



INDEX

A

aaa accounting dot1x command [1](#)
aaa authentication dot1x command [3](#)
aaa authorization network command [5](#)
AAA methods [3](#)
abort command [666](#)
access control entries
 See ACEs
access control lists
 See ACLs
access groups
 IP [117](#)
 MAC, displaying [445](#)
access list, IPv6 [169](#)
access map configuration mode [228](#)
access mode [612](#)
access ports [612](#)
ACEs [62, 293](#)
ACLs
 deny [60](#)
 displaying [333](#)
 for non-IP protocols [207](#)
 IP [117](#)
 matching [228](#)
 on Layer 2 interfaces [117](#)
 permit [291](#)
action command [6](#)
address aliasing [276](#)
aggregate-port learner [281](#)
allowed VLANs [632](#)
apply command [666](#)
archive download-sw command [8](#)

archive tar command [11](#)
archive upload-sw command [14](#)
authentication failed VLAN
 See dot1x auth-fail vlan
auth-fail max-attempts
 See dot1x auth-fail max-attempts
auth-fail vlan
 See dot1x auth-fail vlan
authorization state of controlled port [86](#)
autonegotiation of duplex mode [97](#)
auto qos voip command [16](#)

B

BackboneFast, for STP [545](#)
backup interfaces
 configuring [606](#)
 displaying [383](#)
boot (boot loader) command [2](#)
boot config-file command [20](#)
boot enable-break command [21](#)
boot helper command [22](#)
boot helper-config file command [23](#)
booting
 Cisco IOS image [26](#)
 displaying environment variables [341](#)
 interrupting [21](#)
 manually [24](#)

boot loader

accessing 1

booting

Cisco IOS image 2

helper image 22

directories

creating 15

displaying a list of 7

removing 19

displaying

available commands 12

memory heap utilization 13

version 26

environment variables

described 20

displaying settings 20

location of 21

setting 20

unsetting 24

files

copying 5

deleting 6

displaying a list of 7

displaying the contents of 4, 16, 23

renaming 17

file system

formatting 10

initializing flash 9

running a consistency check 11

resetting the system 18

boot manual command 24

boot private-config-file command 25

boot system command 26

BPDU filtering, for spanning tree 546, 579

BPDU guard, for spanning tree 548, 579

break key detection 323, 1

broadcast storm control 597

C

cat (boot loader) command 4

CDP, enabling protocol tunneling for 187

channel-group command 27

channel-protocol command 30

Cisco SoftPhone

auto-QoS configuration 16

trusting packets sent from 268

class command 31

class-map command 33

class maps

creating 33

defining the match criteria 230

displaying 343

class of service

See CoS

clear dot1x command 35

clear eap sessions command 36

clear errdisable interface 37

clear ipc command 38

clear ip dhcp snooping database command 40

clear l2protocol-tunnel counters command 39

clear lacp command 42

clear mac address-table command 43, 44

clear pagp command 45

clear port-security command 46

clear spanning-tree counters command 48

clear spanning-tree detected-protocols command 49

clear vmpls statistics command 50

clear vtp counters command 51

clusters

SNMP trap 535

command modes defined 1

configuration files

password recovery disable considerations 1

specifying the name 20, 25

configuring multiple interfaces 113

config-vlan mode

commands [652](#)

description [4](#)

entering [651](#)

summary [2](#)

copy (boot loader) command [5](#)

CoS

assigning default value to incoming packets [238](#)

assigning to Layer 2 protocol packets [190](#)

overriding the incoming value [238](#)

CoS-to-DSCP map [242](#)

CPU ASIC statistics, displaying [344](#)

crashinfo files [106](#)

D

debug auto qos command [2](#)

debug backup command [4](#)

debug dot1x command [5](#)

debug dtp command [6](#)

debug eap command [7](#)

debug etherchannel command [8](#)

debug interface command [11](#)

debug ip dhcp snooping command [9](#)

debug ip igmp filter command [12](#)

debug ip igmp max-groups command [13](#)

debug ip igmp snooping command [14](#)

debug ip verify source packet command [10](#)

debug lacp command [15](#)

debug mac-notification command [16](#)

debug matm command [17](#)

debug matm move update command [18](#)

debug monitor command [19](#)

debug mvrdbg command [20](#)

debug nvram command [21](#)

debug pagp command [22](#)

debug platform acl command [23](#)

debug platform backup interface command [24](#)

debug platform cli-redirection main command [25](#)

debug platform cpu-queues command [26](#)

debug platform dot1x command [28](#)

debug platform etherchannel command [29](#)

debug platform fallback-bridging command [30](#)

debug platform forw-tcam command [31](#)

debug platform ip arp inspection command [32](#)

debug platform ipc command [40](#)

debug platform ip dhcp command [33](#)

debug platform ip igmp snooping command [34](#)

debug platform ip multicast command [36](#)

debug platform ip unicast command [38](#)

debug platform led command [41](#)

debug platform matm command [42](#)

debug platform messaging application command [43](#)

debug platform phy command [44](#)

debug platform pm command [46](#)

debug platform port-asic command [48](#)

debug platform port-security command [49](#)

debug platform qos-acl-tcam command [50](#)

debug platform remote-commands command [51](#)

debug platform resource-manager command [52](#)

debug platform snmp command [53](#)

debug platform span command [54](#)

debug platform supervisor-asic command [55](#)

debug platform sw-bridge command [56](#)

debug platform tcam command [57](#)

debug platform udd command [60](#)

debug platform vlan command [61](#)

debug pm command [62](#)

debug port-security command [64](#)

debug qos-manager command [65](#)

debug spanning-tree backbonefast command [68](#)

debug spanning-tree bpd command [69](#)

debug spanning-tree bpd-opt command [70](#)

debug spanning-tree command [66](#)

debug spanning-tree mstp command [71](#)

debug spanning-tree switch command [73](#)

debug spanning-tree uplinkfast command [75](#)

debug sw-vlan command [76](#)

