Dell™ PowerConnect™ 5324 Systems

CLI Reference Guide

Notes, Notices, and Cautions

NOTE: A NOTE indicates important information that helps you make better use of your computer.

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

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

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Command Groups

Introduction

The Command Language Interface (CLI) is a network management application operated through an ASCII terminal without the use of a Graphic User Interface (GUI) driven software application. By directly entering commands, you have greater configuration flexibility. The CLI is a basic command-line interpreter similar to the UNIX C shell.

A device can be configured and maintained by entering commands from the CLI, which is based solely on textual input and output with commands being entered from a terminal keyboard and the output displayed as text via a terminal monitor. The CLI can be accessed from a VT100 terminal connected to the console port of the device or through a Telnet connection from a remote host.

This guide describes how the Command Line Interface (CLI) is structured, describes the command syntax, and describes the command functionality.

This guide also provides information for configuring the PowerConnect switch, details the procedures and provides configuration examples. Basic installation configuration is described in the *User's Guide* and must be completed before using this document.

Command Groups

The system commands can be broken down into the functional groups shown below.

Command Group	Description
AAA	Configures connection security including authorization and passwords.
Address Table	Configures bridging address tables.
Configuration and Image Files	Manages the device configuration files.
Clock	Configures clock commands on the device.
Ethernet Configuration	Configures all port configuration options for example ports, storm control, port speed and auto-negotiation.
GVRP	Configures and displays GVRP configuration and information.
IGMP Snooping	Configures IGMP snooping and displays IGMP configuration and IGMP information.
IP Addressing	Configures and manages IP addresses on the device.
LACP	Configures and displays LACP information.
Line	Configures the console and remote Telnet connection.
LLDP	Configures and displays LLDP information.
Management ACL	Configures and displays management access-list information.

PHY Diagnostics	Diagnoses and displays the interface status.
Port Channel	Configures and displays Port channel information.
Port Monitor	Monitors activity on specific target ports.
QoS	Configures and displays QoS information.
RADIUS	Configures and displays RADIUS information.
RMON	Displays RMON statistics.
SNMP	Configures SNMP communities, traps and displays SNMP information.
Spanning Tree	Configures and reports on Spanning Tree protocol
SSH	Configures SSH authentication.
Syslog Commands	Manages and displays syslog messages.
System Management	Configures the device clock, name and authorized users.
TACACS	Configures TACACS commands
User Interface	Describes user commands used for entering CLI commands.
VLAN	Configures VLANs and displays VLAN information.
Web Server	Configures Web based access to the device.
802.1x	Configures commands related to 802.1x security protocol.

AAA Commands

Command Group	Description	Access Mode
aaa authentication login	Defines login authentication.	Global Configuration
aaa authentication enable	Defines authentication method lists for accessing higher privilege levels.	Global Configuration
login authentication	Specifies the login authentication method list for a remote telnet or console.	Global Configuration
enable authentication	Specifies the authentication method list when accessing a higher privilege level from a remote telnet or console.	Line Configuration
ip http authentication	Specifies authentication methods for http.	Global Configuration
ip https authentication	Specifies authentication methods for https.	Global Configuration
show authentication methods	Displays information about the authentication methods.	Privileged User EXEC
password	Specifies a password on a line.	Line Configuration
enable password	Sets a local password to control access to normal and privilege levels.	Global Configuration
username	Establishes a username-based authentication system.	Global Configuration
show users accounts	Displays information about the local user database.	Privileged User EXEC

Address Table Commands

Command Group	Description	Access Mode
bridge address	Adds a static MAC-layer station source address to the bridge table.	VLAN Configuration
bridge multicast filtering	Enables filtering of multicast addresses.	Global Configuration
bridge multicast address	Registers MAC-layer multicast addresses to the bridge table, and adds static ports to the group.	VLAN Configuration
bridge multicast forbidden address	Forbids adding a specific multicast address to specific ports.	VLAN Configuration

bridge multicast forward-all	Enables forwarding of all multicast frames on a port.	VLAN Configuration
bridge multicast forbidden forward-all	Enables forbidding forwarding of all multicast frames to a port.	VLAN Configuration
bridge aging-time	Sets the address table aging time.	Global Configuration
clear bridge	Removes any learned entries from the forwarding database.	Privileged User EXEC
port security	Disables new address learning on an interface.	Interface Configuration
port security routed secure-address	Adds MAC-layer secure addresses to a routed port.	Interface Configuration
show bridge address-table	Displays dynamically created entries in the bridge-forwarding database.	Privileged User EXEC
show bridge address-table static	Displays statically created entries in the bridge-forwarding database.	Privileged User EXEC
show bridge address-table count	Displays the number of addresses present in all or at a specific VLAN.	Privileged User EXEC
show bridge multicast address-table	Displays statically created entries in the bridge-forwarding database.	Privileged User EXEC
show bridge multicast filtering	Displays the multicast filtering configuration.	Privileged User EXEC
show ports security	Displays the port-lock status.	Privileged User EXEC

Clock Commands

Command Group	Description	Access Mode
clock set	Manually sets the system clock.	Privileged User EXEC
clock source	Configures an external time source for the system clock.	Privileged User EXEC
clock timezone	Sets the time zone for display purposes.	Global Configuration
clock summer-time	Configures the system to automatically switch to summer time (daylight saving time).	Global Configuration
sntp authentication-key	Defines an authentication key for Simple Network Time Protocol (SNTP).	Global Configuration

sntp authenticate	Grants authentication for received Network Time Protocol (NTP) traffic from servers.	Global Configuration
sntp trusted-key	Authenticates the identity of a system to which Simple Network Time Protocol (SNTP) will synchronize.	Global Configuration
sntp client poll timer	Sets the polling time for the Simple Network Time Protocol (SNTP) client.	Global Configuration
sntp broadcast client enable	Enables the Simple Network Time Protocol (SNTP) broadcast clients.	Global Configuration
sntp anycast client enable	Enables Anycast clients.	Global Configuration
sntp client enable (interface)	Enables the Simple Network Time Protocol (SNTP) client on an interface.	Interface Configuration
sntp unicast client enable	Enables the device to use the Simple Network Time Protocol (SNTP) to request and accept Network Time Protocol (NTP) traffic from servers.	Global Configuration
sntp unicast client poll	Enables polling for the Simple Network Time Protocol (SNTP) predefined unicast clients.	Global Configuration
sntp server	Configures the device to use the Simple Network Time Protocol (SNTP) to request and accept Network Time Protocol (NTP) traffic from a server.	Global Configuration
show clock	Displays the time and date from the system clock.	User EXEC
show sntp configuration	Shows the configuration of the Simple Network Time Protocol (SNTP).	Privileged User EXEC
show sntp status	Shows the status of the Simple Network Time Protocol (SNTP).	Privileged User EXEC

Configuration and Image Files Commands

Command Group	Description	Access Mode
delete startup-config	Deletes the startup-config file.	Privileged User EXEC
copy	Copies files from a source to a destination.	Privileged User EXEC
boot system	Specifies the system image that the device loads at startup.	Privileged User EXEC

show running-config	Displays the contents of the currently running configuration file.	Privileged User EXEC
show startup-config	Displays the startup configuration file contents.	Privileged User EXEC
show backup-config	Displays the backup configuration file contents.	Privileged User EXEC
show bootvar	Displays the active system image file that the device loads at startup.	Privileged User EXEC

Ethernet Configuration Commands

Command Group	Description	Access Mode
interface ethernet	Enters the interface configuration mode to configure an Ethernet type interface.	Global Configuration
interface range ethernet	Enters the interface configuration mode to configure multiple Ethernet type interfaces.	Global Configuration
shutdown	Disables interfaces.	Interface Configuration
description	Adds a description to an interface.	Interface Configuration
speed	Configures the speed of a given Ethernet interface when not using auto-negotiation.	Interface Configuration
duplex	Configures the full/half duplex operation of a given Ethernet interface when not using auto-negotiation.	Interface Configuration
negotiation	Enables auto-negotiation operation for the speed and duplex parameters of a given interface.	Interface Configuration
flowcontrol	Configures the Flow Control on a given interface.	Interface Configuration
mdix	Enables automatic crossover on a given interface.	Interface Configuration
back-pressure	Enables Back Pressure on a given interface.	Interface Configuration
port jumbo-frame	Enables jumbo frames for the device.	Global Configuration
clear counters	Clears statistics on an interface.	User EXEC

set interface active	Reactivates an interface that was suspended by the system.	Privileged User EXEC
show interfaces configuration	Displays the configuration for all configured interfaces.	User EXEC
show interfaces status	Displays the status for all configured interfaces.	User EXEC
show interfaces description	Displays the description for all configured interfaces.	User EXEC
show interfaces counters	Displays traffic seen by the physical interface.	User EXEC
show ports jumbo-frame	Displays the jumbo frames configuration.	User EXEC
port storm-control include-multicast	Enables the device to count multicast packets.	Global Configuration
port storm-control broadcast enable	Enables broadcast storm control.	Interface Configuration
port storm-control broadcast rate	Configures the maximum broadcast rate.	Interface Configuration
show ports storm-control	Displays the storm control configuration.	Privileged User EXEC

GVRP Commands

Command Group	Description	Mode
gvrp enable (global)	Enables GVRP globally.	Global Configuration
gvrp enable (interface)	Enables GVRP on an interface.	Interface Configuration
garp timer	Adjusts the GARP application join, leave, and leaveall GARP timer values.	Interface Configuration
gvrp vlan-creation-forbid	Enables or disables dynamic VLAN creation.	Interface Configuration
gvrp registration-forbid	De-registers all VLANs, and prevents dynamic VLAN registration on the port.	Interface Configuration
clear gvrp statistics	Clears all the GVRP statistics information.	Privileged User EXEC
show gvrp configuration	Displays GVRP configuration information.	User EXEC
show gvrp statistics	Displays GVRP statistics.	User EXEC
show gvrp error-statistics	Displays GVRP error statistics.	User EXEC

IGMP Snooping Commands

Command Group	Description	Access Mode
ip igmp snooping (Global)	Enables Internet Group Management Protocol (IGMP) snooping.	Global Configuration
ip igmp snooping (Interface)	Enables Internet Group Management Protocol (IGMP) snooping on a specific VLAN.	VLAN Configuration
ip igmp snooping mrouter	Enables automatic learning of multicast router ports in the context of a specific VLAN.	VLAN Configuration
ip igmp snooping host-time-out	Configures the host-time-out.	VLAN Configuration
ip igmp snooping mrouter-time-out	Configures the mrouter-time-out.	VLAN Configuration
ip igmp snooping leave-time-out	Configures the leave-time-out.	VLAN Configuration
show ip igmp snooping mrouter	Displays information on dynamically learned multicast router interfaces.	User EXEC
show ip igmp snooping interface	Displays IGMP snooping configuration.	User EXEC
show ip igmp snooping groups	Displays multicast groups learned by IGMP snooping.	User EXEC

IP Addressing

Command Group	Description	Access Mode
clear host dhcp	Sets an IP address on the device.	Interface Configuration
ip address	Sets an IP address	Interface Configuration
ip address dhcp	Acquires an IP address on an interface from the DHCP server.	Interface Configuration
ip default-gateway	Defines a default gateway (router)	Global Configuration
show ip interface	Displays the usability status of interfaces configured for IP.	User EXEC
arp	Adds a permanent entry in the ARP cache.	Global Configuration

arp timeout	Configures how long an entry remains in the ARP cache	Global Configuration
clear arp-cache	Deletes all dynamic entries from the ARP cache.	Privileged User EXEC
show arp	Displays entries in the ARP table.	Privileged User EXEC
ip domain-lookup	Enables the IP Domain Naming System (DNS)-based host name-to-address translation.	Global Configuration
ip domain-name	Defines a default domain name, that the software uses to complete unqualified host names.	Global Configuration
ip name-server	Sets the available name servers.	Global Configuration
ip host	Defines static host name-to-address mapping in the host cache.	Global Configuration
clear host	Deletes entries from the host name-to-address cache	Privileged User EXEC
show hosts	Displays the default domain name, a list of name server hosts, the static and cached list of host names and addresses.	User EXEC

LACP Commands

Command Group	Description	Access Mode
lacp system-priority	Configures the system LACP priority.	Global Configuration
lacp port-priority	Configures the priority value for physical ports.	Interface Configuration
lacp timeout	Assigns an administrative LACP timeout.	Interface Configuration
show lacp ethernet	Displays LACP information for Ethernet ports.	User EXEC
show lacp port-channel	Displays LACP information for a port-channel.	User EXEC

Line Commands

Command Group	Description	Access Mode
line	Identifies a specific line for configuration and enters the line configuration command mode.	Global Configuration

speed	Sets the line baud rate.	Line Configuration
autobaud	Sets the line for automatic baud rate detection	Line Configuration
exec-timeout	Configures the interval that the system waits until user input is detected.	Line Configuration
show line	Displays line parameters.	User EXEC

LLDP Commands

Command Group	Description	Access Mode
lldp enable (global)	Enables Link Layer Discovery Protocol.	Global configuration
lldp enable (interface)	Enables Link Layer Discovery Protocol (LLDP) on an interface.	Interface configuration (Ethernet)
lldp timer	Specifies how often the software sends Link Layer Discovery Protocol (LLDP) updates.	Global configuration
lldp hold-multiplier	Specifies the amount of time the receiving device should hold a Link Layer Discovery Protocol packet before discarding it.	Global configuration
lldp reinit-delay	Specifies the minimum time an LLDP port will wait before reinitializing LLDP transmission.	Global configuration
lldp tx-delay	Specifies the delay between successive LLDP frame transmissions initiated by value/status changes in the LLDP local systems MIB.	Global configuration
lldp optional-tlv	Specifies which optional TLVs from the basic set should be transmitted.	Interface configuration (Ethernet)
lldp management-address	Specifies the management address that would be advertised from an interface.	Interface configuration (Ethernet)
clear lldp rx	Restarts the LLDP RX state machine and clears the neighbors table.	Privileged EXEC
show lldp configuration	Displays the Link Layer Discovery Protocol (LLDP) configuration.	Privileged EXEC
show lldp local	Displays the Link Layer Discovery Protocol (LLDP) information that is advertised from a specific port.	Privileged EXEC

show lldp neighbors	Displays information about discovered neighboring devices using Link Layer Discovery Protocol (LLDP).	Privileged EXEC

Management ACL Commands

Command Group	Description	Access Mode
management access-list	Defines a management access-list, and enters the access-list for configuration.	Global Configuration
permit (management)	Defines a permit rule.	Management Access-level
deny (management)	Defines a deny rule.	Management Access-level
management access-class	Defines which management access-list is used.	Global Configuration
show management access-list	Displays management access-lists.	Privileged User EXEC
show management access-class	Displays the active management access-list.	Privileged User EXEC

PHY Diagnostics Commands

Command Group	Description	Access Mode
test copper-port tdr	Diagnoses with TDR (Time Domain Reflectometry) technology the quality and characteristics of a copper cable attached to a port.	Privileged User EXEC
show copper-ports tdr	Displays the last TDR (Time Domain Reflectometry) tests on specified ports.	Privileged User EXEC
show copper-ports cable-length	Displays the estimated copper cable length attached to a port.	Privileged User EXEC
show fiber-ports optical-transceiver	Displays the optical transceiver diagnostics.	Privileged User EXEC

Port Channel Commands

Command Group	Description	Access Mode
interface port-channel	Enters the interface configuration mode of a specific port-channel.	Global Configuration
interface range port-channel	Enters the interface configuration mode to configure multiple port-channels.	Global Configuration
channel-group	Associates a port with a port-channel.	Interface Configuration
port channel load balance	Configures the load balancing policy of the port channeling	Global Configuration
show interfaces port-channel	Displays port-channel information.	User EXEC

Port Monitor Commands

Command Group	Description	Access Mode
port monitor	Starts a port monitoring session.	Interface Configuration
show ports monitor	Displays the port monitoring status.	User EXEC

QoS Commands

Command Group	Description	Access Mode
qos	Enables quality of service (QoS) on the device and enters QoS basic or advance mode.	Global Configuration
show qos	Displays the QoS status.	User EXEC
wrr-queue cos-map	Maps assigned CoS values to select one of the egress queues.	Global Configuration
wrr-queue bandwidth	Assigns Weighted Round Robin (WRR) weights to egress queues.	Interface Configuration
priority-queue out num-of-queues	Enables the egress queues to be expedite queues.	Global Configuration
show qos interface	Displays interface QoS data.	User EXEC
qos map dscp-queue	Modifies the DSCP to CoS map.	Global Configuration

qos trust (Global)	Configures the system to basic mode and the "trust" state.	Global Configuration
qos trust (Interface)	Enables each port trust state	Interface Configuration
qos cos	Configures the default port CoS value.	Interface Configuration
show qos map	Displays all the maps for QoS.	User EXEC

Radius Commands

Command Group	Description	Access Mode
radius-server host	Specifies a RADIUS server host.	Global Configuration
radius-server key	Sets the authentication and encryption key for all RADIUS communications between the router and the RADIUS daemon.	Global Configuration
radius-server retransmit	Specifies the number of times the software searches the list of RADIUS server hosts.	Global Configuration
radius-server source-ip	Specifies the source IP address used for communication with RADIUS servers.	Global Configuration
radius-server timeout	Sets the interval for which a router waits for a server host to reply.	Global Configuration
radius-server deadtime	Improves RADIUS response times when servers are unavailable.	Global Configuration
show radius-servers	Displays the RADIUS server settings.	Privileged User EXEC

RMON Commands

Command Group	Description	Mode
show rmon statistics	Displays RMON Ethernet Statistics.	User EXEC
rmon collection history	Enables a Remote Monitoring (RMON) MIB history statistics group on an interface.	Interface Configuration
show rmon collection history	Displays the requested history group configuration.	User EXEC
show rmon history	Displays RMON Ethernet Statistics history.	User EXEC
rmon alarm	Configures alarm conditions.	Global Configuration
show rmon alarm-table	Displays the alarms summary table.	User EXEC
show rmon alarm	Displays alarm configurations.	User EXEC
rmon event	Configures a RMON event.	Global Configuration
show rmon events	Displays the RMON event table.	User EXEC
show rmon log	Displays the RMON logging table.	User EXEC
rmon table-size	Configures the maximum RMON tables sizes.	Global Configuration

SNMP Commands

Command Group	Description	Access Mode
snmp-server community	Sets up the community access string to permit access to SNMP protocol.	Global Configuration
snmp-server view	Creates or update a view entry,	Global Configuration
snmp-server filter	Create or update a filter entry,	Global Configuration
snmp-server contact	Sets up a system contact.	Global Configuration
snmp-server location	Sets up the information on where the device is located.	Global Configuration
snmp-server enable traps	Enables the switch to send SNMP traps or SNMP notifications.	Global Configuration
snmp-server trap authentication	Enables the switch to send Simple Network Management Protocol traps when authentication failed.	Global Configuration

snmp-server host	Specifies the recipient of Simple Network Management Protocol notification operation,	Global Configuration
snmp-server set	Sets SNMP MIB value by the CLI.	Global Configuration
snmp-server group	Configures a new Simple Network Management Protocol (SNMP) group, or a table that maps SNMP users to SNMP views.	Global Configuration
snmp-server user	Configure a new SNMP Version 3 user.	Global Configuration
snmp-server v3-host	Specifies the recipient of Simple Network Management Protocol Version 3 notifications.	Global Configuration
snmp-server engineID local	Specifies the Simple Network Management Protocol (SNMP) engineID on the local device.	Global Configuration
show snmp engineid	Displays the ID of the local Simple Network Management Protocol (SNMP) engine.	Privileged User EXEC
show snmp	Displays the SNMP status..	Privileged User EXEC
show snmp views	Displays the configuration of views.	Privileged User EXEC
show snmp groups	Displays the configuration of groups.	Privileged User EXEC
show snmp filters	Displays the configuration of filters.	Privileged User EXEC
show snmp users	Displays the configuration of groups.	Privileged User EXEC

Spanning Tree Commands

Command Group	Description	Access Mode
spanning-tree	Enables spanning tree functionality.	Global Configuration
spanning-tree mode	Configures the spanning tree protocol.	Global Configuration
spanning-tree forward-time	Configures the spanning tree bridge forward time.	Global Configuration
spanning-tree hello-time	Configures the spanning tree bridge Hello Time.	Global Configuration
spanning-tree max-age	Configures the spanning tree bridge maximum age.	Global Configuration

spanning-tree priority	Configures the spanning tree priority.	Global Configuration
spanning-tree disable	Disables spanning tree on a specific port.	Interface Configuration
spanning-tree cost	Configures the spanning tree path cost for a port.	Interface Configuration
spanning-tree port-priority	Configures port priority.	Interface Configuration
spanning-tree portfast	Enables PortFast mode.	Interface Configuration
spanning-tree mst priority	Configures the device priority for the specified spanning-tree instance	Global Configuration
spanning-tree mst max-hops	Configures the number of hops in an MST region before the BDPU is discarded and the port information is aged out.	Global Configuration
spanning-tree mst port-priority	Configures port priority for the specified MST instance.	Interface Configuration
sspanning-tree mst cost	Configures the path cost for multiple spanning tree (MST) calculations.	Interface Configuration
spanning-tree mst configuration	Enables configuring an MST region by entering the Multiple Spanning Tree (MST) mode.	Global Configuration
instance (mst)	Maps VLANS to an MST instance.	MST Configuration mode
name (mst)	Defines the configuration name.	MST Configuration mode
revision (mst)	Defines the configuration revision number.	MST Configuration mode
show (mst)	Displays the current or pending MST region configuration.	MST Configuration mode
exit (mst)	Exits the MST configuration mode and applies all configuration changes.	MST Configuration mode
abort (mst)	Exits the MST configuration mode without applying the configuration changes	MST Configuration mode

spanning-tree link-type	Overrides the default link-type setting.	Interface Configuration
spanning-tree pathcost method	Sets the default path cost method.	Global Configuration
spanning-tree bpdu	Defines BPDU handling when spanning tree is disabled on an interface.	Global Configuration
clear spanning-tree detected-protocols	Restarts the protocol migration process on all interfaces or on the specified interface.	Privileged User EXEC
show spanning-tree	Displays spanning tree configuration.	Privileged User EXEC
spanning-tree mst mstp-rstp	Configure the switch to convert STP/RSTP packets to MSTP instances.	Global Configuration
Spanning-tree guard root	Enables root guard on all the spanning tree instances on that interface.	Interface Configuration

SSH Commands

Command Group	Description	Access Mode
ip ssh port	Specifies the port to be used by the SSH server.	Global Configuration
ip ssh server	Enables the device to be configured from a SSH server.	Global Configuration
crypto key generate dsa	Generates DSA key pairs.	Global Configuration
crypto key generate rsa	Generates RSA key pairs.	Global Configuration
ip ssh pubkey-auth	Enables public key authentication for incoming SSH sessions.	Global Configuration
crypto key pubkey-chain ssh	Enters SSH Public Key-chain configuration mode.	Global Configuration
user-key	Specifies which SSH public key is manually configured and enters the SSH public key-string configuration command.	SSH Public Key
key-string	Manually specifies a SSH public key.	SSH Public Key
show ip ssh	Displays the SSH server configuration.	Privileged User EXEC
show crypto key mypubkey	Displays the SSH public keys stored on the device.	Privileged User EXEC

show crypto key pubkey-chain ssh	Displays SSH public keys stored on the device.	Privileged User EXEC

Syslog Commands

Command Group	Description	Access Mode
logging on	Controls error messages logging.	Global Configuration
logging	Logs messages to a syslog server.	Global Configuration
logging console	Limits messages logged to the console based on severity.	Global Configuration
logging buffered	Limits syslog messages displayed from an internal buffer based on severity.	Global Configuration
logging buffered size	Changes the number of syslog messages stored in the internal buffer.	Global Configuration
clear logging	Clears messages from the internal logging buffer.	Privileged User EXEC
logging file	Limits syslog messages sent to the logging file based on severity.	Global Configuration
clear logging file	Clears messages from the logging file.	Privileged User EXEC
show logging	Displays the state of logging and the syslog messages stored in the internal buffer.	Privileged User EXEC
show logging file	Displays the state of logging and the syslog messages stored in the logging file.	Privileged User EXEC
show syslog-servers	Displays the syslog servers settings.	Privileged User EXEC

System Management Commands

Command Group	Description	Access Mode
ping	Sends ICMP echo request packets to another node on the network.	User EXEC
traceroute	Discovers the routes that packets will actually take when traveling to their destination.	User EXEC
telnet	Logs in to a host that supports Telnet.	User EXEC
resume	Switches to another open Telnet session	User EXEC
reload	Reloads the operating system	Privileged User EXEC
hostname	Specifies or modifies the device host name.	Global Configuration
show users	Displays information about the active users.	User EXEC
show sessions	Lists the open Telnet sessions.	User EXEC
show system	Displays system information.	User EXEC
show version	Displays the system version information.	User EXEC
asset-tag	Specifies the device asset-tag.	Global Configuration
show system id	Displays the service ID information.	User EXEC

TACACS Commands

Command Group	Description	Mode
tacacs-server host	Specifies a TACACS+ host.	Global Configuration
tacacs-server key	Sets the authentication encryption key used for all TACACS+ communications between the device and the TACACS+ daemon.	Global Configuration
tacacs-server source-ip	Specifies the source IP address that will be used for the communication with TACACS servers.	Global Configuration
tacacs-server timeout	Sets the timeout value.	Global Configuration
show tacacs	Displays configuration and statistics for a TACACS+ servers.	Privileged User EXEC

User Interface Commands

Command Group	Description	Access Mode
enable	Enters the privileged EXEC mode.	All
disable	Returns to User EXEC mode.	All
login	Changes a login username.	All
configure	Enables the global configuration mode	All
exit(configuration)	Exits any configuration mode to the next highest mode in the CLI mode hierarchy.	All
exit(EXEC)	Closes an active terminal session by logging off the device.	All
end	Ends the current configuration session and returns to the previous command mode.	All
help	Displays a brief description of the help system.	All
history	Enables the command history function.	All
history size	Changes the command history buffer size for a particular line.	All
debug-mode	Switches the mode to debug.	All
show history	Lists the commands entered in the current session.	All
show privilege	Displays the current privilege level.	All

VLAN Commands

Command Group	Description	Access Mode
vlan database	Enters the VLAN database configuration mode.	Global Configuration
vlan	Creates a VLAN.	VLAN Configuration
default-vlan disable	Disables the default VLAN functionality.	VLAN Configuration
interface vlan	Enters the interface configuration (VLAN) mode.	Global Configuration
interface range vlan	Enters the interface configuration mode to configure multiple VLANs.	Global Configuration
name	Configures a name to a VLAN.	Interface Configuration

switchport access vlan	Configures the VLAN membership mode of a port.	Interface Configuration
switchport access vlan	Configures the VLAN ID when the interface is in access mode.	Interface Configuration
switchport trunk allowed vlan	Adds or removes VLANs from a port in general mode.	Interface Configuration
switchport trunk native vlan	Defines the port as a member of the specified VLAN, and the VLAN ID is the "port default VLAN ID (PVID)".	Interface Configuration
switchport general allowed vlan	Adds or removes VLANs from a general port.	Interface Configuration
switchport general pvid	Configures the PVID when the interface is in general mode.	Interface Configuration
switchport general ingress-filtering disable	Disables port ingress filtering.	Interface Configuration
switchport general acceptable-frame-type tagged-only	Discards untagged frames at ingress.	Interface Configuration
switchport forbidden vlan	Forbids adding specific VLANs to a port.	Interface Configuration
map protocol protocols-group	Adds a special protocol to a named group of protocols, which may be used for protocol-based VLAN assignment.	VLAN Configuration
switchport general map protocols-group vlan	Sets a protocol-based classification rule.	Interface Configuration
ip internal-usage-vlan	Reserves a VLAN as the internal usage VLAN of an interface.	Interface Configuration
show vlan	Displays VLAN information.	Privileged User EXEC
show vlan internal usage	Displays a list of VLANs being used internally by the switch.	Privileged User EXEC
show vlan protocols-groups	Displays protocols-groups information.	Privileged User EXEC
show interfaces switchport	Displays switchport configuration.	Privileged User EXEC
switchport mode	Configures the VLAN membership mode of a port	Interface configuration (Ethernet, port-channel)

switchport customer vlan	Sets the port's VLAN when the interface is in customer mode.	Interface configuration (Ethernet, port-channel)

Web Server Commands

Command Group	Description	Access Mode
ip http server	Enables the device to be configured from a browser.	Global Configuration
ip http port	Specifies the TCP port for use by a web browser to configure the device.	Global Configuration
ip https port	Configures a TCP port for use by a secure web browser to configure the device.	Global Configuration
ip https server	Enables the device to be configured from a secured browser.	Global Configuration
crypto certificate generate	Generates a HTTPS certificate.	Global Configuration
crypto certificate request	Generates and displays certificate requests for HTTPS.	Privileged User EXEC
crypto certificate import	Imports a certificate signed by Certification Authority for HTTPS.	Global Configuration
ip https certificate	Configures the active certificate for HTTPS.	Global Configuration
crypto certificate export pkcs12	Exports the certificate and the RSA keys within a PKCS12 file	Privileged User EXEC
show ip http	Displays the HTTP server configuration.	Privileged User EXEC
show ip https	Displays the HTTPS server configuration.	Privileged User EXEC
show crypto certificate mycertificate	Displays the SSL certificates of the device	Privileged User EXEC

802.1x Commands

Command	Description	Access Mode
aaa authentication dot1x	Specifies one or more authentication, authorization, and accounting (AAA) methods for use on interfaces running IEEE 802.1X.	Global Configuration
dot1x system-auto-control	Enables 802.1x globally.	Global Configuration
dot1x port-control	Enables manual control of the authorization state of the port	Interface Configuration
dot1x re-authentication	Enables periodic re-authentication of the client.	Interface Configuration
dot1x timeout re-authperiod	Sets the number of seconds between re-authentication attempts.	Interface Configuration
dot1x re-authenticate	Manually initiates a re-authentication of all 802.1X-enabled ports or the specified 802.1X-enabled port.	Privileged User EXEC
dot1x timeout quiet-period	Sets the number of seconds that the switch remains in the quiet state following a failed authentication exchange.	Interface Configuration
dot1x timeout tx-period	Sets the number of seconds that the switch waits for a response to an Extensible Authentication Protocol (EAP) - request/identity frame, from the client, before resending the request.	Interface Configuration
dot1x max-req	Sets the maximum number of times that the switch sends an EAP - request/identity frame to the client, before restarting the authentication process.	Interface Configuration
dot1x timeout supp-timeout	Sets the time for the retransmission of an Extensible Authentication Protocol (EAP)-request frame to the client.	Interface Configuration
dot1x timeout server-timeout	Sets the time for the retransmission of packets to the authentication server.	Interface Configuration
show dot1x	Allows multiple hosts on an 802.1X-authorized port, that has the **dot1x port-control** interface configuration command set to **auto**.	Interface Configuration
show dot1x users	Displays 802.1X statistics for the specified interface.	Privileged User EXEC
show dot1x statistics	Displays 802.1X statistics for the specified interface.	Privileged User EXEC

