



INDEX

A

- aaa accounting dot1x command [2-1](#)
- aaa authentication dot1x command [2-3](#)
- aaa authorization network command [2-5, 2-24, 2-30, 2-32, 2-34, 2-36, 2-38, 2-144, 2-312, 2-480, B-7, B-31](#)
- AAA methods [2-3](#)
- access control entries
 - See ACEs
- access control lists
 - See ACLs
- access groups
 - IP [2-195](#)
 - MAC, displaying [2-607](#)
- access list, IPv6 [2-269](#)
- access map configuration mode [2-338](#)
- access mode [2-799](#)
- access ports [2-799](#)
- ACEs [2-128, 2-415](#)
- ACLs
 - deny [2-126](#)
 - displaying [2-462](#)
 - for non-IP protocols [2-316](#)
 - IP [2-195](#)
 - matching [2-338](#)
 - on Layer 2 interfaces [2-195](#)
 - permit [2-413](#)
- action command [2-6](#)
- aggregate-port learner [2-402](#)
- allowed VLANs [2-819](#)
- archive copy-sw command [2-8](#)
- archive download-sw command [2-11](#)
- archive tar command [2-15](#)
- archive upload-sw command [2-18](#)
- arp (boot loader) command [A-2](#)
- arp access-list command [2-20](#)
- authentication command disable-port ignore [2-23](#)
- authentication control-direction command [2-24](#)
- authentication event command [2-26](#)
- authentication failed VLAN
 - See dot1x auth-fail vlan
- authentication fallback command [2-30](#)
- authentication host-mode command [2-32](#)
- authentication mac-move permit command [2-34](#)
- authentication open command [2-36](#)
- authentication order command [2-38](#)
- authentication periodic command [2-40](#)
- authentication port-control command [2-42](#)
- authentication priority command [2-44](#)
- authentication timer command [2-46](#)
- authentication violation command [2-48](#)
- auth-fail max-attempts
 - See dot1x auth-fail max-attempts
- auth-fail vlan
 - See dot1x auth-fail vlan
- auth open command [2-36](#)
- auth order command [2-38](#)
- authorization state of controlled port [2-161](#)
- auth timer command [2-46](#)
- autonegotiation of duplex mode [2-172](#)
- auto qos classify command [2-50](#)
- auto qos trust command [2-53](#)
- auto qos video command [2-56](#)
- auto qos voip command [2-59](#)

B

BackboneFast, for STP [2-721](#)

backup interfaces

configuring [2-793](#)

displaying [2-529](#)

boot (boot loader) command [A-3](#)

boot auto-copy-sw command [2-66](#)

boot auto-download-sw command [2-68](#)

boot config-file command [2-71](#)

boot enable-break command [2-72](#)

boot helper command [2-73](#)

boot helper-config file command [2-74](#)

booting

Cisco IOS image [2-77](#)

displaying environment variables [2-475](#)

interrupting [2-72](#)

manually [2-75](#)

boot loader

accessing [A-1](#)

booting

Cisco IOS image [A-3](#)

helper image [2-73](#)

directories

creating [A-19](#)

displaying a list of [A-8](#)

removing [A-23](#)

displaying

available commands [A-13](#)

memory heap utilization [A-14](#)

version [A-30](#)

environment variables

described [A-24](#)

displaying settings [A-24](#)

location of [A-25](#)

setting [A-24](#)

unsetting [A-28](#)

files

copying [A-6](#)

deleting [A-7](#)

displaying a list of [A-8](#)

displaying the contents of [A-5, A-20, A-27](#)

renaming [A-21](#)

file system

formatting [A-11](#)

initializing flash [A-10](#)

running a consistency check [A-12](#)

prompt [A-1](#)

resetting the system [A-22](#)

boot manual command [2-75](#)

boot private-config-file command [2-76](#)

boot system command [2-77](#)

BPDU filtering, for spanning tree [2-722, 2-756](#)

BPDU guard, for spanning tree [2-724, 2-756](#)

broadcast storm control [2-777](#)

C

cat (boot loader) command [A-5](#)

CDP, enabling protocol tunneling for [2-295](#)

channel-group command [2-79](#)

channel-protocol command [2-83](#)

Cisco IP camera

auto-QoS configuration [2-56](#)

Cisco SoftPhone

auto-QoS configuration [2-59](#)

trusting packets sent from [2-379](#)

Cisco Telepresence System

auto-QoS configuration [2-56](#)

CISP

See Client Information Signalling Protocol

cisp

debug platform cisp command [B-31](#)

cisp enable command [2-84](#)

class command [2-85](#)

class-map command [2-88](#)

class maps

- creating [2-88](#)
- defining the match criteria [2-340](#)
- displaying [2-481](#)

class of service

- See CoS

clear dot1x command [2-90](#)

clear eap command [2-91](#)

clear errdisable interface [2-92](#)

clear ip arp inspection log command [2-93](#)

clear ip arp inspection statistics command [2-94](#)

clear ipc command [2-99](#)

clear ip dhcp snooping database command [2-95, 2-97](#)

clear ipv6 dhcp conflict command [2-100](#)

clear l2protocol-tunnel counters command [2-101](#)

clear lacp command [2-102](#)

clear logging command [2-103](#)

clear mac address-table command [2-104, 2-105](#)

clear nmsp statistics command [2-106](#)

clear pagp command [2-107](#)

clear port-security command [2-108](#)

clear spanning-tree counters command [2-110](#)

clear spanning-tree detected-protocols command [2-111](#)

clear vmpls statistics command [2-112](#)

clear vtp counters command [2-113](#)

Client Information Signalling Protocol [2-84, 2-144, 2-480, B-7, B-31](#)

command modes defined [1-2](#)

configuration files

- password recovery disable considerations [A-1](#)
- specifying the name [2-71, 2-76](#)

configuring multiple interfaces [2-191](#)

config-vlan mode

- commands [2-843](#)
- entering [2-842](#)

copy (boot loader) command [A-6](#)

copy logging onboard command [2-114](#)

CoS

- assigning default value to incoming packets [2-349](#)
- assigning to Layer 2 protocol packets [2-298](#)
- overriding the incoming value [2-349](#)

CoS-to-DSCP map [2-353](#)

CPU ASIC statistics, displaying [2-482](#)

crashinfo files [2-182](#)

critical VLAN [2-27](#)

D

debug authentication [B-2](#)

debug auto qos command [B-4](#)

debug backup command [B-6](#)

debug cisp command [B-7](#)

debug dot1x command [B-8](#)

debug dtp command [B-9](#)

debug eap command [B-10](#)

debug etherchannel command [B-11](#)

debug fastethernet command [B-12](#)

debug interface command [B-15](#)

debug ip dhcp snooping command [B-13](#)

debug ip igmp filter command [B-16](#)

debug ip igmp max-groups command [B-17](#)

debug ip igmp snooping command [B-18](#)

debug ip verify source packet command [B-14](#)

debug lacp command [B-19](#)

debug lldp packets command [B-20](#)

debug mac-notification command [B-21](#)

debug matm command [B-22](#)

debug matm move update command [B-23](#)

debug monitor command [B-24](#)

debug mvrdbg command [B-25](#)

debug nmsp command [B-26](#)

debug nvram command [B-27](#)

debug pagp command [B-28](#)

debug platform acl command [B-29](#)

debug platform backup interface command [B-30](#)

debug platform cisp command [B-31](#)

