **spanning-tree max-age** Global Configuration mode command configures the spanning tree bridge maximum age. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree max-age *seconds*

no spanning-tree max-age

Parameters

- *seconds* — Time in seconds. (Range: 6 - 40)

Default Configuration

The default maximum age for IEEE Spanning Tree Protocol (STP) is 20 seconds.

Command Modes

Global Configuration mode

User Guidelines

When configuring the maximum age, the following relationships should be kept:

2*(Forward-Time - 1) >= Max-Age

Max-Age >= 2*(Hello-Time + 1)

Example

The following example configures the spanning tree bridge maximum-age to 10 seconds.

```
Console(config)# spanning-tree max-age 10
```

spanning-tree priority

The **spanning-tree priority** Global Configuration mode command configures the spanning tree priority of the device. The priority value is used to determine which bridge is elected as the root bridge. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree priority *priority*

no spanning-tree priority

Parameters

- *priority* — Priority of the bridge. (Range: 0 - 61440 in steps of 4096)

Default Configuration

The default bridge priority for IEEE Spanning Tree Protocol (STP) is 32768.

Command Modes

Global Configuration mode

User Guidelines

The bridge with the lowest priority is elected as the root bridge.

Example

The following example configures spanning tree priority to 12288.

```
Console(config)# spanning-tree priority 12288
```

spanning-tree disable

The **spanning-tree disable** Interface Configuration mode command disables spanning tree on a specific port. To enable spanning tree on a port, use the **no** form of this command.

Syntax

spanning-tree disable

no spanning-tree disable

Default Configuration

Spanning tree is enabled on all ports.

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example disables spanning-tree on Ethernet port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# spanning-tree disable
```

spanning-tree cost

The **spanning-tree cost** Interface Configuration mode command configures the spanning tree path cost for a port. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree cost *cost*

no spanning-tree cost

Parameters

- *cost* — Path cost of the port (Range: 1 - 200,000,000)

Default Configuration

Default path cost is determined by port speed and path cost method (long or short) as shown below:

Interface	Long	Short
Port-channel	20,000	4
Gigabit Ethernet (1000 Mbps)	20,000	4
Fast Ethernet (100 Mbps)	200,000	19
Ethernet (10 Mbps)	2,000,000	100

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

The path cost method is configured using the **spanning-tree pathcost method** Global Configuration mode command.

Example

The following example configures the spanning-tree cost on Ethernet port 5 to 35000.

```
Console(config)# interface ethernet e5
Console(config-if)# spanning-tree cost 35000
```

spanning-tree port-priority

The **spanning-tree port-priority** Interface Configuration mode command configures port priority. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree port-priority *priority*

no spanning-tree port-priority

Parameters

- *priority* — The priority of the port. (Range: 0 - 240 in multiples of 16). Allowed values are :0   16 32 48 64 80 96 112 128 144 160 176 192 208 224 240

Default Configuration

The default port priority for IEEE Spanning TreeProtocol (STP) is 128.

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the spanning priority on Ethernet port 3 to 16.

```
Console(config)# interface ethernet e3
Console(config-if)# spanning-tree port-priority 16
```

spanning-tree portfast

The **spanning-tree portfast** Interface Configuration mode command enables PortFast mode. In PortFast mode, the interface is immediately put into the forwarding state upon linkup without waiting for the standard forward time delay. To disable PortFast mode, use the **no** form of this command.

Syntax

spanning-tree portfast

no spanning-tree portfast

Default Configuration

PortFast mode is disabled.

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

This feature should be used only with interfaces connected to end stations. Otherwise, an accidental topology loop could cause a data packet loop and disrupt device and network operations.

Example

The following example enables PortFast on Ethernet port 5**.**

```
Console(config)# interface ethernet e5
Console(config-if)# spanning-tree portfast
```

spanning-tree link-type

The **spanning-tree link-type** Interface Configuration mode command overrides the default link-type setting determined by the duplex mode of the port and enables Rapid Spanning Tree Protocol (RSTP) transitions to the forwarding state. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree link-type {**point-to-point** | **shared**}

no spanning-tree spanning-tree link-type

Parameters

- **point-to-point** —Indicates that the port link type is point-to-point.
- **shared** — Indicates that the port link type is shared.

Default Configuration

The device derives the port link type from the duplex mode. A full-duplex port is considered a point-to-point link and a half-duplex port is considered a shared link..

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enables shared spanning-tree on Ethernet port 5.

```
Console(config)# interface ethernet e5
Console(config-if)# spanning-tree link-type shared
```

spanning-tree pathcost method

The **spanning-tree pathcost method** Global Configuration mode command sets the default path cost method. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree pathcost method {**long** | **short**}

no spanning-tree pathcost method

Parameters

- *long* — Specifies port path costs with a range of 1-200,000,000 .
- *short* — Specifies port path costs with a range of 0-65,535.

Default Configuration

Short path cost method.

Command Mode

Global Configuration mode

User Guidelines

This command applies to all spanning tree instances on the device.

The cost is set using the **spanning-tree cost** command.

Example

The following example sets the default path cost method to **long**.

```
Console(config)# spanning-tree pathcost method long
```

spanning-tree bpdu

The **spanning-tree bpdu** Global Configuration mode command defines BPDU handling when the spanning tree is disabled globally or on a single interface. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree bpdu {**filtering** | **flooding**}

Parameters

- **filtering** — Filter BPDU packets when the spanning tree is disabled on an interface.
- **flooding** — Flood BPDU packets when the spanning tree is disabled on an interface.

Default Configuration

The default setting is flooding.

Command Modes

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example defines BPDU packet flooding when the spanning-tree is disabled on an interface.

```
Console(config)# spanning-tree bpdu flooding
```

clear spanning-tree detected-protocols

The **clear spanning-tree detected-protocols** Privileged EXEC mode command restarts the protocol migration process (forces renegotiation with neighboring devices) on all interfaces or on a specified interface.

Syntax

clear spanning-tree detected-protocols [**ethernet** *interface* | **port-channel** *port-channel-number*]

Parameters

- *interface* — A valid Ethernet port.
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Modes

Privileged EXEC mode

User Guidelines

This feature should be used only when working in RSTP or MSTP mode.

Example

The following example restarts the protocol migration process on Ethernet port 5.

```
Console# clear spanning-tree detected-protocols ethernet e5
```

spanning-tree guard root

The **spanning-tree guard root** interface configuration command enables root guard on all spanning tree instances on that interface. Root guard restricts the interface to be the root port for the switch. To disable root guard on the interface use, the **no** form of this command.

Syntax

spanning-tree guard root

no spanning-tree guard root

Default Configuration

Root guard is disabled.

Command Modes

Interface configuration (Ethernet, port-channel)

User Guidelines

Root guard can be enabled when the switch work in STP, RSTP and MSTP.

When root guard is enabled, if spanning-tree calculations cause a port to be selected as the root port, the port transitions to the alternate state.

Example

The following example enables root guard on all spanning tree instances on port 5.

```
Console# configure
Console (config)# interface ethernet e5
Console (config-if)# spanning-tree guard root
```

spanning-tree mst priority

The **spanning-tree mst priority** Global Configuration mode command configures the device priority for the specified spanning-tree instance. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree mst *instance-id* **priority** *priority*

no spanning-tree *mst* *instance-id* **priority**

Parameters

- *instance -id*—ID of the spanning -tree instance (Range: 1-16).
- *priority*—Device priority for the specified spanning-tree instance (Range: 0-61440 in multiples of 4096).

Default Configuration

The default bridge priority for IEEE Spanning Tree Protocol (STP) is 32768.

Command Mode

Global Configuration mode

User Guidelines

The device with the lowest priority is selected as the root of the spanning tree.

Example

The following example configures the spanning tree priority of instance 1 to 4096.

```
Console (config) # spanning-tree mst 1 priority 4096
```

spanning-tree mst max-hops

The **spanning-tree mst priority** Global Configuration mode command configures the number of hops in an MST region before the BDPU is discarded and the port information is aged out. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree mst max-hops *hop-count*

no spanning-tree mst max-hops

Parameters

- *hop-count*—Number of hops in an MST region before the BDPU is discarded .(Range: 1-40)

Default Configuration

The default number of hops is 20.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the maximum number of hops that a packet travels in an MST region before it is discarded to 10.

```
Console (config) # spanning-tree mst max-hops 10
```

spanning-tree mst port-priority

The **spanning-tree mst port-priority** Interface Configuration mode command configures port priority for the specified MST instance. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree mst *instance-id* **port-priority** *priority*

no spanning-tree mst *instance-id* **port-priority**

Parameters

- *instance-ID*—ID of the spanning tree instance. (Range: 1-16)
- *priority*—The port priority. (Range: 0 - 240 in multiples of 16)

Default Configuration

The default port priority for IEEE Multiple Spanning Tree Protocol (MSTP) is 128.

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the port priority of port 1 to 142.

```
Console(config)# interface ethernet e1
Console(config-if)# spanning-tree mst 1 port-priority 142
```

spanning-tree mst cost

The **spanning-tree mst cost** Interface Configuration mode command configures the path cost for multiple spanning tree (MST) calculations. If a loop occurs, the spanning tree considers path cost when selecting an interface to put in the forwarding state. To return to the default configuration, use the **no** form of this command.

Syntax

spanning-tree mst *instance-id* **cost** *cost*

no spanning-tree mst *instance-id* **cost**

Parameters

- *instance-ID*—ID of the spanning -tree instance (Range: 1-15).
- *cost*—The port path cost. (Range: 1 - 200,000,000)

Default Configuration

Default path cost is determined by port speed and path cost method (long or short) as shown below:

Interface	Long	Short
Port-channel	20,000	4
Gigabit Ethernet (1000 Mbps)	20,000	4
Fast Ethernet (100 Mbps)	200,000	19
Ethernet (10 Mbps)	2,000,000	100

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the MSTP instance 1 path cost for Ethernet port 9 to 4.