- debug sw-vlan ifs command [78](#)
- debug sw-vlan notification command [79](#)
- debug sw-vlan vtp command [80](#)
- debug udd command [82](#)
- debug vqpc command [84](#)
- define interface-range command [52](#)
- delete (boot loader) command [6](#)
- delete command [54](#)
- deny (IPv6) command [55](#)
- deny command [60](#)
- detect mechanism, causes [98](#)
- DHCP snooping
 - accepting untrusted packets from edge switch [132](#)
 - enabling
 - on a VLAN [138](#)
 - option 82 [130, 132](#)
 - trust on an interface [136](#)
 - error recovery timer [103](#)
 - rate limiting [135](#)
- DHCP snooping binding database
 - binding file, configuring [128](#)
 - bindings
 - adding [126](#)
 - deleting [126](#)
 - displaying [396](#)
 - clearing database agent statistics [40](#)
 - database agent, configuring [128](#)
 - displaying
 - binding entries [396](#)
 - database agent status [398, 400](#)
 - renewing [317](#)
- dir (boot loader) command [7](#)
- directories, deleting [54](#)
- domain name, VTP [676, 680](#)
- dot1x auth-fail max-attempts [65](#)
- dot1x auth-fail vlan [67](#)
- dot1x command [63](#)
- dot1x control-direction command [69](#)
- dot1x critical global configuration command [71](#)
- dot1x critical interface configuration command [73](#)
- dot1x default command [75](#)
- dot1x fallback command [76](#)
- dot1x guest-vlan command [77](#)
- dot1x host-mode command [79](#)
- dot1x initialize command [80](#)
- dot1x mac-auth-bypass command [81](#)
- dot1x max-reauth-req command [83](#)
- dot1x max-req command [84](#)
- dot1x pae command [85](#)
- dot1x port-control command [86](#)
- dot1x re-authenticate command [88](#)
- dot1x reauthentication command [89](#)
- dot1x test eapol-capable command [90](#)
- dot1x test timeout command [91](#)
- dot1x timeout command [92](#)
- dot1x violation-mode command [95](#)
- dropping packets, with ACL matches [6](#)
- drop threshold, Layer 2 protocol tunneling [187](#)
- DSCP-to-CoS map [242](#)
- DSCP-to-DSCP-mutation map [242](#)
- DTP [613](#)
- DTP flap
 - error detection for [98](#)
 - error recovery timer [103](#)
- DTP negotiation [617](#)
- dual IPv4 and IPv6 templates [285](#)
- duplex command [96](#)
- dynamic-access ports
 - configuring [602](#)
 - restrictions [602](#)
- dynamic ARP inspection
 - error detection for [98](#)
- dynamic auto VLAN membership mode [612](#)
- dynamic desirable VLAN membership mode [612](#)
- Dynamic Host Configuration Protocol (DHCP)
 - See DHCP snooping
- Dynamic Trunking Protocol
 - See DTP

E

EAP-request/identity frame

- maximum number to send [84](#)
- response time before retransmitting [92](#)

encapsulation methods [632](#)

environment variables, displaying [341](#)

errdisable detect cause command [98](#)

errdisable detect cause small-frame comand [100](#)

errdisable recovery cause small-frame [102](#)

errdisable recovery command [103](#)

error conditions, displaying [370](#)

error disable detection [98](#)

error-disabled interfaces, displaying [383](#)

EtherChannel

assigning Ethernet interface to channel group [27](#)

creating port-channel logical interface [111](#)

debug EtherChannel/PAgP, display [8](#)

debug platform-specific events, display [29](#)

displaying [374](#)

enabling Layer 2 protocol tunneling for

LACP [188](#)

PAgP [188](#)

UDLD [188](#)

interface information, displaying [383](#)

LACP

clearing channel-group information [42](#)

debug messages, display [15](#)

displaying [434](#)

modes [27](#)

port priority for hot-standby ports [191](#)

restricting a protocol [30](#)

system priority [193](#)

load-distribution methods [301](#)

PAgP

aggregate-port learner [281](#)

clearing channel-group information [45](#)

debug messages, display [22](#)

displaying [491](#)

error detection for [98](#)

error recovery timer [103](#)

learn method [281](#)

modes [27](#)

physical-port learner [281](#)

priority of interface for transmitted traffic [283](#)

Ethernet controller, internal register display [346](#)

Ethernet statistics, collecting [319](#)

exception crashinfo command [106](#)

exit command [666](#)

extended-range VLANs

and allowed VLAN list [632](#)

and pruning-eligible list [632](#)

configuring [651](#)

extended system ID for STP [554](#)

F

fallback profile command [107](#)

fallback profiles

displaying [377](#)

file name, VTP [676](#)

files, deleting [54](#)

flash_init (boot loader) command [9](#)

Flex Links

configuring [606](#)

configuring preferred VLAN [608](#)

displaying [383](#)

flowcontrol command [109](#)

format (boot loader) command [10](#)

forwarding packets, with ACL matches [6](#)

forwarding results, display [6](#)

frame forwarding information, displaying [6](#)

fsck (boot loader) command [11](#)