Command Modes

GC (Global Configuration) Mode

Command	Description
aaa authentication enable	Defines authentication method lists for accessing higher privilege levels.
aaa authentication login	Defines login authentication.
aaa authentication dot1x	Specifies one or more authentication, authorization, and accounting (AAA) methods for use on interfaces running IEEE 802.1X.
arp	Adds a permanent entry in the ARP cache.
arp timeout	Configures how long an entry remains in the ARP cache
asset-tag	Specifies the device asset-tag.
bridge aging-time	Sets the address table aging time.
bridge multicast filtering	Enables filtering of multicast addresses.
clock source	Configures an external time source for the system clock.
clock timezone	Sets the time zone for display purposes
clock summer-time	Configures the system to automatically switch to summer time (daylight saving time).
crypto certificate generate	Generates a HTTPS certificate.
crypto certificate import	Imports a certificate signed by Certification Authority for HTTPS.
crypto key generate dsa	Generates DSA key pairs.
crypto key generate rsa	Generates RSA key pairs.
crypto key pubkey-chain ssh	Enters SSH Public Key-chain configuration mode.
dot1x system-auto-control	Enables 802.1x globally.
enable password	Sets a local password to control access to normal and privilege levels.
end	Ends the current configuration session and returns to the previous command mode.
gvrp enable (global)	Enables GVRP globally.
hostname	Specifies or modifies the device host name.
interface ethernet	Enters the interface configuration mode to configure an Ethernet type interface.
interface port-channel	Enters the interface configuration mode of a specific port-channel.

interface range ethernet	Enters the interface configuration mode to configure multiple ethernet type interfaces.
interface range port-channel	Enters the interface configuration mode to configure multiple port-channels.
interface range vlan	Enters the interface configuration mode to configure multiple VLANs.
interface vlan	Enters the interface configuration (VLAN) mode.
ip default-gateway	Defines a default gateway.
ip domain-lookup	Enables the IP Domain Naming System (DNS)-based host name-to-address translation.
ip domain-name	Defines a default domain name, that the software uses to complete unqualified host names.
ip host	Defines static host name-to-address mapping in the host cache.
ip http authentication	Specifies authentication methods for http.
ip http port	Specifies the TCP port for use by a web browser to configure the device.
ip http server	Enables the device to be configured from a browser.
ip https authentication	Specifies authentication methods for https
ip https certificate	Configures the active certificate for HTTPS. Use the **no** form of this command to return to default.
ip https server	Enables the device to be configured from a secured browser.
ip https port	Configures a TCP port for use by a secure web browser to configure the device.
ip igmp snooping (Global)	Enables Internet Group Management Protocol (IGMP) snooping
ip name-server	Sets the available name servers.
ip ssh port	Specifies the port to be used by the SSH server.
ip ssh pubkey-auth	Enables public key authentication for incoming SSH sessions.
ip ssh server	Enables the device to be configured from a SSH server.
lacp system-priority	Configures the system LACP priority.
line	Identifies a specific line for configuration and enters the line configuration command mode.
logging	Logs messages to a syslog server.
logging buffered	Limits syslog messages displayed from an internal buffer based on severity.
logging buffered size	Changes the number of syslog messages stored in the internal buffer.
logging console	Limits messages logged to the console based on severity.

logging file	Limits syslog messages sent to the logging file based on severity.
logging on	Controls error messages logging.
login authentication	Specifies the login authentication method list for a remote telnet or console.
management access-class	Defines which management access-list is used.
management access-list	Defines a management access-list, and enters the access-list for configuration.
port jumbo-frame	Enables jumbo frames for the device.
port storm-control include-multicast	Enables the device to count multicast packets.
priority-queue out num-of-queues	Enables the egress queues to be expedite queues.
qos	Enables quality of service (QoS) on the device and enters QoS basic or advance mode.
qos map dscp-queue	Modifies the DSCP to CoS map.
qos trust (Global)	Configure the system to "trust" state.
radius-server deadtime	Improves RADIUS response times when servers are unavailable.
radius-server host	Specifies a RADIUS server host.
radius-server key	Sets the authentication and encryption key for all RADIUS communications between the router and the RADIUS daemon.
radius-server retransmit	Specifies the number of times the software searches the list of RADIUS server hosts.
radius-server source-ip	Specifies the source IP address used for communication with RADIUS servers.
radius-server timeout	Sets the interval for which a router waits for a server host to reply.
rmon alarm	Configures alarm conditions.
rmon event	Configures a RMON event.
rmon table-size	Configures the maximum RMON tables sizes.
snmp-server community	Sets up the community access string to permit access to SNMP protocol.
snmp-server contact	Sets up a system contact.
snmp-server enable traps	Enables the switch to send SNMP traps or SNMP notifications.
snmp-server host	Specifies the recipient of Simple Network Management Protocol notification operation.
snmp-server location	Sets up the information on where the device is located.

snmp-server set	Sets SNMP MIB value by the CLI.
snmp-server trap authentication	Enables the switch to send Simple Network Management Protocol traps when authentication failed.
sntp authenticate	Grants authentication for received Network Time Protocol (NTP) traffic from servers.
sntp authentication-key	Defines an authentication key for Simple Network Time Protocol (SNTP).
spanning-tree	Enables spanning tree functionality.
spanning-tree bpdu	Defines BPDU handling when spanning tree is disabled on an interface
spanning-tree forward-time	Configures the spanning tree bridge forward time.
spanning-tree hello-time	Configures the spanning tree bridge Hello Time.
spanning-tree max-age	Configures the spanning tree bridge maximum age.
spanning-tree mode	Configures the spanning tree protocol.
spanning-tree pathcost method	Sets the default pathcost method.
spanning-tree priority	Configures the spanning tree priority.
tacacs-server key	Sets the authentication encryption key used for all TACACS+ communications between the device and the TACACS+ daemon.
tacacs-server source-ip	Specifies the source IP address that will be used for the communication with TACACS servers.
tacacs-server timeout	Sets the timeout value.
tacacs-server host	Specifies a TACACS+ host.
username	Establishes a username-based authentication system.
vlan database	Enters the VLAN database configuration mode.
wrr-queue cos-map	Maps assigned CoS values to select one of the egress queues.

IC (Interface Configuration) Mode

Command	Description
back-pressure	Enables Back Pressure on a given interface.
channel-group	Associates a port with a Port-channel.
clear host dhcp	Sets an IP address on the device.
description	Adds a description to an interface.
dot1x auth-not-req	Enables unauthorized users access to that VLAN

dot1x max-req	Sets the maximum number of times that the switch sends an EAP - request/identity frame to the client, before restarting the authentication process.
show dot1x	Allows multiple hosts on an 802.1X-authorized port, that has the dot1x port-control interface configuration command set to auto.
dot1x port-control	Enables manual control of the authorization state of the port
dot1x re-authentication	Enables periodic re-authentication of the client.
dot1x single-host-violation	Configures the action to be taken, when a station whose MAC address is not the supplicant MAC address, attempts to access the interface.
dot1x timeout quiet-period	Sets the number of seconds that the switch remains in the quiet state following a failed authentication exchange.
dot1x timeout re-authperiod	Sets the number of seconds between re-authentication attempts.
dot1x timeout server-timeout	Sets the time for the retransmission of packets to the authentication server
dot1x timeout supp-timeout	Sets the time for the retransmission of an EAP-request frame to the client.
dot1x timeout tx-period	Sets the number of seconds that the switch waits for a response to an Extensible Authentication Protocol (EAP) - request/identity frame, from the client, before resending the request.
show dot1x	Sets the number of seconds that the switch waits for a response to an EAP request/identity frame, from the client, before resending the request.
duplex	Configures the full/half duplex operation of a given ethernet interface when not using auto-negotiation.
flowcontrol	Configures the Flow Control on a given interface.
garp timer	Adjusts the GARP application join, leave, and leaveall GARP timer values.
gvrp enable (interface)	Enables GVRP on an interface.
gvrp registration-forbid	De-registers all VLANs, and prevents dynamic VLAN registration on the port.
gvrp vlan-creation-forbid	Enables or disables dynamic VLAN creation.
ip address	Sets an IP address
ip address dhcp	Acquires an IP address on an interface from the DHCP server.
ip internal-usage-vlan	Reserves a VLAN as the internal usage VLAN of an interface.
lacp port-priority	Configures the priority value for physical ports.
lacp timeout	Assigns an administrative LACP timeout.
mdix	Enables automatic crossover on a given interface.

name	Configures a name to a VLAN.
negotiation	Enables auto-negotiation operation for the speed and duplex parameters of a given interface.
port monitor	Starts a port monitoring session.
port security	Disables new address learning on an interface.
port security routed secure-address	Adds MAC-layer secure addresses to a routed port.
port storm-control broadcast enable	Enables broadcast storm control.
port storm-control broadcast rate	Configures the maximum broadcast rate.
qos cos	Configures the default port CoS value.
qos trust (Interface)	Enables each port trust state while the system is in basic mode.
rmon collection history	Enables a Remote Monitoring (RMON) MIB history statistics group on an interface.
shutdown	Disables interfaces.
sntp client enable (interface)	Enables the Simple Network Time Protocol (SNTP) client on an interface.
spanning-tree cost	Configures the spanning tree path cost for a port.
spanning-tree disable	Disables spanning tree on a specific port.
spanning-tree link-type	Overrides the default link-type setting.
spanning-tree portfast	Enables PortFast mode.
spanning-tree port-priority	Configures port priority.
speed	Configures the speed of a given ethernet interface when not using auto-negotiation.
qos map dscp-queue	Defines the wrr-queue mechanism on an egress queue.
wrr-queue bandwidth	Assigns Weighted Round Robin (WRR) weights to egress queues.

LC (Line Configuration) Mode

Command	Description
enable authentication	Specifies the authentication method list when accessing a higher privilege level from a remote telnet or console.
exec-timeout	Configures the interval that the system waits until user input is detected.
history	Enables the command history function.

history size	Changes the command history buffer size for a particular line.
password	Specifies a password on a line.
autobaud	Sets the line for automatic baud rate detection
speed	Sets the line baud rate.

MA (Management Access-level) Mode

Command	Description
deny (management)	Defines a deny rule.
permit (management)	Defines a permit rule.

PE (Privileged User EXEC) Mode

Command	Description
show dot1x users	Displays 802.1X statistics for the specified interface.
boot system	Specifies the system image that the device loads at startup.
clear arp-cache	Deletes all dynamic entries from the ARP cache.
clear bridge	Removes any learned entries from the forwarding database.
clear gvrp statistics	Clears all the GVRP statistics information.
clear host	Deletes entries from the host name-to-address cache
clear host dhcp	Deletes entries from the host name-to-address mapping received from Dynamic Host Configuration Protocol (DHCP).
clear logging	Clears messages from the internal logging buffer.
clear logging file	Clears messages from the logging file
clear spanning-tree detected-protocols	Restarts the protocol migration process on all interfaces or on the specified interface.
clock set	Manually sets the system clock.
configure	Enters the global configuration mode.
copy	Copies files from a source to a destination.
crypto certificate request	Generates and displays certificate requests for HTTPS.
dot1x re-authenticate	Manually initiates a re-authentication of all 802.1X-enabled ports or the specified 802.1X-enabled port.
login	Returns to User EXEC mode.
reload	Reloads the operating system.

set interface active	Reactivates an interface that was suspended by the system.
show arp	Displays entries in the ARP table.
show authentication methods	Displays information about the authentication methods.
show bootvar	Displays the active system image file that the device loads at startup
show bridge address-table	Displays dynamically created entries in the bridge-forwarding database.
show bridge address-table count	Displays the number of addresses present in all VLANs or at specific VLAN.
show bridge multicast address-table	Displays statically created entries in the bridge-forwarding database.
show bridge multicast address-table	Displays multicast MAC address table information.
show bridge multicast filtering	Displays the multicast filtering configuration.
show copper-ports cable-length	Displays the estimated copper cable length attached to a port.
show copper-ports tdr	Displays the last TDR (Time Domain Reflectometry) tests on specified ports.
show crypto key mypubkey	Displays the SSH public keys stored on the device.
show crypto key pubkey-chain ssh	Displays SSH public keys stored on the device.
show crypto certificate mycertificate	Displays the SSL certificates of the device
show dot1x	Displays 802.1X status for the switch or for the specified interface.
show dot1x advanced	Displays 802.1X enhanced features for the switch or for the specified interface.
show dot1x users	Displays 802.1X users for the switch.
show fiber-ports optical-transceiver	Displays the optical transceiver diagnostics.
show ip ssh	Displays the SSH server configuration.
show lacp port-channel	Displays LACP information for a port-channel.
show logging	Displays the state of logging and the syslog messages stored in the internal buffer.
show logging file	Displays the state of logging and the syslog messages stored in the logging file.
show management access-class	Displays the active management access-list.
show management access-list	Displays management access-lists.
show ports security	Displays the port-lock status.

show ports storm-control	Displays the storm control configuration.
show radius-servers	Displays the RADIUS server settings.
show running-config	Displays the contents of the currently running configuration file.
show snmp	Displays the SNMP status.
show spanning-tree	Displays spanning tree configuration.
show startup-config	Displays the startup configuration file contents.
show syslog-servers	Displays the syslog servers settings.
show tacacs	Displays configuration and statistics for a TACACS+ servers.
show users accounts	Displays information about the local user database.
test copper-port tdr	Diagnoses with TDR (Time Domain Reflectometry) technology the quality and characteristics of a copper cable attached to a port.

SP (SSH Public Key) Mode

Command	Description
key-string	Manually specifies a SSH public key.
user-key	Specifies which SSH public key is manually configured and enters the SSH public key-string configuration command

UE (User EXEC) Mode

Command	Description
clear counters	Clears statistics on an interface.
enable	Enters the privileged EXEC mode.
exit(EXEC)	Closes an active terminal session by logging off the device.
login	Changes a login username.
ping	Sends ICMP echo request packets to another node on the network.
show clock	Displays the time and date from the system clock.
show gvrp configuration	Displays GVRP configuration information.
show gvrp error-statistics	Displays GVRP error statistics.
clear gvrp statistics	Displays GVRP statistics.
show history	Lists the commands entered in the current session.

show hosts	Displays the default domain name, a list of name server hosts, the static and the cached list of host names and addresses.
show interfaces configuration	Displays the configuration for all configured interfaces.
show interfaces counters	Displays traffic seen by the physical interface.
show interfaces description	Displays the description for all configured interfaces.
port channel load balance	Displays Port-channel information.
show interfaces status	Displays the status for all configured interfaces.
show ip igmp snooping groups	Displays multicast groups learned by IGMP snooping.
show ip igmp snooping interface	Displays IGMP snooping configuration.
show ip igmp snooping mrouter	Displays information on dynamically learned multicast router interfaces.
show ip interface	Displays the usability status of interfaces configured for IP.
show lacp ethernet	Displays LACP information for Ethernet ports.
show line	Displays line parameters.
show ports jumbo-frame	Displays the jumbo frames configuration.
show ports monitor	Displays the port monitoring status.
show privilege	Displays the current privilege level.
show qos	Displays the QoS status.
show qos interface	Assigns CoS values to select one of the egress queues.
show qos map	Displays all the maps for QoS.
show rmon alarm	Displays alarm configurations.
show rmon alarm-table	Displays the alarms summary table.
show rmon collection history	Displays the requested history group configuration.
show rmon events	Displays the RMON event table.
show rmon history	Displays RMON Ethernet Statistics history.
show rmon log	Displays the RMON logging table.
show rmon statistics	Displays RMON Ethernet Statistics.
show system	Displays system information.
show system id	Displays the service id information.
show users	Displays information about the active users.
show version	Displays the system version information.

VC (VLAN Configuration) Mode

Command	Description
bridge address	Adds a static MAC-layer station source address to the bridge table.
bridge multicast address	Registers MAC-layer multicast addresses to the bridge table, and adds static ports to the group.
bridge multicast forbidden address	Forbids adding a specific multicast address to specific ports.
bridge multicast forbidden forward-all	Enables forbidding forwarding of all multicast frames to a port.
bridge multicast forward-all	Enables forwarding of all multicast frames on a port.
ip igmp snooping (Interface)	Enables Internet Group Management Protocol (IGMP) snooping on a specific VLAN.
ip igmp snooping host-time-out	Configures the host-time-out.
ip igmp snooping leave-time-out	Configures the leave-time-out.
show ip igmp snooping mrouter	Enables automatic learning of multicast router ports in the context of a specific VLAN.
ip igmp snooping mrouter-time-out	Configures the mrouter-time-out.
vlan	Creates a VLAN.

3

Using the CLI

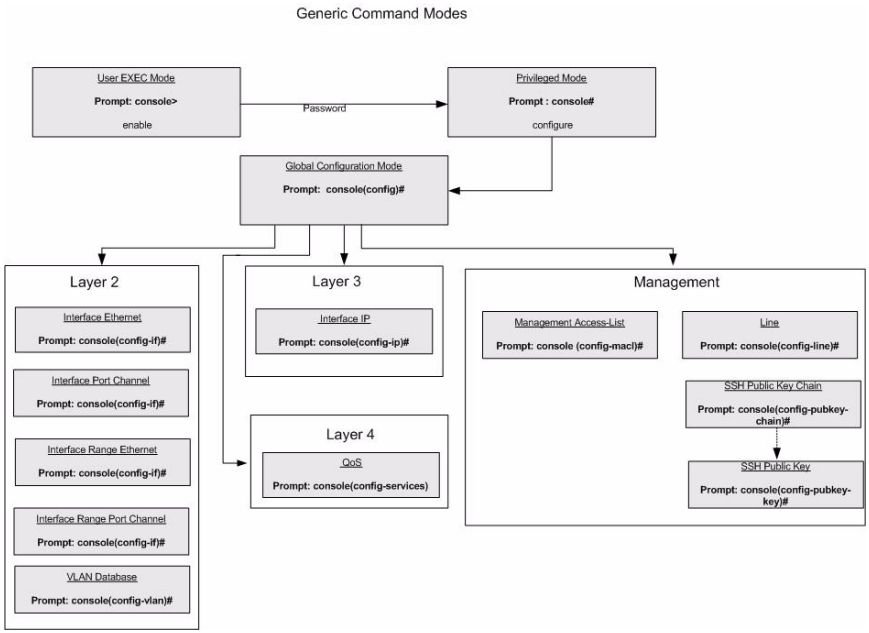
This chapter describes how to start using the CLI and describes implemented command editing features to assist in using the CLI.

CLI Command Modes

Introduction

To assist in configuring devices, the CLI [Command Line Interface] 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.



When starting a session, the initial mode is the User EXEC mode. Only a limited subset of commands are 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 mode gives access to commands that are restricted on 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.

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.

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 command **enable** 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 Privileged Exec mode to User EXEC mode, type the **disable** command at the command prompt.

The following example illustrates how to access Privileged Exec mode and return back 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 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

Global Configuration Mode

Global Configuration mode commands apply to features that affect the system as a whole, rather than just a specific interface. The Privileged EXEC mode command **configure** 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 command **configure** and press **<Enter>**. The Global Configuration mode prompt is displayed. The Global Configuration mode prompt consists of the device "host name" followed by the word "(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 Global Configuration mode and returns to the Privileged EXEC mode:

```
console#
console#configure
console(config)#exit
console#
```

Interface Configuration Mode and Specific Configuration Modes

Interface Configuration mode commands are to 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 speed, timeout settings, etc. The Global Configuration mode command **line** is used to enter the Line Configuration command mode.
- **VLAN Database**—Contains commands to create a VLAN as a whole. The Global Configuration mode command **vlan database** is used to enter the VLAN Database Interface Configuration mode.
- **Management Access List**—Contains commands to define management access-lists. The Global Configuration mode command **management access-list** is used to enter the Management Access List Configuration mode.
- **Ethernet**—Contains commands to manage port configuration. The Global Configuration mode command **interface ethernet** 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 VLAN or 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 Global Configuration mode command **interface port-channel** 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 Global Configuration mode command **crypto key pubkey-chain ssh** is used to enter the SSH Public Key-chain Configuration mode.
- **Interface**—Contains commands that configure the interface. The Global Configuration mode command **interface ethernet** is used to enter the Interface Configuration mode.
- **QoS—**Contains commands related to service definitions. The Global Configuration mode command **qos config-services** is used to enter the QoS services configuration mode.

Starting the CLI

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

If access is via a Telnet connection, ensure the device has an IP address defined, 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. Start the device and wait until the startup procedure is complete.

   The User Exec mode is entered, and the prompt "Console>" is displayed.

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

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

Editing Features

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 g5**," **show**, **interfaces** and **status** are keywords, **ethernet** is an argument that specifies the interface type, and **g5** 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 the 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 displayed.
- **Partial keyword lookup**—A command is incomplete and the character **?** is entered in place of a parameter. The matched 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

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	Source or destination
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 256. 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.

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.

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.

Incorrect or incomplete commands are automatically re-entered next to the cursor. If a parameter must be added, the parameter can be added to the basic command already displayed next to the cursor. The following example indicates that the command interface ethernet requires a missing parameter.

```
(config)#interface ethernet
%missing mandatory parameter
(config)#interface ethernet
```

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 mode.
Backspace key	Moves the cursor back one space.

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**.

4

AAA Commands

aaa authentication login

The **aaa authentication login** Global Configuration mode commands 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*}

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

Keyword	Source or destination
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.
tacacs	Uses the list of all TACACS 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 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

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

Keyword	Source or destination
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.
tacacs	Uses the list of all TACACS+ 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.
- Create a list by entering the **aaa authentication enable** *list-name method* command 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.
- All **aaa authentication enable default** requests sent by the device to a RADIUS or TACACS server include the username "$enab15$".

Example

The following example sets 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, SSH or console. To return to the default specified by the authentication login command, use the **no** form of this command.

Syntax

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

no login authentication

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

Default Configuration

Uses the default set with the command **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, SSH or console. To return to the default specified by the **enable authentication** command, use the **no** form of this command.

Syntax

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

no enable authentication

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

Default Configuration

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

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. To return to the default, use the **no** form of this command.

Syntax

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

no ip http authentication

- *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.
tacacs	Uses the list of all TACACS 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
Console (config)# ip http authentication tacacs local
```

ip https authentication

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

Syntax

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

no ip https authentication

- *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.
tacacs	Uses the list of all TACACS 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
Console (config)# ip https authentication tacacs local
```

show authentication methods

The **authentication methods** Privilege 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
---------------------------------
Console_Default: None
Network_Default: Local

Enable  Authentication Method Lists
-----------------------------------
Console_Default: Enable None
Network_Default: Enable

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

http            : Tacacs  Local
https           : Tacacs  Local
dot1x           :
```

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

- *password*—Password for this level, from 1 to 159 characters in length.
- **encrypted**—Encrypted password to be entered, copied from another device configuration.

Default Configuration

No password is required.

Command Mode

Line Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example specifies a password "secret" on a line.

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

enable password

The **enable password** Global Configuration mode command sets a local password to control access to normal 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*]

- *password*—Password for this level, from 1 to 159 characters in length.
- **level** *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

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 sets a 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 establishes a username-based authentication system. To remove a user name use the **no** form of this command.

Syntax

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

no username *name*

- *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

- No password is required.

Example

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

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

show users accounts

The **show users accounts** Privileged EXEC mode command displays information about the local user database.

Syntax

show users accounts

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 local users configured with access to the system.

```
Console# show users accounts


Username           Privilege
--------           ---------
Bob                15
Robert             15
```

5

Address Table Commands

bridge address

The **bridge address** VLAN Interface Configuration mode command adds a static MAC-layer station source address to the bridge table. To delete the MAC address, use the **no** form of the **bridge address** command (using the **no** form of the command without specifying a MAC address deletes all static MAC addresses belonging to this VLAN).

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*]

- *mac-address*—A valid MAC address in the format of xx:xx:xx:xx:xx:xx.
- *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 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

- There are no user guidelines for this command.

Example

The following example adds a permanent static MAC-layer station source address 3aa2.64b3.a245 on port g8 to the bridge table.

```
Console (config)# interface vlan 2

Console (config-vlan)# bridge address 3a:a2:64:b3:a2:45 ethernet
g8 permanent
```

bridge multicast filtering

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

Syntax

bridge multicast filtering

no bridge multicast filtering

Default Configuration

Disabled. All multicast addresses are flooded to all ports.

Command Mode

Global Configuration mode

User Guidelines

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

Example

In this example, bridge multicast filtering is enabled.

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

bridge multicast address

The **bridge multicast address** Interface Configuration mode command registers MAC-layer multicast addresses to the bridge table, and adds static ports to the group. To unregister the MAC address, use the **no** form of the **bridge multicast address** 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*}

- **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*—MAC multicast address in the format of xx:xx:xx:xx:xx:xx.
- *ip- multicast-address*—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 g1-9
```

bridge multicast forbidden address

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

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*}

- **add**—Adds ports to the group.
- **remove**—Removes ports from the group.
- *mac-multicast-address*—MAC multicast address in the format of xx:xx:xx:xx:xx:xx.
- *ip- multicast-address*—IP multicast address is in the format xxx.xxx.xxx.xxx.
- *interface-list*—Separate non consecutive valid Ethernet ports with a comma and no spaces; hyphen is used to designate a range of ports.
- *port-channel-number-list*—Separate non consecutive 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 the MAC address 01:00:5e:02:02:03 is forbidden on port g9 within VLAN 8.

```
Console (config)# interface vlan 8

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

Console (config-if)# bridge multicast forbidden address
01:00:5e:02:02:03 add ethernet g9
```

bridge multicast forward-all

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

Syntax

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

no bridge multicast forward-all

- **add**—Adds ports to the group.
- **remove**—Removes ports from the group.
- *interface-list*—Separate non consecutive valid Ethernet ports with a comma and no spaces; a hyphen is used to designate a range of ports.
- *port-channel-number-list*—Separate non consecutive valid port-channels with a comma and no spaces; a hyphen is used to designate a range of port-channels.

Default Configuration

Disable forward-all on the specified interface.

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 g8 are forwarded.

```
Console (config)# interface vlan 2

Console (config-if)# bridge multicast forward-all add ethernet
g8
```

bridge multicast forbidden forward-all

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

Syntax

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

no bridge multicast forward-all

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

Default Configuration

By default, this setting is disabled (for example, forwarding to the port is not forbidden).

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 to be a multicast router port.

Example

In this example, forwarding all multicast packets to g6 are forbidden.

```
Console (config)# interface vlan 2

Console (config-if)# bridge multicast forbidden forward-all add
ethernet g6
```

bridge aging-time

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

Syntax

bridge aging-time *seconds*

no bridge aging-time

- *seconds*—Time is number of seconds. (Range: 10 - 630 seconds)

Default Configuration

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

- This command has no keywords or arguments.

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. By locking the port, new addresses are not learned on the port. To enable new address learning, use the **no** form of the **port security** command.

Syntax

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

no port security

- **forward**—Forwards frames with unlearned source addresses, but does not learn the address.
- **discard**—Discards frames with unlearned source addresses. This is the default if no option is indicated.
- **discard-shutdown**—Discards frames with unlearned source addresses. The port is also shut down.
- **trap** *Seconds*—Sends SNMP traps and defines the minimal amount of time in seconds between two consecutive traps. (Range: 1 - 1,000,000)

Default Configuration

Disabled - No port security

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- There are no user guidelines for this command.

Example

In this example, frame forwarding is enabled without learning, and with traps sent every 100 seconds on port g1.

```
Console (config)# interface ethernet g1
Console (config-if)# port security forward trap 100
Console (config-if)# port security discard trap 100
Console (config-if)# port security discard-shutdown trap 100
```

port security routed secure-address

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

Syntax

port security routed secure-address *mac-address*

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

- *mac-address*—Specify a MAC address in the format of xx:xx:xx:xx:xx:xx.

Default Configuration

No addresses are defined.

Command Mode

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

User Guidelines

- The command enables adding secure MAC addresses to a routed ports 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 g1.

```
Console (config)# interface ethernet g1
Console (config-if)# port security routed secure-address
66:66:66:66:66:66
```

show bridge address-table

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

Syntax

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

- *vlan*—Specific 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

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

Example

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

```
Console# show bridge address-table

Aging time is 300 sec

vlan     mac address          port        type
----     -----------          ----        ----
1        00:60:70:4C:73:FF    g8          dynamic
1        00:60:70:8C:73:FF    g7          dynamic
200      00:10:0D:48:37:FF    g4          static
8        00:10:0D:48:37:FF    g2          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*]

- *vlan*—Specific 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     g8     permanent
1       00:60:70:8C:73:FF     g8     delete-on-timeout
200     00:10:0D:48:37:FF     g8     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 all VLANs or in a specific VLAN.

Syntax

show bridge address-table count [**vlan** *vlan*]

- *vlan* —Specific VLAN.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

- This command displays the count for 1 VLAN, for all VLANs or for a specific port.
- No commas are allowed.

Example

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

```
Console# show bridge address-table count

Capacity: 8192
Free: 8084
Used: 108

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

show bridge multicast address-table

The **show bridge multicast address-table** Privileged EXEC mode command displays multicast MAC address table information.

Syntax

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

- *vlan_id*—A VLAN ID value.
- *mac-multicast-address*—A MAC multicast address in the format of xx:xx:xx:xx:xx:xx.
- *ip-multicast-address*—An IP multicast address.
- **format**—Multicast address format. Can be **ip** or **mac**. If format is unspecified, the default is **mac**.