```
Console(config) # interface ethernet e9
Console(config-if) # spanning-tree mst 1 cost 4
```

spanning-tree mst configuration

The **spanning-tree mst configuration** Global Configuration mode command enables configuring an MST region by entering the Multiple Spanning Tree (MST) mode.

Syntax

spanning-tree mst configuration

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

All devices in an MST region must have the same VLAN mapping, configuration revision number and name.

Example

The following example configures an MST region.

```
Console(config)# spanning-tree mst configuration
Console(config-mst) # instance 1 add vlan 10-20
Console(config-mst) # name region1
Console(config-mst) # revision 1
```

instance (mst)

The **instance** MST Configuration mode command maps VLANS to an MST instance.

Syntax

instance *instance-id* **{add | remove} vlan** *vlan-range*

Parameters

- *instance-ID*—ID of the MST instance (Range: 1-16).
- *vlan-range*—VLANs to be added to or removed from the specified MST instance. To specify a range of VLANs, use a hyphen. To specify a series of VLANs, use a comma. (Range: 1-4094).

Default Configuration

VLANs are mapped to the common and internal spanning tree (CIST) instance (instance 0).

Command Modes

MST Configuration mode

User Guidelines

All VLANs that are not explicitly mapped to an MST instance are mapped to the common and internal spanning tree (CIST) instance (instance 0) and cannot be unmapped from the CIST.

For two or more devices to be in the same MST region, they must have the same VLAN mapping, the same configuration revision number, and the same name.

Example

The following example maps VLANs 10-20 to MST instance 1.

```
Console(config)# spanning-tree mst configuration
Console(config-mst)# instance 1 add vlan 10-20
```

name (mst)

The **name** MST Configuration mode command defines the configuration name. To return to the default setting, use the **no** form of this command.

Syntax

name *string*

Parameters

- *string*—MST configuration name. Case-sensitive (Range: 1-32 characters).

Default Configuration

The default name is a bridge ID.

Command Mode

MST Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example defines the configuration name as region1.

```
Console(config) # spanning-tree mst configuration
Console(config-mst) # name region 1
```

revision (mst)

The **revision** MST configuration command defines the configuration revision number. To return to the default configuration, use the **no** form of this command.

Syntax

revision *value*

no revision

Parameters

- *value*—Configuration revision number (Range: 0-65535).

Default Configuration

The default configuration revision number is 0.

Command Mode

MST Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example sets the configuration revision to 1.

```
Console(config) # spanning-tree mst configuration
Console(config-mst) # revision 1
```

show (mst)

The **show** MST Configuration mode command displays the current or pending MST region configuration.

Syntax

show {current | pending}

Parameters

- **current**—Indicates the current region configuration.
- **pending**—Indicates the pending region configuration.

Default Configuration

This command has no default configuration.

Command Mode

MST Configuration mode

User Guidelines

The pending MST region configuration takes effect only after exiting the MST configuration mode.

Example

The following example displays a pending MST region configuration.

```
Console(config-mst)# show pending
Pending MST configuration
Name: Region1
Revision: 1
Instance        Vlans Mapped          State
--------        ------------          -------
0               1-9,21-4094           Enabled
1               10-20                 Enabled
```

exit (mst)

The **exit** MST Configuration mode command exits the MST configuration mode and applies all configuration changes.

Syntax

exit

Default Configuration

This command has no default configuration.

Command Mode

MST Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example exits the MST configuration mode and saves changes.

```
Console(config) # spanning-tree mst configuration
Console(config-mst) # exit
```

abort (mst)

The **abort** MST Configuration mode command exits the MST configuration mode without applying the configuration changes.

Syntax

abort

Default Configuration

This command has no default configuration.

Command Mode

MST Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example exits the MST configuration mode without saving changes.

```
Console(config) # spanning-tree mst configuration
Console(config-mst) # abort
```

show spanning-tree

The **show spanning-tree** Privileged EXEC mode command displays spanning-tree configuration.

Syntax

show spanning-tree [ethernet *interface -number*| **port-channel** *port-channel-number*] [**instance** instance-id]

show spanning-tree [**detail**] [**active** | **blockedports**] [**instance** instance-id]

show spanning-tree mst-configuration

Parameters

- *interface -number*— A valid Ethernet port.
- *port-channel-number* — A valid port channel number.
- **detail** — Indicates detailed information.
- **active** — Indicates active ports only.
- **blockedports** — Indicates blocked ports only.
- **mst-configuration**— Indicates the MST configuration identifier.
- *instance-id*—Specifies ID of the spanning tree instance.

Default Configuration

This command has no default configuration.

Command Modes

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays spanning-tree information.

```
Console# show spanning-tree
Spanning tree disabled (BPDU flooding) mode STP
Default port cost method: short
  Root ID    Priority    32768
             Address     00:19:28:37:46:00
             This switch is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
 Number of topology changes 0 last change occurred 00:01:07 ago
  Times:  hold 1, topology change 35, notification 2
          hello 2, max age 20, forward delay 15
Interfaces
 Name   State   Prio.Nbr   Cost     Sts   Role PortFast       Type
------ -------- -------- --------- ------ ---- -------- --------------
 1    enabled   128.1      19      DSBL  Desg    No        P2p (STP)
  2    enabled   128.2      19      DSBL  Desg    No        P2p (STP)
  3    enabled   128.3      19      DSBL  Desg    No        P2p (STP)
  4    enabled   128.4      19      DSBL  Desg    No        P2p (STP)
  5    enabled   128.5      100     DSBL  Desg    No        P2p (STP)
  6    enabled   128.6      100     DSBL  Desg    No        P2p (STP)
  7    enabled   128.7      100     DSBL  Desg    No        P2p (STP)
  8    enabled   128.8      19      DSBL  Desg    No        P2p (STP)
  9    enabled   128.9       4      DSBL  Desg    No        P2p (STP)
  10   enabled   128.10     100     DSBL  Desg    No        P2p (STP)
 ch1   enabled  128.1000     4      DSBL  Desg    No        P2p (STP)
 ch2   enabled  128.1001     4      DSBL  Desg    No        P2p (STP)
 ch3   enabled  128.1002     4      DSBL  Desg    No        P2p (STP)
 ch4   enabled  128.1003     4      DSBL  Desg    No        P2p (STP)
 ch5   enabled  128.1004     4      DSBL  Desg    No        P2p (STP)
 ch6   enabled  128.1005     4      DSBL  Desg    No        P2p (STP)
 ch7   enabled  128.1006     4      DSBL  Desg    No        P2p (STP)
 ch8   enabled  128.1007     4      DSBL  Desg    No        P2p (STP)
console#
```

Section 21. Syslog Commands

logging on

The **logging on** Global Configuration mode command controls error message logging. This command sends debug or error messages to a logging process, which logs messages to designated locations asynchronously to the process that generated the messages. To disable the logging process, use the **no** form of this command.

Syntax

logging on

no logging on

Default Configuration

Logging is enabled.

Command Mode

Global Configuration mode

User Guidelines

The logging process controls the distribution of logging messages at various destinations, such as the logging buffer, logging file or syslog server. Logging on and off at these destinations can be individually configured using the **logging buffered**, **logging file**, and **logging** Global Configuration mode commands. However, if the **logging on** command is disabled, no messages are sent to these destinations. Only the console receives messages.

Example

The following example enables logging error messages.

```
Console(config)# logging on
```

logging

The **logging** Global Configuration mode command logs messages to a syslog server. To delete the syslog server with the specified address from the list of syslogs, use the **no** form of this command.

Syntax

logging {*ip-address* | *hostname*} [**port** *port*] [**severity** *level*] [**facility** *facility*] [**description** *text*]

no logging {*ip-address* | *hostname*}

Parameters

- *ip-address* — IP address of the host to be used as a syslog server.
- *hostname* — Specifies the host name of the syslog server. (Range: 1-158 characters)
- *port* — Specifies the port number for syslog messages. (Range: 1 - 65535)
- *level* — Specifies the severity level of logged messages sent to the syslog servers. Possible values: **emergencies, alerts**, **critical**, **errors, warnings**, **notifications, informational** and **debugging**.
- *facility* — Specifies the facility that is indicated in the message. Possible values: **local0, local1, local2, local3, local4, local5, local 6, local7**.
- *text* — Syslog server description. (Range: 1-64 characters)

Default Configuration

The default port number is 514.

The default logging message level is **errors**.

The default facility is local7.

Command Mode

Global Configuration mode

User Guidelines

Up to 8 syslog servers can be used.

If no specific severity level is specified, the global values apply to each server.

Example

The following example limits logged messages sent to the syslog server with IP address 10.1.1.1 to severity level **critical**.

```
Console(config)# logging 10.1.1.1 severity critical
```

logging console

The **logging console** Global Configuration mode command limits messages logged to the console based on severity. To disable logging to the console, use the **no** form of this command.

Syntax

logging console *level*

no logging console

Parameters

- *level* — Specifies the severity level of logged messages displayed on the console. Possible values: **emergencies, alerts**, **critical**, **errors, warnings**, **notifications, informational, debugging.**

Default Configuration

The default severity level is **informational**.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example limits logging messages displayed on the console to severity level **errors**.

```
Console(config)# logging console errors
```

logging buffered

The **logging buffered** Global Configuration mode command limits syslog messages displayed from an internal buffer based on severity. To cancel using the buffer, use the **no** form of this command.

Syntax

logging buffered *level*

no logging buffered

Parameters

- *level* — Specifies the severity level of messages logged in the buffer. Possible values: **emergencies, alerts**, **critical**, **errors, warnings**, **notifications, informational, debugging.**

Default Configuration

The default severity level is **informational**.

Command Mode

Global Configuration mode

User Guidelines

All the syslog messages are logged to the internal buffer. This command limits the messages displayed to the user.

Example

The following example limits syslog messages displayed from an internal buffer based on severity level **debugging**.

```
Console(config)# logging buffered debugging
```

logging buffered size

The **logging buffered size** Global Configuration mode command changes the number of syslog messages stored in the internal buffer. To return to the default configuration, use the **no** form of this command.

Syntax

logging buffered size *number*

no logging buffered size

Parameters

- *number* — Specifies the maximum number of messages stored in the history table. (Range: 20 - 400)

Default Configuration

The default number of messages is 200.

Command Mode

Global Configuration mode

User Guidelines

This command takes effect only after Reset.

Example

The following example changes the number of syslog messages stored in the internal buffer to 300.