- debug platform cli-redirect main command [B-32](#)
- debug platform configuration command [B-33](#)
- debug platform cpu-queues command [B-34](#)
- debug platform device-manager command [B-36](#)
- debug platform dot1x command [B-37](#)
- debug platform etherchannel command [B-38](#)
- debug platform fallback-bridging command [B-39](#)
- debug platform ip arp inspection command [B-40](#)
- debug platform ipc command [B-49](#)
- debug platform ip dhcp command [B-41](#)
- debug platform ip igmp snooping command [B-42](#)
- debug platform ip multicast command [B-44](#)
- debug platform ip unicast command [B-46](#)
- debug platform ip wccp command [B-48](#)
- debug platform led command [B-50](#)
- debug platform matm command [B-51](#)
- debug platform messaging application command [B-52](#)
- debug platform phy command [B-53](#)
- debug platform pm command [B-55](#)
- debug platform port-asic command [B-57](#)
- debug platform port-security command [B-58](#)
- debug platform qos-acl-tcam command [B-59](#)
- debug platform remote-commands command [B-60](#)
- debug platform resource-manager command [B-61](#)
- debug platform snmp command [B-62](#)
- debug platform span command [B-63](#)
- debug platform stack-manager command [B-64](#)
- debug platform supervisor-asic command [B-65](#)
- debug platform sw-bridge command [B-66](#)
- debug platform tcam command [B-67](#)
- debug platform udd command [B-70](#)
- debug platform vlan command [B-71](#)
- debug pm command [B-72](#)
- debug port-security command [B-74](#)
- debug qos-manager command [B-75](#)
- debug spanning-tree backbonefast command [B-78](#)
- debug spanning-tree bpdu command [B-79](#)
- debug spanning-tree bpdu-opt command [B-80](#)
- debug spanning-tree command [B-76](#)
- debug spanning-tree mstp command [B-81](#)
- debug spanning-tree switch command [B-83](#)
- debug spanning-tree uplinkfast command [B-85](#)
- debug sw-vlan command [B-86](#)
- debug sw-vlan ifs command [B-88](#)
- debug sw-vlan notification command [B-89](#)
- debug sw-vlan vtp command [B-91](#)
- debug udd command [B-93](#)
- debug vqpc command [B-95](#)
- define interface-range command [2-116](#)
- delete (boot loader) command [A-7](#)
- delete command [2-118](#)
- deny (ARP access-list configuration) command [2-119](#)
- deny (IPv6) command [2-121](#)
- deny command [2-126](#)
- detect mechanism, causes [2-174](#)
- DHCP snooping
 - accepting untrusted packets from edge switch [2-227](#)
 - enabling
 - on a VLAN [2-233](#)
 - option 82 [2-225, 2-227](#)
 - trust on an interface [2-231](#)
 - error recovery timer [2-178](#)
 - rate limiting [2-230](#)
- DHCP snooping binding database
 - binding file, configuring [2-223](#)
 - bindings
 - adding [2-221](#)
 - deleting [2-221](#)
 - displaying [2-551](#)
 - clearing database agent statistics [2-95, 2-97](#)
 - database agent, configuring [2-223](#)
 - displaying
 - binding entries [2-551](#)
 - database agent status [2-553, 2-555](#)
 - renewing [2-442](#)
- dir (boot loader) command [A-8](#)

- directories, deleting [2-118](#)
- domain name, VTP [2-861](#)
- dot1x auth-fail max-attempts [2-138](#)
- dot1x auth-fail vlan [2-140](#)
- dot1x command [2-136](#)
- dot1x control-direction command [2-142](#)
- dot1x credentials (global configuration) command [2-144](#)
- dot1x critical global configuration command [2-145](#)
- dot1x critical interface configuration command [2-147](#)
- dot1x default command [2-149](#)
- dot1x fallback command [2-150](#)
- dot1x guest-vlan command [2-151](#)
- dot1x host-mode command [2-153](#)
- dot1x initialize command [2-154](#)
- dot1x mac-auth-bypass command [2-155](#)
- dot1x max-reauth-req command [2-157](#)
- dot1x max-req command [2-159](#)
- dot1x pae command [2-160](#)
- dot1x port-control command [2-161](#)
- dot1x re-authenticate command [2-163](#)
- dot1x reauthentication command [2-164](#)
- dot1x supplicant force-multicast command [2-165](#)
- dot1x timeout command [2-166](#)
- dot1x violation-mode command [2-169](#)
- dropping packets, with ACL matches [2-6](#)
- drop threshold, Layer 2 protocol tunneling [2-295](#)
- DSCP-to-CoS map [2-353](#)
- DSCP-to-DSCP-mutation map [2-353](#)
- DTP [2-800](#)
- DTP flap
 - error detection for [2-174](#)
 - error recovery timer [2-178](#)
- DTP negotiation [2-804](#)
- dual IPv4 and IPv6 templates [2-408](#)
- duplex command [2-171](#)
- dynamic-access ports
 - configuring [2-789](#)
 - restrictions [2-790](#)
- dynamic ARP inspection
 - ARP ACLs
 - apply to a VLAN [2-203](#)
 - define [2-20](#)
 - deny packets [2-119](#)
 - display [2-466](#)
 - permit packets [2-406](#)
 - clear
 - log buffer [2-93](#)
 - statistics [2-94](#)
 - display
 - ARP ACLs [2-466](#)
 - configuration and operating state [2-546](#)
 - log buffer [2-546](#)
 - statistics [2-546](#)
 - trust state and rate limit [2-546](#)
 - enable per VLAN [2-213](#)
 - error detection for [2-174](#)
 - error recovery timer [2-178](#)
 - log buffer
 - clear [2-93](#)
 - configure [2-207](#)
 - display [2-546](#)
 - rate-limit incoming ARP packets [2-205](#)
 - statistics
 - clear [2-94](#)
 - display [2-546](#)
 - trusted interface state [2-209](#)
 - type of packet logged [2-214](#)
 - validation checks [2-211](#)
- dynamic auto VLAN membership mode [2-799](#)
- dynamic desirable VLAN membership mode [2-799](#)
- Dynamic Host Configuration Protocol (DHCP)
 - See DHCP snooping
- Dynamic Trunking Protocol
 - See DTP

E

EAP-request/identity frame

- maximum number to send [2-159](#)
- response time before retransmitting [2-166](#)

encapsulation methods [2-819](#)environment variables, displaying [2-475](#)epm access-control open [2-173](#)errdisable detect cause command [2-174](#)errdisable detect cause small-frame comand [2-176](#)errdisable recovery cause small-frame [2-181](#)errdisable recovery command [2-178](#)error conditions, displaying [2-517](#)error disable detection [2-174](#)error-disabled interfaces, displaying [2-529](#)

EtherChannel

- assigning Ethernet interface to channel group [2-79](#)
- creating port-channel logical interface [2-189](#)
- debug EtherChannel/PAGP, display [B-11](#)
- debug platform-specific events, display [B-38](#)
- displaying [2-520](#)
- enabling Layer 2 protocol tunneling for
 - LACP [2-296](#)
 - PAGP [2-296](#)
 - UDLD [2-296](#)

interface information, displaying [2-529](#)