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, multicast MAC address table information is displayed.

```
Console # show bridge multicast address-table

Vlan     MAC Address           Type              Ports
----     -----------           -----             ----------
1        01:00:5e:02:02:03     static            g1, g2
19       01:00:5e:02:02:08     static            g1-8
19       01:00:5e:02:02:08     dynamic           g9-11

Forbidden ports for multicast addresses:

Vlan     MAC Address           Ports
----     -----------           ----------
1        01:00:5e:02:02:03     g8
19       01:00:5e:02:02:08     g8

Console # show bridge multicast address-table format ip

Vlan     IP Address            Type              Ports
----     -----------           -----             ----------
1        224-239.130|2.2.3     static            g1,g2
19       224-239.130|2.2.8     static            g1-8
19       224-239.130|2.2.8     dynamic           g9-11

Forbidden ports for multicast addresses:

Vlan     IP Address            Ports
----     -----------           ----------
1        224-239.130|2.2.3     g8
19       224-239.130|2.2.8     g8
```

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

show bridge multicast filtering

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

Syntax

show bridge multicast filtering *vlan-id*

- *vlan_id*—A valid VLAN ID value.

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 multicast configuration for VLAN 1 is displayed.

```
Console # show bridge multicast filtering 1
Filtering: Enabled
VLAN: 1

Port            Static                Status
-------         ----------------      -----------
g1              Forbidden             Filter
g2              Forward               Forward(s)
g3              -                     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*]

- *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   Status       Action        Trap       Frequency  Counter
-----  -------      -------       -------    ---------  --------
g1     Locked       Discard       Enable     100        88
g2     Unlocked     -             -          -          -
g3     Locked       Discard,      Disable    -          -
                    Shutdown

Frequency: Minimum time in seconds between consecutive traps
Counter: Number of actions since last trap
```

6

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*

- *hh:mm:ss*—Current time in hours (military format), minutes, and seconds (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

The default time set is 0:0:0:0 Jan 1 2000 or xxxxx Month Day Year.

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** Privileged EXEC mode command configures an external time source for the system clock.

Syntax

clock source {sntp}

no clock source

- **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# clock source sntp
```

clock timezone

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

Syntax

clock timezone *hours-offset* [**minutes** *minutes-offset*] [**zone** *acronym*]

no clock timezone

- *hours-offset*— Hours difference from UTC. (Range: -12 – +13)
- **minutes** *minutes-offset*—Minutes difference from UTC. (Range: 0 – 59)
- **zone** *acronym*—The acronym of the time zone. (Range: Up to 4 characters)

Default Configuration

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 to not automatically switch to summer time, use the **no** form of this command.

Syntax

clock summer-time recurring {**usa** | **eu** | {*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**—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.
- **usa**—The summer time rules are the United States rules.
- **eu**—The summer time rules are the European Union rules.
- *week*— Week of the month. (Range: 1 - 4, **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)
- *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** *offset*—Number of minutes to add during summer time (Range: 1 - 1440).
- **zone** *acronym*—The acronym of the time zone to be displayed when summer time is in effect. If unspecified default to the timezone acronym. (Range: Up to 4 characters)

Default Configuration

Summer time is disabled.

offset *offset*—default is 60

zone *acronym*— If unspecified default to the timezone acronym.

If the timezone has not been defined, the default will be 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.
- USA rule for daylight saving time:
  - Start: First Sunday in April
  - End: Last Sunday in October
  - Time: 2 am local time
- EU rule for daylight saving time:
  - Start: Last Sunday in March
  - End: Last Sunday in October
  - Time: 1.00 am (01:00) Greenwich Mean Time (GMT)

Examples

The following example sets summer time starting on the first Sunday in April at 2am 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*

- *number*—Key number (Range: 1 - 4294967295)
- *value*—Key value (Range: Up to 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
Console(config)# sntp trusted-key 8
Console(config)# sntp authenticate
```

sntp authenticate

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

Syntax

sntp authenticate

no sntp authenticate

This command has no arguments or keywords.

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*

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

Default Configuration

Not 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, use the **no** form of this command.

Syntax

sntp client poll timer *seconds*

no sntp client poll timer

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

Default Configuration

1024

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 the Simple Network Time Protocol (SNTP) broadcast clients. To disable the SNTP broadcast clients, use the **no** form of this command.

Syntax

sntp broadcast client enable

no sntp broadcast client enable

This command has no arguments or keywords.

Default Configuration

Disabled

Command Mode

Global configuration mode

User Guidelines

- The **sntp broadcast client enable** Interface Configuration mode command enables the device to receive broadcast transmissions globally and on ALL interfaces.
- Use the **sntp client enable** 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 anycast client. To disable the polling for SNTP broadcast client, use the **no** form of this command.

Syntax

sntp anycast client enable

no sntp anycast client enable

This command has no arguments or keywords.

Default Configuration

Disabled

Command Mode

Global configuration

User Guidelines

- Polling time is determined by the **sntp client poll timer** Global Configuration mode command.
- Use the **sntp client enable** Interface Configuration mode command to enable the SNTP client on a specific interface.

Examples

The following example enables anycast clients.t

```
Console (config-if)# sntp anycast client enable
```

sntp client enable (interface)

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

Syntax

sntp client enable

no sntp client enable

This command has no arguments or keywords.

Default Configuration

Disabled

Command Mode

Interface configuration (Ethernet, Port-Channel, VLAN) mode

User Guidelines

- Use the **sntp 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 the interface.

```
Console (config)# 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 Network Time Protocol (NTP) traffic from servers. To disable requesting and accepting Network Time Protocol (NTP) traffic from servers, use the **no** form of this command.

Syntax

sntp unicast client enable

no sntp unicast client enable

This command has no arguments or keywords.

Default Configuration

Disabled

Command Mode

Global Configuration mode

User Guidelines

- Use the **sntp server** command to define SNTP servers.

Examples

The following example enables the device to use the Simple Network Time Protocol (SNTP) to request and accept Network Time Protocol (NTP) 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 clients. To disable the polling for SNTP client, use the **no** form of this command.

Syntax

sntp unicast client poll

no sntp unicast client poll

This command has no arguments or keywords.

Default Configuration

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 the 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 Network Time Protocol (NTP) traffic from a server. To remove a server from the list of NTP servers, use the **no** form of this command.

Syntax

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

no sntp server *host*

- *ip-address*—IP address of the server.
- *hostname*—Hostname of the server. (Range: 1 - 158 characters)
- **poll**—Enable polling.
- **key** *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.
- If multiple servers are added then the updates applied are determined by the following: Unicast Server updates take precedence, followed by Anycast and then Broadcast.

Examples

The following example configures the device to accept Network Time Protocol (NTP) 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**]

- **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

Device> 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

This command has no keywords or arguments.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

- There are no user guidelines for this command.

Examples

```
Console# show sntp configuration
Polling interval: 7200 seconds

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

Unicast Clients Polling: Enabled.

Server                          Polling         Encryption Key
```

```
-----------                    --------        -----------------
176.1.1.8                      Enabled         9
176.1.8.179                    Disabled        Disabled

Broadcast Clients: Enabled
Broadcast Clients Poll:
Enabled
Broadcast Interfaces: g1, g3
```

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

- This command has no keywords or arguments.

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
Reference time is AFE2525E.70597B34 (00:10:22.438 PDT Jul 5 1993)

Unicast servers:
Server         Preference  Status     Last response       Offset    Delay
                                                          [mSec]    [mSec]
---------      ----------  ------     ---------------     -----     ------
176.1.1.8      Primary     Up         AFE252C1.6DBDDFF2   7.33      117.79
```

```
176.1.8.179    Secondary   Unknown    AFE21789.643287C9   8.98      189.19

Broadcast:
Interface      IP address  Last response
---------      ----------  ------------------------
176.1.1.8      Primary     AFE252C1.6DBDDFF2
176.1.8.179    Secondary   AFE21789.643287C9
```

7

Configuration and Image Files

delete startup-config

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

Syntax

delete startup-config

This command has no arguments or keywords.

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
```

copy

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

Syntax

copy *source-url destination-url* [**SNMP**]

- *source-url*—The source file location URL or reserved keyword being copied.
- *destination-url*—The destination file URL or reserved keyword.
- **SNMP—**Used only when copying from/to **startup-config**. Specifies that the destination/source file is in SNMP format

The following table displays keywords aliases to URL:

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.
backup-config	Represents the backup configuration file.
image	If source file, represent the active image file. If destination file, represent 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 either 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

- 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, the following cannot be copied:

- If the source file and destination file are the same file.
- **xmodem** cannot be a destination. Can only be copied to **image**, **boot** and **null**.
- **tftp** cannot be the source and destination on the same copy.
- Active Image is the image the system currently boots from (see "show bootvar" command) or set to boot next from. Non active image is the spare image location.

Copy Character Descriptions:

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

Copying image file from a Server to Flash Memory

Use the **copy source-url image** command to copy an image file from a server to Flash memory.

Copying boot file from a Server to Flash Memory

Use the **copy source-url boot** command to copy a boot file from a server to Flash memory.

Copying a Configuration File from a Server to the Running Configuration

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

Copying a Configuration File from a Server to the Startup Configuration

Use the **copy source-url startup-config** command to copy a "configuration file" from a network server to the device "startup configuration". These commands replace the startup configuration file with 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.

The configuration file copy can serve as a backup copy.

Saving the Running Configuration to the Startup Configuration

Use the copy **running-config startup-config** command to copy the "running configuration" to the "startup configuration".

Backup the Running Configuration or Startup Configuration to the Backup Configuration

Use the copy **running-config file** command to backup the running configuration to a backup configuration file. Use the copy **startup-config file** command to backup the startup configuration a backup configuration file

Example

The following example copies a system image named file1 from the TFTP server with an IP address of 172.16.101.101 to 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]
```

boot system

The **boot system** Privileged EXEC mode command specifies the system image that the device loads at startup.

Syntax

boot system {**image-1** | **image-2**}

- **image-1**—Specifies image 1 as the system startup image.
- **image-2**—Specifies image 2 as the system startup image.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

- Use the **show bootvar** command to find out which image is the active image.

Examples

The following example loads system image 1 for the next device startup.

```
Console# boot system image-1
```

show running-config

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

Syntax

show running-config [**sort** *type*]

- **sort** *type* —Specifies the sorting type of the file. Can be one of the following values: **interface**, **feature**.

Default Configuration

Sort type defaults to **interface** if unspecified.

Command Mode

Privileged EXEC mode

User Guidelines

- **show running-config** does not show all the port configurations under the port. Although the device is already configured with some default parameters,"show running config" on an empty device is empty.

Examples

The following example displays the contents of the running-config file.

```
Console# show running-config
no spanning-tree
vlan database
vlan 2
exit
interface range ethernet g(1-2)
switchport access vlan 2
exit
interface vlan 2
bridge address 00:00:00:00:00:01 ethernet g1
exit
interface ethernet g1
gvrp enable
exit
gvrp enable
interface ethernet g24
ip address dhcp
exit
ip name-server  10.6.1.36
console#
```

show startup-config

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

Syntax

show startup-config [**sort** *type*]

- **sort** *type* —Specifies the sorting type of the file. Can be one of the following values: **interface**, **feature**.

Default Configuration

Sort type defaults to **interface** if unspecified.

Command Mode

Privileged EXEC mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following example displays the contents of the startup-config file.

```
Console# show startup-config
no spanning-tree
vlan database
vlan 2
exit
interface range ethernet g(1-2)
switchport access vlan 2
exit
interface vlan 2
bridge address 00:00:00:00:00:01 ethernet g1
exit
interface ethernet g1
gvrp enable
exit
gvrp enable
interface ethernet g24
ip address dhcp
exit
ip name-server  10.6.1.36
console#
```

show backup-config

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

Syntax

show backup-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

```
Console# show backup-config
software version 1.1

hostname device

interface ethernet g1
ip address 176.242.100.100 255.255.255.0
duplex full
speed 1000

interface ethernet g2
ip address 176.243.100.100 255.255.255.0
duplex full
speed 1000
```

show bootvar

The **show bootvar** Privileged EXEC mode command displays the active system image file that the device loads at startup.

Syntax

show bootvar

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 active system image file that the device loads at startup.

```
Console# show bootvar
Images currently available on the FLASH
image-1             active (selected for next boot)
image-2             not active
```

8

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*

- *interface*—Valid Ethernet 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 ports g8 for configuration.

```
Console(config)# interface ethernet g8
Console(config-if)#
```

interface range ethernet

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

Syntax

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

- *port-range*—List of valid ports to add. Separate non consecutive ports with a comma and no spaces; a hyphen is used to designate a range of ports.
- **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 g18 to g20 and ports g22 to g24 are grouped to receive the same command.

```
Console(config)# interface range ethernet g18 - g20, g22 - g24
Console(config-if)#
```

shutdown

The **shutdown** Interface Configuration mode command disables interfaces. 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 port g5.

```
Console(config)# interface ethernet g5
Console(config-if)# shutdown
```

The following example re-enables port g5.

```
Console(config)# interface ethernet g5
Console(config-if)# no shutdown
```

description

The **description** Interface Configuration mode command adds a description to an interface. To remove the description use the **no** form of this command.

Syntax

description *string*

no description

- *string*—Comment or a description of the port up to 64 characters.

Default Configuration

By default, 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 the Ethernet g5.

```
Console(config)# interface ethernet g5
Console(config-if)# description RD SW#3
```

speed

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

Syntax

speed {100 | 1000 | 10000}

no speed

- 100—Force 100 Mbps operation.

- **1000**—Force 1000 Mbps operation.
- **10000**—Force 10000 Mbps operation.

Default Configuration

Maximum port capability.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

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

Example

The following example configures the speed operation of Ethernet g5 to force 100-Mbps operation.

```
Console(config)# interface ethernet g5
Console(config-if)# speed 100
```

duplex

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

Syntax

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

no duplex

- **half**—Force half-duplex operation
- **full**—Force full-duplex operation

Default Configuration

The interface is set to full duplex.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

- Before attempting to force a particular duplex mode on the port operating at 10/100/1000 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 g5 to force full duplex operation.

```
Console(config)# interface ethernet g5
Console(config-if)# duplex full
```

negotiation

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

Syntax

negotiation

no negotiation

Default Configuration

auto-negotiation

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- Turning off auto-negotiation on an aggregate link may, under some circumstances, make it non-operational. If the other side has auto-negotiation turned on, it may re-synchronize all members of the aggregated link to half-duplex operation, and may, as per the standards, set them all inactive.

Example

The following example enables autonegotiation on Ethernet g5.

```
Console(config)# interface ethernet g5
Console(config-if)# negotiation
```

flowcontrol

The **flowcontrol** Interface Configuration mode command configures the Flow Control on a given interface. To restore the default, use the **no** form of this command.

Syntax

flowcontrol {auto | on | off}

no flowcontrol

- **auto**—Enables auto-negotiation of Flow Control.
- **on**—Enables Flow Control.
- **off**—Disables Flow Control.

Default Configuration

Flow Control is off.

Command Mode

Interface configuration (Ethernet, port-channel) mode

User Guidelines

- Flow Control will operate only if duplex mode is set to FULL. Back Pressure will operate only if duplex mode is set to HALF.
- When Flow Control is ON, the head-of-line-blocking mechanism of this port is disabled.
- If a link is set to NOT use auto-negotiation, the other side of the link must also be configured to not use auto-negotiation.
- To select **auto**, ensure negotiation for Flow Control is enabled.

Example

In the following example, Flow Control is enabled on g5.

```
Console(config)# interface ethernet g5
Console(config-if)# flowcontrol on
```

mdix

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

Syntax

mdix {on | auto}

no mdix

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

Default Configuration

Automatic crossover is enabled

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

- **Mdix Auto:** All possibilities to connect a PC with cross OR normal cables are supported and are automatically detected.
- **Mdix ON**: It is possible to connect to a PC only with a normal cable and to connect to another switch ONLY with a cross cable.
- If MDIX is set to "no mdix", the device works opposite from the "MDIX On" behavior. With this setting you can only use either an ethernet standard cross-over cable to connect to a PC, or an ethernet standard cable to connect to another switch.

Example

In the following example, automatic crossover is enabled on g5.

```
Console(config)# interface ethernet g5
Console(config-if)# mdix auto
```

back-pressure

The **back-pressure** Interface Configuration 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 disabled.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- Back Pressure will operate only if duplex mode is set to half.

Example

In the following example Back Pressure is enabled on g5.

```
Console(config)# interface ethernet g5
Console(config-if)# back-pressure
```

port jumbo-frame

The **port jumbo-frame** Global Configuration mode command enables jumbo frames for the device. The size of the port jumbo frame is 10K. To disable jumbo frames, use the **no** form of this command.

Syntax

port jumbo-frame

no port jumbo-frame

Default Configuration

Jumbo Frames are not enabled.

Command Mode

Global Configuration mode

User Guidelines

- The command would be effective only after reset.

Example

In the following example, Jumbo Frames are enabled on the device.

```
Console(config)# port jumbo-frame
```

clear counters

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

Syntax

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

- *interface*—Valid Ethernet port.
- *port-channel-number*—Valid port-channel trunk index.

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 g1 are cleared.

```
Console# clear counters ethernet g1
```

set interface active

The **set interface active** Privileged EXEC mode command reactivates an interface that was suspended by the system.

Syntax

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

- *interface*—Valid Ethernet port.
- *port-channel-number*—Valid port-channel trunk index.

Default Configuration

This command has no default configuration.

Command Mode

Privilege EXEC mode

User Guidelines

- This command is used to activate interfaces that were configured to be active, but were shutdown for some reason.

Example

The following example activates interface g5, which is disabled.

```
Console# set interface active ethernet g5
```

show interfaces configuration

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

Syntax

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

- *interface*—Valid Ethernet port.
- *port-channel-number*—Valid port-channel trunk index.

Default Configuration

This command has no default configuration.

Command Modes

Privilege EXEC mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays the configuration for all configured interfaces:

```
Console# show interfaces configuration

Port    Type    Duplex  Speed     Neg       Flow       Admin    Back       Mdix
                                            Control    State    Pressure   Mode
----    ----    ------  ------    ----      ------     -----    ------     ----
g1      1G      Full    1000      Auto      On         Up       Enable     Auto
g2      1G      Full    100       Off       Off        Up       Disable    Off
g3      1G      Full    1000      Off       Off        Up       Disable    On



Ch      Type    Speed   Neg       Flow      Back       Admin
                                  Control   Pressure   State
---     ----    -----   ---       -----     --------   -----
1       1000    1000    Off       Off       Disable    Up
```

The displayed port configuration information includes the following:

- **Port**—The port number.
- **Port Type**—The port designated IEEE shorthand identifier. For example 1000Base-T refers to 1000 Mbps baseband signaling.
- **Duplex**—Displays the port Duplex status.
- **Speed**—Refers to the port speed.
- **Neg**—Describes the Auto-negotiation status.
- **Flow Control**—Displays the Flow Control status.
- **Back Pressure**—Displays the Back Pressure status.
- **MDIX Mode**—Displays the Auto-crossover status.
- **Admin State**—Displays whether the port is enabled or disabled.

show interfaces status

The **show interfaces status** User EXEC mode command displays the status for all configured interfaces.

Syntax

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

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

Default Configuration

This command has no default configuration.

Command Mode

Privilege EXEC mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays the status for all configured interfaces.

```
Console# show interfaces status

Port   Type         Duplex  Speed  Neg      Flow       Back       MDIX       Link
                                             Control    Pressur    Mode       State
                                                        e

----   -----        ------  ----   ----     ------     -----      ------     ----
g1     1G Copper    Full    100    Auto     On         Enable     On         Up
g2     1G Copper    Full    100    Off      Off        Disable    Off        Down *
g23    1G Fiber     Full    1000   Off      Off        Disable    On         Up


Ch     Type         Duplex  Speed  Neg      Flow       Back       Link
                                             Control    Pressur    State
                                                        e
---    ----         -----   ---    -----    -------    -------    ------
1      1000         Full    1000   Off      Off        Disable    Up

* The interface was suspended by the system.
```

The displayed port status information includes the following:

- **Port**—The port number.
- **Description**—If the port has a description, the description is displayed.
- **Port Type**—The port designated IEEE shorthand identifier. For example, 1000Base-T refers to 1000 Mbps baseband signaling.
- **Duplex**—Displays the port Duplex status.
- **Speed**—Refers to the port speed.
- **Neg**—Describes the Auto-negotiation status.
- **Flow Control**—Displays the Flow Control status.
- **Back Pressure—**Displays the Back Pressure status.
- **Link State**—Displays the Link Aggregation status.

show interfaces description

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

Syntax

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

- *interface*—Valid Ethernet port.
- *port-channel-number*—A valid port-channel trunk index.

Default Configuration

This command has no default configuration.

Command Modes

Privilege EXEC mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays the description for the interface g1.

```
Console# show interfaces description ethernet g1

Port         Description
----         -------------------
g1           Management_port
g2           R&D_port
g3           Finance_port

Ch           Description
----         -------------------
Ch 1         Output
```

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*]

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

Default Configuration

This command has no default configuration.

Command Modes

Privilege 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
-------  -------------  ----------------  ----------------  ------------
g1       183892         1289              987               8
g2       0              0                 0                 0
g3       123899         1788              373               19

Port     OutOctets      OutUcastPkts      OutMcastPkts      OutBcastPkts
-------  -------------  ----------------  ----------------  ------------
g4       9188           9                 8                 0
g5       0              0                 0                 0
g6       8789           27                8                 0


Ch       InOctets       InUcastPkts       InMcastPkts       InBcastPkts
-------  -------------  ----------------  ----------------  ------------
1        27889          928               0                 78

Ch       OutOctets      OutUcastPkts      OutMcastPkts      OutBcastPkts
-------  -------------  ----------------  ----------------  ------------
1        23739          882               0                 122
```

The following example displays counters for port g1.

```
Console# show interfaces counters ethernet g1

Port    InOctets     InUcastPkts     InMcastPkts     InBcastPkts
------  -----------  --------------  --------------  -----------
g1      183892       1289            987             8

Port    OutOctets    OutUcastPkts    OutMcastPkts    OutBcastPkts
------  -----------  --------------  --------------  -----------
g1      9188         9               8               0

FCS Errors: 8
Single Collision Frames: 0
Multiple Collision Frames: 0
SQE Test Errors: 0
Deferred Transmissions: 0
Late Collisions: 0
Excessive Collisions: 0
Internal MAC Tx Errors: 0
Carrier Sense Errors: 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.
Alignment Errors	A count of frames received that are not an integral number of octets in length and do not pass the FCS check.
FCS Errors	Counted frames received 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.
Multiple Collision Frames	A count of frames that are involved in more than one collision and are subsequently transmitted successfully
SQE Test Errors	A count of times that the SQE TEST ERROR is received. The SQE TEST ERROR is set in accordance with the rules for verification of the SQE detection mechanism in the PLS Carrier Sense Function as described in IEEE Std. 802.3, 2000 Edition, section 7.2.4.6.
Deferred Transmissions	A count of frames for which the first transmission attempt is delayed because the medium is busy.
Late Collisions	Counted times that a collision is detected later than one slotTime into the transmission of a packet.
Excessive Collisions	Counted frames for which transmission fails due to excessive collisions.
Internal MAC Tx Errors	Counted frames for which transmission fails due to an internal MAC sublayer transmit error.
Carrier Sense Errors	The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame.
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.

Symbol Errors	For an interface operating at 100 Mb/s, the number of times there was an invalid data symbol when a valid carrier was present.For an interface operating in half-duplex mode at 1000 Mb/s, the number of times the receiving media is non-idle (a carrier event) for a period of time equal to or greater than slotTime, and during which there was at least one occurrence of an event that causes the PHY to indicate 'Data reception error' or 'carrier extend error' on the GMII.For an interface operating in full-duplex mode at 1000 Mb/s, the number of times the receiving media is non-idle (a carrier event) for a period of time equal to or greater than minFrameSize, and during which there was at least one occurrence of an event that causes the PHY to indicate 'Data reception error' on the GMII.For an interface operating at 10 Gb/s, the number of times the receiving media is non-idle (a carrier event) for a period of time equal to or greater than minFrameSize, and during which there was at least one occurrence of an event that causes the PHY to indicate 'Receive Error' on the XGMII.
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.

show ports jumbo-frame

The **show ports jumbo-frame** User EXEC mode command displays the jumbo frames configuration.

Syntax

show ports jumbo-frame

Default Configuration

This command has no default configuration.

Command Modes

User EXEC mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays the jumbo frames configuration.

```
Console# show ports jumbo-frame
Jumbo frames are disabled
Jumbo frames will be enabled after reset
```

port storm-control include-multicast

The **port storm-control include-multicast** Global Configuration mode command enables the device to count multicast packets together with broadcast packets. To disable counting of multicast packets, use the **no** form of this command.

Syntax

port storm-control include-multicast

no port storm-control include-multicast

There are no arguments or keywords for this command.

Default Configuration

Multicast packets are not counted.

Command Modes

Global Configuration mode

User Guidelines

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

Example

The following example enables the counting of multicast packets.

```
Console# configure
Console(config)# port storm-control include-multicast
```

port storm-control broadcast enable

The **port storm-control broadcast enable** Interface Configuration 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 mode command, to set the maximum allowable broadcast rate.
- Multicast can be counted as part of the "storm" frames if the **port storm-control include-multicast** Global Configuration mode command is already executed.

Example

The following example enables broadcast storm control on port g5.

```
Console(config)# interface ethernet g5
Console(config-if)# port storm-control broadcast enable
```

port storm-control broadcast rate

The **port storm-control broadcast rate** Interface Configuration mode command configures the maximum broadcast rate. Use the **no** form of this command to return to the default value.

port storm-control broadcast rate *rate*

no port storm-control broadcast rate

- *rate*—Maximum kilobytes per second of broadcast and multicast traffic on a port. (Rate: 0-65535)

Default Configuration

The default storm control broadcast rate is 1000.

Command Mode

Global Configuration mode

User Guidelines

- Use the **port storm-control broadcast enable** Interface Configuration mode command to enable broadcast storm control.
- The granularity is 1 - 64K packets. Note that if the rate is 0, broadcast packets are not forwarded.

Example

The following example configures the maximum broadcast rate 10 kilobytes per second.

```
console(config)# interface ethernet g2
console(config-if)# port storm-control broadcast rate 10
```

show ports storm-control

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

Syntax

show ports storm-control [*interface*]

- *interface*—A valid Ethernet 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(config)# port storm-control broadcast rate 333
Console# show ports storm-control
Port                Broadcast Storm control [Packets/sec]
-----               -------------------------------------
g1                  333
g2                  Disabled
g3                  333
g4                  Disabled
g5                  Disabled
g6                  Disabled
g7                  Disabled
```

g8	Disabled
g9	Disabled
g10	Disabled
g11	Disabled
g12	Disabled
g13	Disabled
g14	Disabled
g15	Disabled
g16	Disabled
g17	Disabled
g18	Disabled
g19	Disabled
g20	Disabled
g21	Disabled
g22	Disabled
g23	Disabled
g24	Disabled

9

GVRP Commands

gvrp enable (global)

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

The **gvrp enable** Global Configuration mode command enables GVRP globally. To disable GVRP globally on the switch, 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 globally enables GVRP on the device.

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

gvrp enable (interface)

The **gvrp enable** Interface Configuration 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 by default.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- An access port would not dynamically join a VLAN because it is always a member in only one VLAN.
- Membership in an untagged VLAN would be propagated in a same way as a tagged VLAN. i.e. in such a case it's the administrator's responsibility to set the PVID to be the untagged VLAN VID.

Example

The following example enables GVRP on ethernet g8.

```
Console (config)# interface ethernet g8
Console (config-if)# gvrp enable
```

garp timer

The **garp timer** Interface Configuration mode command adjusts the GARP application join, leave, and leaveall GARP timer values. To reset the timer to default values, use the **no** form of this command.

Syntax

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

no garp timer

- **join**—Indicates the time in milliseconds that PDUs are transmitted. (Range: 10-2147483640)
- **leave**—Indicates the amount of time in milliseconds that the device waits before leaving its GARP state. The Leave Time is activated by a Leave All Time message sent/received, and cancelled by the Join message. (Range: 10-2147483640)
- **leaveall**—Used to confirm the port within the VLAN. The time in milliseconds between messages sent. (Range: 10-2147483640)
- *timer_value*—Timer values in milliseconds.

Default Configuration

The default timer values are as follows:

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

Command Mode

Interface configuration (Ethernet, port-channel) mode

User Guidelines

- The timer_value value must be a multiple of 10.
- You must maintain the following relationship for the various timer values:
  - ·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 the Layer 2-connected devices, GARP application will not operate successfully.

Example

The following example sets the leave timer for port g8 to 900 milliseconds.

```
Console (config)# interface ethernet g8
Console (config-if)# garp timer leave 900
```

gvrp vlan-creation-forbid

The **gvrp vlan-creation-forbid** Interface Configuration mode command enables or disables dynamic VLAN creation. To disable dynamic VLAN creation, use the **no** form of this command.

Syntax

gvrp vlan-creation-forbid

no gvrp vlan-creation-forbid

Default Configuration

By default, dynamic VLAN creation 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 port g8.

```
Console (config)# interface ethernet g8
Console (config-if)# gvrp vlan-creation-forbid
```

gvrp registration-forbid

The **gvrp registration-forbid** Interface Configuration mode command de-registers all dynamic VLANs, and prevents dynamic VLAN registration on the port. To allow dynamic registering for VLANs on a port, use the **no** form of this command.

Syntax

gvrp registration-forbid

no gvrp registration-forbid

Default Configuration

Dynamic registering and deregistering for each VLAN 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 shows how default dynamic registering and deregistering is forbidden for each VLAN on port g8.

```
Console (config)# interface ethernet g8
Console (config-if)# gvrp registration-forbid
```

clear gvrp statistics

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

Syntax

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

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

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 the GVRP statistics information on port g8.

```
Console# clear gvrp statistics ethernet g8
```

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*]

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

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 to display GVRP configuration information:

```
Console# show gvrp configuration

GVRP Feature is currently enabled on the switch.
Maximum VLANs: 256

Port(s)   GVRP-    Registration  Dynamic    Timers          Leave    Leave
          Status                 VLAN       (milliseconds)          All
                                 Creation   Join
-------   ------   ------------  --------   -------------   -----    -----
g1        Enabled  Normal        Enabled    200             600      10000
g4        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*]

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

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 statistics information:

```
Console# show gvrp statistics

GVRP statistics:
----------------
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
---   ---   ----  ----  ----  ---  ---  ---   ----  ----  ----  ---  ---
g1    0     0     0     0     0    0    0     0     0     0     0    0
g2    0     0     0     0     0    0    0     0     0     0     0    0
g3    0     0     0     0     0    0    0     0     0     0     0    0
g4    0     0     0     0     0    0    0     0     0     0     0    0
g5    0     0     0     0     0    0    0     0     0     0     0    0
g6    0     0     0     0     0    0    0     0     0     0     0    0
g7    0     0     0     0     0    0    0     0     0     0     0    0
g8    0     0     0     0     0    0    0     0     0     0     0    0
```

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*]

- *interface*—port.
- *port-channel-number*—A valid port-channel trunk index.