```
Console(config)# logging buffered size 300
```

clear logging

The **clear logging** Privileged EXEC mode command clears messages from the internal logging buffer.

Syntax

clear logging

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example clears messages from the internal logging buffer.

```
Console# clear logging
Clear logging buffer [y/n]?
```

logging file

The **logging file** Global Configuration mode command limits syslog messages sent to the logging file based on severity. To cancel using the buffer, use the **no** form of this command.

Syntax

logging file *level*

no logging file

Parameters

- *level* — Specifies the severity level of syslog messages sent to the logging filePossible values: **emergencies, alerts**, **critical**, **errors, warnings**, **notifications, informational** and **debugging.**

Default Configuration

The default severity level is **errors**.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example limits syslog messages sent to the logging file based on severity level **alerts**.

```
Console(config)# logging file alerts
```

clear logging file

The **clear logging file** Privileged EXEC mode command clears messages from the logging file.

Syntax

clear logging file

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example clears messages from the logging file.

```
Console# clear logging file
Clear Logging File [y/n]?
```

aaa logging

The **aaa logging** Global Configuration mode command enables logging AAA login events. To disable logging AAA login events, use the **no** form of this command.

Syntax

aaa logging login

no aaa logging login

Parameters

- **login** — Indicates logging messages related to successful login events, unsuccessful login events and other login-related events**.**

Default Configuration

Logging AAA login events is enabled.

Command Mode

Global Configuration mode

User Guidelines

Other types of AAA events are not subject to this command.

Example

The following example enables logging messages related to AAA login events.

```
Console(config)# aaa logging login
```

file-system logging

The **file-system logging** Global Configuration mode command enables logging file system events. To disable logging file system events, use the **no** form of this command.

Syntax

file-system logging copy

no file-system logging copy

file-system logging delete-rename

no file-system logging delete-rename

Parameters

- **copy** — Indicates logging messages related to file copy operations.
- **delete-rename** — Indicates logging messages related to file deletion and renaming operations.

Default Configuration

Logging file system events is enabled.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enables logging messages related to file copy operations.

```
Console(config)# file-system logging copy
```

management logging

The **management logging** global configuration command enables logging management access list (ACL) events. To disable logging management access list events, use the **no** form of this command.

Syntax

management logging deny

no management logging deny

Parameters

- **deny** — Indicates logging messages related to deny actions of management ACLs.

Default Configuration

Logging management ACL events is enabled.

Command Mode

Global Configuration mode

User Guidelines

Other types of management ACL events are not subject to this command.

Example

The following example enables logging messages related to deny actions of management ACLs.

```
Console(config)# management logging deny
```

show logging

The **show logging** Privileged EXEC mode command displays the state of logging and the syslog messages stored in the internal buffer.

Syntax

show logging

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the state of logging and the syslog messages stored in the internal buffer.

```
Console# show logging


Logging is enabled.
Console logging: level debugging. Console Messages: 0 Dropped (severity).
Buffer logging: level debugging. Buffer Messages: 11 Logged, 200 Max.
File logging: level notifications. File Messages: 0 Dropped (severity).
Syslog server 192.180.2.27 logging: errors. Messages: 6 Dropped (severity).
Syslog server 192.180.2.28 logging: errors. Messages: 6 Dropped (severity).
2 messages were not logged (resources)
Application filtering control
Application          Event                Status
-----------          -----                ------
AAA                  Login                Enabled
File system          Copy                 Enabled
File system          Delete-Rename        Enabled
Management ACL       Deny                 Enabled


Buffer log:
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface FastEthernet0, changed state to up
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface Ethernet1, changed state to up
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface Ethernet1, changed state to up
```

```
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface Ethernet2, changed state to up
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface Ethernet, changed state to up
11-Aug-2004 15:41:43: %SYS-5-CONFIG_I: Configured from memory by console
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0,
changed state to up
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1, changed
state to down
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1, changed
state to down
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2, changed
state to down
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3, changed
state to down
```

show logging file

The **show logging file** Privileged EXEC mode command displays the state of logging and the syslog messages stored in the logging file.

Syntax

show logging file

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the logging state and the syslog messages stored in the logging file.

```
Console# show logging file


Logging is enabled.
Console logging: level debugging. Console Messages: 0 Dropped (severity).
Buffer logging: level debugging. Buffer Messages: 11 Logged, 200 Max.
File logging: level notifications. File Messages: 0 Dropped (severity).
Syslog server 192.180.2.27 logging: errors. Messages: 6 Dropped (severity).
Syslog server 192.180.2.28 logging: errors. Messages: 6 Dropped (severity).
2 messages were not logged (resources)
Application filtering control
Application          | Event                Status
-----------          | -----                ------
AAA                  | Login                Enabled
File system          | Copy                 Enabled
File system          | Delete-Rename        Enabled
Management ACL       | Deny                 Enabled
                     |
Buffer log:
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface FastEthernet0, changed state to up
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface Ethernet1, changed state to up
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface Ethernet1, changed state to up
```

```
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface Ethernet2, changed state to up
11-Aug-2004 15:41:43: %LINK-3-UPDOWN: Interface Ethernet3, changed state to up
11-Aug-2004 15:41:43: %SYS-5-CONFIG_I: Configured from memory by console
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0,
changed state to up
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/, changed
state to down
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet11, changed
state to down
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet2, changed
state to down
11-Aug-2004 15:41:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet3, changed
state to down
```

show syslog-servers

The **show syslog-servers** Privileged EXEC mode command displays the settings of the syslog servers.

Syntax

show syslog-servers

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the settings of the syslog servers.

```
Console# show syslog-servers


Device Configuration
IP address          Port     Severity             Facility    Description
------------        ----     -------------        --------    -----------
192.180.2.27        514      Informational        local7
192.180.2.28        514      Warning              local7
```

Section 22. System Management

ping

The **ping** User EXEC mode command sends ICMP echo request packets to another node on the network.

Syntax

ping {*ip-address* | *hostname* }[**size** *packet_size*] [**count** *packet_count*] [**timeout** *time_out*]

Parameters

- *ip-address* — IP address to ping.
- *hostname* — Host name to ping. (Range: 1-158 characters)
- *packet_size* — Number of bytes in a packet. The actual packet size is eight bytes larger than the specified size specified because the device adds header information. (Range: 56 - 1472 bytes)
- *packet_count* — Number of packets to send. If 0 is entered, it pings until stopped. (Range: 0-65535 packets)
- *time_out* — Timeout in milliseconds to wait for each reply. (Range: 50 - 65535 milliseconds)

Default Configuration

Default packet size is 56 bytes.

Default number of packets to send is 4.

Default timeout value is 2000 milliseconds.

Command Mode

User EXEC mode

User Guidelines

Press **Esc** to stop pinging.

Following are examples of unsuccessful pinging:

Destination does not respond. If the host does not respond, a “no answer from host” appears in ten seconds.

Destination unreachable. The gateway for this destination indicates that the destination is unreachable.

Network or host unreachable. The device found no corresponding entry in the route table.

Examples

The following example displays pinging results:

```
Console> ping 10.1.1.1
Pinging 10.1.1.1 with 64 bytes of data:

64 bytes from 10.1.1.1: icmp_seq=0. time=11 ms
64 bytes from 10.1.1.1: icmp_seq=1. time=8 ms
64 bytes from 10.1.1.1: icmp_seq=2. time=8 ms
64 bytes from 10.1.1.1: icmp_seq=3. time=7 ms

----10.1.1.1 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms) min/avg/max = 7/8/11

Console> ping yahoo.com
Pinging yahoo.com (66.218.71.198) with 64 bytes of data:

64 bytes from 10.1.1.1: icmp_seq=0. time=11 ms
64 bytes from 10.1.1.1: icmp_seq=1. time=8 ms
64 bytes from 10.1.1.1: icmp_seq=2. time=8 ms
64 bytes from 10.1.1.1: icmp_seq=3. time=7 ms

----10.1.1.1 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms) min/avg/max = 7/8/11
```

traceroute

The **traceroute** User EXEC mode command discovers routes that packets actually take when traveling to their destination.

Syntax

traceroute {*ip-address* **|***hostname* }[**size** *packet_size*] [**ttl** *max-ttl*] [**count** *packet_count*] [**timeout** *time_out*] [**source** *ip-address*] [**tos** *tos*]

Parameters

- *ip-address* — IP address of the destination host.
- *hostname* — Host name of the destination host. (Range: 1-158 characters)
- *packet_size* — Number of bytes in a packet. (Range: 40-1500)
- *max-ttl* — The largest TTL value that can be used. The **traceroute** command terminates when the destination is reached or when this value is reached. (Range:1-255)
- *packet_count* — The number of probes to be sent at each TTL level. (Range:1-10)
- *time_out* — The number of seconds to wait for a response to a probe packet. (Range:1-60)
- *ip-address* — One of the device's interface addresses to use as a source address for the probes. The device normally selects what it feels is the best source address to use.
- *tos* — The Type-Of-Service byte in the IP Header of the packet. (Range: 0-255)

Default Configuration

The default number of bytes in a packet is 40.

The default maximum TTL value is 30.

The default number of probes to be sent at each TTL level is 3.

The default timeout interval in seconds is 3.

Command Mode

User EXEC mode

User Guidelines

The **traceroute** command takesadvantage of the error messages generated by the routers when a datagram exceeds its time-to-live (TTL) value.

The **traceroute** command starts by sending probe datagrams with a TTL value of one. This causes the first router to discard the probe datagram and send back an error message. The **traceroute** command sends several probes at each TTL level and displays the round-trip time for each.

The **traceroute** command sends out one probe at a time. Each outgoing packet may result in one or two error messages. A "time exceeded" error message indicates that an intermediate router has seen and discarded the probe. A "destination unreachable" error message indicates that the destination node has received the probe and discarded it because it could not deliver the packet. If the timer goes off before a response comes in, the **traceroute** command prints an asterisk (*).

The **traceroute** command terminates when the destination responds, when the maximum TTL is exceeded or when the user interrupts the trace by pressing **Esc**.

Examples

The following example discovers the routes that packets will actually take when traveling to their destination.