LACP

- clearing channel-group information [2-102, 2-103](#)
- debug messages, display [B-19](#)
- displaying [2-592](#)
- modes [2-79](#)
- port priority for hot-standby ports [2-299](#)
- restricting a protocol [2-83](#)
- system priority [2-301](#)

load-distribution methods [2-423](#)

PAGP

- aggregate-port learner [2-402](#)
- clearing channel-group information [2-107](#)
- debug messages, display [B-28](#)

displaying [2-658](#)error detection for [2-174](#)error recovery timer [2-178](#)learn method [2-402](#)modes [2-79](#)physical-port learner [2-402](#)priority of interface for transmitted traffic [2-404](#)Ethernet controller, internal register display [2-484, 2-491](#)Ethernet Management port, debugging [B-12](#)Ethernet statistics, collecting [2-445](#)exception crashinfo command [2-182, 2-187](#)

extended-range VLANs

- and allowed VLAN list [2-819](#)
- and pruning-eligible list [2-819](#)
- configuring [2-842](#)

extended system ID for STP [2-730](#)**F**fallback profile command [2-183](#)fallback profiles, displaying [2-523](#)fan information, displaying [2-513](#)file name, VTP [2-861](#)files, deleting [2-118](#)flash_init (boot loader) command [A-10](#)flexible authentication ordering [2-38](#)

Flex Links

- configuring [2-793](#)
- displaying [2-529](#)

flowcontrol command [2-185](#)format (boot loader) command [A-11](#)forwarding packets, with ACL matches [2-6](#)forwarding results, display [C-7](#)frame forwarding information, displaying [C-7](#)front-end controller counter and status information [C-9](#)fsck (boot loader) command [A-12](#)

G

global configuration mode [1-2, 1-4](#)

H

hardware ACL statistics [2-462](#)
 health monitoring diagnostic tests [2-129](#)
 help (boot loader) command [A-13](#)
 hierarchical policy maps [2-421](#)
 host connection, port configuration [2-798](#)
 host ports, private VLANs [2-802](#)

I

IEEE 802.1Q trunk ports and native VLANs [2-852](#)
 IEEE 802.1Q tunnel ports
 configuring [2-799](#)
 displaying [2-503](#)
 limitations [2-800](#)
 IEEE 802.1x
 and switchport modes [2-800](#)
 violation error recovery [2-178](#)
 See also port-based authentication
 IGMP filters
 applying [2-236](#)
 debug messages, display [B-16](#)
 IGMP groups, setting maximum [2-238](#)
 IGMP maximum groups, debugging [B-17](#)
 IGMP profiles
 creating [2-240](#)
 displaying [2-558](#)
 IGMP snooping
 adding ports as a static member of a group [2-256](#)
 displaying [2-559, 2-564, 2-566](#)
 enabling [2-242](#)
 enabling the configurable-leave timer [2-244](#)
 enabling the Immediate-Leave feature [2-253](#)
 flooding query count [2-250](#)

 interface topology change notification behavior [2-252](#)
 multicast table [2-562](#)
 querier [2-246](#)
 query solicitation [2-250](#)
 report suppression [2-248](#)
 switch topology change notification behavior [2-250](#)
 images
 See software images
 Immediate-Leave processing
 IGMP [2-253](#)
 IPv6 [2-291](#)
 MVR [2-389](#)
 interface configuration mode [1-2, 1-4](#)
 interface port-channel command [2-189](#)
 interface range command [2-191](#)
 interface-range macros [2-116](#)
 interfaces
 assigning Ethernet interface to channel group [2-79](#)
 configuring [2-171](#)
 configuring multiple [2-191](#)
 creating port-channel logical [2-189](#)
 debug messages, display [B-15](#)
 disabling [2-707](#)
 displaying the MAC address table [2-619](#)
 restarting [2-707](#)
 interface speed, configuring [2-767](#)
 interface vlan command [2-193](#)
 internal registers, displaying [2-484, 2-491, 2-494](#)
 Internet Group Management Protocol
 See IGMP
 invalid GBIC
 error detection for [2-174](#)
 error recovery timer [2-178](#)
 ip access-group command [2-195](#)
 ip address command [2-198](#)
 IP addresses, setting [2-198](#)
 IP address matching [2-338](#)
 ip admission command [2-200](#)
 ip admission name proxy http command [2-201](#)

- ip arp inspection filter vlan command [2-203](#)
 - ip arp inspection limit command [2-205](#)
 - ip arp inspection log-buffer command [2-207](#)
 - ip arp inspection trust command [2-209](#)
 - ip arp inspection validate command [2-211](#)
 - ip arp inspection vlan command [2-213](#)
 - ip arp inspection vlan logging command [2-214](#)
 - ip device tracking command [2-216](#)
 - ip device tracking probe command [2-218](#)
 - IP DHCP snooping
 - See DHCP snooping
 - ip dhcp snooping binding command [2-221](#)
 - ip dhcp snooping command [2-220](#)
 - ip dhcp snooping database command [2-223](#)
 - ip dhcp snooping information option allow-untrusted command [2-227](#)
 - ip dhcp snooping information option command [2-225](#)
 - ip dhcp snooping information option format remote-id command [2-229](#)
 - ip dhcp snooping limit rate command [2-230](#)
 - ip dhcp snooping trust command [2-231](#)
 - ip dhcp snooping verify command [2-232](#)
 - ip dhcp snooping vlan command [2-233](#)
 - ip dhcp snooping vlan information option format-type circuit-id string command [2-234](#)
 - ip igmp filter command [2-236](#)
 - ip igmp max-groups command [2-238](#), [2-263](#), [2-265](#)
 - ip igmp profile command [2-240](#)
 - ip igmp snooping command [2-242](#)
 - ip igmp snooping last-member-query-interval command [2-244](#)
 - ip igmp snooping querier command [2-246](#)
 - ip igmp snooping report-suppression command [2-248](#)
 - ip igmp snooping tcn command [2-250](#)
 - ip igmp snooping tcn flood command [2-252](#)
 - ip igmp snooping vlan immediate-leave command [2-253](#)
 - ip igmp snooping vlan mrouter command [2-254](#)
 - ip igmp snooping vlan static command [2-256](#)
 - IP multicast addresses [2-386](#)
 - IP phones
 - auto-QoS configuration [2-59](#)
 - trusting packets sent from [2-379](#)
 - IP-precedence-to-DSCP map [2-353](#)
 - ip snap forwarding command [2-258](#)
 - ip source binding command [2-259](#)
 - IP source guard
 - disabling [2-267](#)
 - displaying
 - binding entries [2-568](#)
 - configuration [2-570](#)
 - dynamic binding entries only [2-551](#)
 - enabling [2-267](#)
 - static IP source bindings [2-259](#)
 - ip ssh command [2-261](#)
 - IPv6 access list, deny conditions [2-121](#)
 - ipv6 access-list command [2-269](#)
 - ipv6 address dhcp command [2-271](#)
 - ipv6 dhcp client request vendor command [2-272](#)
 - ipv6 dhcp ping packets command [2-273](#)
 - ipv6 dhcp pool command [2-275](#)
 - ipv6 dhcp server command [2-277](#)
 - ipv6 mld snooping command [2-279](#)
 - ipv6 mld snooping last-listener-query count command [2-281](#)
 - ipv6 mld snooping last-listener-query-interval command [2-283](#)
 - ipv6 mld snooping listener-message-suppression command [2-285](#)
 - ipv6 mld snooping robustness-variable command [2-287](#)
 - ipv6 mld snooping tcn command [2-289](#)
 - ipv6 mld snooping vlan command [2-291](#)
 - IPv6 SDM template [2-446](#)
 - ipv6 traffic-filter command [2-293](#)
 - ip verify source command [2-267](#)
-
- ## J
- jumbo frames
 - See MTU

