Numerics

6500 chassis
  types 1-2
7600 chassis
  types 1-2
802.1D 8-18

A

AAL5 over MPLS
  configuring 11-47
  restrictions 11-25
Any Transport over MPLS (AToM)
  ATM AAL5 11-25
  restrictions 11-23
any transport over MPLS (AToM) 11-23
  ATM AAL5 over MPLS 11-47
  ATM cell relay over MPLS VC-mode 11-50
  compatibility with previous releases of AToM 11-27
  configuring QoS 11-79
  Ethernet over MPLS 11-28
  frame relay over MPLS 11-54
  packet transport 11-26
  QoS 11-27
APS
  basic APS on single router 8-28
  commands 8-31
  examples 3-15, 5-18
  multiple APS interfaces 8-30
  protect interface 8-27
  working interface 8-27
APS commands 8-30
ATM AAL5 over MPLS
  configuration 11-47
  restrictions 11-25
  supported OSMs 11-47
ATM cell relay over MPLS
  restrictions 11-25
ATM cell relay over MPLS VC-mode
  configuration 11-50
ATM VC to VC local switching with AAL0 encapsulation 11-61
ATM VC to VC local switching with AAL5 encapsulation 11-59
ATM VP to VP local switching 11-63
audience xiii
automatic protection switching 3-13
  channelized OC-12/T3 OSMs 5-13

B

BPDU packet formats 8-20
bridge-domain command
  new keywords 8-21
Bridge Protocol Data Unit (BPDU) 8-18

C

Class-based marking for MPLS (supervisor engine 2) 11-14
commands
  APS 8-31
  ATM 8-12
  class-map 11-71, 11-72, 11-77, 11-78
  CLI 1-8
  clock source 6-13

configuration 2-1
configuration file 3-24
configuration subcommands 4-3
debug 11-50, 11-53, 11-68
interface subcommands 2-2
non-supported frame relay commands 3-18
non-supported on OSM-12CT3/T1 7-14
platform-specific 3-17
QoS 11-80
show 3-12
SONET and SDH 8-31
STS-1 path configuration 6-14
common part convergence sublayer 8-19
configuration, basic
customizing 2-2
cyclic redundancy check 2-3
framing 2-2
MTU size 2-2
SONET payload scrambling 2-3
transmit clock 2-3
configuration example
AAL5 over MPLS 11-48
ATM cell relay over MPLS VC-mode 11-51
AToMPLS ingress QoS 11-88
basic APS for OC-12/T3 5-18
basic multiple router APS 8-29
basic single router 8-28
BCP 3-23
BERT timeslots 6-18
BRE on a PVC 8-7
CBWFQ on OC-3 link 9-11, 9-13
channelized DS-3 5-17
channelized POS 5-17
configuring interfaces under SDH framing with AU-4 mapping 5-11
configuring link for 12 T3 channels 6-19
create a multilink interface and add it to a multilink bundle 7-13
displaying traffic policy 11-82, 11-87
DS-3 interface 6-16
E1 line 7-11
EoMPLS port mode for OSM-based system 11-39
EoMPLS port mode for SUP720-3BXL-based system 11-43, 11-60, 11-61, 11-64
EoMPLS QoS 11-86
EoMPLS VLAN mode for OSM-based system 11-31
EoMPLS VLAN mode for SUP720-3BXL-based system 11-34
first TUG-3 of the AU-4 in port 6/1 6-20
frame relay DLCI local switching 11-66
frame relay over MPLS 11-56
frame relay traffic shaping 3-18
frame relay traffic shaping for channelized OC-12/T3 OSM 5-15
FRoMPLS ingress QoS 11-88
ILMI keepalive interval 8-10
ILMI PVC 8-11
ILMI PVC on an ATM main interface 8-10
ingress DSB 10-6
ingress DSS 10-3
load balancing for tag-to-tag traffic 11-21
low latency queueing 9-13
mulitlink interface 7-14
multilink bundle 7-12
multilink PPP minimum links mandatory feature 7-14
multiple APS interface for OC-12/T3 5-18
multiple APS interfaces 8-30
nested traffic policy 9-17
NSAP address 8-12
policy map 9-13
POS/SDH OSM for SRP/DPT mode 3-21
POS/SDH OSM multiple APS 3-16
priority queue 9-13
PVC 8-7
QoS on VLAN for EoMPLS 11-87
shape average rate 11-82
show policy map 9-9
signaling PVC 8-10
STS-1 mode of operation 6-14