```
Console> traceroute umaxp1.physics.lsa.umich.edu
Type Esc to abort.
Tracing the route to umaxp1.physics.lsa.umich.edu (141.211.101.64)
1 i2-gateway.stanford.edu (192.68.191.83)  0 msec 0 msec 0 msec
2 STAN.POS.calren2.NET (171.64.1.213) 0 msec 0 msec 0 msec
3 SUNV--STAN.POS.calren2.net (198.32.249.73) 1 msec 1 msec 1 msec
4 Abilene--QSV.POS.calren2.net (198.32.249.162)  1 msec 1 msec 1 msec
5 kscyng-snvang.abilene.ucaid.edu (198.32.8.103)  33 msec 35 msec 35 msec
6 iplsng-kscyng.abilene.ucaid.edu (198.32.8.80)   47 msec 45 msec 45 msec
7 so-0-2-0x1.aa1.mich.net (192.122.183.9)  56 msec  53 msec 54 msec
8 atm1-0x24.michnet8.mich.net (198.108.23.82)  56 msec 56 msec 57 msec
9 * * *
10 A-ARB3-LSA-NG.c-SEB.umnet.umich.edu (141.211.5.22) 58 msec 58 msec 58 msec
11 umaxp1.physics.lsa.umich.edu (141.211.101.64)  62 msec 63 msec 63 msec
```

The following table describes significant fields shown above.

Field	Description
1	Indicates the sequence number of the device in the path to the host.
i2-gateway.stanford.edu	Host name of this device.
192.68.191.83	IP address of this device.
1 msec 1 msec 1 msec	Round-trip time for each probe sent.

The following table describes characters that may appear in the **traceroute** command output.

Field	Description
*	The probe timed out.
?	Unknown packet type.
A	Administratively unreachable. Usually, this output indicates that an access list is blocking traffic.
F	Fragmentation is required and DF is set.
H	Host unreachable.
N	Network unreachable.
P	Protocol unreachable.
Q	Source quench.
R	Fragment reassembly time exceeded.
S	Source route failed.
U	Port unreachable.

reload

The **reload** Privileged EXEC mode command reloads the operating system.

Syntax

reload

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

Caution should be exercised when resetting the device, to ensure that no other activity is being performed. In particular, the user should verify that no configuration files are being downloaded at the time of reset.

Example

The following example reloads the operating system.

```
Console# reload
This command will reset the whole system and disconnect your current session. Do you want
to continue (y/n) [n]?
```

hostname

The **hostname** Global Configuration mode command specifies or modifies the device host name. To remove the existing host name, use the **no** form of the command.

Syntax

hostname *name*

no hostname

Parameters

- *name* — The host name. of the device. (Range: 1-158 characters)

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

show users

The **show users** User EXEC mode command displays information about the active users.

Syntax

show users

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays information about the active users.

```
Console> show users

Username           Protocol        Location
----------         -----------     ------------
Bob                Serial
John               SSH             172.16.0.1
Robert             HTTP            172.16.0.8
Betty              Telnet          172.16.1.7
```

show system

The **show system** User EXEC mode command displays system information.

Syntax

show system

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the system information.

```
Console> show system


System Description:                         8 Port 10/100, 1 Gigabit, 1 SFP, Switc
h w/Embedded Web
System Up Time (days,hour:min:sec):         0,00:50:35
System Contact:
System Name:
System Location:
System MAC Address:                         00:13:25:38:78:00
System Object ID:                           1.3.6.1.4.1.89.1.1.171.10.67.2
```

show version

The **show version** User EXEC mode command displays system version information.

Syntax

show version

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays system version information (only for demonstration purposes).

```
Console> show version
SW version 1.0.0.0                  (date 23-Jul-2004 time 17:34:19)
Boot version 1.0.0.0                (date 11-Jan-2004 time 11:48:21)
HW version 1.0.0
```

show system id

The **show system id** User EXEC mode command displays system ID information.

Syntax

show system id

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the system ID information.

```
console# show system id
Service tag :
Serial number :
Asset tag:
```

system language web

The **system language web** Global Configuration mode command specifies the language of the Web management interface.

Syntax

system language web *english* | *chinese* | *default*

Parameters

- *english* — Specify that the language of the Web management interface is English.
- *chinese* — Specify that the language of the Web management interface is Chinese.
- *default* — Specify that the language of the Web management interface is the default language.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Section 23. User Interface

enable

The **enable** User EXEC mode command enters the Privileged EXEC mode.

Syntax

enable [*privilege-level*]

Parameters

- *privilege-level* — Privilege level to enter the system. (Range: 1 - 15)

Default Configuration

The default privilege level is 15.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enters Privileged EXEC mode:

```
Console> enable
enter password:
Console#
```

disable

The **disable** Privileged EXEC mode command returns to the User EXEC mode.

Syntax

disable [*privilege-level*]

Parameters

- *privilege-level* — Privilege level to enter the system. (Range: 1 - 15)

Default Configuration

The default privilege level is 1.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example return to Users EXEC mode.

```
Console# disable
Console>
```

login

The login User EXEC mode command changes a login username.

Syntax

login

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enters Privileged EXEC mode and logs in with username **admin**.

```
Console> login
User Name:admin
Password:*****
Console#
```

configure

The **configure** Privileged EXEC mode command enters the Global Configuration mode.

Syntax

configure

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enters Global Configuration mode.

```
Console# configure
Console(config)#
```

exit (Configuration)

The **exit** command exits any configuration mode to the next highest mode in the CLI mode hierarchy.

Syntax

exit

Default Configuration

This command has no default configuration.

Command Mode

All configuration modes

User Guidelines

There are no user guidelines for this command.

Example

The following example changes the configuration mode from Interface Configuration mode to Privileged EXEC mode.

```
Console(config-if)# exit
Console(config)# exit
Console#
```

exit

The **exit** Privileged/User EXEC mode command closes an active terminal session by logging off the device.

Syntax

exit

Default Configuration

This command has no default configuration.

Command Mode

Privileged and User EXEC modes

User Guidelines

There are no user guidelines for this command.

Example

The following example closes an active terminal session.

```
Console> exit
```

end

The **end** command ends the current configuration session and returns to the Privileged EXEC mode.

Syntax

end

Default Configuration

This command has no default configuration.

Command Mode

All configuration modes.

User Guidelines

There are no user guidelines for this command.

Example

The following example changes from Global Configuration mode to Privileged EXEC mode.

```
Console(config)# end
Console#
```

help

The **help** command displays a brief description of the help system.

Syntax

help

Default Configuration

This command has no default configuration.

Command Mode

All command modes

User Guidelines

There are no user guidelines for this command.

Example

The following example describes the help system.

```
Console# help
Help may be requested at any point in a command by entering a question mark '?'. If nothing
matches the currently entered incomplete command, the help list is empty. This indicates
that for a query at this point, there is no command matching the current input. If the
request is within a command, enter backspace and erase the entered characters to a point
where the request results in a display.
Help is provided when:
1. There is a valid command and a help request is made for entering a parameter or argument
(e.g. 'show ?'). All possible parameters or arguments for the entered command are
displayed.
2. An abbreviated argument is entered and a help request is made for arguments matching the
input (e.g. 'show pr?').
```

terminal data-dump

The **terminal data-dump** User EXEC mode command enables dumping all the output of a show command without prompting. To disable dumping, use the **no** form of this command.

Syntax

terminal data-dump

no terminal data-dump

Default Configuration

Dumping is disabled.

Command Mode

User EXEC mode

User Guidelines

By default, a **More** prompt is displayed when the output contains more lines than can be displayed on the screen. Pressing the **Enter** key displays the next line; pressing the Spacebar displays the next screen of output. The data-dump command enables dumping all output immediately after entering the show command.

This command is relevant only for the current session.

Example

This example dumps all output immediately after entering a show command.

```
Console> terminal data-dump
```

show history

The **show history** User EXEC mode command lists the commands entered in the current session.

Syntax

show history

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

The buffer includes executed and unexecuted commands.

Commands are listed from the first to the most recent command.

The buffer remains unchanged when entering into and returning from configuration modes.

Example

The following example displays all the commands entered while in the current Privileged EXEC mode.

```
Console# show version
SW version 3.131 (date 23-Jul-2004 time 17:34:19)
HW version 1.0.0
Console# show clock
15:29:03 Jun 17 2004
Console# show history
show version
show clock
show history
3 commands were logged (buffer size is 10)
```

show privilege

The **show privilege** Privileged/User EXEC mode command displays the current privilege level.

Syntax

show privilege

Default Configuration

This command has no default configuration.

Command Mode

Privileged and User EXEC modes

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the current privilege level for the Privileged EXEC mode.

```
Console# show privilege
Current privilege level is 15
```

Section 24. VLAN Commands

vlan database

The **vlan database** Global Configuration mode command enters the VLAN Configuration mode.

Syntax

vlan database

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enters the VLAN database mode.

```
Console(config)# vlan database
Console(config-vlan)#
```

vlan

Use the **vlan** VLAN Configuration mode command to create a VLAN. To delete a VLAN, use the **no** form of this command.

Syntax

vlan *vlan-range*

no vlan *vlan-range*

Parameters

- *vlan-range* — Specifies a list of VLAN IDs to be added. Separate nonconsecutive VLAN IDs with a comma and no spaces; a hyphen designates a range of IDs.

Default Configuration

This command has no default configuration.

Command Mode

VLAN Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example VLAN number 1972 is created.

```
Console(config)# vlan database
Console(config-vlan)# vlan 1972
```

interface vlan

The **interface vlan** Global Configuration mode command enters the Interface Configuration (VLAN) mode.

Syntax

interface vlan *vlan-id*

Parameters

- *vlan-id* — Specifies an existing VLAN ID.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures VLAN 1 with IP address 131.108.1.27 and subnet mask 255.255.255.0.