L

l2protocol-tunnel command [2-295](#)
 l2protocol-tunnel cos command [2-298](#)
 LACP
 See EtherChannel
 lacp port-priority command [2-299](#)
 lacp system-priority command [2-301](#)
 Layer 2 mode, enabling [2-787](#)
 Layer 2 protocol ports, displaying [2-589](#)
 Layer 2 protocol-tunnel
 error detection for [2-174](#)
 error recovery timer [2-178](#)
 Layer 2 protocol tunnel counters [2-101](#)
 Layer 2 protocol tunneling error recovery [2-296](#)
 Layer 2 traceroute
 IP addresses [2-833](#)
 MAC addresses [2-830](#)
 Layer 3 mode, enabling [2-787](#)
 line configuration mode [1-3, 1-5](#)
 Link Aggregation Control Protocol
 See EtherChannel
 link flap
 error detection for [2-174](#)
 error recovery timer [2-178](#)
 link state group command [2-303](#)
 link state track command [2-305](#)
 load-distribution methods for EtherChannel [2-423](#)
 location (global configuration) command [2-306](#)
 location (interface configuration) command [2-308](#)
 logging file command [2-310](#)
 logical interface [2-189](#)
 loopback error
 detection for [2-174](#)
 recovery timer [2-178](#)
 loop guard, for spanning tree [2-732, 2-736](#)

M

mab request format attribute 32 command [2-312](#)
 mac access-group command [2-314](#)
 MAC access-groups, displaying [2-607](#)
 MAC access list configuration mode [2-316](#)
 mac access-list extended command [2-316](#)
 MAC access lists [2-126](#)
 MAC addresses
 disabling MAC address learning per VLAN [2-319](#)
 displaying
 aging time [2-613](#)
 all [2-611](#)
 dynamic [2-617](#)
 MAC address-table move updates [2-622](#)
 notification settings [2-621, 2-624](#)
 number of addresses in a VLAN [2-615](#)
 per interface [2-619](#)
 per VLAN [2-628](#)
 static [2-626](#)
 static and dynamic entries [2-609](#)
 dynamic
 aging time [2-318](#)
 deleting [2-104](#)
 displaying [2-617](#)
 enabling MAC address notification [2-323](#)
 enabling MAC address-table move update [2-321](#)
 matching [2-338](#)
 persistent stack [2-775](#)
 static
 adding and removing [2-325](#)
 displaying [2-626](#)
 dropping on an interface [2-326](#)
 tables [2-611](#)
 MAC address notification, debugging [B-21](#)
 mac address-table aging-time [2-314, 2-338](#)
 mac address-table aging-time command [2-318](#)
 mac address-table learning command [2-319](#)
 mac address-table move update command [2-321](#)

- mac address-table notification command [2-323](#)
- mac address-table static command [2-325](#)
- mac address-table static drop command [2-326](#)
- MAC frames
 - See MTU
- macro apply command [2-328](#)
- macro description command [2-331](#)
- macro global command [2-332](#)
- macro global description command [2-335](#)
- macro name command [2-336](#)
- macros
 - adding a description [2-331](#)
 - adding a global description [2-335](#)
 - applying [2-332](#)
 - creating [2-336](#)
 - displaying [2-660](#)
 - interface range [2-116, 2-191](#)
 - specifying parameter values [2-332](#)
 - tracing [2-332](#)
- maps
 - QoS
 - defining [2-353](#)
 - displaying [2-638](#)
 - VLAN
 - creating [2-849](#)
 - defining [2-338](#)
 - displaying [2-697](#)
- match (access-map configuration) command [2-338](#)
- match (class-map configuration) command [2-340](#)
- maximum transmission unit
 - See MTU
- mdix auto command [2-343](#)
- memory (boot loader) command [A-14](#)
- mgmt_clr (boot loader) command [A-16](#)
- mgmt_init (boot loader) command [A-17, A-18](#)
- mkdir (boot loader) command [A-19](#)
- MLD snooping
 - configuring [2-285, 2-287](#)
 - configuring queries [2-281, 2-283](#)
 - configuring topology change notification [2-289](#)
 - displaying [2-579, 2-581, 2-583, 2-585](#)
 - enabling [2-279](#)
 - enabling on a VLAN [2-291](#)
- mls qos aggregate-policer command [2-347](#)
- mls qos command [2-345](#)
- mls qos cos command [2-349](#)
- mls qos dscp-mutation command [2-351](#)
- mls qos map command [2-353](#)
- mls qos queue-set output buffers command [2-357](#)
- mls qos queue-set output threshold command [2-359](#)
- mls qos rewrite ip dscp command [2-361](#)
- mls qos srr-queue input bandwidth command [2-363](#)
- mls qos srr-queue input buffers command [2-365](#)
- mls qos srr-queue input cos-map command [2-367](#)
- mls qos srr-queue input dscp-map command [2-369](#)
- mls qos srr-queue input priority-queue command [2-371](#)
- mls qos srr-queue input threshold command [2-373](#)
- mls qos srr-queue output cos-map command [2-375](#)
- mls qos srr-queue output dscp-map command [2-377](#)
- mls qos trust command [2-379](#)
- mls qos vlan-based command [2-381](#)
- mode, MVR [2-386](#)
- Mode button, and password recovery [2-449](#)
- modes, commands [1-2](#)
- monitor session command [2-382](#)
- more (boot loader) command [A-20](#)
- MSTP
 - displaying [2-674](#)
 - interoperability [2-111](#)
 - link type [2-734](#)

- MSTP (continued)
 - MST region
 - aborting changes [2-740](#)
 - applying changes [2-740](#)
 - configuration name [2-740](#)
 - configuration revision number [2-740](#)
 - current or pending display [2-740](#)
 - displaying [2-674](#)
 - MST configuration mode [2-740](#)
 - VLANs-to-instance mapping [2-740](#)
 - path cost [2-742](#)
 - protocol mode [2-738](#)
 - restart protocol migration process [2-111](#)
 - root port
 - loop guard [2-732](#)
 - preventing from becoming designated [2-732](#)
 - restricting which can be root [2-732](#)
 - root guard [2-732](#)
 - root switch
 - affects of extended system ID [2-730](#)
 - hello-time [2-745, 2-752](#)
 - interval between BPDU messages [2-746](#)
 - interval between hello BPDU messages [2-745, 2-752](#)
 - max-age [2-746](#)
 - maximum hop count before discarding BPDU [2-747](#)
 - port priority for selection of [2-748](#)
 - primary or secondary [2-752](#)
 - switch priority [2-751](#)
 - state changes
 - blocking to forwarding state [2-759](#)
 - enabling BPDU filtering [2-722, 2-756](#)
 - enabling BPDU guard [2-724, 2-756](#)
 - enabling Port Fast [2-756, 2-759](#)
 - forward-delay time [2-744](#)
 - length of listening and learning states [2-744](#)
 - rapid transition to forwarding [2-734](#)
 - shutting down Port Fast-enabled ports [2-756](#)
 - state information display [2-673](#)
- MTU
 - configuring size [2-827](#)
 - displaying global setting [2-686](#)
- Multicast Listener Discovery
 - See MLD
- multicast group address, MVR [2-389](#)
- multicast groups, MVR [2-387](#)
- Multicast Listener Discovery
 - See MLD
- multicast router learning method [2-254](#)
- multicast router ports, configuring [2-254](#)
- multicast router ports, IPv6 [2-291](#)
- multicast storm control [2-777](#)
- multicast VLAN, MVR [2-386](#)
- multicast VLAN registration
 - See MVR
- multiple hosts on authorized port [2-153](#)
- Multiple Spanning Tree Protocol
 - See MSTP
- MVR
 - configuring [2-386](#)
 - configuring interfaces [2-389](#)
 - debug messages, display [B-25](#)
 - displaying [2-647](#)
 - displaying interface information [2-649](#)
 - members, displaying [2-651](#)
- mvr (global configuration) command [2-386](#)
- mvr (interface configuration) command [2-389](#)
- mvr vlan group command [2-390](#)