G

global configuration mode [2, 3](#)

H

hardware ACL statistics [333](#)
 help (boot loader) command [12](#)
 hierarchical policy maps [299](#)
 host connection, port configuration [611](#)
 host ports, private VLANs [615](#)

I

IEEE 802.1Q trunk ports and native VLANs [668](#)
 IEEE 802.1Q tunnel ports
 configuring [612](#)
 displaying [357](#)
 limitations [613](#)
 IEEE 802.1x
 and switchport modes [613](#)
 violation error recovery [103](#)
 See also port-based authentication
 IEEE 802.1X Port Based Authentication
 enabling guest VLAN supplicant [66, 76, 108](#)
 IGMP filters
 applying [141](#)
 debug messages, display [12](#)
 IGMP groups, setting maximum [143](#)
 IGMP maximum groups, debugging [13](#)
 IGMP profiles
 creating [145](#)
 displaying [403](#)
 IGMP snooping
 adding ports as a static member of a group [161](#)
 displaying [404, 409, 411](#)
 enabling [147](#)
 enabling the configurable-leave timer [149](#)
 enabling the Immediate-Leave feature [158](#)
 flooding query count [155](#)
 interface topology change notification behavior [157](#)
 multicast table [407](#)
 querier [151](#)
 query solicitation [155](#)
 report suppression [153](#)
 switch topology change notification behavior [155](#)
 images
 See software images
 Immediate-Leave feature, MVR [278](#)
 Immediate-Leave processing
 IPv6 [183](#)
 immediate-leave processing [158](#)
 interface configuration mode [2, 4](#)
 interface port-channel command [111](#)
 interface range command [113](#)
 interface-range macros [52](#)
 interfaces
 assigning Ethernet interface to channel group [27](#)
 configuring [96](#)
 configuring multiple [113](#)
 creating port-channel logical [111](#)
 debug messages, display [11](#)
 disabling [531](#)
 displaying the MAC address table [457](#)
 restarting [531](#)
 interface speed, configuring [589](#)
 interface vlan command [115](#)
 internal registers, displaying [346, 353](#)
 Internet Group Management Protocol
 See IGMP
 invalid GBIC
 error detection for [98](#)
 error recovery timer [103](#)
 ip access-group command [117](#)
 ip address command [120](#)
 IP addresses, setting [120](#)
 IP address matching [228](#)
 ip admission command [122](#)
 ip admission name proxy http command [123](#)
 IP DHCP snooping
 See DHCP snooping
 ip dhcp snooping binding command [126](#)

ip dhcp snooping command [125](#)
 ip dhcp snooping database command [128](#)
 ip dhcp snooping information option allow-untrusted command [132](#)
 ip dhcp snooping information option command [130](#)
 ip dhcp snooping information option format remote-id command [134](#)
 ip dhcp snooping limit rate command [135](#)
 ip dhcp snooping trust command [136](#)
 ip dhcp snooping verify command [137](#)
 ip dhcp snooping vlan command [138](#)
 ip dhcp snooping vlan information option format-type circuit-id string command [139](#)
 ip igmp filter command [141](#)
 ip igmp max-groups command [143](#)
 ip igmp profile command [145](#)
 ip igmp snooping command [147](#)
 ip igmp snooping last-member-query-interval command [149](#)
 ip igmp snooping querier command [151](#)
 ip igmp snooping report-suppression command [153](#)
 ip igmp snooping tcn command [155](#)
 ip igmp snooping tcn flood command [157](#)
 ip igmp snooping vlan immediate-leave command [158](#)
 ip igmp snooping vlan mrouter command [159](#)
 ip igmp snooping vlan static command [161](#)
 IP multicast addresses [275](#)
 IP phones
 auto-QoS configuration [16](#)
 trusting packets sent from [268](#)
 IP-precedence-to-DSCP map [242](#)
 ip snap forwarding command [163](#)
 ip source binding command [164](#)

IP source guard
 disabling [168](#)
 displaying
 binding entries [413](#)
 configuration [415](#)
 dynamic binding entries only [396](#)
 enabling [168](#)
 static IP source bindings [164](#)
 ip ssh command [166](#)
 IPv6 access list
 deny conditions [55](#)
 ipv6 access-list command [169](#)
 ipv6 mld snooping command [171](#)
 ipv6 mld snooping last-listener-query count command [173](#)
 ipv6 mld snooping last-listener-query-interval command [175](#)
 ipv6 mld snooping listener-message-suppression command [177](#)
 ipv6 mld snooping robustness-variable command [179](#)
 ipv6 mld snooping tcn command [181](#)
 ipv6 mld snooping vlan command [183](#)
 IPv6 SDM template [320](#)
 ipv6 traffic-filter command [185](#)
 ip verify source command [168](#)

J

jumbo frames
 See MTU

L

l2protocol-tunnel command [187](#)
 l2protocol-tunnel cos command [190](#)
 LACP
 See EtherChannel
 lacp port-priority command [191](#)
 lacp system-priority command [193](#)