```
Console(config)# interface vlan 1
Console(config-if)# ip address 131.108.1.27 255.255.255.0
```

interface range vlan

The **interface range vlan** Global Configuration mode command enables simultaneously configuring multiple VLANs.

Syntax

interface range vlan {*vlan-range* | **all**}

Parameters

- *vlan-range* — Specifies a list of VLAN IDs to be added. Separate nonconsecutive VLAN IDs with a comma and no spaces; a hyphen designates a range of IDs.
- **all** — All existing static VLANs.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

Commands under the interface range context are executed independently on each interface in the range. If the command returns an error on one of the interfaces, an error message is displayed and execution of the command continues on the other interfaces.

Example

The following example groups VLANs 221, 228 and 889 to receive the same command.

```
Console(config)# interface range vlan 221-228,889
Console(config-if)#
```

name

The **name** Interface Configuration mode command adds a name to a VLAN. To remove the VLAN name, use the **no** form of this command.

Syntax

name *string*

no name

Parameters

- *string* — Unique name to be associated with this VLAN. (Range: 1-32 characters)

Default Configuration

No name is defined.

Command Mode

Interface Configuration (VLAN) mode. Cannot be configured for a range of interfaces (range context).

User Guidelines

There are no user guidelines for this command.

Example

The following example gives VLAN number 19 the name **Marketing**.

```
Console(config)# interface vlan 19
Console(config-if)# name Marketing
```

switchport mode

The **switchport mode** Interface Configuration mode command configures the VLAN membership mode of a port. To return to the default configuration, use the **no** form of this command.

Syntax

switchport mode {**access** | **trunk | general**}

no switchport mode

- **access** — Indicates an untagged layer 2 VLAN port.
- **trunk** — Indicates a trunking layer 2 VLAN port.
- **general** — Indicates a full 802-1q supported VLAN port.

Default Configuration

All ports are in access mode, and belong to the default VLAN (whose VID=1).

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- A port cannot be defined as promiscuous or isolated if it is a member of a VLAN.
- If a port is defined as promiscuous or isolated, it is no longer a member of the default VLAN.

Example

The following example configures Ethernet port 3 as an untagged layer 2 VLAN port.

```
Console(config)# interface ethernet e3
Console(config-if)# switchport mode access
```

switchport access vlan

The **switchport access vlan** Interface Configuration mode command configures the VLAN ID when the interface is in access mode. To return to the default configuration, use the **no** form of this command.

Syntax

switchport access vlan {*vlan-id* | **dynamic**}

no switchport access vlan

Parameters

- *vlan-id* — Specifies the ID of the VLAN to which the port is configured.
- **dynamic**—Indicates that the port is assigned to a VLAN based on the source MAC address of the host connected to the port.

Default Configuration

All ports belong to VLAN 1.

Command Mode

Interface configuration (Ethernet, port-channel) mode

User Guidelines

The command automatically removes the port from the previous VLAN and adds it to the new VLAN.

Example

The following example configures a VLAN ID of 23 to the untagged layer 2 VLAN Ethernet port 6.

```
Console(config)# interface ethernet e6
Console(config-if)# switchport access vlan 23
```

switchport trunk allowed vlan

The **switchport trunk allowed vlan** Interface Configuration mode command adds or removes VLANs to or from a trunk port.

Syntax

switchport trunk allowed vlan {**add** *vlan-list* | **remove** *vlan-list* }

Parameters

- **add** *vlan-list* — List of VLAN IDs to be added. Separate nonconsecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.
- **remove** *vlan-list* — List of VLAN IDs to be removed. Separate nonconsecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.

Default Configuration

This command has no default configuration.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example adds VLANs 1, 2, 5 to 6 to the allowed list of Ethernet port 6.

```
Console(config)# interface ethernet e6
console(config-if)# switchport trunk allowed vlan add 1-2,5-6
```

switchport trunk native vlan

The **switchport trunk native vlan** Interface Configuration mode command defines the native VLAN when the interface is in trunk mode. To return to the default configuration, use the **no** form of this command.

Syntax

switchport trunk native vlan *vlan-id*

no switchport trunk native vlan

Parameters

- *vlan-id*— Specifies the ID of the native VLAN.

Default Configuration

VID=1.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

The command adds the port as a member in the VLAN. If the port is already a member in the VLAN (not as a native), it should be first removed from the VLAN.

Example

The following example configures VLAN number 123 as the native VLAN when Ethernet port 6 is in trunk mode.

```
Console(config)# interface ethernet e6
Console(config-if)# switchport trunk native vlan 123
```

switchport general allowed vlan

The **switchport general allowed vlan** Interface Configuration mode command adds or removes VLANs from a general port.

Syntax

switchport general allowed vlan add *vlan-list* [**tagged** | **untagged**]

switchport general allowed vlan remove *vlan-list*

Parameters

- **add** *vlan-list* — Specifies the list of VLAN IDs to be added. Separate nonconsecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.
- **remove** *vlan-list* — Specifies the list of VLAN IDs to be removed. Separate nonconsecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.
- **tagged** — Indicates that the port transmits tagged packets for the VLANs.
- **untagged** — Indicates that the port transmits untagged packets for the VLANs.

Default Configuration

If the port is added to a VLAN without specifying tagged or untagged, the default setting is tagged.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

This command enables changing the egress rule (e.g., from tagged to untagged) without first removing the VLAN from the list.

Example

The following example adds VLANs 2, 5, and 6 to the allowed list of Ethernet port 6 .

```
Console(config)# interface ethernet e6
Console(config-if)# switchport general allowed vlan add 2,5-6 tagged
```

switchport general pvid

The **switchport general pvid** Interface Configuration mode command configures the PVID when the interface is in general mode. To return to the default configuration, use the **no** form of this command.

Syntax

switchport general pvid *vlan-id*

no switchport general pvid

Parameters

- *vlan-id* — Specifies the PVID (Port VLAN ID).

Default Configuration

If the default VLAN is enabled, PVID = 1. Otherwise, PVID=4095.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures the PVID for Ethernet port 6, when the interface is in general mode.

```
Console(config)# interface ethernet e6
Console(config-if)# switchport general pvid 234
```

switchport general ingress-filtering disable

The **switchport general ingress-filtering disable** Interface Configuration mode command disables port ingress filtering. To return to the default configuration, use the **no** form of this command.

Syntax

switchport general ingress-filtering disable

no switchport general ingress-filtering disable

Default Configuration

Ingress filtering is enabled.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example disables port ingress filtering on Ethernet port 6.

```
Console(config)# interface ethernet e6
Console(config-if)# switchport general ingress-filtering disable
```

switchport general acceptable-frame-type tagged-only

The **switchport general acceptable-frame-type tagged-only** Interface Configuration mode command discards untagged frames at ingress. To return to the default configuration, use the **no** form of this command.

Syntax

switchport general acceptable-frame-type tagged-only

no switchport general acceptable-frame-type tagged-only

Default Configuration

All frame types are accepted at ingress.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

There are no user guidelines for this command.

Example

The following example configures Ethernet port 6 to discard untagged frames at ingress.

```
Console(config)# interface ethernet e6
Console(config-if)# switchport general acceptable-frame-type tagged-only
```

switchport forbidden vlan

The **switchport forbidden vlan** Interface Configuration mode command forbids adding specific VLANs to a port. To return to the default configuration, use the **remove** parameter for this command.

Syntax

switchport forbidden vlan {**add** *vlan-list* | **remove** *vlan-list*}

Parameters

- **add** *vlan-list* — Specifies the list of VLAN IDs to be added. Separate nonconsecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.
- **remove** *vlan-list* — Specifies the list of VLAN IDs to be removed. Separate nonconsecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.

Default Configuration

All VLANs are allowed.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

This command can be used to prevent GVRP from automatically making the specified VLANs active on the selected ports.

Example

The following example forbids adding VLAN IDs 234 to 256 to Ethernet port 6.

```
Console(config)# interface ethernet e6
Console(config-if)# switchport forbidden vlan add 234-256
```

switchport protected

The **switchport protected** Interface Configuration mode command overrides the FDB decision and sends all Unicast, Multicast and Broadcast traffic to an uplink port. To return to the default configuration, use the **no** form of the command .

Syntax

switchport protected {**ethernet** *interface* | **port-channel** *port-channel-number* }

no switchport protected

- *interface* — Specifies the uplink Ethernet port.
- *port-channel-number*— Specifies the port-channel uplink port.

Default Configuration

Overriding the FDB decision is disabled.

Command Mode

Interface Configuration (Ethernet, port-channel)

User Guidelines

- Packets to the MAC address of the device are sent to the device and not forwarded to the uplink.

Example

The following example overrides the FDB decision and sends all Unicast, Multicast and Broadcast traffic to Ethernet port 7 from protected Ethernet port 8.

```
Console# config
Console(config)# interface ethernet e7
Console(config-if)# switchport protected ethernet e8
```

ip internal-usage-vlan

The **ip internal-usage-vlan** Interface Configuration mode command reserves a VLAN as the internal usage VLAN of an interface. To return to the default configuration, use the **no** form of this command.

Syntax

ip internal-usage-vlan *vlan-id*

no ip internal-usage-vlan

Parameters

- *vlan-id* — Specifies the ID of the internal usage VLAN.

Default Configuration

The software reserves a VLAN as the internal usage VLAN of an interface.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

An internal usage VLAN is required when an IP interface is configured on an Ethernet port or port-channel.

This command enables the user to configure the internal usage VLAN of a port. If an internal usage VLAN is not configured and the user wants to configure an IP interface, an unused VLAN is selected by the software.

If the software selected a VLAN for internal use and the user wants to use that VLAN as a static or dynamic VLAN, the user should do one of the following:

- Remove the IP interface.
- Create the VLAN and recreate the IP interface.
- Use this command to explicitly configure a different VLAN as the internal usage VLAN.

Example

The following example reserves an unused VLAN as the internal usage VLAN of ethernet port 7.

```
Console# config
Console(config)# interface ethernet e7
Console(config-if)# ip internal-usage-vlan 2
```

show vlan

The **show vlan** Privileged EXEC mode command displays VLAN information.

Syntax

show vlan [**id** *vlan-id* | **name** *vlan-name* **]**

Parameters

- *vlan-id* — specifies a VLAN ID
- *vlan-name* — Specifies a VLAN name string. (Range: 1 - 32 characters)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays all VLAN information.