N

- native VLANs [2-819](#)
- native VLAN tagging [2-852](#)
- network-policy (global configuration) command [2-392](#)
- network-policy command [2-391](#)
- network-policy profile (network-policy configuration) command [2-393](#)

nmsp attachment suppress command [2-396](#)
 nmsp command [2-395](#)
 no authentication logging verbose [2-397](#)
 no dot1x logging verbose [2-398](#)
 no mab logging verbose [2-399](#)
 nonegotiate
 DTP messaging [2-804](#)
 speed [2-767](#)
 non-IP protocols
 denying [2-126](#)
 forwarding [2-413](#)
 non-IP traffic access lists [2-316](#)
 non-IP traffic forwarding
 denying [2-126](#)
 permitting [2-413](#)
 non-stop forwarding [2-400](#)
 normal-range VLANs [2-842, 2-848](#)
 no vlan command [2-842](#)
 nsf command [2-400](#)

O

online diagnostics
 configuring health monitoring diagnostic tests [2-129](#)
 displaying
 configured boot-up coverage level [2-498](#)
 current scheduled tasks [2-498](#)
 event logs [2-498](#)
 supported test suites [2-498](#)
 test ID [2-498](#)
 test results [2-498](#)
 test statistics [2-498](#)
 enabling
 scheduling [2-131](#)
 syslog messages [2-129](#)
 global configuration mode
 clearing health monitoring diagnostic test
 schedule [2-129](#)
 clearing test-based testing schedule [2-131](#)

 setting health monitoring diagnostic
 testing [2-129](#)
 setting test-based testing [2-131](#)
 setting up health monitoring diagnostic test
 schedule [2-129](#)
 setting up test-based testing [2-131](#)
 removing scheduling [2-131](#)
 scheduled switchover
 disabling [2-131](#)
 enabling [2-131](#)
 setting test interval [2-131](#)
 specifying health monitoring diagnostic tests [2-129](#)
 starting testing [2-133](#)

P

PAgP

See EtherChannel

pagp learn-method command [2-402](#)
 pagp port-priority command [2-404](#)
 password, VTP [2-862](#)
 password-recovery mechanism, enabling and
 disabling [2-449](#)
 permit (ARP access-list configuration) command [2-406](#)
 permit (IPv6) command [2-408](#)
 permit (MAC access-list configuration) command [2-413](#)
 per-VLAN spanning-tree plus
 See STP
 physical-port learner [2-402](#)
 PID, displaying [2-545](#)
 PIM-DVMRP, as multicast router learning method [2-254](#)
 police aggregate command [2-418](#)
 police command [2-416](#)
 policed-DSCP map [2-353](#)
 policy-map command [2-420](#)
 policy maps
 applying to an interface [2-451, 2-457](#)
 creating [2-420](#)
 displaying [2-663](#)

- policy maps (continued)
 - hierarchical [2-421](#)
 - policers
 - displaying [2-631](#)
 - for a single class [2-416](#)
 - for multiple classes [2-347, 2-418](#)
 - policed-DSCP map [2-353](#)
 - traffic classification
 - defining the class [2-85](#)
 - defining trust states [2-835](#)
 - setting DSCP or IP precedence values [2-455](#)
- Port Aggregation Protocol
 - See EtherChannel
- port-based authentication
 - AAA method list [2-3](#)
 - configuring violation modes [2-169](#)
 - debug messages, display [B-8](#)
 - enabling guest VLAN supplicant [2-139, 2-150](#)
 - enabling IEEE 802.1x
 - globally [2-136](#)
 - per interface [2-161](#)
 - guest VLAN [2-151](#)
 - host modes [2-153](#)
 - IEEE 802.1x AAA accounting methods [2-1](#)
 - initialize an interface [2-154](#)
 - MAC authentication bypass [2-155](#)
 - manual control of authorization state [2-161](#)
 - multiple hosts on authorized port [2-153](#)
 - PAE as authenticator [2-160](#)
 - periodic re-authentication
 - enabling [2-164](#)
 - time between attempts [2-166](#)
 - quiet period between failed authentication exchanges [2-166](#)
 - re-authenticating IEEE 802.1x-enabled ports [2-163](#)
 - resetting configurable IEEE 802.1x parameters [2-149](#)
 - switch-to-authentication server retransmission time [2-166](#)
 - switch-to-client frame-retransmission number [2-157 to 2-159](#)
 - switch-to-client retransmission time [2-166](#)
- port-channel load-balance command [2-423](#)
- Port Fast, for spanning tree [2-759](#)
- port ranges, defining [2-114, 2-116](#)
- ports, debugging [B-72](#)
- ports, protected [2-817](#)
- port security
 - aging [2-811](#)
 - debug messages, display [B-74](#)
 - enabling [2-806](#)
 - violation error recovery [2-178](#)
- port trust states for QoS [2-379](#)
- port types, MVR [2-389](#)
- power information, displaying [2-513](#)
- priority-queue command [2-425](#)
- priority value, stack member [2-681, 2-782](#)
- private-vlan command [2-427](#)
- private-vlan mapping command [2-430](#)
- private VLANs
 - association [2-815](#)
 - configuring [2-427](#)
 - configuring ports [2-802](#)
 - displaying [2-692](#)
 - host ports [2-802](#)
 - mapping
 - configuring [2-815](#)
 - displaying [2-529](#)
 - promiscuous ports [2-802](#)
- privileged EXEC mode [1-2, 1-3](#)
- product identification information, displaying [2-545](#)
- promiscuous ports, private VLANs [2-802](#)
- protected ports, displaying [2-536](#)

pruning

VLANs [2-819](#)

VTP

displaying interface information [2-529](#)enabling [2-862](#)pruning-eligible VLAN list [2-821](#)

PVST+

See STP

Q

QoS

auto-QoS

configuring [2-59](#)debug messages, display [B-4](#)displaying [2-471](#)

auto-QoS trust

configuring [2-53](#)

auto-QoS video

configuring [2-56](#)

class maps

creating [2-88](#)defining the match criteria [2-340](#)displaying [2-481](#)defining the CoS value for an incoming packet [2-349](#)displaying configuration information [2-471, 2-630](#)DSCP transparency [2-361](#)