Layer 2 mode, enabling [600](#)
 Layer 2 protocol ports, displaying [431](#)
 Layer 2 protocol-tunnel
 error detection for [98](#)
 error recovery timer [103](#)
 Layer 2 protocol tunnel counters [39](#)
 Layer 2 protocol tunneling error recovery [188](#)
 Layer 2 traceroute
 IP addresses [642](#)
 MAC addresses [639](#)
 Layer 3 mode, enabling [600](#)
 line configuration mode [2, 5](#)
 Link Aggregation Control Protocol
 See EtherChannel
 link flap
 error detection for [98](#)
 error recovery timer [103](#)
 link state group command [199](#)
 link state track command [201](#)
 load-distribution methods for EtherChannel [301](#)
 location (global configuration) command [195](#)
 location (interface configuration) command [197](#)
 logging event command [202](#)
 logging file command [203](#)
 logical interface [111](#)
 loopback error
 detection for [98](#)
 recovery timer [103](#)
 loop guard, for spanning tree [555, 559](#)

M

mac access-group command [205](#)
 MAC access-groups, displaying [445](#)
 MAC access list configuration mode [207](#)
 mac access-list extended command [207](#)
 MAC access lists [60](#)

MAC addresses
 disabling MAC address learning per VLAN [210](#)
 displaying
 aging time [451](#)
 all [449](#)
 dynamic [455](#)
 MAC address-table move updates [460](#)
 notification settings [459, 462](#)
 number of addresses in a VLAN [453](#)
 per interface [457](#)
 per VLAN [466](#)
 static [464](#)
 static and dynamic entries [447](#)
 dynamic
 aging time [209](#)
 deleting [43](#)
 displaying [455](#)
 enabling MAC address notification [214](#)
 enabling MAC address-table move update [212](#)
 matching [228](#)
 static
 adding and removing [216](#)
 displaying [464](#)
 dropping on an interface [217](#)
 tables [449](#)
 mac address notification, debugging [16](#)
 mac address-table aging-time [205, 228](#)
 mac address-table aging-time command [209](#)
 mac address-table learning command [210](#)
 mac address-table move update command [212](#)
 mac address-table notification command [214](#)
 mac address-table static command [216](#)
 mac address-table static drop command [217](#)
 macro apply command [219](#)
 macro description command [222](#)
 macro global command [223](#)
 macro global description command [225](#)
 macro name command [226](#)

macros

- adding a description [222](#)
- adding a global description [225](#)
- applying [223](#)
- creating [226](#)
- displaying [493](#)
- interface range [52, 113](#)
- specifying parameter values [223](#)
- tracing [223](#)

maps

QoS

- defining [242](#)
- displaying [476](#)

VLAN

- creating [663](#)
- defining [228](#)
- displaying [523](#)

match (access-map configuration) command [228](#)

match (class-map configuration) command [230](#)

maximum transmission unit

See MTU

mdix auto command [232](#)

MDL snooping

- displaying [425](#)

memory (boot loader) command [13](#)

mkdir (boot loader) command [15](#)

MLD snooping

- configuring [177, 179](#)
- configuring queries [173, 175](#)
- configuring topology change notification [181](#)
- displaying [423, 427, 429](#)
- enabling [171](#)

MLD snooping on a VLAN

- enabling [183](#)

mls qos aggregate-policer command [236](#)

mls qos command [234](#)

mls qos cos command [238](#)

mls qos dscp-mutation command [240](#)

mls qos map command [242](#)

mls qos queue-set output buffers command [246](#)

mls qos queue-set output threshold command [248](#)

mls qos rewrite ip dscp command [250](#)

mls qos srr-queue input bandwidth command [252](#)

mls qos srr-queue input buffers command [254](#)

mls qos srr-queue input cos-map command [256](#)

mls qos srr-queue input dscp-map command [258](#)

mls qos srr-queue input priority-queue command [260](#)

mls qos srr-queue input threshold command [262](#)

mls qos srr-queue output cos-map command [264](#)

mls qos srr-queue output dscp-map command [266](#)

mls qos trust command [268](#)

mls qos vlan-based command [270](#)

mode, MVR [275](#)

Mode button, and password recovery [323](#)

modes, commands [1](#)

monitor session command [271](#)

more (boot loader) command [16](#)

MSTP

displaying [504](#)

interoperability [49](#)

link type [557](#)

MST region

aborting changes [563](#)

applying changes [563](#)

configuration name [563](#)

configuration revision number [563](#)

current or pending display [563](#)

displaying [504](#)

MST configuration mode [563](#)

VLANs-to-instance mapping [563](#)

path cost [565](#)

protocol mode [561](#)

restart protocol migration process [49](#)

root port

loop guard [555](#)

preventing from becoming designated [555](#)

restricting which can be root [555](#)

root guard [555](#)

MSTP (continued)

root switch

- affects of extended system ID [554](#)
- hello-time [568, 575](#)
- interval between BPDU messages [569](#)
- interval between hello BPDU messages [568, 575](#)
- max-age [569](#)
- maximum hop count before discarding BPDU [570](#)
- port priority for selection of [571](#)
- primary or secondary [575](#)
- switch priority [574](#)

state changes

- blocking to forwarding state [581](#)
- enabling BPDU filtering [546, 579](#)
- enabling BPDU guard [548, 579](#)
- enabling Port Fast [579, 581](#)
- forward-delay time [567](#)
- length of listening and learning states [567](#)
- rapid transition to forwarding [557](#)
- shutting down Port Fast-enabled ports [579](#)

state information display [503](#)

MTU

- configuring size [637](#)
- displaying global setting [511](#)

Multicast Listener Discovery

See MLD

multicast group address, MVR [278](#)multicast groups, MVR [276](#)