```
Console# show vlan

VLAN     Name            Ports                    Type       Authorization
----     -------         --------                 ----       -------------
1        default         1-2, 1-4                 other      Required
10       VLAN0010        3-4                      dynamic    Required
11       VLAN0011        1-2                      static     Required
20       VLAN0020        3-4                      static     Required
21       VLAN0021                                 static     Required
30       VLAN0030                                 static     Required
31       VLAN0031                                 static     Required
91       VLAN0011        1-2                      static     Not Required
3978     Guest VLAN      7                        guest      -
```

show vlan internal usage

The **show vlan internal usage** Privileged EXEC mode command displays a list of VLANs used internally by the device.

Syntax

show vlan internal usage

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays VLANs used internally by the device.

```
Console# show vlan internal usage


Usage         VLAN          Reserved     IP address
---------     ----          --------     ----------
Eth 3         1007          No           Active
Eth 4         1008          Yes          Inactive
Eth 3         1009          Yes          Active
```

show interfaces switchport

The **show interfaces switchport** Privileged EXEC mode command displays the switchport configuration.

Syntax

show interfaces switchport {ethernet *interface* | **port-channel** *port-channel-number*}

Parameters

- *interface* — A valid Ethernet port number.
- *port-channel-number* — A valid port-channel number.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the switchport configuration for Ethernet port 1.

```
Console# show interface switchport ethernet e1
Port e1:
VLAN Membership mode: General

Operating parameters:
PVID: 1 (default)
Ingress Filtering: Enabled
Acceptable Frame Type: All
GVRP status: Enabled
Protected: Enabled, Uplink is 8.

Port e1 is member in:
Vlan          Name                     Egress rule       Type
----          -------                  -----------       -------
1             default                  untagged          System
8             VLAN008                  tagged            Dynamic
11            VLAN011                  tagged            Static
19            IPv6 VLAN                untagged          Static
72            VLAN0072                 untagged          Static
```

```
Static configuration:
PVID: 1 (default)
Ingress Filtering: Enabled
Acceptable Frame Type: All

Port e1 is statically configured to:
Vlan          Name                     Egress rule
----          -------                  -----------
1             default                  untagged
11            VLAN011                  tagged
19            IPv6 VLAN                untagged
72            VLAN0072                 untagged

Forbidden VLANS:
VLAN          Name
----          ----
73            out

Console# show interface switchport ethernet e2
Port e2:
VLAN Membership mode: General

Operating parameters:
PVID: 4095 (discard vlan)
Ingress Filtering: Enabled
Acceptable Frame Type: All

Port e1 is member in:
Vlan          Name                     Egress rule       Type
----          ------------             -----------       ------
91            IP Telephony             tagged            Static

Static configuration:
PVID: 8
Ingress Filtering: Disabled
Acceptable Frame Type: All
```

```
Port e2 is statically confgiured to:
Vlan          Name                     Egress rule
----          ------------             -----------
8             VLAN0072                 untagged
91            IP Telephony             tagged

Forbidden VLANS:
VLAN          Name
----          ----
73            out

Port e7
VLAN Membership mode:
Primary VLAN: 2921
Community VLAN: 2922

Console# show interfaces switchport ethernet e7
Port e7:
VLAN Membership mode:

Operating parameters:
PVID: 2922
Ingress Filtering: Enabled
Acceptable Frame Type: Untagged
GVRP status: Disabled

Port e7 is member in:
Vlan          Name                     Egress rule      Type
----          ------------             -----------      ------
2921          Primary A                untagged         Static
2922          Community A1             untagged         Static

Static configuration:
PVID: 2922
Ingress Filtering: Enabled
Acceptable Frame Type: Untagged
GVRP status: Disabled
```

Section 25. Web Server

ip http server

The **ip http server** Global Configuration mode command enables configuring the device from a browser. To disable this function, use the **no** form of this command.

Syntax

ip http server

no ip http server

Default Configuration

HTTP server is enabled.

Command Mode

Global Configuration mode

User Guidelines

Only a user with access level 15 can use the Web server.

Example

The following example enables configuring the device from a browser.

```
Console(config)# ip http server
```

ip http exec-timeout

The **ip http exec-timeout** Global Configuration mode command specifies the timeout interval of a http session. To return to the default configuration, use the **no** form of this command.

Syntax

ip http exec-timeout *minutes* [*seconds*]

no ip http exec-timeout

Parameters

- *minutes* — Specifies the number of minutes. (Range: 0 - 65535)
- *seconds* — Specifies additional time intervals in seconds. (Range: 0 - 59)

Default Configuration

The default configuration is 10 minutes.

Command Mode

Global Configuration mode

User Guidelines

To specify no timeout, enter the **ip http exec-timeout** 0 command.

Examples

The following example configures the timeout interval to 5 minutes.

```
Console(config)# ip http exec-timeout 5
```

ip https server

The **ip https server** Global Configuration mode command enables configuring the device from a browser. To disable this function, use the **no** form of this command.

Syntax

ip https server

no ip https server

Default Configuration

HTTPS server is enabled.

Command Mode

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Example

The following example enables configuring the device from a browser.

```
Console(config)# ip https server
```

ip http port

The **ip http port** Global Configuration mode command specifies the TCP port to be used by the Web browser interface. To return to the default configuration, use the **no** form of this command.

Syntax

ip http port *port-number*

no ip http port

Parameters

- *port-number* — Port number for use by the HTTP server. (Range: 0 - 65535)

Default Configuration

The default port number is 80.

Command Mode

Global Configuration mode

User Guidelines

Specifying 0 as the port number effectively disables HTTP access to the device.

Example

The following example configures the http port number to 100.

```
Console(config)# ip http port 100
```

ip https port

The **ip https port** Global Configuration mode command specifies the TCP port to be used by the Web browser interface. To return to the default configuration, use the **no** form of this command.

Syntax

ip https port *port-number*

no ip https port

Parameters

- *port-number* — Port number for use by the HTTPS server. (Range: 1 - 65534)

Default Configuration

The default port number is 80.

Command Mode

Global Configuration mode

User Guidelines

Use the **crypto certificate generate** Global Configuration mode command to generate an HTTPS certificate.

Specifying 0 as the port number effectively disables https access to the device.

Example

The following example configures the HTTPS port number to 100.

```
Console(config)# ip https port 100
```

show ip http

The **show ip http** Privileged EXEC mode command displays the HTTP server configuration.

Syntax

show ip http

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the HTTP server configuration.

```
Console# show ip http
HTTP server enabled. Port: 80
```

Section 26. 802.1x Commands

aaa authentication dot1x

The **aaa authentication dot1x** Global Configuration mode command specifies one or more authentication, authorization, and accounting (AAA) methods for use on interfaces running IEEE 802.1X. To return to the default configuration, use the **no** form of this command.

Syntax

aaa authentication dot1x default *method1* [*method2*...]

no aaa authentication dot1x default

Parameters

- *method1* [*method2*...] — At least one from the following table:

Keyword	Description
Radius	Uses the list of all RADIUS servers for authentication
None	Uses no authentication

Default Configuration

No authentication method is defined.

Command Mode

Global Configuration mode

User Guidelines

Additional methods of authentication are used only if the previous method returns an error and not if the request for authentication is denied. To ensure that authentication succeeds even if all methods return an error, specify **none** as the final method in the command line.

The RADIUS server must support MD-5 challenge and EAP type frames.

Examples

The following example uses the **aaa authentication dot1x default** command with no authentication.

```
Console(config)# aaa authentication dot1x default none
```

dot1x system-auth-control

The **dot1x system-auth-control** Global Configuration mode command enables 802.1x globally. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x system-auth-control

no dot1x system-auth-control

Default Configuration

802.1x is disabled globally.

Command Modes

Global Configuration mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example enables 802.1x globally.

```
Console(config)# dot1x system-auth-control
```

dot1x port-control

The **dot1x port-control** Interface Configuration mode command enables manually controlling the authorization state of the port. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x port-control {**auto** | **force-authorized** | **force-unauthorized**}

no dot1x port-control

Parameters

- **auto —** Enables 802.1X authentication on the interface and causes the port to transition to the authorized or unauthorized state based on the 802.1X authentication exchange between the port and the client.
- **force-authorized —** Disables 802.1X authentication on the interface and causes the port to transition to the authorized state without any authentication exchange required. The port resends and receives normal traffic without 802.1X-based authentication of the client.
- **force-unauthorized —** Denies all access through this interface by forcing the port to transition to the unauthorized state and ignoring all attempts by the client to authenticate. The device cannot provide authentication services to the client through the interface.

Default Configuration

Port is in the force-authorized state

Command Mode

Interface Configuration (Ethernet)

User Guidelines

It is recommended to disable spanning tree or to enable spanning-tree PortFast mode on 802.1x edge ports (ports in **auto** state that are connected to end stations), in order to get immediately to the forwarding state after successful authentication.

Examples

The following example enables 802.1X authentication on Ethernet port 6.

```
Console(config)# interface ethernet e6
Console(config-if)# dot1x port-control auto
```

dot1x re-authentication

The **dot1x re-authentication** Interface Configuration mode command enables periodic re-authentication of the client. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x re-authentication

no dot1x re-authentication

Default Configuration

Periodic re-authentication is disabled.

Command Mode

Interface Configuration (Ethernet)

User Guidelines

There are no user guidelines for this command.

Examples

The following example enables periodic re-authentication of the client.

```
Console(config)# interface ethernet e6
Console(config-if)# dot1x re-authentication
```

dot1x timeout re-authperiod

The **dot1x timeout re-authperiod** Interface Configuration mode command sets the number of seconds between re-authentication attempts. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x timeout re-authperiod *seconds*

no dot1x timeout re-authperiod

Parameters

- *seconds* — Number of seconds between re-authentication attempts. (Range: 300 - 4294967295)

Default Configuration

Re-authentication period is 3600 seconds.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example sets the number of seconds between re-authentication attempts, to 300.