DSCP trusted ports

applying DSCP-to-DSCP-mutation map to [2-351](#)defining DSCP-to-DSCP-mutation map [2-353](#)

egress queues

allocating buffers [2-357](#)defining the CoS output queue threshold map [2-375](#)defining the DSCP output queue threshold map [2-377](#)displaying buffer allocations [2-634](#)displaying CoS output queue threshold map [2-638](#)displaying DSCP output queue threshold map [2-638](#)displaying queueing strategy [2-634](#)displaying queue-set settings [2-641](#)enabling bandwidth shaping and scheduling [2-771](#)enabling bandwidth sharing and scheduling [2-773](#)limiting the maximum output on a port [2-769](#)mapping a port to a queue-set [2-432](#)mapping CoS values to a queue and threshold [2-375](#)mapping DSCP values to a queue and threshold [2-377](#)setting maximum and reserved memory allocations [2-359](#)setting WTD thresholds [2-359](#)enabling [2-345](#)

ingress queues

allocating buffers [2-365](#)assigning SRR scheduling weights [2-363](#)defining the CoS input queue threshold map [2-367](#)defining the DSCP input queue threshold map [2-369](#)displaying buffer allocations [2-634](#)displaying CoS input queue threshold map [2-638](#)displaying DSCP input queue threshold map [2-638](#)displaying queueing strategy [2-634](#)displaying settings for [2-632](#)enabling the priority queue [2-371](#)mapping CoS values to a queue and threshold [2-367](#)mapping DSCP values to a queue and threshold [2-369](#)setting WTD thresholds [2-373](#)

maps

defining [2-353, 2-367, 2-369, 2-375, 2-377](#)displaying [2-638](#)

QoS (continued)

policy maps

- applying an aggregate policer [2-418](#)
- applying to an interface [2-451, 2-457](#)
- creating [2-420](#)
- defining policers [2-347, 2-416](#)
- displaying policers [2-631](#)
- displaying policy maps [2-663](#)
- hierarchical [2-421](#)
- policed-DSCP map [2-353](#)
- setting DSCP or IP precedence values [2-455](#)
- traffic classifications [2-85](#)
- trust states [2-835](#)

port trust states [2-379](#)queues, enabling the expedite [2-425](#)

statistics

- in-profile and out-of-profile packets [2-634](#)
- packets enqueued or dropped [2-634](#)
- sent and received CoS values [2-634](#)
- sent and received DSCP values [2-634](#)

trusted boundary for IP phones [2-379](#)VLAN-based [2-381](#)

quality of service

See QoS

querytime, MVR [2-386](#)queue-set command [2-432](#)**R**radius-server dead-criteria command [2-433](#)radius-server host command [2-435](#)

rapid per-VLAN spanning-tree plus

See STP

rapid PVST+

See STP

re-authenticating IEEE 802.1x-enabled ports [2-163](#)

re-authentication

- periodic [2-164](#)
- time between attempts [2-166](#)

receiver ports, MVR [2-389](#)receiving flow-control packets [2-185](#)

recovery mechanism

- causes [2-178](#)
- display [2-92, 2-478, 2-515, 2-518](#)
- timer interval [2-179](#)

reload command [2-437](#)remote command [2-439](#)remote-span command [2-440](#)

Remote Switched Port Analyzer

See RSPAN

rename (boot loader) command [A-21](#)renew ip dhcp snooping database command [2-442](#)reset (boot loader) command [A-22](#)resource templates, displaying [2-668](#)

restricted VLAN

See dot1x auth-fail vlan

rmdir (boot loader) command [A-23](#)rmon collection stats command [2-445](#)root guard, for spanning tree [2-732](#)

routed ports

- IP addresses on [2-199](#)
- number supported [2-199](#)

routing frames

See MTU

RSPAN

- configuring [2-382](#)
- displaying [2-644](#)
- filter RSPAN traffic [2-382](#)
- remote-span command [2-440](#)
- sessions
 - add interfaces to [2-382](#)
 - displaying [2-644](#)
 - start new [2-382](#)

S

- scheduled switchover
 - disabling [2-131](#)
 - enabling [2-131](#)
- SDM mismatch mode [2-447, 2-682](#)
- sdm prefer command [2-446](#)
- SDM templates
 - allowed resources [2-447](#)
 - and stacking [2-447](#)
 - displaying [2-668](#)
 - dual IPv4 and IPv6 [2-446](#)
- secure ports, limitations [2-808](#)
- sending flow-control packets [2-185](#)
- service password-recovery command [2-449](#)
- service-policy command [2-451](#)
- session command [2-454](#)
- set (boot loader) command [A-24](#)
- set command [2-455](#)
- setup command [2-457](#)
- setup express command [2-460](#)
- show access-lists command [2-462](#)
- show archive status command [2-465](#)
- show arp access-list command [2-466](#)
- show authentication command [2-467](#)
- show auto qos command [2-471](#)
- show boot command [2-475](#)
- show cable-diagnostics tdr command [2-478](#)
- show cisp command [2-480](#)
- show class-map command [2-481](#)
- show controllers cpu-interface command [2-482](#)
- show controllers ethernet-controller command [2-484](#)
- show controllers ethernet-controller fastethernet command [2-491](#)
- show controllers team command [2-494](#)
- show controller utilization command [2-496](#)
- show dot1q-tunnel command [2-503](#)
- show dot1x command [2-504](#)
- show dtp [2-508](#)
- show eap command [2-510](#)
- show env command [2-513](#)
- show errdisable detect command [2-515](#)
- show errdisable flap-values command [2-517](#)
- show errdisable recovery command [2-518](#)
- show etherchannel command [2-520](#)
- show fallback profile command [2-523](#)
- show flowcontrol command [2-525](#)
- show idprom command [2-527](#)
- show interfaces command [2-529](#)
- show interfaces counters command [2-542](#)
- show inventory command [2-545](#)
- show ip arp inspection command [2-546](#)
- show ipc command [2-572](#)
- show ip dhcp snooping binding command [2-551](#)
- show ip dhcp snooping command [2-550](#)
- show ip dhcp snooping database command [2-553, 2-555](#)
- show ip igmp profile command [2-558](#)
- show ip igmp snooping address command [2-581](#)
- show ip igmp snooping command [2-559, 2-579](#)
- show ip igmp snooping groups command [2-562](#)
- show ip igmp snooping mrouter command [2-564, 2-583](#)
- show ip igmp snooping querier command [2-566, 2-585](#)
- show ip source binding command [2-568](#)
- show ipv6 access-list command [2-576](#)
- show ipv6 dhcp conflict command [2-578](#)
- show ipv6 route updated [2-587](#)
- show ip verify source command [2-570](#)
- show l2protocol-tunnel command [2-589](#)
- show lacp command [2-592](#)
- show link state group command [2-596](#)
- show lldp command [2-598](#)
- show location [2-599](#)
- show location command [2-599](#)
- show logging command [2-602](#)
- show mac access-group command [2-607](#)
- show mac address-table address command [2-611](#)
- show mac address-table aging time command [2-613](#)
- show mac address-table command [2-609](#)