Multicast Listener Discovery

See MLD

multicast router learning method [159](#)

multicast router ports

IPv6 [183](#)multicast router ports, configuring [159](#)multicast storm control [597](#)multicast VLAN, MVR [275](#)

multicast VLAN registration

See MVR

multiple hosts on authorized port [79](#)

Multiple Spanning Tree Protocol

See MSTP

MVR

- and address aliasing [276](#)
- configuring [275](#)
- configuring interfaces [278](#)
- debug messages, display [20](#)
- displaying [485](#)
- displaying interface information [487](#)
- members, displaying [489](#)

mvr (global configuration) command [275](#)mvr (interface configuration) command [278](#)mvr vlan group command [279](#)

Nnative VLANs [632](#)native VLAN tagging [668](#)

nonegotiate

DTP messaging [617](#)nonegotiate, speed [589](#)

non-IP protocols

denying [60](#)forwarding [291](#)non-IP traffic access lists [207](#)

non-IP traffic forwarding

denying [60](#)permitting [291](#)normal-range VLANs [651, 657](#)no vlan command [651, 661](#)

O

online diagnostics

displaying

- configured boot-up coverage level [357](#)
- current scheduled tasks [357](#)
- event logs [357](#)
- supported test suites [357](#)
- test ID [357](#)
- test results [357](#)
- test statistics [357](#)

P

PAgP

See EtherChannel

- pagp learn-method command [281](#)
- pagp port-priority command [283](#)
- password, VTP [676, 680](#)
- password-recovery mechanism, enabling and disabling [323](#)
- permit (IPv6) command [285](#)
- permit (MAC access-list configuration) command [291](#)
- per-VLAN spanning-tree plus
 - See STP
- physical-port learner [281](#)
- PID, displaying [394](#)
- PIM-DVMRP, as multicast router learning method [159](#)
- police aggregate command [296](#)
- police command [294](#)
- policed-DSCP map [242](#)
- policy-map command [298](#)

policy maps

- applying to an interface [325, 330](#)
- creating [298](#)
- displaying [496](#)
- hierarchical [299](#)
- policers
 - displaying [469](#)
 - for a single class [294](#)
 - for multiple classes [236, 296](#)
 - policed-DSCP map [242](#)
- traffic classification
 - defining the class [31](#)
 - defining trust states [644](#)
 - setting DSCP or IP precedence values [328](#)

Port Aggregation Protocol

See EtherChannel

port-based authentication

- AAA method list [3](#)
- configuring violation modes [95](#)
- debug messages, display [5](#)
- enabling IEEE 802.1x
 - globally [63](#)
 - per interface [86](#)
- guest VLAN [77](#)
- host modes [79](#)
- IEEE 802.1x AAA accounting methods [1](#)
- initialize an interface [80, 91](#)
- MAC authentication bypass [81](#)
- manual control of authorization state [86](#)
- multiple hosts on authorized port [79](#)
- PAE as authenticator [85](#)
- periodic re-authentication
 - enabling [89](#)
 - time between attempts [92](#)
- quiet period between failed authentication exchanges [92](#)
- re-authenticating IEEE 802.1x-enabled ports [88](#)
- resetting configurable IEEE 802.1x parameters [75](#)

- port-based authentication
 - switch-to-authentication server retransmission time [92](#)
 - switch-to-client frame-retransmission number [83 to 84](#)
 - switch-to-client retransmission time [92](#)
 - test for IEEE 802.1x readiness [90](#)
- port-channel load-balance command [301](#)
- Port Fast, for spanning tree [581](#)
- port ranges, defining [52](#)
- ports, debugging [62](#)
- ports, protected [630](#)
- port security
 - aging [624](#)
 - debug messages, display [64](#)
 - enabling [619](#)
 - violation error recovery [103](#)
- port trust states for QoS [268](#)
- port types, MVR [278](#)
- priority-queue command [303](#)
- private-vlan command [305](#)
- private-vlan mapping command [308](#)
- private VLANs
 - association [628](#)
 - configuring [305](#)
 - configuring ports [615](#)
 - displaying [517](#)
 - host ports [615](#)
 - mapping
 - configuring [628](#)
 - displaying [383](#)
 - promiscuous ports [615](#)
- privileged EXEC mode [2, 3](#)
- product identification information, displaying [394](#)
- promiscuous ports, private VLANs [615](#)
- protected ports, displaying [389](#)

- pruning
 - VLANs [632](#)
 - VTP
 - displaying interface information [383](#)
 - enabling [676, 680](#)
- pruning-eligible VLAN list [634](#)
- PVST+
 - See STP

Q

- QoS
 - auto-QoS
 - configuring [16](#)
 - debug messages, display [2](#)
 - displaying [337](#)
 - class maps
 - creating [33](#)
 - defining the match criteria [230](#)
 - displaying [343](#)
 - defining the CoS value for an incoming packet [238](#)
 - displaying configuration information [337, 468](#)
 - DSCP transparency [250](#)
 - DSCP trusted ports
 - applying DSCP-to-DSCP-mutation map to [240](#)
 - defining DSCP-to-DSCP-mutation map [242](#)
 - egress queues
 - allocating buffers [246](#)
 - defining the CoS output queue threshold map [264](#)
 - defining the DSCP output queue threshold map [266](#)
 - displaying buffer allocations [472](#)
 - displaying CoS output queue threshold map [476](#)
 - displaying DSCP output queue threshold map [476](#)
 - displaying queueing strategy [472](#)
 - displaying queue-set settings [479](#)
 - enabling bandwidth shaping and scheduling [593](#)

QoS (continued)