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 statistics information.

```
Console# show gvrp-error statistics

GVRP error statistics:
----------------------
Legend:
INVPROT  : Invalid Protocol Id      INVPLEN  : Invalid PDU Length
INVATYP  : Invalid Attribute Type   INVALEN  : Invalid Attribute Length
INVAVAL  : Invalid Attribute Value  INVEVENT : Invalid Event
Port      INVPROT        INVATYP     INVAVAL       INVALEN    INVEVENT
----      -------        -------     -------       -------    --------
g1        0              0           0             0          0
g2        0              0           0             0          0
g3        0              0           0             0          0
g4        0              0           0             0          0
g5        0              0           0             0          0
g6        0              0           0             0          0
g7        0              0           0             0          0
g8        0              0           0             0          0
```

10

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

- There are no user guidelines for this command.

Example

The following example enables IGMP snooping.

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

ip igmp snooping (Interface)

The **ip igmp snooping** Interface Configuration 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 on all VLANs in the set context.

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 mrouter

The **ip igmp snooping mrouter** Interface Configuration mode command enables automatic learning of multicast router ports in the context of a specific VLAN. To remove automatic learning of multicast router ports, use the **no** form of this command.

Syntax

ip igmp snooping mrouter learn-pim-dvmrp

no ip igmp snooping mrouter learn-pim-dvmrp

Default Configuration

Automatic learning of mrouter ports is enabled.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

- Multicast router ports can be configured statically by the **bridge multicast forward-all** command.

Example

The following example enables automatic learning of multicast router ports on VLANs.

```
Console (config) # interface vlan 2
Console (config-if)# ip igmp snooping mrouter learn-pim-dvmrp
```

ip igmp snooping host-time-out

The **ip igmp snooping host-time-out** Interface Configuration 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 reset to default host-time-out use the **no** form of this command.

Syntax

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

no ip igmp snooping host-time-out

- *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 mode command configures the mrouter-time-out. The **mrouter-time-out** command is used for setting the aging-out time after multicast router ports are automatically learned. To configure the default mrouter-time-out, use the **no** form of this command.

Syntax

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

no ip igmp snooping mrouter-time-out

- *time-out*—mrouter 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 mrouter 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** VLAN Interface Configuration mode command configures the leave-time-out. If an IGMP report for a multicast group is not received within the leave-time-out period after an IGMP leave was received from a specific port, the current port is deleted from the member list of that multicast group. To configure the default leave-time-out, 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

- *time-out*—leave-time-out in seconds. (Range: 0 - 2147483647)
- **immediate-leave**—Specifies 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 only 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*]

- *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

The following example shows IGMP snooping mrouter information.

```
Console # show ip igmp snooping mrouter

VLAN            Ports
----            ------
2               g1
```

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*

- *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

The example displays IGMP snooping information.

```
Console # show ip igmp snooping interface 1
IGMP Snooping is globaly disabled
IGMP Snooping is disabled on VLAN 1
IGMP host timeout is 260 sec
IGMP Immediate leave is disabled. IGMP leave timeout is 60 sec
IGMP mrouter timeout is 300 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 the multicast groups learned by IGMP snooping.

Syntax

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

- *vlan_id*—VLAN ID value.
- *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 address-table** command.

Example

The example shows IGMP snooping information.

```
Console # show ip igmp snooping groups

Vlan         IP Address           Querier        Ports
-----        ------------------   --------       ------------
1            224-239.130|2.2.3    Yes            g1, g2
19           224-239.130|2.2.8    Yes            g9-11
```

11

IP Addressing Commands

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* | *}

- name—Particular host entry to remove. (Range: 1 - 158 characters.)
- *— Removes all entries.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

- This command would delete the host name-to-address mapping temporarily until the next renew of the IP address.

Examples

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

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

ip address

The **ip address** Interface Configuration 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*]

- *ip-address*—IP address
- *mask*—Specifies the network mask of the IP address. (Range: Valid Subnet mask)

- *prefix-length*—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)

User Guidelines

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

Example

The following example configures VLAN 1 with the 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 mode command acquires an IP address on an interface from the Dynamic Host Configuration Protocol (DHCP) server. To deconfigure any acquired address, use the **no** form of this command.

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

Syntax

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

no ip address dhcp

- **hostname**—Specifies the host name.(Range: 1 - 20 characters)
- *host-name*—DHCP host name. This name need not be the same as the host name entered in global configuration mode.

Default Configuration

This command has no default configuration.

Command Mode

Interface configuration (Ethernet, VLAN, port-channel)

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 most typical usage of the **ip address dhcp hostname** *host-name* command is when *host-name* is the host name provided by the system administrator.
- If a 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 device globally configured host name.
- However, you can use the **ip address dhcp hostname** *host-name* command to place a different name in the DHCP option 12 field than the globally configured host name of the device.
- 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 on an Ethernet interface from DHCP.

```
Console (config)# interface ethernet g8
Console (config-if)# ip address dhcp
```

ip default-gateway

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

Syntax

ip default-gateway ip-address

no ip default-gateway

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

Default Configuration

No default gateway is defined.

Command Mode

Global configuration

User Guidelines

- There are no User Guidelines for this command.

Example

The following example defines an ip default gateway.

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

show ip interface

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

Syntax

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

- **ethernet** *interface-number*—port.
- **vlan** *vlan-id*—VLAN number.
- **port-channel** *number*—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 the displays the usability status of interfaces configured for IP.

```
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 i*p_addr hw_addr* {**ethernet** i*nterface-number* | **vlan** *vlan-id* | **port-channel** *number*}

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

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

Example

The following example adds the 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
g8
```

arp timeout

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

Syntax

arp timeout *seconds*

no arp timeout

- *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 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: 60000 Seconds

Interface      IP address        HW address          status
----------     ----------------  ------------------  --------
g1             10.7.1.102        00:10:B5:04:DB:4B   Dynamic
g2             10.7.1.135        00:50:22:00:2A:A4   Static
```

ip domain-lookup

The **ip domain-lookup** Global Configuration mode command enables the IP Domain Naming System (DNS)-based host name-to-address translation. To disable the DNS, use the **no** form of this command.

Syntax

ip domain-lookup

no ip domain-lookup

This command has no arguments or keywords.

Default Configuration

Enabled

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following example enables the IP Domain Naming System (DNS)-based host name-to-address translation.

```
Console (config)# ip domain-lookup
```

ip domain-name

The **ip domain-name** Global Configuration mode command defines a default domain name, that the software uses to complete unqualified host names (names without a dotted-decimal domain name). To disable use of the Domain Name System (DNS), use the **no** form of this command.

Syntax

ip domain-name *name*

no ip domain-name

- *name*—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

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 defines a default domain name of www.dell.com.

```
Console (config)# ip domain-name www.dell.com
```

ip name-server

The **ip name-server** Global Configuration mode command sets 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*]

- *server-address*—IP addresses of the name server. Up to 8 servers can be defined in one command or by using multiple commands.

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 they were entered.
- Up to 8 servers can be defined.

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 a 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*

- *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.

Examples

The following example defines a static host name-to-address mapping in the host cache.

```
Console (config)# ip host accounting.dell.com 176.10.23.1
```

clear host

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

Syntax

clear host {*name* | *}

- *name*—Particular host entry to remove. (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 entries from the host name-to-address cache.

```
Console (config)# clear host *
```

show hosts

The **show hosts** User 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*]

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

Default Configuration

Command Mode

User EXEC mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following example displays host information.

```
console> show hosts
Default domain is GM.COM
Name/address lookup is enabled
Name servers: 176.16.1.18 176.16.1.19
Static host name-to-address mapping:

Host                                    Addresses
----                                    ---------
www.dell.com                            176.16.8.8 176.16.8.9
Cache:
              TTL(Hours)
Host          Total           Elapsed   Type        Addresses
----          -----           ---------  ------     ---------
www.dell.com  72              3         IP          171.64.14.203
```

12

LACP Commands

lacp system-priority

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

Syntax

lacp system-priority *value*

no lacp system-priority

- *value*—Value of the priority. (Range: 1 - 65535)

Default Configuration

The default system priority value 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 mode command configures the priority value for physical ports. To reset to default priority value, use the **no** form of this command.

Syntax

lacp port-priority *value*

no lacp port-priority

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

Default Configuration

The default port priority value is 1.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example configures the priority value for port g8 to 247.

```
Console (config)# interface ethernet g8
Console (config-if)# lacp port-priority 247
```

lacp timeout

The **lacp timeout** Interface Configuration mode command assigns an administrative LACP timeout. To reset the default administrative LACP timeout use the **no** form of this command.

Syntax

lacp timeout {**long** | **short**}

no lacp timeout

- **long**—Specifies a long timeout value.
- **short**—Specifies a 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 an administrative LACP timeout for port g8 to a long timeout value.

```
Console (config)# interface ethernet g8
Console (config-if)# lacp timeout long
```

show lacp ethernet

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

Syntax

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

- *Interface*—Ethernet interface.

Default Configuration

This command has no default configuration.

Command Mode

Privilege EXEC mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example shows how to display LACP statistics information.

```
Console# show lacp ethernet g1 statistics

Port g1 LACP Statistics:

LACP PDUs sent:2


LACP PDUs received:2
```

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*]

- *port_channel_number*—The 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 shows how to display LACP port-channel information.

```
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
```

13

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**}

- **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.

Syntax

speed *bps*

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

Default Configuration

This default speed is 9600.

Command Mode

Line Configuration (console) mode

User Guidelines

- The configured speed would be applied when Autobaud is disabled.
- If Autobaud is disabled, the new speed is implemented immediately.

Examples

The following example sets the baud rate to 9600.

```
Console (config)# line console
Console(config-line)# speed 9600
```

autobaud

The **autobaud** Line Configuration mode command sets the line for automatic baud rate detection (autobaud). Use the **no** form of this command to disable automatic baud rate detection.

Syntax

autobaud

no autobaud

Default Configuration

Disabled

Command Mode

Line Configuration (console) mode

User Guidelines

- To start communications using automatic baud detection, press the Enter key twice.

Examples

The following example sets the line for automatic baud rate detection.

```
Console (config)# line console
Console(config-line)# autobaud
```

exec-timeout

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

Syntax

exec-timeout *minutes* [*seconds*]

no exec-timeout

- *minutes*—Integer that specifies the number of minutes. (Range: 0 - 65535)
- *seconds*—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 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
```

show line

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

Syntax

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

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

Default Configuration

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

Interactive timeout:  10 minutes

History:  10
```

terminal history

The **terminal history** EXEC mode 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

terminal no history

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

The command enables the command history for the current session. The default would be determined by the history line configuration command.

terminal history size

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

Syntax

terminal history size *number-of-commands*

terminal no history size

- *number-of-commands* - Number of commands the system records in the history buffer (Range: 1-0216).

Default Configuration

The default is determined by the history size line configuration command.

Command Mode

User EXEC mode

User Guidelines

The maximum for the sum of all buffers is 256.

14

LLDP Commands

lldp enable (global)

To **enable Link Layer Discovery Protocol (LLDP)**, use the **lldp enable** command in global configuration mode. To disable LLDP, use the **no** form of this command.

Syntax

lldp enable

no **lldp enable**

Default Configuration

The command is enabled.

Command Mode

Global configuration

User Guidlines

- There are no guidelines for this command.

Example

The following example enables Link Layer Discovery Protocol (LLDP) .

```
console (config)# lldp enable
```

lldp enable (interface)

To enable Link Layer Discovery Protocol (LLDP) on an interface, use the **lldp enable** command in interface configuration mode. To disable LLDP on an interface, use the **no** form of this command.

Syntax

lldp enable [rx | tx | both]

no **lldp enable**

- *rx* — Receive only LLDP packets.
- *tx* —Transmit only LLDP packets.
- *both* — Receive and transmit LLDP packets (default)

Default Configuration

Enabled in both modes.

Command Modes

Interface configuration (Ethernet)

User Guidelines

- LLDP manages LAG ports individually. LLDP sends separate advertisements on each port in a LAG. LLDP data received through LAG ports is stored individually per port.
- LLDP operation on a port is not dependent on STP state of a port. I.e. LLDP frames are sent and received on blocked ports. If a port is controlled by 802.1X, LLDP operates only if the port is authorized.

Examples

The following example enables Link Layer Discovery Protocol (LLDP) on an interface (g5).

```
Console(config)# interface ethernet g5
Console(config-if)# lldp enable
```

lldp timer

To specify how often the software sends Link Layer Discovery Protocol (LLDP) updates, use the **lldp timer command** in global configuration mode. To revert to the default setting, use the **no** form of this command.

Syntax

lldp timer seconds

no **lldp timer**

- *seconds* — Specifies in seconds how often the software sends LLDP update. (Range: 5 - 32768 seconds).

Default Configuration

Default - 30 seconds.

Command Modes

Global configuration

User Guidelines

- There are no user guidelines for this command.

Examples

The following example specifies how often the software sends Link Layer Discovery Protocol (LLDP) updates.

```
Console (config) # lldp timer
```

lldp hold-multiplier

To specify the amount of time the receiving device should hold a Link Layer Discovery Protocol (LLDP) packet before discarding it, use the **lldp hold-multiplier** command in global configuration mode. To revert to the default setting, use the **no** form of this command.

Syntax

lldp hold-multiplier number

no **lldp hold-multiplier**

- *number* — Specifies the hold time to be sent in the LLDP update packets as a multiple of the timer value (Range: 2-10).

Default Configuraiton

The default configuration is 4.

Command Modes

Global configuration

User Guidelines

- The actual time-to-live value used in LLDP frames can be expressed by the following formula: TTL = min(65535, LLDP-Timer * LLDP-HoldMultiplier). For example, if the value of LLDP timer is '30', and the value of the LLDP hold multiplier is '4', then the value '120' is encoded in the TTL field in the LLDP header.

Examples

The following example specifies how often the software sends Link Layer Discovery Protocol (LLDP) updates.

```
Console (config) # lldp hold-multiplier 6
```

lldp reinit-delay

To specify the minimum time an LLDP port will wait before reinitializing LLDP transmission, use the **lldp reinit-delay** command in global configuration mode. To revert to the default setting, use the **no** form of this command.

Syntax

lldp reinit-delay seconds

no **lldp reinit-delay**

- seconds — Specifies the minimum time in seconds an LLDP port will wait before reinitializing LLDP transmission. (Range 1-10 seconds).

Default Configuraiton

2 seconds

Command Modes

Global configuration

User Guidelines

There are no user guidelines for this command.

Examples

The following example specifies the minimum time an LLDP port will wait before reinitializing LLDP transmission.

```
Console (config) # lldp reinit-delay 6
```

lldp tx-delay

To specify the delay between successive LLDP frame transmissions initiated by value/status changes in the LLDP local systems MIB, use the **lldp tx-delay** command in global configuration mode. To revert to the default setting, use the **no** form of this command.

Syntax

lldp tx-delay seconds

no **lldp tx-delay**

Parameters

- *seconds* — Specifies the delay in seconds between successive LLDP frame transmissions initiated by value/status changes in the LLDP local systems MIB. Range 1-8192 second.

Default Configuration

The default value is 2 seconds

Command Modes

Global configuration

Usage Guidelines

- It is recommended that the TxDelay would be less than 0.25 of the LLDP timer interval.

Examples

The following example specifies the delay between successive LLDP frame transmissions initiated by value/status changes in the LLDP local systems MIB.

```
Console (config) # lldp tx-delay 7
```

lldp optional-tlv

To specify which optional TLVs from the basic set should be transmitted, use the **lldp optional-tlv** command in interface configuration mode. To revert to the default setting, use the **no** form of this command.

Syntax

lldp optional-tlv tlv1 [tlv2 … tlv5]

no **lldp optional-tlv**

- *tlv* — Specifies TLV that should be included. Available optional TLVs are: port-desc, sys-name, sys-desc and sys-cap . (Range 1-8192 seconds).

Default Configuration

No optional TLV is transmitted.

Command Modes

Interface configuration (Ethernet)

User Guidelines

- There are no user guidelines for this command.

Example

The following example specifies which optional TLV (2)s from the basic set should be transmitted.

```
Console(config)# interface ethernet g5
Console(config-if)# lldp optional-tlv sys-name
```

lldp management-address

To specify the management address that would be advertised from an interface, use the **lldp management-address** command in interface configuration mode. To stop advertising management address information, use the **no** form of this command.

Syntax

lldp management-address ip-address

no management-address ip

- *ip-address* — Specifies the management address to advertise.

Default Configuration

No IP address is advertised.

Command Modes

Interface configuration (Ethernet)

User Guidelines

- Each port can advertise one IP address.
- Only static IP addresses can be advertised.

Example

The following example specifies management address that would be advertised from an interface.

```
Console(config)# interface ethernet g5
Console(config-if)# lldp management-address 192.168.0.1
```

clear lldp rx

To restart the LLDP RX state machine and clearing the neighbors table, use the **clear lldp rx** command in privileged EXEC mode.

Syntax

clear lldp rx [ethernet interface]

- *Interface* — Ethernet port

Command Modes

Privileged EXEC

User Guidelines

- There are no user guidelines for this command.

Example

The folowing example restarts the LLDP RX state machine and clearing the neighbors table.

```
console (config)#clear lldp rx
```

show lldp configuration

To display the Link Layer Discovery Protocol (LLDP) configuration, use the **show lldp configuration** command in privileged EXEC mode.

Syntax

show lldp configuration [ethernet interface]

- *Interface* — Ethernet port

Command Modes

Privileged EXEC

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays the Link Layer Discovery Protocol (LLDP) configuration

```
Switch# show lldp configuration


Timer: 30 Seconds

Hold multiplier: 4

Reinit delay: 2 Seconds

Tx delay: 2 Seconds


Port     State      Optional TLVs      Addres
g1       RX, TX     PD, SN, SD, SC     172.16.1.1
g2       TX         PD, SN             172.16.1.1
g3       Disabled
```

show lldp local

To display the Link Layer Discovery Protocol (LLDP) information that is advertised from a specific port, use the **show lldp local** command in privileged EXEC mode.

Syntax

show lldp local ethernet interface

- *Interface* — Ethernet port

Command Modes

Privileged EXEC

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays the Link Layer Discovery Protocol (LLDP) information that is advertised from a specific port.

```
Switch# show lldp local ethernet g1
Device ID: 0060.704C.73FF
Port ID: 1
Capabilities: Bridge
System Name: ts-7800-1
System description:
Port description:
Management address: 172.16.1.8
```

show lldp neighbors

To display information about neighboring devices discovered using Link Layer Discovery Protocol (LLDP), use the **show lldp neighbors** command in privileged EXEC mode.

Syntax

show lldp neighbors [ethernet interface]

- *Interface* — Ethernet port

Command Modes

Privileged EXEC

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays information about neighboring devices discovered using Link Layer Discovery Protocol (LLDP).

Switch# **show lldp neighbors**

Port	Device ID	Port ID	Hold Time	Capabilities	System Name
g1	0060.704C.73FE	1	117	B	ts-7800-2
g1	0060.704C.73FD	1	93	B	ts-7800-2
g2	0060.704C.73F C	9	1	B, R	ts-7900-1
g3	0060.704C.73FB	1	92	W	ts-7900-2

Switch# **show lldp neighbors ethernet g1**

Device ID: 0060.704C.73FE

Port ID: 1

Hold Time: 117

Capabilities: B

System Name: ts-7800-2

System description:

Port description:

Management address: 172.16.1.1

15

Management ACL

management access-list

The **management access-list** Global Configuration mode command defines an access-list for management, and enters the access-list for configuration. Once in the access-list configuration mode, the denied or permitted access conditions are configured with the **deny** and **permit** commands. To remove an access list, use the **no** form of this command.

Syntax

management access-list *name*

no management access-list *name*

- *name*—The access list name using up to 32 characters.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

- This command enters the access-list configuration mode, where the denied or permitted access conditions with the **deny** and **permit** commands must be defined.
- If no match criteria are defined the default is "deny".
- If reentering to an access-list context, the new rules are entered at the end of the access-list.
- Use the m**anagement 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 (valid IFindex). A valid management interface is an interface with an IP address. A valid (IFindex) management interface can be a single port, vlan or port-channel. Management ACL only restricts access to the device for management configuration or viewing.

Examples

The following example shows how to create an access-list called "mlist", configure two management interfaces ethernet g1 and ethernet g9, and make the access-list the active list.

```
Console (config)# management access-list mlist
Console (config-macl)# permit ethernet g1
Console (config-macl)# permit ethernet g9
Console (config-macl)# exit
Console (config)# management access-class mlist
```

The following example shows how to create an access-list called "mlist", configure all interfaces to be management interfaces except interfaces ethernet g1 and ethernet g9, and make the access-list the active list.

```
Console (config)# management access-list mlist
Console (config-macl)# deny ethernet g1
Console (config-macl)# deny ethernet g9
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** *number*] [**service** *service*]

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

- **ethernet** *interface-number*—A valid Ethernet port number.
- **vlan** *vlan-id*—A valid VLAN number.
- **port-channel** *number*—A valid port channel number.
- *ip-address*—Source IP address.(Range: Valid IP Address)
- **mask** *mask*—Specifies the network mask of the source IP address. (Range: Valid subnet mask)

- **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)
- **service** *service*—Indicates service type. Can be one of the following: **telnet**, **ssh**, **http, https** or **snmp**.

Default Configuration

If no **permit** statement is present, 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 256 management access rules.

Example

The following example shows how all ports are permitted in the access-list called "mlist".

```
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** *number*] [**service** *service*]

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

- **ethernet** *interface-number*—A valid Ethernet port number.
- **vlan** *vlan-id*—A valid VLAN number.
- **port-channel** *number*—A valid port-channel number.
- *ip-address*—Source IP address. (Range: Valid IP Address)
- **mask** *mask*—Specifies the network mask of the source IP address. (Range: Valid subnet mask)
- **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)

- **service** *service*—Indicates service type. Can be one of the following: **telnet**, **ssh**, **http, https** or **snmp**.

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 256 management access rules.

Example

The following example shows how all ports are denied 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 defines which management access-list is used. To disable restriction, use the **no** form of this command.

Syntax

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

no management access-class

- *name*—Name of the access list. If unspecified, defaults to an empty access-list.(Range: 1 - 32 characters)
- **console-only**—The device can be managed only from the console.

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 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*]

- *name*—Name of the access list. If unspecified, defaults to an empty 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 active management access-list.

```
Console# show management access-list
mlist
-----
permit ethernet g1
permit ethernet g9
! (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 the management access-list information.

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

16

PHY Diagnostics Commands

test copper-port tdr

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

Syntax

test copper-port tdr *interface*

- *interface*—A valid Ethernet port.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

- The port under test should be conducted when the fiber link is down.

NOTE: The maximum distance VCT can function is 120 meters.

Examples

The following example results in a report on the cable attached to port g3.

```
Console# test copper-port tdr g3
Cable is open at 100 meters
```

show copper-ports tdr

The **show copper-ports tdr** Privileged EXEC mode command display the last TDR (Time Domain Reflectometry) tests on specified ports.

Syntax

show copper-ports tdr [*interface*]

- *interface*—A valid Ethernet 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 last TDR (Time Domain Reflectometry) tests on all ports.

```
Console# show copper-ports tdr


Port    Result                        Length       Date
                                      [meters]
----    -------                       --------     -----
g1      OK
g2      Short                         50           13:32:00 23 July 2003
g3      Test has not been performed
g4      Short                         128          13:32:00 23 July 2003
g5      Fiber                         -            -
```

show copper-ports cable-length

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

Syntax

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

- *interface*—A valid Ethernet port.

Default Configuration

This command has no default configuration.

Command Mode

Privileged EXEC mode

User Guidelines

- The port must be active and working in 1000M.

Example

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

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

Port         Length [meters]
----         ---------------------
g1           < 50
g2           Giga link not active
g3           110-140
```

show fiber-ports optical-transceiver

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

Syntax

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

- *interface*—A valid Ethernet 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 up. The test is only supported on Dell supported SFP modules.

Examples

The following example displays the optical transceiver diagnostics.

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

Port  Temp    Voltage     Current     Output     Input     LOS
                          Power       Power      Power
----  -----   -------     ------      ------     ------    ---
g3    Copper
g21   W       OK          E           OK         OK        OK
g22   OK      OK          OK          OK         OK        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.
LOS – Loss of signal
```

The following example displays detailed optical transceiver diagnostics.

```
console# show fiber-ports optical-transceiver detailed


Port  Temp    Voltage  Current  Output   Input    LOS
      [C]     [Volt]   [mA]     Power    Power
                                [mWatt   [mWatt]
                                ]
----  -----   -------  ------   ------   ------   ---
g23   70      7.27     0.79     3.30     2.50     No
g21   70      7.24     0.78     2.20     2.49     No

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.
LOS – Loss of signal
```

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Port Channel Commands

interface port-channel

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

Syntax

interface port-channel *port-channel-number*

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

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

- Eight aggregated links can be defined with up to 8 member ports per port channel.Turning off auto-negotiation of an aggregate link may, under some circumstances, make it non-operational. If the other side has auto-negotiation turned on, it may re-synchronize all members of the aggregated link to half-duplex operation, and may, as per the standards, set them all to inactive.

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*}

- *port-channel-range*—List of port-channels to configure. Separate non-consecutive port-channels with a comma and no spaces. A hyphen designates a range of port-channels.
- **all**—All the channel-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 interface in the range: If the command returns an error on one of the interfaces, it will not stop the execution of the command on other interfaces.

Example

The following example shows how port-channels 1, 2 and 8 are grouped to receive the same command.

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

channel-group

The **channel-group** Interface Configuration 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

- *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.
- **auto**—Allows the port to join a channel as a result of an LACP operation.

Default Configuration

The port is not assigned to any port-channel.

Command Mode

Interface Configuration (Ethernet) mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example shows how port g5 is configured to port-channel number 1 without LACP.

```
Console (config)# interface ethernet g5
Console (config-if)# channel-group 1 mode on
```

port channel load balance

Use the **port-channel load-balance** global configuration command to configure the load balancing policy of the port channeling. Use the **no** form of this command to reset to default.

Syntax

port-channel load-balance {layer-2 | layer-2-3 | layer-2-3-4}

no port-channel load-balance

- *layer-2* — Port channel load balancing is based on layer 2 parameters.
- *layer-2-3* — Port channel load balancing is based on layer 2 and layer 3 parameters.
- *layer-2-3-4* — Port channel load balancing is based on layer 2, layer 3 and layer 4 parameters.

Default Configuration

Layer 2

Command Modes

Global Configuration

User Guidelines

- In L2+L3+L4 load balancing policy, fragmented packets might be reordered.

Example

The following example configures the load balancing policy of the port channeling on layer 2.

```
Console (config) # port-channel load-balance layer-2
```

show interfaces port-channel

Use the **show interfaces port-channel** global configuration command to show Port channel information.

Syntax

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

- *port_channel_number* — Number of the Port channel to display. (Range: Valid port channel)

Default Configuration

This command has no default configuration.

Command Modes

EXEC

User Guidelines

- There are no user guidelines for this command.

Example

The following example shows how all port channel information is displayed.

```
Console# show interfaces port-channel

Load balancing: Layer2 and Layer 3.

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

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*

- *src-interface*—Valid Ethernet port or port-channel number.
- **rx**—Monitors received packets only. If no option specified, monitors both rx and tx.
- **tx**—Monitors transmitted packets only. If no option specified, monitors both rx and tx.

Default Configuration

The default is both **rx** and **tx**.

Command Mode

Interface Configuration 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 (the port being configured). Only a single target port can be defined per system.
- The port being monitored cannot be set faster than the monitoring port.
- The following restrictions apply to ports configured to be 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 in any 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:
  - Port monitoring Source Ports must be simple ports, and not port-channels.
  - The port cannot be already configured as a destination port.
  - All the frames are transmitted as either always tagged or always untagged.

General Restrictions:

- Ports cannot be configured as a group using the **interface range ethernet** command.

NOTE: The Port Mirroring target must be a member of the Ingress VLAN of all Mirroring source ports. Therefore, multicast and broadcast frames in these VLANs are seen more than once. (Actually N, where N is the number of mirroring source ports).

When both transmit (Tx) and receive (Rx) directions of more than one port are monitored, the capacity may exceed the bandwidth of the target port. In this case, the division of the monitored packets may not be equal. The user is advised to use caution in assigning port monitoring.

Example

The following example shows how traffic on port g8 (source port) is copied to port g1 (destination port).

```
Console(config)# interface ethernet g1
Console(config-if)# port monitor g8
```

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 copy status is displayed.

```
Console# show ports monitor

Source      Destination Port  Type          Status
Port
----------  ----------------  ------------  -------
g1          g8                RX, TX        Active
g2          g8                RX, TX        Active
g18         g8                Rx            Active
```

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QoS Commands

qos

The **qos** Global Configuration mode command enables quality of service (QoS) on the device and enters QoS basic mode. Use the **no** form of this command to disable the QoS features on the device.

Syntax

qos

no qos

Default Configuration

There is no default configuration for this command.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example shows how QoS is enabled on the device, in basic mode.

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

show qos

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

Syntax

show qos

This command has no arguments or keywords.

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 a QoS mode.

```
Console# show qos
Trust: dscp


Console# show qos
Qos: disabled
Trust: dscp
```

wrr-queue cos-map

The **wrr-queue cos-map** Global Configuration mode command maps assigned CoS values to select one of the egress queues. To return to the default values, use the **no** form of this command.

Syntax

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

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

- *queue-id*—The queue number to which the following CoS values are mapped.
- *cos1...cos8*—Map to specific queues up to eight CoS values from 0 to 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

- You can use this command to distribute traffic into different queues, where each queue is configured with different weighted round robin (WRR) parameters.
- To enable the expedite queues, use the **priority-queue out** Interface Configuration mode command **wrr-queue cos-map**.

Example

The following example maps CoS 3 to queue 4.

```
Console (config)# wrr-queue cos-map 4 3
```

wrr-queue bandwidth

The **wrr-queue bandwidth** Interface Configuration mode command assigns Weighted Round Robin (WRR) weights to egress queues. The weights ratio determines the frequency in which the packet scheduler dequeues packets from each queue. To return to the default values, use the **no** form of this command.