```
Console(config)# interface ethernet e6
Console(config-if)# dot1x timeout re-authperiod 300
```

dot1x re-authenticate

The **dot1x re-authenticate** Privileged EXEC mode command manually initiates a re-authentication of all 802.1X-enabled ports or the specified 802.1X-enabled port.

Syntax

dot1x re-authenticate [**ethernet** *interface*]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following command manually initiates a re-authentication of 802.1X-enabled Ethernet port 6.

```
Console# dot1x re-authenticate ethernet e6
```

dot1x timeout quiet-period

The **dot1x timeout quiet-period** Interface Configuration mode command sets the number of seconds that the device remains in the quiet state following a failed authentication exchange (for example, the client provided an invalid password). To return to the default configuration, use the **no** form of this command.

Syntax

dot1x timeout quiet-period *seconds*

no dot1x timeout quiet-period

Parameters

- *seconds* — Specifies the time in seconds that the device remains in the quiet state following a failed authentication exchange with the client. (Range: 0 - 65535 seconds)

Default Configuration

Quiet period is 60 seconds.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

During the quiet period, the device does not accept or initiate authentication requests.

The default value of this command should only be changed to adjust for unusual circumstances, such as unreliable links or specific behavioral problems with certain clients and authentication servers.

To provide a faster response time to the user, a smaller number than the default value should be entered.

Examples

The following example sets the number of seconds that the device remains in the quiet state following a failed authentication exchange to 3600.

```
Console(config)# interface ethernet e6
Console(config-if)# dot1x timeout quiet-period 3600
```

dot1x timeout tx-period

The **dot1x timeout tx-period** Interface Configuration mode command sets the number of seconds that the device waits for a response to an Extensible Authentication Protocol (EAP)-request/identity frame from the client before resending the request. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x timeout tx-period *seconds*

no dot1x timeout tx-period

Parameters

- *seconds* — Specifies the time in seconds that the device waits for a response to an EAP-request/identity frame from the client before resending the request. (Range: 1-65535 seconds)

Default Configuration

Timeout period is 30 seconds.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

The default value of this command should be changed only to adjust for unusual circumstances, such as unreliable links or specific behavioral problems with certain clients. and authentication servers

Examples

The following command sets the number of seconds that the device waits for a response to an EAP-request/identity frame, to 3600 seconds.

```
Console(config)# interface ethernet e6
Console(config-if)# dot1x timeout tx-period 3600
```

dot1x max-req

The **dot1x max-req** Interface Configuration mode command sets the maximum number of times that the device sends an Extensible Authentication Protocol (EAP)-request/identity frame (assuming that no response is received) to the client, before restarting the authentication process. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x max-req *count*

no dot1x max-req

Parameters

- *count* — Number of times that the device sends an EAP-request/identity frame before restarting the authentication process. (Range: 1-10)

Default Configuration

The default number of times is 2.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

The default value of this command should be changed only to adjust for unusual circumstances, such as unreliable links or specific behavioral problems with certain clients. and authentication servers

Examples

The following example sets the number of times that the device sends an EAP-request/identity frame to 6 .

```
Console(config)# interface ethernet e6
Console(config-if)# dot1x max-req 6
```

dot1x timeout supp-timeout

The **dot1x timeout supp-timeout** Interface Configuration mode command sets the time for the retransmission of an Extensible Authentication Protocol (EAP)-request frame to the client. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x timeout supp-timeout *seconds*

no dot1x timeout supp-timeout

Parameters

- *seconds* — Time in seconds that the device waits for a response to an EAP-request frame from the client before resending the request. (Range: 1- 65535 seconds)

Default Configuration

Default timeout period is 30 seconds.

Command Mode

Interface configuration (Ethernet) mode

User Guidelines

The default value of this command should be changed only to adjust for unusual circumstances, such as unreliable links or specific behavioral problems with certain clients. and authentication servers

Examples

The following example sets the timeout period before retransmitting an EAP-request frame to the client to 3600 seconds.

```
Console(config-if)# dot1x timeout supp-timeout 3600
```

dot1x timeout server-timeout

The **dot1x timeout server-timeout** Interface Configuration mode command sets the time that the device waits for a response from the authentication server. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x timeout server-timeout *seconds*

no dot1x timeout server-timeout

Parameters

- *seconds* — Time in seconds that the device waits for a response from the authentication server. (Range: 1-65535 seconds)

Default Configuration

The timeout period is 30 seconds.

Command Mode

Interface configuration (Ethernet) mode

User Guidelines

The actual timeout can be determined by comparing the **dot1x timeout server-timeout** value and the result of multiplying the **radius-server retransmit** value with the **radius-server timeout** value and selecting the lower of the two values.

Examples

The following example sets the time for the retransmission of packets to the authentication server to 3600 seconds.

```
Console(config-if)# dot1x timeout server-timeout 3600
```

show dot1x

The **show dot1x** Privileged EXEC mode command displays the 802.1X status of the device or specified interface.

Syntax

show dot1x [**ethernet** *interface*]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays the status of 802.1X-enabled Ethernet ports.

```
Console# show dot1x

802.1x is enabled

Port     Admin Mode      Oper Mode          Reauth     Reauth     Username
                                            Control    Period
----     ----------      ---------          -------    ------     --------
1        Auto            Authorized         Ena        3600       Bob
2        Auto            Authorized         Ena        3600       John
3        Auto            Unauthorized       Ena        3600       Clark
4        Force-auth      Authorized         Dis        3600       n/a
5        Force-auth      Unauthorized*      Dis        3600       n/a

* Port is down or not present.

Console# show dot1x ethernet e3

802.1x is enabled.
```

```
Port     Admin Mode     Oper Mode          Reauth     Reauth     Username
                                           Control    Period
----     ----------     ---------          -------    ------     --------
e3       Auto           Unauthorized       Ena        3600       Clark

Quiet period: 60 Seconds
Tx period:30 Seconds
Max req: 2
Supplicant timeout: 30 Seconds
Server timeout: 30 Seconds
Session Time (HH:MM:SS): 08:19:17
MAC Address: 00:08:78:32:98:78
Authentication Method: Remote
Termination Cause: Supplicant logoff

Authenticator State Machine
State: HELD

Backend State Machine
State: IDLE
Authentication success: 9
Authentication fails: 1
```

The following table describes significant fields shown above:

Field	Description
Port	The port number.
Admin mode	The port admin mode. Possible values: Force-auth, Force-unauth, Auto.
Oper mode	The port oper mode. Possible values: Authorized, Unauthorized or Down.
Reauth Control	Reauthentication control.
Reauth Period	Reauthentication period.
Username	The username representing the identity of the Supplicant. This field shows the username in case the port control is auto. If the port is Authorized, it shows the username of the current user. If the port is unauthorized it shows the last user that was authenticated successfully.
Quiet period	The number of seconds that the device remains in the quiet state following a failed authentication exchange (for example, the client provided an invalid password).
Tx period	The number of seconds that the device waits for a response to an Extensible Authentication Protocol (EAP)-request/identity frame from the client before resending the request.

Max req	The maximum number of times that the device sends an Extensible Authentication Protocol (EAP)-request frame (assuming that no response is received) to the client before restarting the authentication process.
Supplicant timeout	Time in seconds the switch waits for a response to an EAP-request frame from the client before resending the request.
Server timeout	Time in seconds the switch waits for a response from the authentication server before resending the request.
Session Time	The amount of time the user is logged in.
MAC address	The supplicant MAC address.
Authentication Method	The authentication method used to establish the session.
Termination Cause	The reason for the session termination.
State	The current value of the Authenticator PAE state machine and of the Backend state machine.
Authentication success	The number of times the state machine received a Success message from the Authentication Server.
Authentication fails	The number of times the state machine received a Failure message from the Authentication Server.

show dot1x users

The **show dot1x users** Privileged EXEC mode command displays active 802.1X authenticated users for the device.

Syntax

show dot1x users [**username** *username*]

Parameters

- *username* — Supplicant username (Range: 1-160 characters)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Example

The following example displays 802.1X users.

```
Console# show dot1x users

Port    Username       Session Time      Auth Method       MAC Address
-----   --------       ------------      -----------      --------------
1       Bob            1d:03:08.58       Remote           0008:3b79:8787
2       John           08:19:17          None             0008:3b89:3127

Console# show dot1x users username Bob

Username: Bob
Port    Username       Session Time      Auth Method       MAC Address
-----   --------       ------------      -----------      --------------
1       Bob            1d:03:08.58       Remote           0008:3b79:8787
```

The following table describes significant fields shown above:

Field	Description
Port	The port number.
Username	The username representing the identity of the Supplicant.
Session Time	The period of time the Supplicant is connected to the system.
Authentication Method	Authentication method used by the Supplicant to open the session.
MAC Address	MAC address of the Supplicant.

show dot1x statistics

The **show dot1x statistics** Privileged EXEC mode command displays 802.1X statistics for the specified interface.

Syntax

show dot1x statistics ethernet *interface*

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays 802.1X statistics for the specified interface.