- enabling bandwidth sharing and scheduling [595](#)
- limiting the maximum output on a port [591](#)
- mapping a port to a queue-set [310](#)
- mapping CoS values to a queue and threshold [264](#)
- mapping DSCP values to a queue and threshold [266](#)
- setting maximum and reserved memory allocations [248](#)
- setting WTD thresholds [248](#)
- enabling [234](#)
- ingress queues
 - allocating buffers [254](#)
 - assigning SRR scheduling weights [252](#)
 - defining the CoS input queue threshold map [256](#)
 - defining the DSCP input queue threshold map [258](#)
 - displaying buffer allocations [472](#)
 - displaying CoS input queue threshold map [476](#)
 - displaying DSCP input queue threshold map [476](#)
 - displaying queueing strategy [472](#)
 - displaying settings for [470](#)
 - enabling the priority queue [260](#)
 - mapping CoS values to a queue and threshold [256](#)
 - mapping DSCP values to a queue and threshold [258](#)
 - setting WTD thresholds [262](#)
- maps
 - defining [242, 256, 258, 264, 266](#)
 - displaying [476](#)
- policy maps
 - applying an aggregate policer [296](#)
 - applying to an interface [325, 330](#)
 - creating [298](#)
 - defining policers [236, 294](#)
 - displaying policers [469](#)
 - displaying policy maps [496](#)
 - hierarchical [299](#)

QoS (continued)

- policed-DSCP map [242](#)
- setting DSCP or IP precedence values [328](#)
- traffic classifications [31](#)
- trust states [644](#)
- port trust states [268](#)
- queues, enabling the expedite [303](#)
- statistics
 - in-profile and out-of-profile packets [472](#)
 - packets enqueued or dropped [472](#)
 - sent and received CoS values [472](#)
 - sent and received DSCP values [472](#)
- trusted boundary for IP phones [268](#)
- VLAN-based [270](#)
- quality of service
 - See QoS
- querytime, MVR [275](#)
- queue-set command [310](#)

R

- radius-server dead-criteria command [311](#)
- radius-server host command [313](#)
- rapid per-VLAN spanning-tree plus
 - See STP
- rapid PVST+
 - See STP
- re-authenticating IEEE 802.1x-enabled ports [88](#)
- re-authentication
 - periodic [89](#)
 - time between attempts [92](#)
- receiver ports, MVR [278](#)
- receiving flow-control packets [109](#)
- recovery mechanism
 - causes [103](#)
 - display [37, 368, 372](#)
 - timer interval [104](#)
- remote-span command [315](#)

Remote Switched Port Analyzer

See RSPAN

rename (boot loader) command [17](#)renew ip dhcp snooping database command [317](#)reset (boot loader) command [18](#)reset command [666](#)resource templates, displaying [500](#)

restricted VLAN

See dot1x auth-fail vlan

rmdir (boot loader) command [19](#)rmon collection stats command [319](#)root guard, for spanning tree [555](#)

routed ports

IP addresses on [121](#)number supported [121](#)

RSPAN

configuring [271](#)displaying [482](#)filter RSPAN traffic [271](#)remote-span command [315](#)

sessions

add interfaces to [271](#)displaying [482](#)start new [271](#)show access-lists command [333](#)show archive status command [336](#)show auto qos command [337](#)show boot command [341](#)show changes command [666](#)show class-map command [343](#)show controllers cpu-interface command [344](#)show controllers ethernet-controller command [346](#)show controllers team command [353](#)show controller utilization command [355](#)show current command [666](#)show dot1q-tunnel command [357](#)show dot1x command [358](#)show dtp [362](#)show eap command [364](#)show env command [367](#)show errdisable detect command [368](#)show errdisable flap-values command [370](#)show errdisable recovery command [372](#)show etherchannel command [374](#)show fallback profile command [377](#)show flowcontrol command [379](#)show idprom command [381](#)show interfaces command [383](#)show interfaces counters command [391](#)show inventory command [394](#)show ipc command [417](#)show ip dhcp snooping binding command [396](#)show ip dhcp snooping command [395](#)show ip dhcp snooping database command [398, 400](#)show ip igmp profile command [403](#)show ip igmp snooping address command [425](#)show ip igmp snooping command [404, 423](#)show ip igmp snooping groups command [407](#)show ip igmp snooping mrouter command [409, 427](#)show ip igmp snooping querier command [411, 429](#)show ip source binding command [413](#)show ipv6 access-list command [421](#)show ip verify source command [415](#)

S
sdm prefer command [320](#)

SDM templates

allowed resources [321](#)displaying [500](#)dual IPv4 and IPv6 [320](#)secure ports, limitations [621](#)sending flow-control packets [109](#)service password-recovery command [323](#)service-policy command [325](#)set (boot loader) command [20](#)set command [328](#)setup command [330](#)