Syntax

wrr-queue bandwidth *weight1 weight2 ... weight_4*

no wrr-queue bandwidth

- *weight1...weight_4*—Sets the bandwidth ratio by the WRR packet scheduler for the packet queues. Separate each value by spaces. (Range: 6 - 255)

Default Configuration

The default WRR weight is 1/4 ratio for all queues (each weight set to 6).

Command Mode

Interface Configuration (Ethernet, port channel) mode

User Guidelines

- The ratio for each queue is defined by the queue weight divided by the sum of all queue weights (i.e., the normalized weight). This actually sets the bandwidth allocation of each queue.
- A weight of 0 means no bandwidth is allocated for the same queue, and the share bandwidth is divided among the remaining queues.
- All 4 queues are participating excluding the queues that are assigned as expedite queues. The weights of these queues are ignored in the ratio calculation.
- All 4 queues participate in the WRR exclude the expedite queues, in which case the corresponded weight is ignored (not used in the ratio calculation). The expedite queue is a priority queue, and it is serviced until empty before the other queues are serviced.

Example

The following example assigns WRR weights to egress queues.

```
Console(config)# priority-queue num-of-queues 1
Console(config)# interface ethernet g1
Console(config-if)# wrr-queue bandwidth 20 30 50

Console(config)# priority-queue num-of-queues 0
Console(config)# interface ethernet g3
Console(config-if)# wrr-queue bandwidth 20 30 50 10
```

priority-queue out num-of-queues

The **priority-queue out num-of-queues** Global Configuration mode command enables the egress queues to be expedite queues. Use the **no** form of this command to return to the default values.

Syntax

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

no priority-queue out num-of-queues

- *number-of-queues*—Assign the number of queues to be expedite queues. The expedite queues would be the queues with higher indexes. (Range: 1 - 4)

Default Configuration

All queues are expedite queues.

Command Mode

Global Configuration mode

User Guidelines

- When configuring the **priority-queue out num-of-queues** command, the weighted round robin (WRR) weight ratios are affected because there are fewer queues participating in WRR.
- Queue 4 is taken as the highest index queue. Queue 3 is taken as the next highest queue. If two priority queues are selected then queue 4 and 3 will be used. Leaving queue 2 and 1 for WRR.

Example

The following example sets queue 4, 3 to be expedite queues.

```
Console (config)# priority-queue out num-of-queues 2
```

show qos interface

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

Syntax

show qos interface [**ethernet** *interface-number* | **queuing**]

- **ethernet** *interface-number*—Ethernet port number.
- **queuing**—Displays 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 with the show qos interface command, the port QoS mode (DSCP trusted, CoS trusted, untrusted), default CoS value, attached to the port, attached to the interface are displayed. If a specific interface is not specified, the information for all interfaces is displayed.

Examples

The following example displays output from the **show qos interface g1 queueing** command.

```
Console# show qos interface ethernet g1 queuing
Ethernet   g1
wrr bandwidth weights and EF priority:

qid       weights          Ef          Priority
1         125              dis         N/A
2         125              dis         N/A
3         125              dis         N/A
4         125              dis         N/A

Cos-queue map:
cos       qid
0         2
1         1
2         1
3         2
4         3
5         3
6         4
7         4
```

qos map dscp-queue

The **qos map dscp-queue** Global Configuration mode command modifies the DSCP to queue 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

- *dscp-list*—Specify up to 8 DSCP values, separate each DSCP with a space. (Range: 0 - 63)
- *queue-id*—Enter the queue number to which the DSCP value corresponds.

Default Configuration

The following table describes the default map.

DSCP value	0-15	16-31	32-47	48-63
Queue-ID	1	2	3	4

Command Mode

Global Configuration mode

User Guidelines

- Queue settings for 3, 11, 19, ... cannot be modified.

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 can be used to configure the system to "trust" state. To return to the default state, use the **no** form of this command.

Syntax

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

no qos trust

- **cos**—Classifies ingress packets with the packet CoS values. For untagged packets, the port default CoS is used.
- **dscp**—Classifies ingress packets with the 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 the 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 switch within the domain.

- Use this command to specify whether the port is trusted and which fields of the packet to use to classify traffic.
- To return to the untrusted state, use the **no qos** command to apply best effort service.

Example

The following example configures the system to DSCP trust state.

```
Console (config)# qos trust dscp
```

qos trust (Interface)

The **qos trust** Interface Configuration mode command enables each port trust state. To disable the trust state on each port, use the **no** form of this command.

Syntax

qos trust

no qos trust

Default Configuration

Each port is enabled while the system is operational.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- Use **no qos trust** to disable the trust mode on each port.

  Use **qos trust** to enable trust mode on each port.

Example

The following example configures port g5 to default trust state (CoS).

```
Console (config)# interface ethernet g5
Console (config-if) qos trust
```

qos cos

The **qos cos** Interface Configuration mode command configures the default port CoS value. To return to the default setting, use the **no** form of this command.

Syntax

qos cos *default-cos*

no qos cos

- *default-cos*—Specifies the default CoS value being assigned to the port. If the port is trusted and the packet is untagged then the default CoS value becomes the CoS value. (Range: 0 - 7)

Default Configuration

Port CoS is 0.

Command Mode

Interface Configuration (Ethernet, port-channel) command

User Guidelines

- You can use the default value to assign a CoS value to all untagged packets entering the port.

Example

The following example configures port g5 default CoS value to 3.

```
Console (config)# interface ethernet g5
Console (config-if) qos cos 3
```

show qos map

The show qos map User EXEC mode command displays all the QoS maps.

Syntax

show qos map [**dscp-queue**]

- **dscp-queue**—Displays 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 fields used above.

Column	Description
D1	Decimal Bit 1 of DSCP
D2	Decimal Bit 2 of DSCP
01 - 04	Queue numbers

(D1 x 10) + D2 = Value of DSCP

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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** *retransmit*] [**deadtime** *deadtime*] [**key** *key*] [**source** *source*] [**priority** *priority*] [**usage** *type*]

no radius-server host *ip-address*

- *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 set to 0. If unspecified, the port number defaults to 1812. (Range: 0 - 65535)
- *timeout*—Specifies the timeout value in seconds. If no timeout value is specified, the global value is used. (Range: 1 - 30)
- *retransmit*—Specifies the re-transmit value. If no re-transmit value is specified, the global value is used. (Range: 1 - 10)
- *deadtime*—Length of time, in minutes, for which a RADIUS server is skipped over by transaction requests. (Range 0 - 2000)
- *key*—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. If no key value is specified, the global value is used. (Range: 1 - 128 characters)
- *source*—Specifies the source IP address to use for the communication. If no retransmit value is specified, the global value is used. 0.0.0.0 is interpreted as request to use the IP address of the outgoing IP interface.
- *priority*—Determines the order in which the servers are used, where 0 is the highest priority. (Range: 0 - 65535)
- *type*—Specifies the usage type of the server. Can be one of the following values: **login**, **802.1x** or **all**. If unspecified, defaults to **all**.

Default Configuration

By default, no RADIUS host is specified.

Command Mode

Global Configuration mode

User Guidelines

- To specify multiple hosts, multiple **radius-server host** commands can be used.
- If no host-specific timeout, retransmit, deadtime or key values are specified, the global values apply to each 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 the following characteristics:

- Server host IP address—192.168.10.1
- Authentication port number—20
- Timeout period—20 seconds

```
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 reset to the default, use the **no** form of this command.

Syntax

radius-server key *[key-string]*

no radius-server key

- *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. The key can be up to 128 characters long.

Default Configuration

The default 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 to "dell-server".

```
Console (config)# radius-server key dell-server
```

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

- *retries*—Specifies the retransmit value. (Range: 1 - 10)

Default Configuration

The default is 3 attempts.

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 attempts.

```
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, use the **no** form of this command.

Syntax

radius-server source-ip *source*

no radius-server-ip *source*

- *source*—Specifies the source IP address.

Default Configuration

The default IP address is 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 for which a device waits for a server host to reply. To restore the default, use the **no** form of this command.

Syntax

radius-server timeout *timeout*

no radius-server timeout

- *timeout*—Specifies the timeout value in seconds. (Range: 1 - 30)

Default Configuration

The default value is 3 seconds.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example sets the interval for which a device waits for a server host to reply to 5 seconds.

```
Console (config)# radius-server timeout 5
```

radius-server deadtime

The **radius-server deadtime** Global Configuration mode command improves RADIUS response times when servers are unavailable. The command is used to cause the unavailable servers to be skipped. To reset the default value, use the **no** form of this command.

Syntax

radius-server deadtime *deadtime*

no radius-server deadtime

- *deadtime*—Length of time in minutes, for which a RADIUS server is skipped over by transaction requests. (Range: 0 - 2000)

Default Configuration

The default dead time is 0 minutes.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example sets a dead time where a RADIUS server is skipped over by transaction requests for this period, to 10 minutes.

```
Console (config)# radius-server deadtime 10
```

show radius-servers

The show radius-servers User 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 the RADIUS server settings.

```
Console# show radius-servers

IP address  Port     Time     Retransmit   Dead     Source    Priority  Usage
            Auth     Out                   time     IP
---------   ----     -----    ----------   ------   -----     -------   -----
172.16.1.1  1645     Global   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
```

21

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*}

- *interface*—Valid Ethernet port.
- *port-channel-number*—Valid port-channel trunk index.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

- The following RMON Groups are supported - Ethernet Statistics (Group1), History (Group 2), Alarms (Group 3) and Events (Group 4).

Example

The following example displays RMON Ethernet Statistics for port g1.

```
Console# show rmon statistics ethernet g1
Port g1
Dropped: 8
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 the significant fields shown in the display:

Field	Description
Dropped	The total number of events in which packets are dropped by the probe due to lack of resources. This number is not always the number of packets dropped; it is the number of times this condition has been detected.
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).
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).
Collisions	The best estimate of the total number of collisions on this Ethernet segment.
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 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*

- *index*—The requested statistics index group. (Range: 1 - 65535)
- **owner** *ownername*—Records the RMON statistics group owner name. If unspecified, the name is an empty string.
- **buckets** *bucket-number*—A value associated with the number of buckets specified for the RMON collection history group of statistics. If unspecified, defaults to 50. (Range: 1 - 65535)
- **interval** *seconds*—The number of seconds in each polling cycle. If unspecified, defaults to 1800. (Range: 1 - 3600)

Default Configuration

This command has no default configuration.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- This command cannot be executed on multiple ports using the **interface range ethernet** command.

Example

The following example enables a Remote Monitoring (RMON) MIB history statistics group on port g8 with the index number "1" and a polling interval period of 2400 seconds.

```
Console (config)# interface ethernet g8
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 history group configuration.

Syntax

show rmon collection history [**ethernet** *interface* | **port-channel** *port-channel-number*]

- *interface*—Valid Ethernet port.
- *port-channel-number*—Valid port-channel trunk index.

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 group statistics.

```
Console# show rmon collection history

Index   Interface   Interval  Requested   Granted     Owner
                              Samples     Samples
------  ----------  --------  ---------   ----------  ----
1       1           1000      50          50          CLI
```

The following table describes the significant fields shown in the display:

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 Statistics history.

Syntax

show rmon history *index* {**throughput** | **errors** | **other**} [**period** *seconds*]

- *index*—The requested set of samples. (Range: 1 - 65535)
- **throughput**—Displays throughput counters.
- **errors**—Displays error counters.
- **other**—Displays drop and collision counters.
- **period** *seconds*—Specifies the requested period time to display. (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 example displays RMON Ethernet Statistics history for "throughput" on index number 5.

```
Console# show rmon history 5 throughput
Sample Set: 1                    Owner: CLI
Interface: g1                    Interval: 1800
Requested samples: 50            Granted samples: 50

Maximum table size: 500

Time                  Octets     Packets  Broadcast    Multicast    %
------------------    ---------  -------  ----------   ---------    -----
Jan 18 2002 21:57:00  303595962  357568   3289         7287         19.98%
Jan 18 2002 21:57:30  287696304  275686   2789         2789         20.17%
```

The following example displays RMON Ethernet Statistics history for "errors" on index number 5.

```
Console# show rmon history 5 errors
Sample Set: 1                     Owner: CLI
Interface: g1                     Interval: 1800
Requested samples: 50             Granted samples: 50

Maximum table size: 500

Time                  CRC Align  Undersize  Oversize  Fragments  Jabbers
------------------    ---------  ---------  --------  ---------  -------
Jan 18 2002 21:57:00  1          1          49        0          0
Jan 18 2002 21:57:30  1          1          27        0          0
```

The following example displays RMON Ethernet Statistics history for "other" on index number 5.

```
Console# show rmon history 5 other
Sample Set: 1                 Owner: CLI
Interface: g1                 Interval: 1800
Requested samples: 50         Granted samples: 50

Maximum table size: 500

Time                 Dropped   Collisions
-------------------  --------  ---------
Jan 18 2002          3         0
21:57:00
Jan 18 2002          3         0
21:57:30
```

The following table describes the significant fields shown in the display:

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.
Utilization%	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*

- *index*—The alarm index. (Range: 1 - 65535)
- *variable*—The object identifier of the particular variable to be sampled.
- *interval*—The interval in seconds over which the data is sampled and compared with the rising and falling thresholds. (Range: 1 - 2147483648)
- *rthreshold*—Rising Threshold. (Range: 1 - 4294967295)
- *fthreshold*—Falling Threshold. (Range: 1 - 4294967295)
- *revent*—The Event index used when a rising threshold is crossed.(Range: 1 - 65535)
- *fevent*—The Event index used when a falling threshold is crossed. (Range: 1 - 65535)

- **type** *type*—The sampling method for the selected variable and calculating the value to be compared against the thresholds. 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 at the last sample is subtracted from the current value, and the difference compared with the thresholds.
- **startup** *direction*—The alarm that may be sent when this entry is first set to valid. If the first sample (after this entry becomes valid) is greater than or equal to the *rthreshold*, and *direction* is equal to **rising** or **rising-falling**, then a single rising alarm is generated. If the first sample (after this entry becomes valid) is less than or equal to the *fthreshold*, and *direction* is equal to **falling** or **rising-falling**, then a single falling alarm is generated.
- **owner** *name*—Enter a name that specifies who configured this alarm. If unspecified, the name is an empty string.

Default Configuration

The following parameters have the following default values:

- **type** *type*—If unspecified, the type is **absolute**.
- **startup** *direction*—If unspecified, 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
- Variable identifier—dell
- Sample interval—360000 seconds
- Rising threshold—1000000
- Falling threshold—1000000
- Rising threshold event index—10
- Falling threshold event index—20

```
Console (config)# rmon alarm 1000 dell 360000 1000000 1000000 10
20
```

show rmon alarm-table

The **show rmon alarm-table** User EXEC mode command displays the alarms summary 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 summary 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 the significant fields shown in the display:

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*

- *number*—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
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.
Alarm	Alarm index.
Owner	The entity that configured this entry.

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.

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*

- *index*—The event index. (Range: 1 - 65535)
- *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** *text*—If an SNMP trap is to be sent, it is sent to the SNMP community specified by this octet string. (Range: 0-127 characters)
- **description** *text*—A comment describing this event. (Range: 0-127 characters)
- **owner** *name*—Enter a name that specifies who configured this event. If unspecified, the name is an empty string. (Range: 0-127 characters)

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 an event with the trap index of 10.

```
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          Log-Trap  device     Manager  Jan 18 2002 23:59:48
         Broadcast
```

The following table describes the significant fields shown in the display:

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 logging table.

Syntax

show rmon log [*event*]

- *event*—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 logging 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 created.

rmon table-size

The **rmon table-size** Global Configuration mode command configures the maximum RMON tables sizes. 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**}

- **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 is effective after the device is rebooted.

Example

The following example configures the maximum RMON history table sizes to 1000 entries.

```
Console (config)# rmon table-size history 1000
```

22

SNMP Commands

snmp-server community

Use the **snmp-server community** command to set up the community access string to permit access to the Simple Network Management Protocol command. Use the **no** form of this command removes the specified community string.

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*]

- *community* — Community string that acts like a password and permits access to the SNMP protocol. (Range :1- 20 chars)
- **ro** — Specifies read-only access (Default)
- **rw** — Specifies read-write access
- **su** — Specifies SNMP administrator access
- **view** *view-name* — Name of a previously defined view. The view defines the objects available to the community. It's not relevant for **su**, which has an access to the whole MIB. If unspecified, all the objects except of the community-table and SNMPv3 user and access tables are available. (Range: 1- 30 chars)
- *ip-address* — Management station IP address. Default is all IP addresses. An out-of-band IP address can be specified as described in the usage guidelines. (Range: Valid IP address)
- *group-name* — Name of a previously defined group. The group defines the objects available to the community. (Range :1- 30 chars)

Default Configuration

There are no default communities defined.

Command Mode

Global Configuration mode

User Guidelines

- You can't specify view-name for **su**, which has an access to the whole MIB.
- You can use the *view-name* to restrict the access rights of a community string. By specifying the *view-name* parameter the software:

  1 Generates an internal security-name.

2 Map the internal security-name for SNMPv1 and SNMPv2 security models to an internal group-name.

3 Map the internal group-name for SNMPv1 and SNMPv2 security models to *view-name* (read-view and notify-view always, and for **rw** for write-view also)

- You can use the *group-name* to restrict the access rights of a community string. By specifying the *group-name* parameter the software:

  1 Generates an internal security-name.

  2 Map the internal security-name for SNMPv1 and SNMPv2 security models to the *group-name*.

Examples

The following example sets up the community access string "public" to permit administrative access to SNMP protocol, at an administrative station with the IP address 192.168.1.20.

```
Console (config)# snmp-server community public su 192.168.1.20
```

snmp-server view

To create or update a view entry, use the **snmp-server view** global configuration command. To remove the specified Simple Network Management Protocol (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*]

- *view-name* — Label for the view record that you are updating or creating. The name is used to reference the record. (Range:1 - 30 chars)
- *oid-tree* — 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** — The view type is included.
- **excluded** — The view type is excluded.

Default Setting

"Default" and "DefaultSuper" views exists.

Command Mode

Global configuration

User Guidelines

- You can enter this command multiple times for the same view record.
- The number of views is limited to 64.
- "Default" and "DefaultSuper" views exist. Those views are used by the software internally and can't be deleted or modified.

Example

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 interfaces 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 include
```

snmp-server filter

To create or update a filter entry, use the **snmp-server filter** global configuration command. To remove the specified Simple Network Management Protocol (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*]

- *filter-name* — Label for the filter record that you are updating or creating. The name is used to reference the record. (Range: Up to 30 characters).
- *oid-tree* — 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** — The filter type is included.
- **excluded** — The filter type is excluded.

Default Configuration

Product specific.

Command Modes

Global Configuration

User Guidelines

- You can enter this command multiple times for the same filter record. Later lines take precedence when an object identifier is included in two or more lines. .

Example

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 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 contact

The **snmp-server contact** Global Configuration mode command sets up a system contact. To remove the system contact information, use the **no** form of the command.

Syntax

snmp-server contact *text*

no snmp-server contact

- *text*—Character string, up to 160 characters, describing the system contact information.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

- Do not include spaces in the text string.

Example

The following example displays setting up the system contact point as "Dell_Technical_Support".

```
Console (config)# snmp-server contact Dell_Technical_Support
```

snmp-server location

The **snmp-server location** Global Configuration mode command sets up information on where the device is located. To remove the location string use, the **no** form of this command.

Syntax

snmp-server location *text*

no snmp-server location

- *text*—Character string, up to 160 characters, describing the system location.

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

- Do not include spaces in the text string.

Example

The following example sets the device location as "New_York".

```
Console (config)# snmp-server location New_York
```

snmp-server enable traps

The **snmp-server enable traps** Global Configuration mode command enables the switch 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

Enabled

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following example displays the command to enable SNMP traps.

```
Console (config)# snmp-server enable traps
```

snmp-server trap authentication

The **snmp-server trap authentication** Global Configuration mode command enables the switch to send Simple Network Management Protocol traps when authentication fails. To disable SNMP authentication failed traps, use the **no** form of this command.

Syntax

snmp-server trap authentication

no snmp-server trap authentication

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 displays the command to enable authentication failed SNMP traps.

```
Console (config)# snmp-server trap authentication
```

snmp-server host

To specify the recipient of Simple Network Management Protocol notification operation, use the **snmp-server host** global configuration command. Use the **no** form of this command to remove the specified host.

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**]

- *ip-address* — Internet address of the host (the targeted recipient). An out-of-band IP address can be specified as described in the usage guidelines.
- *hostname* — Hostname of the host. (Range: 1 - 158 characters).
- *community-string* — Password-like community string sent with the notification operation. (Range: 1 - 20 chars)
- **traps** — Sends SNMP traps to this host (Default).
- **informs**— Sends SNMP informs to this host. Not applicable to SNMPv1.

- **1**— SNMPv1 traps will be used.
- **2**— SNMPv2 traps will be used (Default).
- **udp-port** *port* — UDP port of the host to use. The default is 162. (Range: 1 - 65535)
- **filter** *filtername* — A string that is the name of the filter that define the filter for this host. If unspecified, does not filter anything. (Range : Up to 30 characters).
- **timeout** *seconds* — Number of seconds to wait for an acknowledgment before resending informs. The default is 15 seconds. (Range :1 - 300)
- **retries** *retries* — Maximum number of times to resend an inform request, when response is not received for generated message. The default is 3. (Range: 0 - 255)

Default Configuration

This command has no default configuration.

Command Mode

Global Configuration mode

User Guidelines

- When configuring snmp v1 or v2 notification recipients, the software should automatically generate notification views for those recipients, for all MIBs.

Example

The following example specifies the recipient of Simple Network Management Protocol notification operation.

```
Console (config)# snmp-server host 10.1.1.1 management 2
```

snmp-server set

The **snmp-server set** Global Configuration mode command sets SNMP MIB value by the CLI.

Syntax

snmp-server set *variable-name name1 value1 [name2 value2 …]*

- *variable-name* — MIB variable name.
- *name value*.— List of name and value pairs. In case of scalar MIBs there is only a single pair of name values. In case of entry in a table the first pairs are the indexes, 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 context sensitive.

Examples

The following example sets the scalar MIB "sysName" to have the value "dell".

```
Console (config)# snmp-server set sysName sysname dell
```

The following example sets the entry MIB "rndCommunityTable" with keys 0.0.0.0 and "public". The field rndCommunityAccess gets the value "super" and the rest of the fields get their default values.

```
Console (config)# snmp-server set rndCommunityTable
rndCommunityMngStationAddr 0.0.0.0 rndCommunityString public
rndCommunityAccess super
```

snmp-server group

To configure a new Simple Network Management Protocol (SNMP) group, or a table that maps SNMP users to SNMP views, use the snmp-server group global configuration command. 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] } [**context** name] [**read** readview] [**write** writeview]

no snmp-server group groupname [**v1** | **v2** | **v3** [**noauth** | **auth** | **priv**]] [**context** name]

- *groupname* — The name of the group. (Range: Up to 30 characters)
- **v1** — SNMP Version 1 security model.
- **v2** — SNMP Version 2 security model.
- **v3** — SNMP Version 3 security model.
- **noauth** — Specifies no authentication of a packet. Applicable only to SNMP Version 3 security model.
- **auth** — Specifies authentication of a packet without encrypting it. Applicable only to SNMP Version 3 security model.

- **priv** —Specifies authentication of a packet with encryption. Applicable only to SNMP Version 3 security model.
- **context** *name* — Specifies context of packet.
- **read** *readview* — A string that is the name of the view that enables you only to view the contents of the agent. If unspecified, all the objects except of the community-table and SNMPv3 user and access tables are available. (Range: Up to 30 characters)
- **write** *writeview* — A string that is the name of the view that enables you to enter data and configure the contents of the agent. If unspecified, nothing is defined for the write view. (Range: Up to 30 characters)
- **notify** *notifyview* — A string that is the name of the view that enables you to specify an inform or a trap. If unspecified, nothing is defined for the notify view. (Range: Up to 30 characters)

Default configuration

No group entry exists.

Command Mode

Global configuration

User Guidelines

- The Router context is translated to "" context in the MIB.

Example

The following example configures a new Simple Network Management Protocol (SNMP) group or a table that maps SNMP users to SNMP views

```
Console (config)# snmp-server group user-group v3 priv read
user-view
```

snmp-server user

To configure a new SNMP Version 3 user, use the **snmp-server user** global configuration command. To remove a user, use the **no** form of the 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*]

- *username* — The name of the user on the host that connects to the agent. (Range: Up to 30 characters)

- *groupname* — The name of the group to which the user belongs.(Range: Up to 30 characters)
- **remote** *engineid-string* — Specifies the engine ID of remote SNMP entity to which the user belongs. The engine ID is concatenated hexadecimal string. Each byte in hexadecimal character strings is two hexadecimal digits. Each byte can be separated by a period or colon.(Range: 5 - 32 characters)
- **auth-md5** —The HMAC-MD5-96 authentication level. The user should enter password.
- **auth-sha** —The HMAC-SHA-96 authentication level. The user should enter password.
- *password* — A password (not to exceed 32 characters) for authentication and generation of DES key for privacy.(Range: Up to 30 characters)
- **auth-md5-key** — The HMAC-MD5-96 authentication level. The user should enter authentication and privacy keys.
- *md5-des-keys* — Concatenated hexadecimal string of the MD5 key (MSB) and the privacy key (LSB). If authentication is only required you should enter 16 bytes, if authentication and privacy are required you should enter 32 bytes. Each byte in hexadecimal character strings is two hexadecimal digits. Each byte can be separated by a period or colon. (Range: 16 - 32 characters)
- **auth-sha-key**—The HMAC-SHA-96 authentication level. The user should enter authentication and privacy keys.
- *sha-des-keys* — Concatenated hexadecimal string of the SHA key (MSB) and the privacy key (LSB). If authentication is only required you should enter 20 bytes, if authentication and privacy are required you should enter 36 bytes. Each byte in hexadecimal character strings is two hexadecimal digits. Each byte can be separated by a period or colon. (Range: 20 - 36 characters)

Default configuration

No group entry exists.

Command Mode

Global configuration

User Guidelines

- If **auth-md5** or **auth-sha** is specified, both authentication and privacy are enabled for the user.

  When you enter a **show running-config** command, you will not see a line for this user. To see if this user has been added to the configuration, type the **show snmp user** command.

  An SNMP EngineID should be defined in order to add users to the device.

  Changing or removing the value of snmpEngineID deletes the SNMPv3 users database.

Example

The following example configures a new SNMP Version 3 user.

```
Console (config)# snmp-server user
```

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**]

- *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: 1-24)
- **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 Setting

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 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

- *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 Setting

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.
- 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.
- For a stackable system, configure the engine ID and verify its uniqueness.

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 **engine ID local** GlobalConfiguration mode command.

Example

The following example specifies the Simple Network Management Protocol (SNMP) engineID on the local device.

```
Console(config) # snmp-server engineID local default
```

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 Setting

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

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# sh snmp
```

.

```
Traps are enabled.
Authentication trap is enabled.


Version 1,2 notifications
Target Address      Type    Community   Version   UDP Port   Filter name   TO sec   Retries


Version 3 notifications
Target Address      Type    Username    Security Level   UDP Port   Filter name   TO sec   Retries
System Contact:

System Location:
console#
```

show snmp views

To display the configuration of views use the **show snmp views** Privileged EXEC command

Syntax

show snmp views [*viewname*]

- *viewname*— The name of the view. Range: Up to 30 characters

Default Configuration

There is no default configuration for this command.

Command Modes

Privileged EXEC

User Guidelines

- There are no user guidelines for this command

Example

The following example displays the configuration of views use the show snmp views Privileged EXEC command.

```
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

To display the configuration of groups use the **show snmp groups** Privileged EXEC command.

Syntax

show snmp groups [*groupname*]

- *groupnam* — The name of the group.

Default Configuration

There is no default configuration for this command.

Command Modes

Privileged EXEC

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays the configuration of views use the show snmp views Privileged EXEC command.

```
Console # show snmp
groups

Name                        Security                          Views

                  Model     Level      Context       Read      Write     Notify

user-group        V3        priv       -             Default             -
managers-group    V3        priv       -             Default   Default   -
managers-group    V3        priv       -             Default             -

Console # show snmp groups user-group

Name: user-group
Security Model: V3
Security Level: priv
Security Context: -
Read View: Default
Write View: ""
Notify View: ""
```

show snmp filters

To display the configuration of filters use the **show snmp filters** Privileged EXEC command.

Syntax

show snmp filters [*filtername*]

- *filternam* — The name of the view. Range: Up to 30 character

Default Configuration

There is no default configuration for this command.

Command Modes

Privileged EXEC

User Guidelines

- There are no user guidelines for this command

Example

The following example displays the configuration of filters use the show snmp filters Privileged EXEC command.

```
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

To display the configuration of groups use the **show snmp users** Privileged EXEC command.

Syntax

show snmp users [*username*]

- *usernam* — The name of the user.. Range: Up to 30 character

Default Configuration

There is no default configuration for this command.

Command Modes

Privileged EXEC

User Guidelines

- There are no user guidelines for this command

Example

The following example displays the configuration of groups use the **show snmp users** Privileged EXEC command.

```
Console # show snmp users

Name          group name        Auto Method    Remote

John          1.3.6.1.2.1.1     md5
John          1.3.6.1.2.1.1.7   md5            08009009020C0B09
                                                9C075879
Console # show snmp users John

Name: John
Group name: user-group
Auth Method: md5
Remote:

Name: John
Group name: user-group
Auth Method: md5
Remote: 08009009020C0B099C075879
```

23

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

- **stp**—STP is the Spanning Tree operative mode.
- **rstp**—RSTP is the Spanning Tree operative mode.
- **mstp**—MSTP is enabled

Default Configuration

STP

Command Modes

Global Configuration mode

User Guidelines

- In RSTP mode, the switch would use STP when the neighbor switch is using STP.
- In MSTP mode the switch would use RSTP when the neighbor switch is using RSTP, and would use STP when the neighbor switch is using 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 reset the default forward time, use the **no** form of this command.

Syntax

spanning-tree forward-time *seconds*

no spanning-tree forward-time

- *seconds*—Time in seconds. (Range: 4 - 30)

Default Configuration

The default forwarding-time for IEEE Spanning-tree Protocol (STP) is 15 seconds.

Command Modes

Global Configuration mode

User Guidelines

- When configuring the Forward-Time the following relationship should be kept:
  - 2*(Forward-Time - 1) >= Max-Age

Example

The following example configures spanning-tree bridge forward 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 switch broadcasts hello messages to other switches.To reset the default hello time, use the **no** form of this command.

Syntax

spanning-tree hello-time *seconds*

no spanning-tree *hello-time*

- *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 reset the default maximum age, use the **no** form of this command.