- show mac address-table count command [2-615](#)
- show mac address-table dynamic command [2-617](#)
- show mac address-table interface command [2-619](#)
- show mac address-table learning command [2-621](#)
- show mac address-table move update command [2-622](#)
- show mac address-table notification command [2-105](#),
[2-624](#), [B-23](#)
- show mac address-table static command [2-626](#)
- show mac address-table vlan command [2-628](#)
- show mls qos aggregate-policer command [2-631](#)
- show mls qos command [2-630](#)
- show mls qos input-queue command [2-632](#)
- show mls qos interface command [2-634](#)
- show mls qos maps command [2-638](#)
- show mls qos queue-set command [2-641](#)
- show mls qos vlan command [2-643](#)
- show monitor command [2-644](#)
- show mvr command [2-647](#)
- show mvr interface command [2-649](#)
- show mvr members command [2-651](#)
- show network-policy profile command [2-653](#)
- show nmsp command [2-655](#)
- show pagp command [2-658](#)
- show parser macro command [2-660](#)
- show platform acl command [C-2](#)
- show platform backup interface command [C-3](#)
- show platform configuration command [C-4](#)
- show platform dl command [C-5](#)
- show platform etherchannel command [C-6](#)
- show platform forward command [C-7](#)
- show platform frontend-controller command [C-9](#)
- show platform igmp snooping command [C-10](#)
- show platform ipc trace command [C-18](#)
- show platform ip multicast command [C-12](#)
- show platform ip unicast command [C-13](#)
- show platform ipv6 unicast command [C-19](#)
- show platform ip wccp command [C-17](#)
- show platform layer4op command [C-21](#)
- show platform mac-address-table command [C-22](#)
- show platform messaging command [C-23](#)
- show platform monitor command [C-24](#)
- show platform mvr table command [C-25](#)
- show platform pm command [C-26](#)
- show platform port-asic command [C-27](#)
- show platform port-security command [C-32](#)
- show platform qos command [C-33](#)
- show platform resource-manager command [C-34](#)
- show platform snmp counters command [C-36](#)
- show platform spanning-tree command [C-37](#)
- show platform stack-manager command [C-39](#)
- show platform stp-instance command [C-38](#)
- show platform tb command [C-43](#)
- show platform team command [C-45](#)
- show platform vlan command [C-48](#)
- show policy-map command [2-663](#)
- show port security command [2-665](#)
- show sdm prefer command [2-668](#)
- show setup express command [2-672](#)
- show spanning-tree command [2-673](#)
- show storm-control command [2-679](#)
- show switch command [2-681](#)
- show system mtu command [2-686](#)
- show trust command [2-835](#)
- show udd command [2-687](#)
- show version command [2-690](#)
- show vlan access-map command [2-697](#)
- show vlan command [2-692](#)
- show vlan command, fields [2-694](#)
- show vlan filter command [2-698](#)
- show vmps command [2-699](#)
- show vtp command [2-702](#)
- shutdown command [2-707](#)
- shutdown threshold, Layer 2 protocol tunneling [2-295](#)
- shutdown vlan command [2-708](#)
- small violation-rate command [2-709](#)
- Smartports macros
 - See macros
 - SNMP host, specifying [2-715](#)

- SNMP informs, enabling the sending of [2-711](#)
- snmp-server enable traps command [2-711](#)
- snmp-server host command [2-715](#)
- snmp trap mac-notification command [2-719](#)
- SNMP traps
 - enabling MAC address notification trap [2-719](#)
 - enabling the MAC address notification feature [2-323](#)
 - enabling the sending of [2-711](#)
- SoftPhone
 - See Cisco SoftPhone
- software images
 - copying [2-8](#)
 - deleting [2-118](#)
 - downloading [2-11](#)
 - upgrading [2-8, 2-11](#)
 - uploading [2-18](#)
- software version, displaying [2-690](#)
- source ports, MVR [2-389](#)
- SPAN
 - configuring [2-382](#)
 - debug messages, display [B-24](#)
 - displaying [2-644](#)
 - filter SPAN traffic [2-382](#)
 - sessions
 - add interfaces to [2-382](#)
 - displaying [2-644](#)
 - start new [2-382](#)
- spanning-tree backbonefast command [2-721](#)
- spanning-tree bpduguard command [2-722](#)
- spanning-tree bpduguard command [2-724](#)
- spanning-tree cost command [2-726](#)
- spanning-tree etherchannel command [2-728](#)
- spanning-tree extend system-id command [2-730](#)
- spanning-tree guard command [2-732](#)
- spanning-tree link-type command [2-734](#)
- spanning-tree loopguard default command [2-736](#)
- spanning-tree mode command [2-738](#)
- spanning-tree mst configuration command [2-740](#)
- spanning-tree mst cost command [2-742](#)
- spanning-tree mst forward-time command [2-744](#)
- spanning-tree mst hello-time command [2-745](#)
- spanning-tree mst max-age command [2-746](#)
- spanning-tree mst max-hops command [2-747](#)
- spanning-tree mst port-priority command [2-748](#)
- spanning-tree mst pre-standard command [2-750](#)
- spanning-tree mst priority command [2-751](#)
- spanning-tree mst root command [2-752](#)
- spanning-tree portfast (global configuration) command [2-756](#)
- spanning-tree portfast (interface configuration) command [2-759](#)
- spanning-tree port-priority command [2-754](#)
- Spanning Tree Protocol
 - See STP
- spanning-tree transmit hold-count command [2-761](#)
- spanning-tree uplinkfast command [2-762](#)
- spanning-tree vlan command [2-764](#)
- speed command [2-767](#)
- srr-queue bandwidth limit command [2-769](#)
- srr-queue bandwidth shape command [2-771](#)
- srr-queue bandwidth share command [2-773](#)
- SSH, configuring version [2-261](#)
- stack-mac persistent timer command [2-775](#)
- stack member
 - access [2-454](#)
 - number [2-681, 2-785](#)
 - priority value [2-782](#)
 - provisioning [2-783](#)
 - reloading [2-437](#)
- stacks, switch
 - disabling a member [2-780](#)
 - enabling a member [2-780](#)
 - MAC address [2-775](#)
 - provisioning a new member [2-783](#)
 - reloading [2-437](#)
 - stack member access [2-454](#)
 - stack member number [2-681, 2-785](#)
 - stack member priority value [2-681, 2-782](#)