- show l2protocol-tunnel command 431
- show lacp command 434
- show link state group command 441, 443
- show location 438
- show mac access-group command 445
- show mac address-table address command 449
- show mac address-table aging time command 451
- show mac address-table command 447
- show mac address-table count command 453
- show mac address-table dynamic command 455
- show mac address-table interface command 457
- show mac address-table learning command 459
- show mac address-table move update command 460
- show mac address-table notification command 44, 462, 18
- show mac address-table static command 464
- show mac address-table vlan command 466
- show mls qos aggregate-policer command 469
- show mls qos command 468
- show mls qos input-queue command 470
- show mls qos interface command 472
- show mls qos maps command 476
- show mls qos queue-set command 479
- show mls qos vlan command 481
- show monitor command 482
- show mvr command 485
- show mvr interface command 487
- show mvr members command 489
- show pagp command 491
- show parser macro command 493
- show platform acl command 2
- show platform backup interface command 3
- show platform configuration command 4
- show platform etherchannel command 5
- show platform forward command 6
- show platform igmp snooping command 8
- show platform ipc trace command 15
- show platform ip multicast command 10
- show platform ip unicast command 11
- show platform ipv6 unicast command 16
- show platform layer4op command 18
- show platform mac-address-table command 19
- show platform messaging command 20
- show platform monitor command 21
- show platform mvr table command 22
- show platform pm command 23
- show platform port-asic command 24
- show platform port-security command 29
- show platform qos command 30
- show platform resource-manager command 31
- show platform snmp counters command 33
- show platform spanning-tree command 34
- show platform stp-instance command 35
- show platform team command 36
- show platform vlan command 39
- show policy-map command 496
- show port security command 497
- show proposed command 666
- show sdm prefer command 500
- show spanning-tree command 503
- show storm-control command 509
- show system mtu command 511
- show trust command 644
- show udd command 512
- show version command 515
- show vlan access-map command 523
- show vlan command 517
- show vlan command, fields 519
- show vlan filter command 524
- show vmpls command 525
- show vtp command 527
- shutdown command 531
- shutdown threshold, Layer 2 protocol tunneling 187
- shutdown vlan command 532
- small violation-rate command 533
- Smartports macros
 - See macros
- SNMP host, specifying 539
- SNMP informs, enabling the sending of 535

- snmp-server enable traps command [535](#)
- snmp-server host command [539](#)
- snmp trap mac-notification command [543](#)
- SNMP traps
 - enabling MAC address notification trap [543](#)
 - enabling the MAC address notification feature [214](#)
 - enabling the sending of [535](#)
- SoftPhone
 - See Cisco SoftPhone
- software images
 - deleting [54](#)
 - downloading [8](#)
 - upgrading [8](#)
 - uploading [14](#)
- software version, displaying [515](#)
- source ports, MVR [278](#)
- SPAN
 - configuring [271](#)
 - debug messages, display [19](#)
 - displaying [482](#)
 - filter SPAN traffic [271](#)
 - sessions
 - add interfaces to [271](#)
 - displaying [482](#)
 - start new [271](#)
- spanning [583](#)
- spanning-tree backbonefast command [545](#)
- spanning-tree bpdudfilter command [546](#)
- spanning-tree bpduguard command [548](#)
- spanning-tree cost command [550](#)
- spanning-tree etherchannel command [552](#)
- spanning-tree extend system-id command [554](#)
- spanning-tree guard command [555](#)
- spanning-tree link-type command [557](#)
- spanning-tree loopguard default command [559](#)
- spanning-tree mode command [561](#)
- spanning-tree mst configuration command [563](#)
- spanning-tree mst cost command [565](#)
- spanning-tree mst forward-time command [567](#)
- spanning-tree mst hello-time command [568](#)
- spanning-tree mst max-age command [569](#)
- spanning-tree mst max-hops command [570](#)
- spanning-tree mst port-priority command [571](#)
- spanning-tree mst pre-standard command [573](#)
- spanning-tree mst priority command [574](#)
- spanning-tree mst root command [575](#)
- spanning-tree portfast (global configuration) command [579](#)
- spanning-tree portfast (interface configuration) command [581](#)
- spanning-tree port-priority command [577](#)
- Spanning Tree Protocol
 - See STP
- spanning-tree transmit hold-count command [583](#)
- spanning-tree uplinkfast command [584](#)
- spanning-tree vlan command [586](#)
- speed command [589](#)
- srr-queue bandwidth limit command [591](#)
- srr-queue bandwidth shape command [593](#)
- srr-queue bandwidth share command [595](#)
- SSH, configuring version [166](#)
- static-access ports, configuring [602](#)
- statistics, Ethernet group [319](#)
- sticky learning, enabling [619](#)
- storm-control command [597](#)
- STP
 - BackboneFast [545](#)
 - counters, clearing [48](#)
 - debug messages, display
 - BackboneFast events [68](#)
 - MSTP [71](#)
 - optimized BPDUs handling [70](#)
 - spanning-tree activity [66](#)
 - switch shim [73](#)
 - transmitted and received BPDUs [69](#)
 - UplinkFast [75](#)
 - detection of indirect link failures [545](#)
 - enabling protocol tunneling for [187](#)

STP (continued)

- EtherChannel misconfiguration [552](#)
 - extended system ID [554](#)
 - path cost [550](#)
 - protocol modes [561](#)
 - root port
 - accelerating choice of new [584](#)
 - loop guard [555](#)
 - preventing from becoming designated [555](#)
 - restricting which can be root [555](#)
 - root guard [555](#)
 - UplinkFast [584](#)
 - root switch
 - affects of extended system ID [554, 587](#)
 - hello-time [586](#)
 - interval between BPDU messages [586](#)
 - interval between hello BPDU messages [586](#)
 - max-age [586](#)
 - port priority for selection of [577](#)
 - primary or secondary [586](#)
 - switch priority [586](#)
 - state changes
 - blocking to forwarding state [581](#)
 - enabling BPDU filtering [546, 579](#)
 - enabling BPDU guard [548, 579](#)
 - enabling Port Fast [579, 581](#)
 - enabling timer to recover from error state [103](#)
 - forward-delay time [586](#)
 - length of listening and learning states [586](#)
 - shutting down Port Fast-enabled ports [579](#)
 - state information display [503](#)
 - VLAN options [574, 586](#)
- SVIs, creating [115](#)
- SVI status calculation [604](#)
- Switched Port Analyzer
- See SPAN
- switching characteristics
- modifying [600](#)
 - returning to interfaces [600](#)