Syntax

spanning-tree max-age *seconds*

no spanning-tree max-age

- *seconds* -Time in seconds. (Range: 6 - 40)

Default Configuration

The default max-age for IEEE STP is 20 seconds.

Command Modes

Global Configuration mode

User Guidelines

- When configuring the Max-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. The priority value is used to determine which bridge is elected as the root bridge. To reset the default spanning-tree priority use the **no** form of this command.

Syntax

spanning-tree priority *priority*

no spanning-tree priority

- *priority*—Priority of the bridge. (Range: 0 - 65535 in steps of 4096)

Default Configuration

The default bridge priority for IEEE STP is 32768.

Command Modes

Global Configuration mode

User Guidelines

- The priority value must be a multiple of 4096.
- The bridge with the lowest priority is elected to be 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

By default, all ports are enabled for spanning-tree.

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- When STP is disabled, the device will not forward STP BPDU's based on the Forward BPDU's setting.

Example

The following example disables spanning-tree on g5.

```
Console (config)# interface ethernet g5
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 reset the default port path cost, use the **no** form of this command.

Syntax

spanning-tree cost *cost*

no spanning-tree cost

- *cost*—The port path cost (Range: 1 - 200,000,000)

Default Configuration

For the default short pathcost method, the cost values are: port channel - 4; 1000 mbps - 4; 100 mbps - 19; 10 mbps - 100.

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- The method used (long or short) is set by using the **spanning-tree pathcost method** command.

Example

The following example configures the spanning-tree cost on g5 to 35000.

```
Console(config)# interface ethernet g5
Console(config-if)# spanning-tree cost 35000
```

spanning-tree port-priority

The **spanning-tree port-priority** Interface Configuration mode command configures port priority. To reset the default port priority, use the **no** form of this command.

Syntax

spanning-tree port-priority *priority*

no spanning-tree port-priority

- *priority*—The port priority. (Range: 0 - 240 in multiples of 16)

Default Configuration

The default port-priority for IEEE 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 g5 to 96.

```
Console(config)# interface ethernet g5
Console(config-if)# spanning-tree port-priority 96
```

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 timer to expire. 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 switch and network operations.

Example

The following example enables PortFast on g5.

```
Console(config)# interface ethernet g5
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. To reset the default, use the **no** form of this command.

Syntax

spanning-tree link-type {**point-to-point** | **shared**}

no spanning-tree spanning-tree link-type

- **point-to-point**—Specifies the port link type as point-to-point.
- **shared**—Specifies that the port link type is shared.

Default Configuration

There is no default configuration for this command.

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- The switch derives the link type of a port 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.

Example

The following example enables shared spanning-tree on g5.

```
Console(config)# interface ethernet g5
Console(config-if)# spanning-tree link-type shared
```

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**

- *instance - id* — Displays the ID of the spanning -tree instance (Range: 1-15).
- *priority* — Displays the device priority for the specified spanning-tree instance (Range: 0-61440 in multiples of 4096).

Default Setting

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

- *hop-count* — Number of hops in an MST region before the BDPU is discarded .(Range: 1-40)

Default Setting

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**

- *instance-ID* — ID of the spanning tree instance. (Range: 1-15)
- *priority* — The port priority. (Range: 0 - 240 in multiples of 16)

Default Setting

The default port priority for IEEE Multiple Spanning Tree Protocol (MSTP) is 128.

Command Modes

Interface Configuration (Ethernet, port-channel) mode

User Guidlines

- There are no user guidelines for this command.

Example

The following example configures the port priority of port g1 to 142.

```
Console(config)# interface ethernet g1
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**

- *instance-ID* — ID of the spanning -tree instance (Range: 1-15).
- *cost* — The port path cost. (Range: 1 - 200,000,000)

Default Setting

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

Default Configuration

There is no default configuration for this command.

Example

The following example configures the MSTP instance 1 path cost for Ethernet port e9 to 4.

```
Console(config) # interface ethernet 1/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 Setting

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*

- *instance-ID* — ID of the MST instance (Range: 1- 8).
- *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 Setting

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*

- *string*—MST configuration name. Case-sensitive (Range: 1-32 characters).

Default Setting

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 regional.

```
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

- *value* — Configuration revision number (Range: 0-65535).

Default Setting

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}

- *current* — Indicates the current region configuration.
- *pending* — Indicates the pending region configuration.

Default Setting

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 Setting

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 Setting

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
```

spanning-tree pathcost method

The **spanning-tree pathcost method** Global Configuration mode command sets the default path cost method. To revert to the default setting, use the **no** form of this command.

Syntax

spanning-tree pathcost method {long | short}

no spanning-tree pathcost method

- *long*— Specifies 1 through 200,000,000 range for port path costs.
- *short*—Specifies 0 through 65,535 range for port path costs.

Default Configuration

Short

Command Mode

Global configuration mode

User Guidelines

- The cost is set using the **spanning-tree cost** command.

Example

The following example sets the default path cost method to "long".

```
Console# spanning-tree pathcost method long
```

spanning-tree bpdu

The **spanning-tree bpdu** Global Configuration mode command defines BPDU handling when spanning-tree is disabled on an interface.

Syntax

spanning-tree bpdu {filtering | flooding}

- **filtering**—Filter BPDU packets when spanning-tree is disabled on an interface.
- **flooding**—Flood BPDU packets when spanning-tree is disabled on an interface.

Default Configuration

The default definition is flooding.

Command Modes

Global Configuration mode

User Guidelines

- The command is relevant when spanning-tree is disabled globally or on a single interface.

Example

The following example defines BPDU packet flooding when 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 (force the renegotiation with neighboring switches) on all interfaces or on the specified interface.

Syntax

clear spanning-tree detected-protocols [**ethernet** *interface number* | **port-channel** *port-channel-number*]

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

Default Configuration

If no interface is specified, the action is applied to all interfaces.

Command Modes

Privileged EXEC mode

User Guidelines

- This feature should be used only when working in RSTP mode.

Example

The following example restarts the protocol migration process (forces the renegotiation with neighboring switches) on g1.

```
Console# clear spanning-tree detected-protocols ethernet g1
```

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

- **detail** — Display detailed information.
- **active** — Display active ports only.
- **blockedports** — Display blocked ports only.
- **mst-configuration** — Display the MST configuration identifier.
- *interface-number* — Ethernet port number. (Range:Valid Ethernet port)
- *port-channel-number* — Port channel index. (Range:Valid Ethernet port)
- *instance-id* — ID associated with a 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 enabled mode RSTP
Default port cost method: long

Root ID      Priority     32768
             Address      00:01:42:97:e0:00
             Path Cost    2000
             Root Port    1(1/1)
             Hello Time 2 sec Max Age 20 sec  Forward Delay 15 sec

Bridge ID    Priority 36864
             Address 00:02:4b:29:7a:00
             Hello Time 2 sec Max Age 20 sec  Forward Delay 15 sec

Interfaces
Name       State              Prio.Nbr    Cost     Sts     Role     PortFast    Type
----       -------            ---------   -----    -----   ------   -------     ----
1              Enabled         128.1                FWD      Root     No
                                          20000                                 P2p
                                                                                (RST
                                                                                P)
2              Enabled         128.2                 FWD     Desg      No
                                          20000                                 Shar
                                                                                ed
                                                                                (STP
                                                                                )
3              Disabled        128.3
                                          20000
4              Enabled          128.4               BLK     Altn      No
                                          20000                                 Shar
                                                                                ed
                                                                                (STP
                                                                                )
5              Enabled          128.5        20000   DIS      -
                                                     -
```

```
console# show spanning-tree
Spanning tree enabled mode RSTP
Default port cost method: long

Root ID     Priority             36864
             Address             00:02:4b:29:
                                 7a:00
            This switch is the Root.
            Hello Time 2 sec     Max Age 20 sec  Forward Delay 15 sec


Interfaces
Name              State           Prio.Nbr     Cost     Sts    Role       PortFast   Type

1                 Enabled           128.1                FWD      Desg     No
                                                20000                              P2p
                                                                                   (RST
                                                                                   P)
2                  Enabled          128.2       20000     FWD     Desg      No
                                                                                   Shar
                                                                                   ed
                                                                                   (STP
                                                                                   )
3                 Disabled          128.3
                                                20000
4                  Enabled          128.4                 FWD     Desg      No
                                                20000                              Shar
                                                                                   ed
                                                                                   (STP
                                                                                   )
5                 Enabled           128.5                DIS -
                                                20000


Console# show spanning-tree
Spanning tree disabled (BPDU filtering) mode RSTP
Default port cost method: long


Root ID     Priority             N/A
                 Address          N/A
```

```
               Path Cost       N/A
              Root Port        N/A
            Hello Time N/A     Max Age N/A  Forward Delay
                               N/A

Bridge ID   Priority           36864
            Address            00:02:4b:29:7a:00
            Hello Time 2 sec   Max Age 20 sec  Forward
                               Delay 15 sec


Interface
s
Name           State             Prio.Nbr    Cost     Sts    Role      PortFast   Type

1/1             Enabled           128.1       20000
1/2             Enabled          128.2        20000
1/3            Disabled          128.3        20000
1/4            Enabled           128.4
                                              20000
1/5             Enabled          128.5       20000

Console# show spanning-tree active
Spanning tree enabled mode RSTP
Default port cost method: long

Root ID     Priority           32768
             Address           00:01:42:97:e0:00
             Path Cost         20000
            oot Port           1 (1/1)
             Hello Time 2 sec  Max Age 20 sec  Forward
                               Delay 15 sec


Bridge ID   Priority           36864
```

```
            Address             00:02:4b:29:7a:00

            Hello Time 2 sec    Max Age 20 sec  Forward
                                Delay 15 sec


Interfaces
Name           State              Prio.Nbr    Cost    Sts     Role      PortFast    Type

1/1          Enabled            128.1         20000   FWD      Root     No
                                                                                  P2p
                                                                                  (RST
                                                                                  P)
1/2          Enabled             128.2        20000   FWD     Desg      No
                                                                                  Shar
                                                                                  ed
                                                                                  (STP
                                                                                  )
1/4          Enabled             128.4        20000   BLK     Altn        No      Shar
                                                                                  ed
                                                                                  (STP
                                                                                  )

onsole# show spanning-tree blockedports

Spanning tree enabled mode RSTP
Default port cost method: long

Root ID     Priority            32768
              Address           00:01:42:9
                                7:e0:00
            Path Cost            20000
            Root Port           1 (1/1)
            Hello Time 2 sec    Max Age 20 sec  Forward
                                Delay 15 sec

Bridge ID   Priority            36864
```

```
           Address            00:02:4b:29:7a:00
           Hello Time 2 sec   Max Age 20 sec  Forward Delay 15 sec


Interfaces
Name         State             Prio.Nbr    Cost     Sts     Role     PortFast   Type
1/4           Enabled          128.4         19      BLK     Altn     No
                                                                                Shar
                                                                                ed
                                                                                (STP
                                                                                )
Console# show spanning-tree detail

Spanning tree enabled mode RSTP
Default port cost method: long

Root ID    Priority           32768
              Address         00:01:42:97:e0:00
               Path Cost         20000
               Root Port        1 (1/1)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID  Priority           36864
           Address            00:02:4b:29:7a:00
           Hello Time 2 sec   Max Age 20 sec  Forward Delay 15 sec

Number of topology changes 2 last change occurred 2d18h
ago
Times:  hold 1, topology change 35, notification 2
 hello 2, max age 20, forward delay 15
```

```
State: Forwarding                        Role: Root
```

```
Port id: 128.1                          Port cost: 20000
Type: P2p (configured: auto) RSTP       Port Fast: No (configured:no)
Designated bridge Priority: 32768       Address: 00:01:42:97:e0:00
Designated port id: 128.25              Designated path cost: 0
Guard root: Disabled                    BPDU guard: Disabled
Number of transitions to forwarding
state: 1
BPDU: sent 2, received 120638
```

```
Port 2 (1/2) enabled
State: Forwarding                       Role: Designated
Port id: 128.2                          Port cost: 20000
Type: Shared (configured: auto) STP     Port Fast: No (configured:no)
Designated bridge Priority: 32768       Address: 00:02:4b:29:7a:00
Designated port id: 128.2               Designated path cost: 20000
Guard root: Disabled                    BPDU guard: Disabled
Number of transitions to forwarding state: 1
BPDU: sent 2, received 170638
```

```
Port 3 (1/3) disabled
State: N/A                              Role: N/A
Port id: 128.3                          Port cost: 20000
Type: N/A (configured: auto)            Port Fast: N/A (configured:no)
Designated bridge Priority: N/A         Address: N/A
Designated port id: N/A                 Designated path cost: N/A
Guard root:Disabled                     BPDU guard: Disabled
Number of transitions to forwarding state: N/A
BPDU: sent N/A, received N/A
```

```
Port 4 (1/4) enabled
State: Blocking                                 Role: Alternate
Port Identifier: 128.4                          Port cost: 20000
Type: Shared (configured: auto) STP             Port Fast: No (configured:no)
Designated bridge Priority: 28672               Address: 00:30:94:41:62:c8
Designated port id: 128.25                      Designated path cost: 20000
Guard root:Disabled                             BPDU guard: Disabled
Number of transitions to forwarding state: 1
BPDU: sent 2, received 120638
```

```
Port 5 (1/5) enabled
State: Disabled                         Role: N/A
Port id: 128.5                          Port cost: 20000
Type: N/A (configured: auto)            Port Fast: N/A (configured:no)
Designated bridge Priority: N/A         Address: N/A
Designated port id: N/A                 Designated path cost: N/A
Guard root:Disabled                     BPDU guard: Disabled
Number of transitions to forwarding
state: N/A
BPDU: sent N/A, received N/A
```

```
Console# show spanning-tree ethernet 1/1
Port 1 (1/1) enabled
State: Forwarding                       Role: Root
Port id: 128.1                          Port cost: 20000
Type: P2p (configured: auto) RSTP       Port Fast: No (configured:no)
Designated bridge Priority: 32768       Address: 00:01:42:97:e0:00
```

```
Designated port id: 128.25              Designated path cost: 0

Guard root:Disabled                     BPDU guard: Disabled

Number of transitions to forwarding
state: 1

BPDU: sent 2, received 120638
```

```
Console# show spanning-tree mst-configuration


Name: Region1
Revision: 1


Instance                    Vlans Mapped                State

0                           1-9,21-4094                 Enabled

1                           10-20                       Enabled
```

```
Console# show spanning-tree
Spanning tree enabled mode MSTP
Default port cost method: long


###### MST 0 Vlans Mapped: 1-9

CST Root ID             Priority                    32768

                        Address                     00:01:42:97:e0:00

                        Path Cost                     20000

                        Root Port                    1 (1/1)

                        Hello Time 2 sec            Max Age 20 sec  Forward
                                                    Delay 15 sec
```

```
IST Master ID       Priority            32768

                    Address             00:02:4b:29:7a:00
```

```
Hello Time 2 sec This switch is the IST master. Max Age 20 sec  Forward Delay 15
sec Max hops 20
```

```
Interfaces
Nam                              Cost     Sts      Role   PortFast     Type
e      State      Prio.Nb
                  r


1                 128.1            FWD            No                P2p Bound
       Enabled              20000            Root                (RSTP)
2                 128.2          FWD       Desg    No               Shared
       Enabled              20000                                 Bound (STP)
3                 128.3          FWD             No                P2p
       Enabled              20000            Desg
4                 128.4          FWD             No                P2p
       Enabled              20000            Desg
```

```
##### MST 1 Vlans Mapped: 10-20
Root ID                    Priority                  24576
                           Address                   00:02:4b:29:89:76
                           Path Cost                   20000
                           Root Port                  4(1/4)
                           Rem hops                  19
```

```
Bridge ID                  Priority                  32768
                           Address                   00:02:4b:29:7a:00
```

```
Number of topology changes 2 last change occurred 1d9h ago
Times:  hold 1, topology change 2, notification 2
hello 2, max age 20, forward delay 15

Port 1 (1/1) enabled
State: Forwarding                              Role: Boundary
Port id: 128.1                                 Port cost: 20000
Type: P2p (configured: auto) Boundary RSTP     Port Fast: No (configured:no)
Designated bridge Priority: 32768              Address: 00:02:4b:29:7a:00
Designated port id: 128.1                      Designated path cost: 20000
Guard root:Disabled                            BPDU guard: Disabled
Number of transitions to forwarding state: 1
BPDU: sent 2, received 120638

Port 2 (1/2) enabled
State: Forwarding                              Role: Designated
Port id: 128.2                                 Port cost: 20000
Type: Shared (configured: auto) Boundary STP   Port Fast: No (configured:no)
Designated bridge Priority: 32768              Address: 00:02:4b:29:7a:00
Designated port id: 128.2                      Designated path cost: 20000
Guard root: Disabled                           BPDU guard: Disabled
Number of transitions to forwarding state: 1
BPDU: sent 2, received 170638

Port 3 (1/3) disabled
State: Blocking                                Role: Alternate
Port id: 128.3                                 Port cost: 20000
Type: Shared (configured: auto) Internal       Port Fast: No (configured:no)
Designated bridge Priority: 32768              Address: 00:02:4b:29:1a:19
Designated port id: 128.78                     Designated path cost: 20000
```

```
Guard root: Disabled                          BPDU guard: Disabled
```

```
Number of transitions to forwarding state: 1
BPDU: sent 2, received 170638
Port 4 (1/4) enabled
State: Forwarding                             Role: Designated
Port id: 128.4                                Port cost: 20000
Type: Shared (configured: auto) Internal      Port Fast: No (configured:no)
Designated bridge Priority: 32768             Address: 00:02:4b:29:7a:00
Designated port id: 128.2                     Designated  cost: 20000
Guard root:Disabled                           BPDU guard: Disabled
Number of transitions to forwarding state: 1
BPDU: sent 2, received 170638
```

```
Console# show spanning-tree

Spanning tree enabled mode MSTP
Default port cost method: long

###### MST 0 Vlans Mapped: 1-9


CST Root ID                 Priority                32768
                           Address                  00:01:42:97:e0:00
                           Path Cost                  20000
                           Root Port                  1 (1/1)
                           Hello Time 2 sec         Max Age 20 sec  Forward
                                                    Delay 15 sec


IST Master ID               Priority                32768
```

```
                          Address                   00:02:4b:19:7a:00
                          Path Cost                 10000
                          Rem hops                  19

Bridge ID                 Priority                  32768
                          Address                   00:02:4b:29:7a:00
                          Hello Time 2 sec          Max Age 20 sec  Forward
                                                    Delay 15 sec Max hops 20
```

```
Console# show spanning-tree

Spanning tree enabled mode MSTP
Default port cost method: long

###### MST 0 Vlans Mapped: 1-9

CST Root ID               Priority                  32768
                          Address                   00:01:42:97:e0:00
                          This switch is root for
                          CST and IST master
                          Hello Time 2 sec          Max Age 20 sec  Forward
                                                    Delay 15 sec Max hops 20
```

spanning-tree mst mstp-rstp

Use the **spanning-tree mst mstp-rstp** global configuration command to configure the switch to convert STP/RSTP packets to MSTP instances. Use the **no** form of this command to disable the configuration.

Syntax

spanning-tree mst mstp-rstp

no **spanning-tree mst** mstp-rstp

This command has no arguments or keywords.

Default Configuration

Disabled.

Command Modes

Global configuration

User Guidelines

- This command can be enabled when all the ports are Access ports.
- This command is relevant in MSTP mode only.
- When this feature is enabled incoming IEEE RSTP/STP packets would be mapped to the MSTP instance according to the port's VLAN. Outgoing MSTP packets would be mapped to IEEE RSTP/STP packets according to the port's VLAN.

Example

The following example configures the switch to convert STP/RSTP packets to MSTP instances.

```
Console(config)# spanning-tree mst mstp-rstp
```

Spanning-tree guard root

Use the **spanning-tree guard root** interface configuration command to enable root guard on all the spanning tree instances on that interface. Root guard restricts the interface to be the root port for the switch. Use the no form of this command to disable root guard on the interface.

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 enable root guard on port g8.

```
Console(config)# interface ethernet g8
Console(config-if)# spanning-tree guard root
```

24

SSH Commands

ip ssh port

The **ip ssh port** Global Configuration mode command specifies the port to be used by the SSH server. To use the default port, use the **no** form of this command.

Syntax

ip ssh port *port-number*

no ip ssh port

- *port-number*—Port number for use by the SSH server (Range: 1 - 65535).

Default Configuration

The default value is 22.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example specifies the port to be used by the SSH server as 8080.

```
Console (config)# ip ssh port 8080
```

ip ssh server

The **ip ssh server** Global Configuration mode command enables the device to be configured from a SSH server. To disable this function, use the **no** form of this command.

Syntax

ip ssh server

no ip ssh server

Default Configuration

SSH is enabled.

Command Mode

Global Configuration mode

User Guidelines

- If encryption keys are not generated, the SSH server is in standby until the keys are generated. To generate SSH server keys, use the commands **crypto key generate rsa**, and **crypto key generate dsa**.

Example

The following example enables the device to be configured from a SSH server.

```
Console (config)# ip ssh server
```

crypto key generate dsa

The **ip ssh server** Global Configuration mode command generates DSA key pairs.

Syntax

crypto key generate dsa

Default Configuration

DSA key pairs do not exist.

Command Mode

Global Configuration mode

User Guidelines

- DSA keys are generated in pairs: one public DSA key and one private DSA key. If the device already has DSA keys, a warning and prompt to replace the existing keys with new keys is displayed.
- This command is not saved in the startup configuration; however, the keys generated by this command are saved in the FLASH. The SSH keys can be displayed with the **show crypto key mypubkey dsa** command.
- This command may take a considerable period of time to execute.
- DSA key size is 2048 bits.

Example

The following example generates DSA key pairs.

```
Console (config)# crypto key generate dsa
```

crypto key generate rsa

The **crypto key generate rsa** Global Configuration mode command generates RSA key pairs.

Syntax

crypto key generate rsa

Default Configuration

RSA key pairs do not exist.

Command Mode

Global Configuration mode

User Guidelines

- RSA keys are generated in pairs: one public RSA key and one private RSA key. If the device already has RSA keys, a warning and prompt to replace the existing keys with new keys is displayed.
- The maximum supported size for the RSA key is 2048 bits.
- This command is not saved in the startup configuration; however, the keys generated by this command are saved in the FLASH. The SSH keys can be displayed with the **show crypto key mypubkey rsa** command.
- This command may take a considerable period of time to execute.

Example

The following example generates RSA key pairs.

```
Console (config)# crypto key generate rsa
```

ip ssh pubkey-auth

The **ip ssh pubkey-auth** Global Configuration mode command enables public key authentication for incoming SSH sessions. To disable this function, use the **no** form of this command.

Syntax

ip ssh pubkey-auth

no ip ssh pubkey-auth

Default Configuration

The function is disabled.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example enables public key authentication for incoming SSH sessions.

```
Console (config)# ip ssh pubkey-auth
```

crypto key pubkey-chain ssh

The **crypto key pubkey-chain ssh** Global Configuration mode command enters SSH Public Key-chain configuration mode. The mode is used to manually specify other device public keys such as SSH client public keys.

Syntax

crypto key pubkey-chain ssh

Default Configuration

By default, there are no keys.

Command Mode

Global Configuration mode

User Guidelines

- Use this command to enter public key chain configuration mode.
- This command can also be used when you need to manually specify SSH client's public keys.

Example

The following example enters the SSH Public Key-chain configuration mode.

```
Console(config)# crypto key pubkey-chain ssh
Console(config-pubkey-chain)#
```

user-key

The **user-key** SSH Public Key Chain Configuration mode command specifies which SSH public key is manually configured and enters the SSH public key-string configuration command. To remove a SSH public key, use the **no** form of this command.

Syntax

user-key *username* {**rsa** | **dsa**}

no user-key *username*

- *username*—Specifies the remote SSH client username, which can be up to 48 characters long.
- **rsa**—RSA key.

- **dsa**—DSA key.

Default Configuration

By default, there are no keys.

Command Mode

SSH Public Key Chain Configuration mode

User Guidelines

- Follow this command with the key-string command to specify the key.

Example

The following example enables a SSH public key to be manually configured for the SSH public key chain called "bob".

```
Console(config-pubkey-chain)# user-key bob rsa
Console(config-pubkey-key)# key-string row key-string
AAAAB3NzaC1yc2EAAAADAQABAAABAQCvTnRwPWl
```

key-string

The **key-string** SSH Public Key-String Configuration mode command manually specifies a SSH public key.

Syntax

key-string row key-string

- **row**—Specify SSH public key row by row
- **key-string**—UU-encoded DER format is the same format in authorized_keys file used by OpenSSH.

Default Configuration

By default, the keys do not exist.

Command Mode

SSH Public Key-string configuration

User Guidelines

- Use the **key-string row** command to specify the SSH public key row by row. Each row must begin with the **key-string row** command. This command is useful for configuration files.
- UU-encoded DER format is the same format in authorized_keys file used by OpenSSH.

Example

The following example enters public key strings for SSH public key clients called "bob".

```
Console(config)# crypto key pubkey-chain ssh
Console(config-pubkey-chain)# user-key bob rsa
Console(config-pubkey-key)# key-string
AAAAB3NzaC1yc2EAAAADAQABAAABAQCvTnRwPWl
Al4kpqIw9GBRonZQZxjHKcqKL6rMlQ+
ZNXfZSkvHG+QusIZ/76ILmFT34v7u7ChFAE+
Vu4GRfpSwoQUvV35LqJJk67IOU/zfwOl1g
kTwml75QR9gHujS6KwGN2QWXgh3ub8gDjTSq
muSn/Wd05iDX2IExQWu08licglk02LYciz
+Z4TrEU/9FJxwPiVQOjc+KBXuR0juNg5nFYsY
0ZCk0N/W9a/tnkm1shRE7Di71+w3fNiOA
6w9o44t6+AINEICBCCA4YcF6zMzaT1wefWwX6f+
Rmt5nhhqdAtN/4oJfce166DqVX1gWmN
zNR4DYDvSzg0lDnwCAC8Qh

Fingerprint: a4:16:46:23:5a:8d:1d:b5:37:59:eb:44:13:b9:33:e9
```

show ip ssh

The **show ip ssh** Privileged EXEC mode command displays the SSH server configuration.

Syntax

show ip ssh

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 SSH server configuration.

```
Console# show ip ssh
SSH server enabled. Port: 22
RSA key was generated.
DSA (DSS) key was generated.
SSH Public Key Authentication is enabled.
Active incoming sessions:
IP address    SSH          Version      Cipher         Auth Code
              username
----------    ----------   ---------    -------        ----------
172.16.0.1    John Brown   2.0 3        DES            HMAC-SH1
```

The following table describes the significant fields shown in the display:

Field	Description
IP address	Client address
SSH username	User name
Version	SSH version number
Cipher	Encryption type (3DES, Blowfish, RC4)
Auth Code	Authentication Code (HMAC-MD5, HMAC-SHA1)

show crypto key mypubkey

The **show crypto key mypubkey** Privileged EXEC mode command displays the SSH public keys on the device.

Syntax

show crypto key mypubkey [**rsa** | **dsa**]

- **rsa**—RSA key.
- **dsa**—DSA key.

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 SSH public keys on the device.

```
Console# show crypto key mypubkey rsa
RSA key data:
005C300D 06092A86 4886F70D 01010105 00034B00 30480241 00C5E23B 55D6AB22
04AEF1BA A54028A6 9ACC01C5 129D99E4 64CAB820 847EDAD9 DF0B4E4C 73A05DD2
BD62A8A9 FA603DD2 E2A8A6F8 98F76E28 D58AD221 B583D7A4 71020301 87685768
Fingerprint(Hex): 77:C7:19:85:98:19:27:96:C9:CC:83:C5:78:89:F8:86
Fingerprint(Bubble Babble): yteriuwt jgkljhglk yewiury hdskjfryt gfhkjglk
```

show crypto key pubkey-chain ssh

The **show crypto key pubkey-chain ssh** Privileged EXEC mode command displays SSH public keys stored on the device.

Syntax

show crypto key pubkey-chain ssh [**username** *username*] [**fingerprint bubble-babble | hex**]

- *username*—Specifies the remote SSH client username.
- **bubble-babble**—Fingerprints in Bubble Babble format.
- **hex**—Fingerprint in Hex format. If fingerprint is unspecified, it defaults to Hex format.

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 all SSH public keys stored on the device.

```
Console# show crypto key pubkey-chain ssh
Username  Fingerprint
--------  -----------------------------------------------
bob       9A:CC:01:C5:78:39:27:86:79:CC:23:C5:98:59:F1:86
john      98:F7:6E:28:F2:79:87:C8:18:F8:88:CC:F8:89:87:C8
```

The following example displays the SSH public called "bob".

```
Console# show crypto key pubkey-chain ssh username bob
Username: bob
Key: 005C300D 06092A86
```

25

Syslog Commands

logging on

The **logging on** Global Configuration mode command controls error messages 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 to the various destinations, such as the logging buffer, logging file, or syslog server. Logging on and off for 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 shows how logging is enabled.

```
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*}

- *ip-address*—IP address of the host to be used as a syslog server.
- *hostname*—Hostname of the host to be used as a syslog server. (Range: 1 - 158 characters)

- *port*—Port number for syslog messages. If unspecified, the port number defaults to 514. (Range: 1 - 65535)
- **severity** *level*—Limits the logging of messages to the syslog servers to a specified level: **emergencies**, **alerts**, **critical**, **errors**, **warnings**, **notifications**, **informational** and **debugging**. If unspecified, the default level is **errors**.
- *facility*—The facility that is indicated in the message. Can be one of the following values: **local0, local1, local2, local3, local4, local5, local 6, local7**. If unspecified, the port number defaults to **local7**.
- *text*—Syslog server description, which can be up to 64 characters.

Default Configuration

As described in the field descriptions.

Command Mode

Global Configuration mode

User Guidelines

- Multiple syslog servers can be used.
- If no specific severity level is specified, the global values apply to each server.