SVC 8-12
T1/NxDS0 line 7-10
T1s for CT3 operation 6-17
T1s for VT1.5 operation 6-18
T3 controller for T1 channelization mode 7-9
traffic class 11-15
traffic classes 9-10
unchannelized DS-3 interface 5-9
unchannelized DS3 interface 7-8
VBR-NRT with a peak cell rate of 1000 8-9
VPLS, 802.1Q access port for untagged traffic from CE 11-122
VPLS, 802.1Q Trunk for tagged traffic from the CE device 11-120
VPLS, associating the attachment circuit with the VSI at the PE 11-129
VPLS, L2 VLAN instance on the PE 11-124
VPLS, MPLS in the PE 11-127
VPLS, MPLS WAN interface on the PE 11-125
VPLS, per-VLAN shaping 11-135
VPLS, using QinQ to place all VLANs into a single VPLS 11-123
VPLS, VFI in the PE 11-128
WRED 9-14

D

destination sensitive services 10-1
configuration 10-2
destination sensitive services, configuration
ingress DSB 10-6
ingress DSS 10-2
DLCI
specifying 11-55
DLCI local switchin 11-65
document
revision history xii
documentation, related xiv
document organization xiv

E

encapsulation
aal0 11-50
aal5 11-47
dot1q 11-33
frame-relay 11-54, 11-65
Ethernet over MPLS
configuring 11-28
restrictions 11-24
Ethernet over MPLS (EoMPLS) 11-28
supported OSMs 11-28
Ethernet over MPLS (EoMPLS) configuration
EoMPLS port mode for OSM-based system 11-37
EoMPLS port mode for SUP720-3BXL-based system 11-42
EoMPLS VLAN mode for OSM-based system 11-29
EoMPLS VLAN mode for SUP720-3BXL-based system 11-32
experimental bits
ATM AAL5 over MPLS 11-83
EoMPLS 11-80
FRoMPLS 11-83
setting priority of packets 11-83

F

features
destination senstive services 1-8
encapsulation 1-6
network management 1-7
QoS 1-8
software 1-5
traffic management 1-7
Frame Relay DLCI local switching 11-65
frame relay limitations and restrictions 3-18
Frame Relay over MPLS 11-54
restrictions 11-25
supported OSMs 11-54

frame relay over MPLS
restrictions 11-25
frame relay over MPLS configuration
DLCI local switching 11-65
DLCI-to-DLCI connections 11-54

I

ignore-bpdu-pid keyword 8-21
ingress DSB 10-6
ingress DSS 10-3

L

label switched path 11-27
Layer 2 local switching-ATM to ATM 11-58
configuring ATM VC to VC local switching 11-59
configuring ATM VC to VC local switching with AAL0 11-61
configuring ATM VP to VP local switching with AAL0 11-63
restrictions 11-58
supported modules 11-58
load balancing 11-135
AToM 11-112
guidelines 11-112
load-balancing 11-112
local management interface (LMI) 11-68
low latency queuing 3-29, 4-4

M

match vlan 9-19
Metro Ethernet Advanced QinQ Service Mapping
Gigabit Ethernet WAN 4-7
MPLS 11-2
experimental field 11-14
limitations and restrictions 11-5
per-label load balancing 11-21
supported features 11-3
mpls l2 transport route command 11-27
MPLS QoS
supported features 11-13
MPLS QoS configuration
class map to classify MPLS packets 11-15
MPLS VPN 11-18
limitations and restrictions 11-20
memory requirements 11-20
memory requirements and recommendations 11-20
supported OSMs 11-19