- switchport access command [602](#)
- switchport autostate exclude command [604](#)
- switchport backup interface command [606](#)
- switchport block command [610](#)
- switchport command [600](#)
- switchport host command [611](#)
- switchport mode command [612](#)
- switchport mode private-vlan command [615](#)
- switchport nonegotiate command [617](#)
- switchport port-security aging command [624](#)
- switchport port-security command [619](#)
- switchport priority extend command [626](#)
- switchport private-vlan command [628](#)
- switchport protected command [630](#)
- switchports, displaying [383](#)
- switchport trunk command [632](#)
- switchport voice vlan command [635](#)
- system message logging, save message to flash [203](#)
- system mtu command [637](#)
- system resource templates [320](#)

T

- tar files, creating, listing, and extracting [11](#)
- templates, system resources [320](#)
- traceroute mac command [639](#)
- traceroute mac ip command [642](#)
- trunking, VLAN mode [612](#)
- trunk mode [612](#)
- trunk ports [612](#)
- trunks, to non-DTP device [613](#)
- trusted boundary for QoS [268](#)
- trusted port states for QoS [268](#)
- tunnel ports, Layer 2 protocol, displaying [431](#)
- type (boot loader) command [23](#)

U

UDLD

- aggressive mode [646, 648](#)
- debug messages, display [82](#)
- enable globally [646](#)
- enable per interface [648](#)
- error recovery timer [103](#)
- message timer [646](#)
- normal mode [646, 648](#)
- reset a shutdown interface [650](#)
- status [512](#)

udld command [646](#)

udld port command [648](#)

udld reset command [650](#)

unicast storm control [597](#)

UniDirectional Link Detection

See UDLD

unknown multicast traffic, preventing [610](#)

unknown unicast traffic, preventing [610](#)

unset (boot loader) command [24](#)

upgrading

- software images [8](#)
- monitoring status of [336](#)

UplinkFast, for STP [584](#)

user EXEC mode [2, 3](#)

V

version (boot loader) command [26](#)

VLAN

enabling guest VLAN supplicant [66, 76](#)

vlan (global configuration) command [651](#)

vlan (VLAN configuration) command [657](#)

vlan access-map command [663](#)

VLAN access map configuration mode [663](#)

VLAN access maps

- actions [6](#)
- displaying [523](#)

VLAN-based QoS [270](#)

VLAN configuration

- rules [654, 659](#)
- saving [651, 661](#)

VLAN configuration mode

- commands
 - VLAN [657](#)
 - VTP [680](#)

description [5](#)

entering [665](#)

summary [2](#)

vlan database command [665](#)

vlan dot1q tag native command [668](#)

vlan filter command [669](#)

VLAN filters, displaying [524](#)

VLAN ID range [651, 657](#)

VLAN maps

- applying [669](#)
- creating [663](#)
- defining [228](#)
- displaying [523](#)

VLAN Query Protocol

See VQP

VLANs

- adding [651](#)
- configuring [651, 657](#)
- debug messages, display
 - ISL [79](#)
 - VLAN IOS file system error tests [78](#)
 - VLAN manager activity [76](#)
 - VTP [80](#)
- displaying configurations [517](#)
- enabling guest VLAN supplicant [108](#)
- extended-range [651](#)
- MAC addresses
 - displaying [466](#)
 - number of [453](#)
- media types [654, 659](#)
- normal-range [651, 657](#)

VLANs

- private [615](#)
 - configuring [305](#)
 - displaying [517](#)
 - See also private VLANs
- restarting [532](#)
- saving the configuration [651](#)
- shutting down [532](#)
- SNMP traps for VTP [537, 540](#)
- suspending [532](#)
- variables [657](#)

VLAN Trunking Protocol

See VTP

VMPS

- configuring servers [674](#)
- displaying [525](#)
- error recovery timer [104](#)
- reconfirming dynamic VLAN assignments [671](#)
- vmmps reconfirm (global configuration) command [672](#)
- vmmps reconfirm (privileged EXEC) command [671](#)
- vmmps retry command [673](#)
- vmmps server command [674](#)
- voice VLAN
 - configuring [635](#)
 - setting port priority [626](#)

VQP

- and dynamic-access ports [602](#)
- clearing client statistics [50](#)
- displaying information [525](#)
- per-server retry count [673](#)
- reconfirmation interval [672](#)
- reconfirming dynamic VLAN assignments [671](#)

VTP

- changing characteristics [676](#)
- clearing pruning counters [51](#)
- configuring
 - domain name [676, 680](#)
 - file name [676](#)
 - mode [676, 680](#)
 - password [676, 680](#)
- counters display fields [528](#)
- displaying information [527](#)
- enabling
 - pruning [676, 680](#)
 - tunneling for [187](#)
 - Version 2 [676, 680](#)
- mode [676, 680](#)
- pruning [676, 680](#)
- saving the configuration [651, 661](#)
- statistics [527](#)
- status [527](#)
- status display fields [529](#)
- vtp (global configuration) command [676](#)
- vtp (VLAN configuration) command [680](#)

X

- XENPAK module serial EEPROM information [381](#)