Example

The following example configures messages with a "critical" severity level so that they are logged to a syslog server with an IP address 10.1.1.1.

```
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 terminal, use the **no** form of this command.

Syntax

logging console *level*

no logging console

- *level*—Limits the logging of messages displayed on the console to a specified level: **emergencies, alerts**, **critical**, **errors, warnings**, **notifications, informational, debugging.**

Default Configuration

The default is **informational**.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example limits messages logged to the console based on 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 the buffer use, use the **no** form of this command.

Syntax

logging buffered *level*

no logging buffered

- *level*—Limits the message logging to a specified level buffer: **emergencies, alerts**, **critical**, **errors, warnings**, **notifications, informational, debugging.**

Default Configuration

The default level is **informational**.

Command Mode

Global Configuration mode

User Guidelines

- All the syslog messages are logged to the internal buffer. This command limits the commands displayed to the user.

Example

The following example limits syslog messages displayed from an internal buffer based on the 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 the number of messages stored in the internal buffer to the default value, use the **no** form of this command.

Syntax

logging buffered size *number*

no logging buffered size

- *number*—Numeric value indicating 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

- There are no user guidelines for this command.

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 syslog message logging buffer.

```
Console# clear logging
Clear logging buffer [y/n] y
```

logging file

The **logging file** Global Configuration mode command limits syslog messages sent to the logging file based on severity. To cancel the buffer, use the **no** form of this command.

Syntax

logging file *level*

no logging file

- *level*—Limits the logging of messages to the buffer to a specified level: **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 the 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]y
```

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 debug. Console Messages: 5 Dropped.

Buffer Logging: Level debug. Buffer Messages: 16 Logged, 16
Displayed, 200 Max.

File Logging: Level error. File Messages: 0 Logged, 209 Dropped.

SysLog server 31.1.1.2 Logging: error. Messages: 22 Dropped.

SysLog server 5.2.2.2 Logging: info. Messages: 0 Dropped.

SysLog server 10.2.2.2 Logging: critical. Messages: 21 Dropped.

SysLog server 10.1.1.1 Logging: critical. Messages: 0 Dropped.

1 messages were not logged


03-Mar-2004 12:02:03 :%LINK-I-Up:  g1


03-Mar-2004 12:02:01 :%LINK-W-Down:  g2


03-Mar-2004 12:02:01 :%LINK-I-Up: g3
```

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 state of logging and the syslog messages stored in the logging file.

```
Console # show logging file

console# show logging file

Logging is enabled.

Console Logging: Level debug. Console Messages: 5 Dropped.

Buffer Logging: Level debug. Buffer Messages: 21 Logged, 21
Displayed, 200 Max.

File Logging: Level debug. File Messages: 4 Logged, 210 Dropped.

SysLog server 31.1.1.2 Logging: error. Messages: 27 Dropped.

SysLog server 5.2.2.2 Logging: info. Messages: 0 Dropped.

SysLog server 10.2.2.2 Logging: critical. Messages: 26 Dropped.

SysLog server 10.1.1.1 Logging: critical. Messages: 5 Dropped.

1 messages were not logged


03-Mar-2004 12:04:08 :%LINK-I-Up:  g1

03-Mar-2004 12:04:06 :%LINK-W-Down: g2

03-Mar-2004 12:04:06 :%LINK-I-Up:  g3

03-Mar-2004 12:04:04 :%LINK-W-Down: g4
```

show syslog-servers

The show syslog-servers Privileged EXEC mode command displays the syslog servers settings.

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 syslog server settings.

```
Console# show syslog-servers

IP address     Port    Severity        Facility   Description
-------------  ----    --------        --------   -----------
192.180.2.275  14      Informational   local      7
192.180.2.285  14      Warning         local      7
```

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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*]

- *ip-address*—IP address to ping.
- *hostname*—hostname to ping. (Range: 1 - 158 characters)
- *packet_size*—Number of bytes in a packet. The actual packet size is eight bytes larger than the size specified because the switch 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

timeout *time_out*—The default is 2000 milliseconds.

Command Mode

User EXEC mode

User Guidelines

Press **Esc** to stop pinging. Following are sample results of the **ping** command:

- *Destination (host/network) unreachable—The gateway for this destination indicates that the destination is unreachable.*

```
Console# ping 180.50.1.1
Pinging 180.50.1.1 with 56 bytes of data:
PING: net-unreachable
PING: net-unreachable
PING: net-unreachable
```

Examples

The following example displays a ping to IP address 10.1.1.1.

```
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
```

traceroute

The **traceroute** User EXEC mode command discovers the routes that packets will 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*]

- *ip-address*—IP address of the destination host. (Range: Valid IP Address)
- *hostname*—Hostname of the destination host (Range: 1 - 158 characters)
- **size** *packet_size*—Number of bytes in a packet. (Range: 40-1472)
- **ttl** *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)
- **count** *packet_count*—The number of probes to be sent at each TTL level. (Range:1-10)
- **timeout** *time_out*—The number of seconds to wait for a response to a probe packet. (Range:1-60)

- **source** *ip-address*—One of the interface addresses of the device to use as a source address for the probes. The device will normally pick what it feels is the best source address to use. (Range: Valid IP Address)
- **tos** *tos*—The Type-Of-Service byte in the IP Header of the packet. (Range: 0-255)

Default Configuration

size *packet_size*—The default is 40 bytes.

ttl *max-ttl*—The default is 30.

count *packet_count*—The default count is 3.

timeout *time_out*—The default is 6 seconds.

Command Mode

User EXEC mode

User Guidelines

- The **traceroute** command works by taking advantage of the error messages generated by a device 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 device 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 device 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 with **Esc.**

Examples

```
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 the significant fields shown in the display

Field	Description
1	Indicates the sequence number of the router 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 of the probes that are sent.

The following table describes the characters that can 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.
H	Host unreachable.
N	Network unreachable.
P	Protocol unreachable.
Q	Source quench.
U	Port unreachable.

telnet

The **telnet** User EXEC mode command is used to log in to a host that supports Telnet.

Syntax

telnet *ip-address* | *hostname* [*port*] [*keyword1*.....]

- *ip-address*—IP address of the destination host. (Range: 1 - 160 characters)
- *hostname*—Hostname of the destination host (Range: Valid IP Address)
- *port*—A decimal TCP port number, or one of the keywords from the ports table in the usage guidelines. The default is the Telnet port (decimal23) on the host.
- *keyword*—Can be one or more keywords from the keywords table in the User Guidelines.

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

- The Telnet software supports special Telnet commands in the form of Telnet sequences that map generic terminal control functions to operating system-specific functions. To issue a special Telnet command, enter Esc and then a command character.

Special Telnet Command characters

Escape Sequence	Purpose
Ctrl-shift-6 b	Break
Ctrl-shift-6 c	Interrupt Process (IP)
Ctrl-shift-6 h	Erase Character (EC)
Ctrl-shift-6 o	Abort Output (AO)
Ctrl-shift-6 t	Are You There? (AYT)
Ctrl-shift-6 u	Erase Line (EL)
Ctrl-shift-6 x	Suspends the Session

At any time during an active Telnet session, the Telnet commands can be listed by pressing the Ctrl-shift-6 key, followed by a question mark at the system prompt: Ctrl-shift-6?

A sample of this list follows.

```
Console> 'Ctrl-shift-6' ?
[Special telnet escape help]
Esc B sends telnet BREAK
Esc C sends telnet IP
Esc H sends telnet EC
Esc O sends telnet AO
Esc T sends telnet AYT
Esc U sends telnet EL
Esc x suspends the session (return to system command prompt)
```

Several concurrent Telnet sessions can be opened and switched between them. To open a subsequent session, the current connection needs to be suspended, by pressing the escape sequence 'Ctrl-Shift-6' and 'x' to return to the system command prompt. Then open a new connection with the telnet command.

Keywords Table

Options	Description
/echo	Enables local echo
/quiet	Prevents onscreen display of all messages from the software.
/source-interface	Specifies the source interface.

/stream	Turns on stream processing, which enables a raw TCP stream with no Telnet control sequences. A stream connection does not process Telnet options and can be appropriate for connections to ports running UNIX-to-UNIX Copy Program (UUCP) and other non-Telnet protocols.
Ctrl-shift-6 x	Return to System Command Prompt

Ports Table

Keyword	Description	Port number
bgp	Border Gateway Protocol	179
chargen	Character generator	19
cmd	Remote commands	514
daytime	Daytime	13
discard	Discard	9
domain	Domain Name Service	53
echo	Echo	7
exec	Exec	512
finger	Finger	79
ftp	File Transfer Protocol	21
ftp-data	FTP data connections	20
gopher	Gopher	70
hostname	NIC hostname server	101
ident	Ident Protocol	113
irc	Internet Relay Chat	194
klogin	Kerberos login	543
kshell	Kerberos shell	544
login	Login	513
lpd	Printer service	515
nntp	Network News Transport Protocol	119
pim-auto-rp	PIM Auto-RP	496
pop2	Post Office Protocol v2	109

pop3	Post Office Protocol v3	110
smtp	Simple Mail Transport Protocol	25
sunrpc	Sun Remote Procedure Call	111
syslog	Syslog	514
tacacs	TAC Access Control System	49
talk	Talk	517
telnet	Telnet	23
time	Time	37
uucp	Unix-to-Unix Copy Program	540
whois	Nickname	43
www	World Wide Web	80

Example

```
Console> telnet 176.213.10.50
Esc U sends telnet EL
```

resume

The **resume** User EXEC mode command is used to switch to another open Telnet session.

Syntax

resume [*connection]*

- *connection*—The connection number. The default is the most recent connection

Default Configuration

There is no default configuration for this command.

Command Mode

User EXEC mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following command switches to another open Telnet session.

```
Console> resume 176.213.10.50
```

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
```

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

- *name*—The device host name. 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.

Example

The following example specifies the device host name.

```
Console (config)# hostname Dell
```

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
```

show sessions

The **show sessions** User EXEC mode command lists the open Telnet sessions.

Syntax

show sessions

This command has no arguments or keywords.

Default Configuration

There is no default configuration for this command.

Command Mode

EXEC mode

User Guidelines

1. Open telnet session from PC 5324 to other device.
2. In the other device syntax, press **Cntrl-shift-t-X**
3. Enter the command **show session**. The number of sessions opened from PC 5324 is displayed.
4. Enter the command **resume** [**number of session**] to return to the relevant telnet session.

Examples

The following table describes the significant fields shown in the display:

```
Console> show sessions

Connecti  Host            Address     Port            Byte
on
--------  --------------  --------    -----           ----
1         Remote device   172.16.1.1  23              89
2         172.16.1.2      172.16.1.2  23              8
```

Field	Description
Connection	Connection number
Host	Remote host to which the device is connected through a Telnet session.
Address	IP address of the remote host.
Port	Telnet TCP port number
Byte	Number of unread bytes for the user to see on the connection.

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:                                  Corporate
System Up Time (days,hour:min:sec):                  1,22:38:21
System Contact:
System Name:                                         RS1
System location:
System MAC Address:                                  00:10:B5:F4:00:01
Sys Object ID:
Type: PowerConnect 5324

Power Supply                Status
------------                --------------------
Main                        OK
Secondary                   OK

Fan                         Status
------------                --------------------
1                           OK
2                           OK
```

show version

The **show version** User EXEC mode command displays the 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 a system version (this version number is only for demonstration purposes).

```
Router# show version
SW version 3.131  (  date 23-Jul-2002  time 17:34:19  )
HW version  1.0.0

Router# show clock
15:29:03 Jun 17 2002

Router# show history
show version
show clock
show history
3 commands were logged (buffer size is 10)
```

asset-tag

The **asset-tag** Global Configuration mode command specifies the device asset tag. To remove the existing asset tag, use the **no** form of the command.

Syntax

asset-tag *tag*

no asset-tag

- *tag*—The device asset tag. (Range: 1- 16 characters)

Default Configuration

This command has no default configuration. No asset tag is defined by default.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example specifies the device asset tag as "1qwepot".

```
Console (config)# asset-tag 1qwepot
```

show system id

The **show system id** User EXEC mode command displays the ID information.

Syntax

show system id

Default Configuration

This command has no default configuration.

Command Mode

User EXEC mode

User Guidelines

- The tag information is on a device by device basis.

Example

The following example displays the system service tag information.

```
Console> show system id
Service Tag: 89788978
Serial number: 8936589782
Asset tag: 7843678957
```

TACACS Commands

tacacs-server host

The **tacacs-server host** Global Configuration mode command specifies a TACACS+ host. To delete the specified name or address, use the **no** form of this command.

Syntax

tacacs-server host {*ip-address* | *hostname*} [**single-connection**] [**port** *port-number*] [**timeout** *timeout*] [**key** *key-string*] [**source** *source*] [**priority** *priority*]

no tacacs-server host {*ip-address* | *hostname*}

- *ip-address*—Name or IP address of the host.
- *hostname*—Hostname of the tacacs server. (Range: 1 - 158 characters)
- **single-connection**—Specify single-connection. Rather than have the device open and close a TCP connection to the daemon each time it must communicate, the single-connection option maintains a single open connection between the device and the daemon.
- *port-number*—Specify a server port number. If unspecified, the port number defaults to 49. (Range: 0 - 65535)
- *timeout*—Specifies the timeout value in seconds. If no timeout value is specified, the global value is used. (Range: 1 - 30)
- *key-string*—Specifies the authentication and encryption key for all TACACS communications between the device and the TACACS server. This key must match the encryption used on the TACACS daemon. If no key string value is specified, the global value is used. (Range: 0 - 128 characters)
- *source*—Specifies the source IP address to use for the communication. If no source value is specified, the global value is used.
- *priority*—Determines the order in which the servers will be used, when 0 is the highest priority. If unspecified defaults to 0. (Range: 0 - 65535)

Default Configuration

No TACACS host is specified

Command Mode

Global Configuration mode

User Guidelines

- Multiple **tacacs-server host** commands can be used to specify multiple hosts.

- If no host-specific timeout, key or source values are specified, the global values apply to each host.

Example

The following example specifies a TACACS+ host.

```
Console (config)# tacacs-server host 172.16.1.1
```

tacacs-server key

The **tacacs-server key** Global Configuration mode command sets the authentication encryption key used for all TACACS+ communications between the device and the TACACS+ daemon. To disable the key, use the **no** form of this command.

Syntax

tacacs-server key *key-string*

no tacacs-server key

- *key-string*—Specifies the authentication and encryption key for all TACACS communications between the device and the TACACS server. This key must match the encryption used on the TACACS daemon. (Range: 0 - 128 characters)

Default Configuration

Empty string

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following example sets the authentication encryption key.

```
Console (config)# tacacs-server key dell-s
```

tacacs-server timeout

The **tacacs-server timeout** Global Configuration mode command sets the timeout value. To restore the default, use the **no** form of this command.

Syntax

tacacs-server timeout *timeout*

no tacacs-server timeout

- *timeout*—Specifies the timeout value in seconds. (Range: 1 - 30)

Default Configuration

5 seconds

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following example sets the timeout value as 30.

```
Console (config)# tacacs-server timeout 30
```

tacacs-server source-ip

The **tacacs-server source-ip** Global Configuration mode command specifies the source IP address that will be used for the communication with TACACS servers. To return to default, use the **no** form of this command.

Syntax

tacacs-server source-ip *source*

no tacacs-server source-ip *source*

- *source*—Specifies the source IP address. (Range: Valid IP Address)

Default Configuration

The IP address would be of the outgoing IP interface.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following example specifies the source IP address.

```
Console (config)# tacacs-server source-ip 172.16.8.1
```

show tacacs

The **show tacacs** Privileged EXEC mode command displays configuration and statistics for a TACACS+ server.

Syntax

show tacacs [*ip-address*]

- *ip-address*—Name or IP address of the host.

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 configuration and statistic for a TACACS+ server.

```
Console# show tacacs
IP address   Status     Port   Single      TimeOut   Source    Priority
                               Connection            IP
----------   --------   -----  ---------   -------   -------   --------
172.16.1.1   Connected  49     No          Global    Global    1

Global values
--------------
TimeOut: 3
Source IP: 172.16.8.1
```

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User Interface

enable

The **enable** User EXEC mode command enters the privileged EXEC mode.

Syntax

enable [*privilege-level*]

- *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 shows how to enter privileged mode:

```
Console> enable
enter password:
Console#
```

disable

The **disable** Privileged EXEC mode command returns to User EXEC mode.

Syntax

disable [*privilege-level*]

- *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 shows how to return to normal 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 shows how to enter privileged EXEC mode and login.

```
Console> login
User Name:admin
Password:*****


Console#
```

configure

The **configure** Privileged EXEC mode command enters the global configuration mode.

Syntax

configure

This command has no keywords or arguments.

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 the following example, because no keyword is entered, a prompt is displayed. After the keyword is selected, a message confirming the command entry method is displayed.

```
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 command modes

User Guidelines

- There are no user guidelines for this command.

Example

The following example changes the configuration mode from Interface Configuration mode to User EXEC mode.

```
Console(config-if)# exit
Console(config)# exit
Console#
```

exit(EXEC)

The **exit** 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

User EXEC mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example closes an active terminal session.

```
Console> exit
```

end

The **end** Global Configuration mode command ends the current configuration session and returns to the privileged command mode.

Syntax

end

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 ends the current configuration session and returns to the previous command 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.

history

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

Syntax

history

no history

Default Configuration

The history function is enabled.

Command Mode

Line Configuration mode

User Guidelines

- There are no user guidelines for this 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 changes the command history buffer size for a particular line. To reset the command history buffer size to the default, use the **no** form of this command.

Syntax

history size *number-of-commands*

no history size

- *number-of-commands*—Number of commands that the system records in its history buffer. (Range: 0 - 256)

Default Configuration

The default history buffer size is 10.

Command Mode

Line Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

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

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

debug-mode

The **debug-mode** Privilege EXEC mode command switches the mode to debug.

Syntax

debug-mode

Default Configuration

This command has no default configuration.

Command Mode

Privilege EXEC command mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example enables the debug command interface.

```
console(config)#
console# debug
>debug
Enter DEBUG Password: *****
DEBUG>
```

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 command mode

User Guidelines

- The commands are listed from the first to the latest command.
- The buffer is kept unchanged when entering to configuration mode and returning back.
- The command in the buffer includes the commands that were not executed.

Example

The following example displays all the commands entered while in the current privileged EXEC mode.

```
Console# show history
show version
show clock
show history
```

show privilege

The **show privilege** User EXEC mode command displays the current privilege level.

Syntax

show privilege

Default Configuration

This command has no default configuration.

Command Mode

User EXEC command mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example displays the current privilege level.

```
Console# show privilege
Current privilege level is 15
```

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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*}

- *vlan-range*—A list of valid VLAN IDs to be added. List separate, non-consecutive VLAN IDs separated by commas (without spaces); use a hyphen to designate a range of IDs. (Range: 2 - 4094)

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
```

default-vlan disable

The **default-vlan disable** VLAN Configuration mode command disables the default VLAN functionality. Use the **no** form of this command to enable the default VLAN functionality.

Syntax

default-vlan disable

no default-vlan disable

This command has no keywords or arguments.

Default Configuration

Enabled

Command Modes

VLAN Configuration mode

User Guidelines

- There are no user guidelines for this command.

Examples1

```
Console# vlan database
Console(config-vlan)# default-vlan disable
```

interface vlan

The **interface vlan** Global Configuration mode command enters the interface configuration (VLAN) mode.

Syntax

interface vlan *vlan-id*

- *vlan-id*—The ID of an existing VLAN (excluding GVRP dynamic VLANs).

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 the VLAN 1 IP address of 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 enters the interface configuration mode to configure multiple VLANs.

Syntax

interface range vlan {*vlan-range* | **all**}

- *vlan-range*—A list of valid VLAN IDs to add. Separate non consecutive 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 continues on other interfaces.

Example

The following example groups VLAN 221 until 228 and VLAN 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

- *string*—Unique name, up to 32 characters in length, to be associated with this VLAN.

Default Configuration

No name is defined.

Command Mode

Interface Configuration (VLAN) mode

User Guidelines

- The VLAN name should be unique.

Example

The following example names VLAN number 19 with the name "Marketing".

```
Console (config)# interface vlan 19
Console (config-if)# name Marketing
```

switchport access vlan

The **switchport access vlan** Interface Configuration mode command configures the VLAN ID when the interface is in access mode. To reconfigure the default, use the **no** form of this command.

Syntax

switchport access vlan *vlan-id*

no switchport access vlan

- *vlan-id*—VID of the VLAN to which the port is configured.

Default Configuration

VID=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 interface number g8.

```
Console (config)# interface ethernet g8
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*}

- **add** *vlan-list*—List of VLAN IDs to add. Separate non consecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.
- **remove** *vlan-list*—List of VLAN IDs to remove. Separate non consecutive VLAN IDs with a comma and no spaces. A hyphen designate 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 shows how to add VLANs 2 and 5 to 8 to the allowed list of g8.

```
Console (config)# interface ethernet g8
Console (config-if)# switchport trunk allowed vlan add 2,5-8
```

switchport trunk native vlan

The **switchport trunk native vlan** Interface Configuration mode command defines the port as a member of the specified VLAN, and the VLAN ID as the "port default VLAN ID (PVID)". To configure the default VLAN ID, use the **no** form of this command.

Syntax

switchport trunk native vlan *vlan-id*

no switchport trunk native vlan

- *vlan-id*—Valid VLAN ID of the native VLAN.

Default Configuration

If default VLAN is enabled, then the VID=1, otherwise VID = 4095.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- This command has the following consequences: incoming untagged frames are assigned to this VLAN and outgoing traffic in this VLAN on this port is sent untagged (despite the normal situation where traffic sent from a trunk-mode port is all tagged).
- 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 g8, in trunk mode, is configured to use VLAN number 123 as the "native" VLAN.

```
Console (config)# interface ethernet g8
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*

- **add** *vlan-list*—List of VLAN IDs to add. Separate non consecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.
- **remove** *vlan-list*—List of VLAN IDs to remove. Separate non consecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.
- **tagged**—Sets the port to transmit tagged packets for the VLANs. If the port is added to a VLAN without specifying tagged or untagged the default is tagged.
- **untagged**—Sets the port to transmit untagged packets for the VLANs.

Default Configuration

This command has no default configuration.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- You can use this command to change the egress rule (e.g. from tagged to untagged), without first removing the VLAN from the list.

Example

The following example shows how to add VLANs 2, 5, and 6 to the allowed list.

```
Console (config)# interface ethernet g8
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 configure the default value, use the **no** form of this command.

Syntax

switchport general pvid *vlan-id*

no switchport general pvid

- *vlan-id*—PVID (Port VLAN ID). The vlan-id may belong to a non-existent VLAN.

Default Configuration

VLAN ID=1

Command Mode

Interface configuration (Ethernet, port-channel) mode

User Guidelines

- This command has the following consequences: incoming untagged frames are assigned to this VLAN and outgoing traffic in this VLAN on this port is sent untagged (despite the normal situation where traffic sent from a trunk-mode port is all tagged).

Example

The following example shows how to configure the PVID for g8, when the interface is in general mode.

```
Console (config)# interface ethernet g8
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 enable ingress filtering on a port, 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 shows how to enables port ingress filtering on g8.

```
Console (config)# interface ethernet g8
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 enable untagged frames at ingress, 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 g8 to discard untagged frames at ingress.

```
Console (config)# interface ethernet g8
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. This may be used to prevent GVRP from automatically making these VLANs active on the selected ports. To revert to allowing the addition of specific VLANs to the port, use the **remove** parameter for this command.

Syntax

switchport forbidden vlan {**add** *vlan-list* | **remove** *vlan-list*}

- **add** *vlan-list*—List of VLAN IDs to add to the "forbidden" list. Separate non consecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.
- **remove** *vlan-list*—List of VLAN IDs to remove from the "forbidden" list. Separate non consecutive VLAN IDs with a comma and no spaces. A hyphen designates a range of IDs.

Default Configuration

All VLANs allowed.

Command Mode

Interface Configuration (Ethernet, port-channel) mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example forbids adding VLANs number 234 till 256, to g8.

```
Console (config)# interface ethernet g8
Console (config-if)# switchport forbidden vlan add 234-256
```

map protocol protocols-group

The **map protocol protocols-group** VLAN Configuration mode command maps a protocol to a protocol group. Protocol groups are used for protocol-based VLAN assignment. To delete a protocol from a group, use the no form of this command.

Syntax

map protocol *protocol* [*encapsulation*] **protocols-group** *group*

no map protocol *protocol encapsulation*

- *protocol*—The protocol is a 16 or 40 bits protocol number or one of the following names, **ip-arp** or **ipx**. The protocol number is in Hex format (Range: 0600 - FFFF).
- *encapsulation*—One of the following values: **ethernet**, **rfc1042** or **llcOther**. If no option is indicated the default is **ethernet**.
- *group*—Protocol group number (Range: 1 - 2147483647).

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 maps protocol ip-arp to the group named "213".

```
Console (config)# vlan database
Console (config-vlan)# map protocol ip-arp protocols-group 213
```

switchport general map protocols-group vlan

The **switchport general map protocols-group vlan** Interface Configuration mode command sets a protocol-based classification rule. To delete a classification, use the **no** form of this command.

Syntax

switchport general map protocols-group *group* **vlan** *vlan-id*

no switchport general map protocols-group *group*

- *group*—Group number as defined in the **map protocol protocols-group** command. (Range: 1 - 2147483647)
- *vlan-id*—Define the VLAN ID in the classifying rule.

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 sets a protocol-based classification rule of protocol group 1 to VLAN 8.

```
Console (config)# interface ethernet g8
Console (config-if)# switchport general map protocols-group 1 vlan
8
```

ip internal-usage-vlan

The **ip internal-usage-vlan** Interface Configuration mode command reserves a VLAN as the internal usage VLAN of an interface. Use the **no** form of this command to reset to default.

Syntax

ip internal-usage-vlan *vlan-id*

no ip internal-usage-vlan

- *vlan-id*—VLAN ID of the internal usage VLAN.(Range: Valid VLAN)

Default Configuration

This command has no default configuration.

Command Mode

Interface configuration (Ethernet, port-channel)

User Guidelines

- An internal usage VLAN is required when an IP interface is defined on Ethernet port or Port-channel.
- Using this command the user can define the internal usage VLAN of a port.
- If an internal-usage is not defined for a Port, and the user wants to define an IP interface, the software chooses one of the unused VLANs.
- If a VLAN ID was chosen by the software for internal usage, and the user wants to use that VLAN ID for static or dynamic VLAN, he should either remove the IP interface, creates the VLAN, and recreate the IP interface, or use this command to define explicit internal usage VLAN.

Examples

The following example reserves a VLAN as the internal usage VLAN of an interface.

```
Console (config)# ip internal-usage-vlan 10
```

show vlan

The **show vlan** Privileged EXEC mode command displays VLAN information.

Syntax

show vlan [**tag** *vlan-id* | **name** *vlan-name*]

- *vlan-id*—A valid VLAN ID
- *vlan-name*—A valid 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       g1-2      other            Required
                              g1-4
10              VLAN0010      g3-4      dynamic          Required
11              VLAN0011      g1-2      static           Required
20              VLAN0020      g3-4      static           Required
21              VLAN0021                static           Required
30              VLAN0030                static           Required
31              VLAN0031                static           Not Required
```

show vlan internal usage

The **show vlan internal usage** Privileged EXEC mode command displays a list of VLANs being used internally by the switch.

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 all VLAN information.

```
Console# show vlan internal usage
VLAN       Usage              Reserved          IP Address
----       ---------          ----------        ----------
1007       g21                No                Active
1008       g22                Yes               Inactive
1009       g23                Yes               Active
```

show vlan protocols-groups

The **show vlan protocols-groups** Privileged EXEC mode command displays protocols-groups information.

Syntax

show vlan protocols-groups

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 protocols-groups information.

```
Console# show vlan protocols-groups

Encapsulation   Protocol        Group Id
-------------   --------        --------
ethernet        08 00           213
ethernet        08 06           213
ethernet        81 37           312
ethernet        81 38           312
rfc1042         08 00           213
rfc1042         08 06           213
```

show interfaces switchport

The **show interfaces switchport** Privileged EXEC mode command displays switchport configuration.

Syntax

show interfaces switchport {**ethernet** *interface* | **port-channel** *port-channel-number*}

- *Interface*—Specific interface, such as ethernet g8.
- *port-channel-number*—Valid port-channel trunk index.

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 switchport configuration individually for g1.

```
Console# show interface switchport ethernet g1
Port g1:
Port mode: General
GVRP Status: disabled
Ingress Filtering: true
Acceptable Frame Type: admitAll
Ingress Untagged VLAN (NATIVE) : 1
Port is member in:
Vlan        Name                Egress rule   Type
----        -------             -----------   ---------
1           default             untagged      System
8           VLAN008             tagged        Dynamic
11          VLAN011             tagged        Static

Forbidden VLANS:
VLAN        Name
----        ----
73          Out

Classification rules:
Group ID    VLAN
--------    ----
219         372
```

switchport mode

Use the **switchport mode** interface configuration command to configure the VLAN membership mode of a port. Use the no form of this command to reset the mode to the appropriate default for the device.

Syntax

switchport mode {**customer** | **access** | **trunk** | **general**}

no switchport mode

- **customer** — The port is connected to customer equipment. Used when the switch is in a provider network.
- **access** — Untagged layer 2 VLAN interface
- **trunk** — Trunking layer 2 VLAN interface
- **general** — Full 802.1q support VLAN interface

Default Configuration

All ports are in access mode, and belong to the default VLAN (whose VID=1).

Command Modes

Interface configuration (Ethernet, port-channel)

User Guidelines

- There are no user guidelines for this command

Example

The following example onfigures the VLAN membership mode of a port. Use the no form of this command to reset the mode to the appropriate default for the device.

```
console# config
console(config)# interface ethernet g1
console(config-if)# switchport mode customer
```

switchport customer vlan

Use the **switchport customer vlan** interface configuration command to set the port's VLAN when the interface is in customer mode. Use the **no** form of this command to revert to default.

Syntax

switchport customer vlan *vlan-id*

no switchport customer vlan

- *vlan-id* — VLAN ID of the customer

Default Configuration

No VLAN is configured.

Command Modes

Interface configuration (Ethernet, port-channel)

User Guidelines

- There are no user guidelines for this command.

Example

The following example sets the port's VLAN when the interface is in customer mode.

```
Console(config)# interface ethernet g5
Console(config-if)# switchport customer vlan vlan-id
```

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Web Server

ip http server

The **ip http server** Global Configuration mode command enables the device to be configured 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 disabled by default.

Command Mode

Global Configuration mode

User Guidelines

- Only a user with access level 15 can use the web server.

Example

The following example enables the device to be configured from a browser.

```
Console (enable)# ip http server
```

ip http port

The **ip http port** Global Configuration mode command specifies the TCP port for use by a web browser to configure the device. To use the default TCP port, use the **no** form of this command.