```
Console# show dot1x statistics ethernet e1


EapolFramesRx: 11
EapolFramesTx: 12
EapolStartFramesRx: 12
EapolLogoffFramesRx: 1
EapolRespIdFramesRx: 3
EapolRespFramesRx: 6
EapolReqIdFramesTx: 3
EapolReqFramesTx: 6
InvalidEapolFramesRx: 0
EapLengthErrorFramesRx: 0
LastEapolFrameVersion: 1
LastEapolFrameSource: 00:08:78:32:98:78
```

The following table describes the significant fields shown in the display:

Field	Description
EapolFramesRx	The number of valid EAPOL frames of any type that have been received by this Authenticator.
EapolFramesTx	The number of EAPOL frames of any type that have been transmitted by this Authenticator.
EapolStartFramesRx	The number of EAPOL Start frames that have been received by this Authenticator.
EapolLogoffFramesRx	The number of EAPOL Logoff frames that have been received by this Authenticator.
EapolRespIdFramesRx	The number of EAP Resp/Id frames that have been received by this Authenticator.
EapolRespFramesRx	The number of valid EAP Response frames (other than Resp/Id frames) that have been received by this Authenticator.
EapolReqIdFramesTx	The number of EAP Req/Id frames that have been transmitted by this Authenticator.
EapolReqFramesTx	The number of EAP Request frames (other than Rq/Id frames) that have been transmitted by this Authenticator.
InvalidEapolFramesRx	The number of EAPOL frames that have been received by this Authenticator in which the frame type is not recognized.
EapLengthErrorFramesRx	The number of EAPOL frames that have been received by this Authenticator in which the Packet Body Length field is invalid.
LastEapolFrameVersion	The protocol version number carried in the most recently received EAPOL frame.
LastEapolFrameSource	The source MAC address carried in the most recently received EAPOL frame.

ADVANCED FEATURES

dot1x auth-not-req

The **dot1x auth-not-req** Interface Configuration mode command enables unauthorized devices access to the VLAN. To disable access to the VLAN, use the **no** form of this command.

Syntax

dot1x auth-not-req

no dot1x auth-not-req

Default Configuration

Access is enabled.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

An access port cannot be a member in an unauthenticated VLAN.

The native VLAN of a trunk port cannot be an unauthenticated VLAN.

For a general port, the PVID can be an unauthenticated VLAN (although only tagged packets would be accepted in the unauthorized state.)

Examples

The following example enables access to the VLAN to unauthorized devices.

```
Console(config-if)# dot1x auth-not-req
```

dot1x multiple-hosts

The **dot1x multiple-hosts** Interface Configuration mode command enables multiple hosts (clients) on an 802.1X-authorized port, where the authorization state of the port is set to **auto**. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x multiple-hosts

no dot1x multiple-hosts

Default Configuration

Multiple hosts are disabled.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

This command enables the attachment of multiple clients to a single 802.1X-enabled port. In this mode, only one of the attached hosts must be successfully authorized for all hosts to be granted network access. If the port becomes unauthorized, all attached clients are denied access to the network.

For unauthenticated VLANs, multiple hosts are always enabled.

Multiple-hosts must be enabled to enable port security on the port.

Examples

The following command enables multiple hosts (clients) on an 802.1X-authorized port.

```
Console(config-if)# dot1x multiple-hosts
```

dot1x single-host-violation

The **dot1x single-host-violation** Interface Configuration mode command configures the action to be taken, when a station whose MAC address is not the supplicant MAC address, attempts to access the interface. Use the **no** form of this command to return to default.

Syntax

dot1x single-host-violation {**forward** | **discard | discard-shutdown**} [**trap** *seconds*]

no port dot1x single-host-violation

Parameters

- **forward** — Forwards frames with source addresses that are not the supplicant address, but does not learn the source addresses.
- **discard** — Discards frames with source addresses that are not the supplicant address.
- **discard-shutdown** — Discards frames with source addresses that are not the supplicant address. The port is also shut down.
- **trap** — Indicates that SNMP traps are sent.
- *seconds* — Specifies the minimum amount of time in seconds between consecutive traps.
  (Range: 1- 1000000)

Default Configuration

Frames with source addresses that are not the supplicant address are discarded.

No traps are sent.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

The command is relevant when multiple hosts is disabled and the user has been successfully authenticated.

Examples

The following example forwards frames with source addresses that are not the supplicant address and sends consecutive traps at intervals of 100 seconds.

```
Console(config-if)# dot1x single-host-violation forward trap 100
```

dot1x guest-vlan

The **dot1x guest-vlan** Interface Configuration mode command defines a guest VLAN. To return to the default configuration, use the **no** form of this command.

Syntax

dot1x guest-vlan

no dot1x guest-vlan

Default Configuration

No VLAN is defined as a guest VLAN.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

Use the **dot1x guest-vlan enable** Interface Configuration mode command to enable unauthorized users on an interface to access the guest VLAN.

If the guest VLAN is defined and enabled, the port automatically joins the guest VLAN when the port is unauthorized and leaves it when the port becomes authorized. To be able to join or leave the guest VLAN, the port should not be a static member of the guest VLAN.

Example

The following example defines VLAN 2 as a guest VLAN.

```
Console#
Console# configure
Console(config)# vlan database
Console(config-vlan)# vlan 2
Console(config-vlan)# exit
Console(config)# interface vlan 2
Console(config-if)# dot1x guest-vlan
```

dot1x guest-vlan enable

The **dot1x vlans guest-vlan enable** Interface Configuration mode command enables unauthorized users on the interface access to the Guest VLAN. To disable access, use the **no** form of this command

Syntax

dot1x guest-vlan enable

no dot1x guest-vlan enable

Default Configuration

Disabled.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

A device can have only one global guest VLAN. The guest VLAN is defined using the **dot1x guest-vlan** Interface Configuration mode command.

Example

The following example enables unauthorized users on Ethernet port 1 to access the guest VLAN.

```
Console# configure
Console(config)# interface ethernet e1
Console(config-if)# dot1x guest-vlan enable
```

show dot1x advanced

The **show dot1x advanced** Privileged EXEC mode command displays 802.1X advanced features for the device or specified interface.

Syntax

show dot1x advanced [**ethernet** *interface*]

Parameters

- *interface* — Valid Ethernet port. (Full syntax: *port*)

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

There are no user guidelines for this command.

Examples

The following example displays 802.1X advanced features for the device.

```
Console# show dot1x advanced

Guest VLAN: 2
Unauthenticated VLANs: 91,92

Interface                Multiple Hosts           Guest VLAN
---------                --------------           ----------
1                        Disabled                 Enabled
2                        Enabled                  Disabled

Console# show dot1x advanced ethernet e1

Interface                Multiple Hosts           Guest VLAN
---------                --------------           ----------
1                        Disabled                 Enabled

Single host parameters
Violation action: Discard
Trap: Enabled
```

```
Trap frequency: 100
Status: Single-host locked
Violations since last trap: 9
```

Troubleshooting

This section describes problems that may arise when installing the and how to resolve these issue. This section includes the following topics:

- **Problem Management** — Provides information about problem management with the device.
- **Troubleshooting Solutions** — Provides a list of troubleshooting issues and solutions for using the device.

Problem Management

Problem management includes isolating problems, quantifying the problems, and then applying the solution. When a problem is detected, the exact nature of the problem must be determined. This includes how the problem is detected, and what are the possible causes of the problem. With the problem known, the effect of the problem is recorded with all known results from the problem. Once the problem is quantified, the solution is applied. Solutions are found either in this chapter, or through customer support. If no solution is found in this chapter, contact Customer Support.

Troubleshooting Solutions

Listed below are some possible troubleshooting problems and solutions. These error messages include:

- Cannot connect to management using RS-232 serial connection
- Cannot connect to switch management using Telnet, HTTP, SNMP, etc.
- Self-test exceeds 15 seconds
- No connection is established and the port LED is on
- Device is in a reboot loop
- No connection and the port LED is off
- Add and Edit pages do not open.
- Lost password.

Problems	Possible Cause	Solution
Cannot connect to management using RS-232 serial connection		Be sure the terminal emulator program is set to VT-100 compatible, 38 400 baud rate, no parity, 8 data bits and one stop bit Use the included cable, or be sure that the pin-out complies with a standard null-modem cable
Cannot connect to switch management using Telnet, HTTP, SNMP, etc.		Be sure the switch has a valid IP address, subnet mask and default gateway configured Check that your cable is properly connected with a valid link light, and that the port has not been disabled Ensure that your management station is plugged into the appropriate VLAN to manage the device If you cannot connect using Telnet or the web, the maximum number of connections may already be open. Please try again at a later time.

Problems	Possible Cause	Solution
No response from the terminal emulation software	Faulty serial cable Incorrect serial cable Software settings	Replace the serial cable Replace serial cable for a pin-to-pin straight/flat cable Reconfigure the emulation software connection settings.
Response from the terminal emulations software is not readable	Faulty serial cable Software settings	Replace the serial cable Reconfigure the emulation software connection settings.
Self-test exceeds 15 seconds	The device may not be correctly installed.	Remove and reinstall the device. If that does not help, consult your technical support representative.
No connection is established and the port LED is on	Wrong network address in the workstation No network address set Wrong or missing protocol Faulty ethernet cable Faulty port Faulty module Incorrect initial configuration	Configure the network address in the workstation Configure the network address in the workstation Configure the workstation with IP protocol Replace the cable Replace the module Replace the module Erase the connection and reconfigure the port
Device is in a reboot loop	Software fault	Download and install a working or previous software version from the console
No connection and the port LED is off	Incorrect ethernet cable, e.g., crossed rather than straight cable, or vice versa, split pair (incorrect twisting of pairs) Fiber optical cable connection is reversed Bad cable Wrong cable type	Check pinout and replace if necessary Change if necessary. Check Rx and Tx on fiber optic cable Replace with a tested cable Verify that all 10 Mbps connections use a Cat 5 cable Check the port LED or zoom screen in the NMS application, and change setting if necessary

Problems	Possible Cause	Solution
Add and Edit pages do not open.	A pop-up blocker is enabled.	Disable pop-up blockers.

Lost password		The Password Recovery Procedure enables the user to set the password back to the default setting. The Password Recovery Procedure is invoked from the Startup menu:
		1. Reboot the system either by disconnecting the power supply, or enter the command `reboot`, the following message is displayed:
		`Console> reload`
		`Are you sure you want to reboot the system (y/n)[n]?`
		2. Enter Y. The device reboots. After the POST, when the text "`Autoboot in 2 seconds - press RETURN or Esc. to abort and enter prom.`" is displayed, press **<Enter>**. The Startup Menu is displayed.
		`[1] Download software`
		`[2] Erase flash file`
		`[3] Erase flash sectors`
		`[4] Password Recovery Procedure`
		`[5] Enter Diagnostic Mode`
		`[6] Back`
		3. Enter **4** within 15 seconds after the bootup process from the StartUp menu. If the selection is not made in the allotted time, the current accessibility requirements are erased and the system continues to upload. The password is defined using the CLI mode.
		4. Enter the CLI mode.
		5. Enter the password command using the following syntax: `enable password [level level] password [encrypted]`
		For example: `enable password level 1 password *****`
		6. Enter the command **exit**. The CLI mode is exited.