- static-access ports, configuring [2-789](#)
- statistics, Ethernet group [2-445](#)
- sticky learning, enabling [2-806](#)
- storm-control command [2-777](#)
- STP
 - BackboneFast [2-721](#)
 - counters, clearing [2-110](#)
 - debug messages, display
 - BackboneFast events [B-78](#)
 - MSTP [B-81](#)
 - optimized BPDUs handling [B-80](#)
 - spanning-tree activity [B-76](#)
 - switch shim [B-83](#)
 - transmitted and received BPDUs [B-79](#)
 - UplinkFast [B-85](#)
 - detection of indirect link failures [2-721](#)
 - enabling protocol tunneling for [2-295](#)
 - EtherChannel misconfiguration [2-728](#)
 - extended system ID [2-730](#)
 - path cost [2-726](#)
 - protocol modes [2-738](#)
 - root port
 - accelerating choice of new [2-762](#)
 - loop guard [2-732](#)
 - preventing from becoming designated [2-732](#)
 - restricting which can be root [2-732](#)
 - root guard [2-732](#)
 - UplinkFast [2-762](#)
 - root switch
 - affects of extended system ID [2-730, 2-765](#)
 - hello-time [2-764](#)
 - interval between BPDU messages [2-764](#)
 - interval between hello BPDU messages [2-764](#)
 - max-age [2-764](#)
 - port priority for selection of [2-754](#)
 - primary or secondary [2-764](#)
 - switch priority [2-764](#)
 - state changes
 - blocking to forwarding state [2-759](#)
 - enabling BPDU filtering [2-722, 2-756](#)
 - enabling BPDU guard [2-724, 2-756](#)
 - enabling Port Fast [2-756, 2-759](#)
 - enabling timer to recover from error state [2-178](#)
 - forward-delay time [2-764](#)
 - length of listening and learning states [2-764](#)
 - shutting down Port Fast-enabled ports [2-756](#)
 - state information display [2-673](#)
 - VLAN options [2-751, 2-764](#)
- SVIs, creating [2-193](#)
- SVI status calculation [2-791](#)
- Switched Port Analyzer
 - See SPAN
- switching characteristics
 - modifying [2-787](#)
 - returning to interfaces [2-787](#)
- switchport access command [2-789](#)
- switchport autostate exclude command [2-791](#)
- switchport backup interface command [2-793](#)
- switchport block command [2-796](#)
- switchport command [2-787](#)
- switchport host command [2-798](#)
- switchport mode command [2-799](#)
- switchport mode private-vlan command [2-802](#)
- switchport nonegotiate command [2-804](#)
- switchport port-security aging command [2-811](#)
- switchport port-security command [2-806](#)
- switchport priority extend command [2-813](#)
- switchport private-vlan command [2-815](#)
- switchport protected command [2-817](#)
- switchports, displaying [2-529](#)
- switchport trunk command [2-819](#)
- switchport voice detect [2-822](#)
- switchport voice vlan command [2-823](#)
- switch priority command [2-780, 2-782](#)
- switch provision command [2-783](#)
- switch renumber command [2-785](#)

system env temperature threshold yellow command [2-825](#)
 system message logging, save message to flash [2-310](#)
 system mtu command [2-827](#)
 system resource templates [2-446](#)

T

tar files, creating, listing, and extracting [2-15](#)
 TDR, running [2-829](#)
 temperature information, displaying [2-513](#)
 templates, system resources [2-446](#)
 test cable-diagnostics tdr command [2-829](#)
 traceroute mac command [2-830](#)
 traceroute mac ip command [2-833](#)
 trunking, VLAN mode [2-799](#)
 trunk mode [2-799](#)
 trunk ports [2-799](#)
 trunks, to non-DTP device [2-800](#)
 trusted boundary for QoS [2-379](#)
 trusted port states for QoS [2-379](#)
 tunnel ports, Layer 2 protocol, displaying [2-589](#)
 type (boot loader) command [A-27](#)

U

UDLD

aggressive mode [2-837, 2-839](#)
 debug messages, display [B-93](#)
 enable globally [2-837](#)
 enable per interface [2-839](#)
 error recovery timer [2-178](#)
 message timer [2-837](#)
 normal mode [2-837, 2-839](#)
 reset a shutdown interface [2-841](#)
 status [2-687](#)
 uddl command [2-837](#)
 uddl port command [2-839](#)
 uddl reset command [2-841](#)

unicast storm control [2-777](#)
 UniDirectional Link Detection
 See UDLD
 unknown multicast traffic, preventing [2-796](#)
 unknown unicast traffic, preventing [2-796](#)
 unset (boot loader) command [A-28](#)
 upgrading
 copying software images [2-8](#)
 downloading software images [2-11](#)
 software images, monitoring status of [2-465](#)
 UplinkFast, for STP [2-762](#)
 user EXEC mode [1-2, 1-3](#)

V

version (boot loader) command [A-30](#)
 version mismatch mode [2-682, C-40](#)
 vlan (global configuration) command [2-842](#)
 vlan (VLAN configuration) command [2-848](#)
 vlan access-map command [2-849](#)
 VLAN access map configuration mode [2-849](#)
 VLAN access maps
 actions [2-6](#)
 displaying [2-697](#)
 VLAN-based QoS [2-381](#)
 VLAN configuration
 rules [2-845](#)
 saving [2-842](#)
 VLAN configuration mode
 commands
 VLAN [2-848](#)
 VTP [2-867](#)
 description [1-4](#)
 entering [2-851](#)
 summary [1-3](#)
 vlan database command [2-851](#)
 vlan dot1q tag native command [2-852](#)

- vlan filter command [2-854](#)
- VLAN filters, displaying [2-698](#)
- VLAN ID range [2-842](#)
- VLAN maps
 - applying [2-854](#)
 - creating [2-849](#)
 - defining [2-338](#)
 - displaying [2-697](#)
- VLAN Query Protocol
 - See VQP
- VLANs
 - adding [2-842](#)
 - configuring [2-842, 2-848](#)
 - debug messages, display
 - ISL [B-89](#)
 - VLAN IOS file system error tests [B-88](#)
 - VLAN manager activity [B-86](#)
 - VTP [B-91](#)
 - displaying configurations [2-692](#)
 - extended-range [2-842](#)
 - MAC addresses
 - displaying [2-628](#)
 - number of [2-615](#)
 - media types [2-845](#)
 - normal-range [2-842, 2-848](#)
 - private [2-802](#)
 - configuring [2-427](#)
 - displaying [2-692](#)
 - See also private VLANs
 - restarting [2-708](#)
 - saving the configuration [2-842](#)
 - shutting down [2-708](#)
 - SNMP traps for VTP [2-713, 2-716](#)
 - suspending [2-708](#)
- VLAN Trunking Protocol
 - See VTP
- VM mode [2-682, C-40](#)
- VMPS
 - configuring servers [2-859](#)
 - displaying [2-699](#)
 - error recovery timer [2-179](#)
 - reconfirming dynamic VLAN assignments [2-856](#)
- vmmps reconfirm (global configuration) command [2-857](#)
- vmmps reconfirm (privileged EXEC) command [2-856](#)
- vmmps retry command [2-858](#)
- vmmps server command [2-859](#)
- voice VLAN
 - configuring [2-822, 2-823](#)
 - setting port priority [2-813](#)
- VQP
 - and dynamic-access ports [2-790](#)
 - clearing client statistics [2-112](#)
 - displaying information [2-699](#)
 - per-server retry count [2-858](#)
 - reconfirmation interval [2-857](#)
 - reconfirming dynamic VLAN assignments [2-856](#)
- VTP
 - changing characteristics [2-861](#)
 - clearing pruning counters [2-113](#)
 - configuring
 - domain name [2-861](#)
 - file name [2-861](#)
 - mode [2-861](#)
 - password [2-862](#)
 - counters display fields [2-703](#)
 - displaying information [2-702](#)
 - enabling
 - pruning [2-862](#)
 - tunneling for [2-295](#)
 - Version 2 [2-862](#)

VTP (continued)

enabling per port [2-866](#)

mode [2-861](#)

pruning [2-862](#)

saving the configuration [2-842](#)

statistics [2-702](#)

status [2-702](#)

status display fields [2-705](#)

vtp (global configuration) command [2-861](#)

vtp (VLAN configuration) command [2-867](#)

vtp interface configuration) command [2-866](#)

vtp primary command [2-868](#)