Syntax

ip http port *port-number*

no ip http port

- *port-number*—Port number for use by the HTTP server. (Range: 0 - 65535)

Default Configuration

This default port number is 80.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command. However, specifying 0 as the port number will effectively disable HTTP access to the device.

Example

The following example shows how the http port number is configured to 100.

```
Console (config)# ip http port 100
```

ip https server

The **ip https server** Global Configuration mode command enables the device to be configured from a secured browser. To disable this function, use the **no** form of this command.

Syntax

ip https server

no ip https server

Default Configuration

The default for the device is disabled.

Command Mode

Global Configuration mode

User Guidelines

- You must use the **crypto certificate generate** command to generate the HTTPS certificate.

Example

The following example enables the device to be configured from a browser.

```
Console (enable)# ip https server
```

ip https port

The **ip https port** Global Configuration mode command configures a TCP port for use by a secure web browser to configure the device. To use the default port, use the **no** form of this command.

Syntax

ip https port *port-number*

no ip https port

- *port-number*—Port number for use by the HTTP server. (Range: 0 - 65535)

Default Configuration

This default port number is 443.

Command Mode

Global Configuration mode

User Guidelines

- There are no user guidelines for this command.

Example

The following example configures the https port number to 100.

```
Console (enable)# ip https port 100
```

crypto certificate generate

The **crypto certificate generate** Global Configuration mode command generates a HTTPS certificate.

Syntax

crypto certificate [*number*] **generate** [**key-generate** [*length*]] [**passphrase** *string*] [**cn** *common-name*] [**ou** *organization-unit*] [**o** *organization*] [**l** *location*] [**st** *state*] [**c** *country*] [**duration** *days*]

- *number* —Specifies the certificate number. If unspecified, defaults to 1. (Range: 1 - 2)
- **key-generate**—Regenerate SSL RSA key.
- *length*—Specifies the SSL RSA key length. If unspecified, length defaults to 1024. (Range: 512 - 2048)
- **passphrase** *string*—Passphrase that is used for exporting the certificate in PKCS12 file format. If unspecified the certificate is not exportable. (Range: 8 - 96)
- **cn** *common- name*—Specifies the fully qualified URL or IP address of the device. If unspecified, defaults to the lowest IP address of the device (where the certificate is generated). (Range: 1 - 64)
- **ou** *organization-unit*—Specifies the organization-unit or department name.(Range: 1 - 64)
- **o** *organization*—Specifies the organization name. (Range: 1 - 64)
- **l** *location*—Specifies the location or city name. (Range: 1 - 64)
- **st** *state*—Specifies the state or province name. (Range: 1 - 64)
- **c** *country*—Specifies the country name. (Range: 1 - 2)
- **duration** *days*—Specifies number of days a certification would be valid. If unspecified defaults to 365 days. (Range: 30 - 3650)

Default Configuration

The Certificate and the SSL RSA key pairs do not exist.

Command Mode

Global Configuration mode

User Guidelines

- The command is not saved in the device configuration; however, the certificate and keys generated by this command are saved in the private configuration, which is never displayed to the user or backed up to another device.
- Use this command to generate self-signed certificate for your device.
- When you export an RSA key pair to a PKCS#12 file, the RSA key pair is as secure as the passphrase. Therefore, keep the passphrase secure.

Example

The following example regenerates a HTTPS certificate.

```
Console (enable)# crypto certificate generate key-generate
```

crypto certificate request

The **crypto certificate request** Privileged EXEC mode command generates and displays certificate requests for HTTPS.

Syntax

crypto certificate *number* **request** *common- name* [**ou** *organization-unit*] [**o** *organization*] [**l** *location*] [**st** *state*] [**c** *country*]

- *number*—Specifies the certificate number. (Range: 1 - 2)
- *common- name*—Specifies the fully qualified URL or IP address of the device. (Range: 1- 64)
- **ou** *organization-unit*—Specifies the organization-unit or department name. (Range: 1- 64)
- **o** *organization*—Specifies the organization name. (Range: 1- 64)
- **l** *location*—Specifies the location or city name. (Range: 1- 64)
- **st** *state*—Specifies the state or province name. (Range: 1- 64)
- **c** *country*— Specifies the country name. (Range: 1- 2)

Default Configuration

There is no default configuration for this command.

Command Mode

Privileged EXEC mode

User Guidelines

- Use this command to export a certificate request to a Certification Authority. The certificate request is generated in Base64-encoded X.509 format.
- Before generating a certificate request you must first generate a self-signed certificate using the **crypto certificate generate** Global Configuration mode command.
- After receiving the certificate from the Certification Authority, use the **crypto certificate import** Global Configuration mode command to import the certificate into the device. This certificate would replace the self-signed certificate.

Examples

The following example generates and displays a certificate request for HTTPS.

```
Console# crypto certificate 1 request
-----BEGIN CERTIFICATE REQUEST-----
MIwTCCASoCAQAwYjELMAkGA1UEBhMCUFAxCzAJBgNVBAgTAkNDMQswCQYDVQQH
EwRDEMMAoGA1UEChMDZGxkMQwwCgYDVQQLEwNkbGQxCzAJBgNVBAMTAmxkMRAw
DgKoZIhvcNAQkBFgFsMIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQC8ecwQ
HdML0831i0fh/F0MV/Kib6Sz5p+3nUUenbfHp/igVPmFM+1nbqTDekb2ymCu6K
aKvEbVLF9F2LmM7VPjDBb9bb4jnxkvwW/wzDLvW2rsy5NPmH1QVl+8Ubx3GyCm
/oW93BSOFwxwEsP58kf+sPYPy+/8wwmoNtDwIDAQABoB8wHQYJKoZIhvcNAQkH
MRDjEyMwgICCAgICAICAgIMA0GCSqGSIb3DQEBBAUAA4GBAGb8UgIx7rB05m+2
m5ZZPhIwl8ARSPXwhVdJexFjbnmvcacqjPG8pIiRV6LkxryGF2bVU3jKEipcZa
g+uNpyTkDt3ZVU72pjz/fa8TF0n3
-----END CERTIFICATE REQUEST-----

CN= router.gm.com
0= General Motors
C= US
```

crypto certificate import

The **crypto certificate import** Global Configuration mode command imports a certificate signed by Certification Authority for HTTPS.

Syntax

crypto certificate number import

- number—Specifies the certificate number. (Range: 1 - 2)

Default Configuration

There is no default configuration for this command.

Command Mode

Global configuration mode

User Guidelines

- Use this command to enter an external certificate (signed by Certification Authority) to the device. To end the session, enter a new line, enter "." (period) and add another new line.
- The imported certificate must be based on a certificate request created by the **crypto certificate request** Privileged EXEC mode command.
- If the public key found in the certificate does not match the device's SSL RSA key, the command will fail.
- This command is not saved in the device configuration; however, the certificate imported by this command is saved in the private configuration (which is never displayed to the user or backed up to another device).

Examples

The following example imports a certificate signed by Certification Authority for HTTPS.

```
Console(config)# crypto certificate 1 import
-----BEGIN CERTIFICATE-----
dHmUgUm9vdCBDZXJ0aWZpZXIwXDANBgkqhkiG9w0BAQEFAANLADBIAkEAp4HS
nnH/xQSGA2ffkRBwU2XIxb7n8VPsTm1xyJ1t11a1GaqchfMqqe0kmfhcoHSWr
yf1FpD0MWOTgDAwIDAQABo4IBojCCAZ4wEwYJKwYBBAGCNxQCBAYeBABDAEEw
CwR0PBAQDAgFGMA8GA1UdEwEB/wQFMAMBAf8wHQYDVR0OBBYEFAf4MT9BRD47
ZvKBAEL9Ggp+6MIIBNgYDVR0fBIIBLTCCASkwgdKggc+ggcyGgclsZGFwOi8v
L0VByb3h5JTIwU29mdHdhcmUlMjBSb290JTIwQ2VydGlmaWVyLENOPXNlcnZl
-----END CERTIFICATE-----

Certificate imported successfully.
Issued to: router.gm.com
Issued by: www.verisign.com
Valid from: 8/9/2003 to 8/9/2004
Subject: CN= router.gm.com, 0= General Motors, C= US
Finger print: DC789788 DC88A988 127897BC BB789788
```

ip https certificate

The **ip https certificate** Global Configuration mode command configures the active certificate for HTTPS. Use the **no** form of this command to return to default.

Syntax

ip https certificate *number*

no ip https certificate

- *number*—Specifies the certificate number. (Range: 1 - 2)

Default Configuration

Certificate number 1.

Command Mode

Global configuration mode

User Guidelines

- The **crypto certificate generate** command should be used in order to generate HTTPS certificates.

Example

The following example configures the active certificate for HTTPS.

```
Console (config)# ip https certificate 1
```

crypto certificate export pkcs12

The **crypto certificate export pkcs12** Privileged EXEC mode command, exports the certificate and the RSA keys within a PKCS12 file.

Syntax

crypto certificate *number* **export pkcs12**

- number—Specifies the certificate number. (Range: 1 - 2)

Default Configuration

There is no default configuration for this command.

Command Mode

Privileged EXEC mode

User Guidelines

- The **crypto certificate export pkcs12** command creates a PKCS 12 file that contains the certificate and an RSA key pair.
- The passphrase for the exporting is determined when the key is generated.
- The certificate and key pair is exported in standard PEM-format PKCS12 file. This format can be converted to and from the binary PFX file used by Windows and Linux by using the openssl command-line tool. See the OpenSSL user manual (man pkcs12) for more information.

Example

The following example exports the certificate and RSA keys.

```
Console# crypto certificate 1 export pkcs12
Bag Attributes
localKeyID: 0C 75 81 77 5A 31 53 D1 FF 4E 26 BE 8D 4A FD 8B 22 9F 45 D4
subject=/C=us/ST= /L= /CN= /O= /OU=
issuer= /C=us/ST= /L= /CN= /O= /OU=
-----BEGIN CERTIFICATE-----
MIIBfDCCASYCAQAwDQYJKoZIhvcNAQEEBQAwSTELMAkGA1UEBhMCdXMxCjAIBgNV
BAgTASAxCjAIBgNVBAcTASAxCjAIBgNVBAMTASAxCjAIBgNVBAoTASAxCjAIBgNV
BAsTASAwHhcNMDQwMjA3MTU1NDQ4WhcNMDUwMjA2MTU1NDQ4WjBJMQswCQYDVQQG
EwJ1czEKMAgGA1UECBMBIDEKMAgGA1UEBxMBIDEKMAgGA1UEAxMBIDEKMAgGA1UE
ChMBIDEKMAgGA1UECxMBIDBcMA0GCSqGSIb3DQEBAQUAA0sAMEgCQQCZXP/tk3e/
jrulfZw8q8T2oS5ymrEIes/sRJE8uahTBJqKu1VHqRYJR3VYa/03HSJ741w5MzPI
iuWZzrbbuXAxAgMBAAEwDQYJKoZIhvcNAQEEBQADQQBQ+GTLeN1p1kARxI4C1fTU
efig3ffZ/tjW5q1t1r5F6zNv/GuXWw7rGzmRyoMXDcYp1TaA4gAIFQCpFGqiSbAx
-----END CERTIFICATE-----
Bag Attributes
localKeyID: 0C 75 81 77 5A 31 53 D1 FF 4E 26 BE 8D 4A FD 8B 22 9F 45 D4
Key Attributes: <No Attributes>
-----BEGIN RSA PRIVATE KEY-----
Proc-Type: 4,ENCRYPTED
DEK-Info: DES-EDE3-CBC,085DCBF3A41D2669
dac0m9jqEp1DM50sIDb8Jq1jxW/1P0kqSxuMhc25OdBE/1fPBg9VSvV1ARaYt16W
bX67UyJ8t7HHF3AowjcWzElQ5GJgSQ0VemsqsRQzjpCTb090rx+cNwVfIvjoedgQ
Mtl5+fKIAcqsfEgEGJNXQ4jEzsXAkwfQLFfgt47O3IpkUn0AxrQzutJDOcC28Uxp
raMVTVSlSkJIvaPuXJxdZ279tDMwZffILBfKCJGACT5V5/4WEqDkrF+uuF9/oxm2
5SVL8TvUmXB/3hX4UoaXtxAhuyOdhh1kyyZSpw9BPPR/8bc/wUYERh7+7JXLKHpd
ueeu3znfIX4dDeti8B3xYvvE8kGZjxFN1cC3zc3JsD0IVu1LkyiAa93P4LPEvAwG
Fw1LqmGiiqw9JM/tzc6kYkZXylFzCrSVf2exP+/tEvM=
-----END RSA PRIVATE KEY-----
```

crypto certificate import pkcs12

The **crypto certificate import pkcs12** Privileged EXEC mode command, imports the certificate and the RSA keys within a PKCS12 file.

Syntax

crypto certificate *number* **import pkcs12** *passphrase*

- *number*—Specifies the certificate number. (Range: 1 - 2)
- *passphrase*—Passphrase that is used to encrypt the PKCS12 file for export. (Range: 8 - 96)

Default Configuration

There is no default configuration for this command.

Command Mode

Privileged EXEC mode

User Guidelines

- The passphrase that was exported by the **crypto certificate export pkcs12** command should be used. Please note that this passphrase would be saved for later exports.

Example

The following example imports the certificate and RSA keys.

```
Console# crypto certificate 1 import pkcs12 passphrase
Bag Attributes
localKeyID: 0C 75 81 77 5A 31 53 D1 FF 4E 26 BE 8D 4A FD 8B 22 9F 45 D4
subject=/C=us/ST= /L= /CN= /O= /OU=
issuer= /C=us/ST= /L= /CN= /O= /OU=
-----BEGIN CERTIFICATE-----
MIIBfDCCASYCAQAwDQYJKoZIhvcNAQEEBQAwSTELMAkGA1UEBhMCdXMxCjAIBgNV
BAgTASAxCjAIBgNVBAcTASAxCjAIBgNVBAMTASAxCjAIBgNVBAoTASAxCjAIBgNV
BAsTASAwHhcNMDQwMjA3MTU1NDQ4WhcNMDUwMjA2MTU1NDQ4WjBJMQswCQYDVQQG
EwJ1czEKMAgGA1UECBMBIDEKMAgGA1UEBxMBIDEKMAgGA1UEAxMBIDEKMAgGA1UE
ChMBIDEKMAgGA1UECxMBIDBcMA0GCSqGSIb3DQEBAQUAA0sAMEgCQQCZXP/tk3e/
jrulfZw8q8T2oS5ymrEIes/sRJE8uahTBJqKu1VHqRYJR3VYa/03HSJ741w5MzPI
iuWZzrbbuXAxAgMBAAEwDQYJKoZIhvcNAQEEBQADQQBQ+GTLeN1p1kARxI4C1fTU
efig3ffZ/tjW5q1t1r5F6zNv/GuXWw7rGzmRyoMXDcYp1TaA4gAIFQCpFGqiSbAx
-----END CERTIFICATE-----
Bag Attributes
localKeyID: 0C 75 81 77 5A 31 53 D1 FF 4E 26 BE 8D 4A FD 8B 22 9F 45 D4
Key Attributes: <No Attributes>
-----BEGIN RSA PRIVATE KEY-----
Proc-Type: 4,ENCRYPTED
DEK-Info: DES-EDE3-CBC,085DCBF3A41D2669
dac0m9jqEp1DM50sIDb8Jq1jxW/1P0kqSxuMhc25OdBE/1fPBg9VSvV1ARaYt16W
bX67UyJ8t7HHF3AowjcWzElQ5GJgSQ0VemsqsRQzjpCTb090rx+cNwVfIvjoedgQ
Mtl5+fKIAcqsfEgEGJNXQ4jEzsXAkwfQLFfgt47O3IpkUn0AxrQzutJDOcC28Uxp
raMVTVSlSkJIvaPuXJxdZ279tDMwZffILBfKCJGACT5V5/4WEqDkrF+uuF9/oxm2
5SVL8TvUmXB/3hX4UoaXtxAhuyOdhh1kyyZSpw9BPPR/8bc/wUYERh7+7JXLKHpd
ueeu3znfIX4dDeti8B3xYvvE8kGZjxFN1cC3zc3JsD0IVu1LkyiAa93P4LPEvAwG
Fw1LqmGiiqw9JM/tzc6kYkZXylFzCrSVf2exP+/tEvM=
-----END RSA PRIVATE KEY-----
```

show crypto certificate mycertificate

The **show crypto certificate mycertificate** Privileged EXEC mode command allows you to view the SSL certificates of your device.

Syntax

show crypto certificate mycertificate [*number*]

- number—Specifies the certificate number. (Range: 1- 2)

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 certificate.

```
Console# show crypto certificate mycertificate 1
-----BEGIN CERTIFICATE-----
dHmUgUm9vdCBDZXJ0aWZpZXIwXDANBgkqhkiG9w0BAQEFAANLADBIAkEAp4HS
nnH/xQSGA2ffkRBwU2XIxb7n8VPsTm1xyJ1t11a1GaqchfMqqe0kmfhcoHSWr
yf1FpD0MWOTgDAwIDAQABo4IBojCCAZ4wEwYJKwYBBAGCNxQCBAYeBABDAEEw
CwR0PBAQDAgFGMA8GA1UdEwEB/wQFMAMBAf8wHQYDVR0OBBYEFAf4MT9BRD47
ZvKBAEL9Ggp+6MIIBNgYDVR0fBIIBLTCCASkwgdKggc+ggcyGgclsZGFwOi8v
L0VByb3h5JTIwU29mdHdhcmUlMjBSb290JTIwQ2VydGlmaWVyLENOPXNlcnZl
-----END CERTIFICATE-----

Issued by: www.verisign.com
Valid from: 8/9/2003 to 8/9/2004
Subject: CN= router.gm.com, 0= General Motors, C= US
Finger print: DC789788 DC88A988 127897BC BB789788
```

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
```

show ip https

The **show ip http** Privileged EXEC mode command displays the HTTPS server configuration.

Syntax

show ip https

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 https
HTTPS server enabled.  Port: 443

Certificate 1 is active
Issued by: www.verisign.com
Valid from: 8/9/2003 to 8/9/2004
Subject: CN= router.gm.com, 0= General Motors, C= US
Finger print: DC789788 DC88A988 127897BC BB789788

Certificate 2 is inactive
Issued by: self-signed
Valid from: 8/9/2003 to 8/9/2004
Subject: CN= router.gm.com, 0= General Motors, C= US
Finger print: 1873B936 88DC3411 BC8932EF 782134BA
```

31

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 to authenticate interfaces running IEEE 802.1X. Use the **no** form of this command to return to default.

Syntax

aaa authentication dot1x default *method1* [*method2*...]

no aaa authentication dot1x default

- *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

The default behavior of the "aaa authentication" for dot1.x is "failed to authenticate". If the 8021.x calls the AAA for authentication services it will receive a fail status.

Command Mode

Global configuration mode

User Guidelines

- The additional methods of authentication are used only if the previous method returns an error, for example the authentication server is down, and not if the request for authenticate is denied access. To ensure that the 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-auto-control

The **dot1x system-auto-control** Global Configuration mode command enables 802.1x globally. Use the **no** form of this command to disable 802.1x globally.

Syntax

dot1x system-auto-control

no dot1x system-auto-control

- This command has no arguments or keywords.

Default Configuration

Disabled

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-auto-control
```

dot1x port-control

The **dot1x port-control** Interface Configuration mode command enables manual control of the authorization state of the port. Use the **no** form of this command to return to the default setting.

Syntax

dot1x port-control {auto | force-authorized | force-unauthorized}

no dot1x port-control

- **auto**—Enable 802.1X authentication on the interface and cause the port to transition to the authorized or unauthorized state based on the 802.1X authentication exchange between the switch and the client.
- **force-authorized**—Disable 802.1X authentication on the interface and cause 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**—Deny all access through this interface by forcing the port to transition to the unauthorized state, ignoring all attempts by the client to authenticate. The switch cannot provide authentication services to the client through the interface.

Default Configuration

force-authorized

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 the interface.

```
Console (config)# interface ethernet g8
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. Use the **no** form of this command to return to the default setting.

Syntax

dot1x re-authentication

no dot1x re-authentication

This command has no arguments or keywords.

Default Configuration

Periodic re-authentication is disabled.

Command Mode

Interface configuration (Ethernet)

User Guidelines

- It is recommended to use re-authentication because if re-authentication is not defined, once a port is authenticated, it will remain in this state until the port is down or a log-off message is sent by client.

Examples

The following example enables periodic re-authentication of the client.

```
Console (config)# interface ethernet g8
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. Use the **no** form of this command to return to the default setting.

Syntax

dot1x timeout re-authperiod *seconds*

no dot1x timeout re-authperiod

- *seconds*— Number of seconds between re-authentication attempts. (Range: 300 - 4294967295)

Default Configuration

3600

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 3600.

```
Console (config)# interface ethernet g8
Console (config-if)# dot1x timeout re-authperiod 3600
```

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.

dot1x re-authenticate [**ethernet** *interface*]

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 the 802.1X-enabled port.

```
Console# dot1x re-authenticate ethernet g8
```

dot1x timeout quiet-period

The **dot1x timeout quiet-period** Interface Configuration mode command sets the number of seconds that the switch remains in the quiet state following a failed authentication exchange (for example, the client provided an invalid password). Use the **no** form of this command to return to the default setting.

Syntax

dot1x timeout quiet-period *seconds*

no dot1x timeout quiet-period

- *seconds*—Time in seconds that the switch remains in the quiet state following a failed authentication exchange with the client. (Range: 0 - 65535 seconds)

Default Configuration

60

Command Mode

Interface configuration (Ethernet)

User Guidelines

- During the quiet period, the switch does not accept or initiate any 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.
- If it is necessary to provide a faster response time to the user, a smaller number than the default should be entered.

Examples

The following example sets the number of seconds that the switch remains in the quiet state following a failed authentication exchange, to 3600.

```
Console (config)# interface ethernet g8
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 switch waits for a response to an Extensible Authentication Protocol (EAP) - request/identity frame, from the client, before resending the request. Use the **no** form of this command to return to the default setting.

Syntax

dot1x timeout tx-period *seconds*

no dot1x timeout tx-period

- *seconds*— Time in seconds that the switch should wait for a response to an EAP - request/identity frame from the client before resending the request. (Range: 1 - 65535 seconds)

Default Configuration

30

Command Mode

Interface configuration (Ethernet) mode

User Guidelines

- You should change the default value of this command 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 switch waits for a response to an EAP - request/identity frame, to 3600 seconds.

```
Console (config)# interface ethernet g8
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 switch sends an Extensible Authentication Protocol (EAP) - request/identity frame (assuming that no response is received) to the client, before restarting the authentication process. Use the **no** form of this command to return to the default setting.

Syntax

dot1x max-req *count*

no dot1x max-req

- *count*—Number of times that the switch sends an EAP - request/identity frame before restarting the authentication process. (Range: 1 - 10)

Default Configuration

2

Command Mode

Interface configuration (Ethernet) mode

User Guidelines

- You should change the default value of this command 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 switch sends an EAP - request/identity frame, to 6 .

```
Console (config)# interface ethernet g8
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. Use the **no** form of this command to return to the default setting.

Syntax

dot1x timeout supp-timeout *seconds*

no dot1x timeout supp-timeout

- *seconds*—Time in seconds that the switch should wait for a response to an EAP-request frame from the client before resending the request. (Range: 1 - 65535 seconds)

Default Configuration

30

Command Mode

Interface configuration (Ethernet) mode

User Guidelines

- The default value of this command should be changed only to adjust to unusual circumstances, such as unreliable links or specific behavioral problems with certain clients and authentication servers.

Examples

The following example sets the time for the retransmission of an EAP-request frame to the client, to 3600 seconds.

```
console config-if(Config-VLAN)# dot1x timeout supp-timeout 3600
```

dot1x timeout server-timeout

The **dot1x timeout server-timeout** Interface Configuration mode command sets the time for the retransmission of packets to the authentication server. Use the **no** form of this command to return to the default setting.

Syntax

dot1x timeout server-timeout *seconds*

no dot1x timeout server-timeout

- *seconds*—Time in seconds that the switch should wait for a response from the authentication server before resending the request. (Range: 1 - 65535 seconds)

Default Configuration

30

Command Mode

Interface configuration (Ethernet) mode

User Guidelines

- There are no user guidelines for this command.

Examples

The following example sets the time for the retransmission of packets to the authentication server., to 3600 seconds.

```
Console (config)# dot1x timeout server-timeout 3600
```

show dot1x

The **show dot1x** Privileged EXEC mode command displays 802.1X status for the switch or for the specified interface.

Syntax

show dot1x [**ethernet** *interface*]

- *interface*—The full syntax is: *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 status for the switch.

```
Console# show dot1x

Interface   Admin Mode    Oper Mode       Reauth       Reauth       Username
                                          Control      Period
---------   ----------    ----------      --------     ------       --------
g1          Auto          Authorized      Ena          3600         Bob
g2          Auto          Authorized      Ena          3600         John
g3          Auto          Unauthorized    Ena          3600         Clark
g4          Force-auth    Authorized      Dis          3600         n/a
```

```
Console# show dot1x ethernet g3

Interface   Admin Mode  Oper Mode     Reauth       Reauth       Username
                                      Control      Period
g3          Auto        Unauthorize   Ena          3600         Clark
                        d
State: held
Quiet period: 60
Tx period: 30
Max req: 2
Login Time: n/a
Last Authentication: n/a
MAC Address: 00:08:78:32:98:78
Authentication Method: Remote
Termination Cause: Supplicant logoff
```

The following table describes the significant fields shown in the display:

Field	Description
Interface	The interface number.
Admin mode	The admin mode of the port. Possible values are: Force-auth, Force-unauth, Auto
Oper mode	The oper mode of the port. Possible values are: Authorized, Unauthorized.
Reauth Control	Reauthentication control.
Reauth Period	Reauthentication period.
Username	The User-Name representing the identity of the Supplicant.
State	The current value of the Authenticator PAE state machine.
Quiet period	The number of seconds that the switch 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 switch 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 switch sends an Extensible Authentication Protocol (EAP)-request/identity frame (assuming that no response is received) to the client before restarting the authentication process.
Login Time	How long the user is logged in.
Last Authentication	Time since last authentication.
Mac address	The supplicant MAC address.
Authentication Method	The authentication method used to establish the session.
Termination Cause	The reason for the session termination.

show dot1x users

The **show dot1x users** Privileged EXEC mode command displays 802.1X users for the switch.

Syntax

show dot1x users [**username** *username*]

- *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

Username  Session      Last Auth  Auth      MAC Address        Interface
          Time                    Method
--------  -----------  ---------  --------  --------------     --------
Bob       1d3h         58m        Remote    00:08:3b:79:87:87  g1
John      8h19m        2m         None      00:08:3b:89:31:27  g2
```

The following table describes the significant fields shown in the display:

Field	Description
Username	The User-Name representing the identity of the Supplicant.
Login Time	How long the user is logged in.
Last Authentication	Time since last authentication.
Authentication Method	The authentication method used to establish the session.
Mac address	The supplicant MAC address.
Interface	The interface that the user is using.

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*

- *interface*—The full syntax is: *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.

```
Switch# show dot1x statistics ethernet g1


EapolFramesRx: 11
EapolFramesTx: 12
EapolStartFramesRx: 1
EapolLogoffFramesRx: 1
EapolRespIdFramesRx: 3
EapolRespFramesRx: 6
EapolReqIdFramesTx: 3
EapolReqFramesTx: 6
InvalidEapolFramesRx: 0
EapLengthErrorFramesRx: 0
LastEapolFrameVersion: 1
LastEapolFrameSource: 0008.3b79.8787
```

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 carried in the most recently received EAPOL frame.

ADVANCED FEATURES

dot1x auth-not-req

The **dot1x auth-not-req** VLAN Configuration mode command enables unauthorized users access to that VLAN. Use the **no** form of this command to disable the access.

Syntax

dot1x auth-not-req

no dot1x auth-not-req

This command has no arguments or keywords.

Default Configuration

User should be authorized to access the VLAN.

Command Mode

VLAN Configuration 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 the Unauthenticated VLAN (although only tagged packets would be accepted in Unauthorized state.)

Examples

The following example enables unauthorized users access to the VLAN.

```
console config-if(Config-VLAN)# dot1x auth-not-req
```

dot1x multiple-hosts

The **dot1x multiple-hosts** Interface Configuration mode command allows multiple hosts (clients) on an 802.1X-authorized port, that has the **dot1x port-control** Interface Configuration mode command set to **auto**. Use the **no** form of this command to return to the default setting.

Syntax

dot1x multiple-hosts

no dot1x multiple-hosts

This command has no arguments or keywords.

Default Configuration

Multiple hosts are disabled. If a port would join a port-channel, the state would be multiple hosts as long as the port is member in the port-channel.

Multiple-hosts must be enabled if the user wants to disable ingress-filtering on this port.

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.

Examples

The following command allows multiple hosts (clients) on an 802.1X-authorized port.

```
console config-if(Config-VLAN)#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

- **forward**—Forward frames with source addresses not the supplicant address, but do not learn the address.
- **discard**—Discard frames with source addresses not the supplicant address.
- **discard-shutdown**—Discard frames with source addresses not the supplicant address. The port is also shutdown.
- **trap** *seconds*—Send SNMP traps, and specifies the minimum time between consecutive traps. (Range: 1- 1000000)

Default Configuration

Discard frames with source addresses not the supplicant address. No traps.

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 uses the forward action to forward frames with source addresses.

```
console config-if(Config-VLAN)# dot1x single-host-violation
forward trap 100
```

show dot1x advanced

The **show dot1x advanced** Privileged EXEC mode command displays 802.1X advanced features for the switch or for the specified interface.

Syntax

show dot1x advanced [**ethernet** *interface*]

- *interface*—Ethernet interface

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 switch.

```
Switch# show dot1x advanced

Unauthenticated VLANs: 91, 92

Port        Multiple
            Hosts
g1          Disabled
g2          Enabled

Switch# show dot1x advanced ethernet g1

Port        Multiple
            Hosts
g1          Disabled
Single host parameters
Violation action: Discard
Trap: Enabled
Trap frequency: 100
Status: Single-host locked
Violations since last trap: 9
```

```
console# show dot1x advanced ethernet g1

Guest VLAN: 3978
Unauthenticated VLANs: 91, 92
Use user attributes from Authentication Server: Enabled
User VLAN not created: Create
Interface    Multiple
             Hosts
g1           Disabled
g2           Enabled
Single Host Violation: Discard
Trap: Enabled
Frequency: 100
Status: Authorized (Locked)
Counter: 9
```