O

OSMs
enhanced 1-3
MPLS-supported 11-2
standard 1-2
support for MPLS VPN 11-19
OSMs, channelized/unchannelized 12-port CT3/T
general features 7-3
OSMs, channelized/unchannelized 12-port CT3/T1 7-1
DS3 alarms 7-5
DSU mode 7-4
E1 configuration options 7-4
features 7-2
network management 7-5
QoS 7-5
serial encapsulation protocols 7-3
T1 configuration options 7-4
OSMs, channelized/unchannelized 12-port CT3/T1 configuration
channelized DS3 interface 7-9
distributed MLPPP 7-11
E1 lines 7-10
multilink PPP minimum links mandatory 7-14
T1/Nx DS0 lines 7-9
T3 controller 7-6
T3 controller for channelization 7-9

unchannelized DS3 interface 7-7
OSMs, Channelized OC-12/T
DC-12 POS interface 6-8
OSMs, Channelized OC-12/T1
DS0 lines 6-11
DS-3 features 6-9
E1 lines 6-10
E3 lines 6-8
features 6-3
MIB support 6-8
QoS 6-11
SONET/SDH recovery support 6-8
SONET compliance 6-3
T1 lines 6-9
WAN protocols 6-7
OSMs, Channelized OC-12/T1 configuration
CT3 links under SONET framing 6-16
POS interface 6-14
SDH framing with AU-3 mapping 6-18
SDH framing with AU-4 mapping 6-20
SONET Controller 6-12
STS-1 path attributes under SONET framing 6-13
T1 Lines 6-17
T1 Links in VT-1.5 Mapping 6-18
T3 Links Under SONET Framing 6-15
Unchannelized and Subrate DS-3 Serial Interface 6-15
VT-15 Links Under SONET Framing 6-17
OSMs, Channelized OC-12/T1 OSM
errors, alarms, and performance monitoring 6-3
OSMs, channelized OC-12/T3
DS-3 Support 5-4
DSU Mode 5-5
features 5-2
frame relay limitations and restrictions 5-14
network management 5-4
QoS 5-5
SONET compliance 5-2
SONET errors, alarms, and performance monitoring 5-3
SONET synchronization 5-3
OSMs, channelized OC-12/T3 configuration
APS, protect interface 5-14
APS, working interface 5-13
DS-3 serial interface 5-8
interfaces under SDH framing with AU-4 mapping 5-11
interfaces using SDH framing with AU-3 mapping 5-9
POS interface 5-7
SONET controller 5-6
OSMs, Gigabit Ethernet WAN
QoS 4-7
supported features 4-1
OSMs, Gigabit Ethernet WAN configuration
basic interface 4-3
OSMs, OC-12 ATM
automatic protection switching 8-26
features 8-2
overview 8-1
OSMs, OC-12 ATM configuration
APS, multiple APS interface 8-30
APS, multiple router 8-29
APS, on a single router 8-28
APS, protect interface 8-27
APS, working interface 8-27
bridging of RFC 1483 routed encapsulations 8-7
communication with the ILMI 8-9
complete NSAP address 8-11
enabling ATM interface 8-3
initial configuration 8-3
maximum VCs per VP 8-5
NSAP address 8-11
PVC 8-6
PVC traffic parameters 8-9
SVC 8-12
SVCs 8-9
valid VCI and VPI configurations 8-4
OSMs, POS
supported QoS features 3-6
OSMs, POS/SDH

SONET/SDH compliance 3-2
SONET/SDH Error, Alarm, and Performance Monitoring 3-2
supported features 3-1
OSMs, POS/SDH configuration
APS 3-13
APS, configuring the protect interface 3-14
APS, configuring the working interface 3-14
basic APS 3-15
bridging control protocol 3-22
configuring the interface 3-9
customizing 3-10
dynamic packet transport protocol 3-20
example 3-24
framing 3-11
multiple APS 3-16
POS SPE scrambling 3-11
SONET overhead 3-11
using show commands 3-12
OSMs, PWAN
upgrading 4-1
out-of-order packets 11-23

P

Per VLAN Spanning Tree (PVST) 8-19
port mode 11-28
PVST+ 8-19
PVST and PVST+ interoperability 8-18
802.1D 8-18
CLI summary 8-21
common part convergence sublayer 8-19
ignore-bpdu-pid keyword 8-21
L2PT topologies 8-22
line cards supported 8-19
problem summarized 8-19
pvst-tlv keyword 8-22
pvst-tlv keyword 8-22

Q

QinQ translation
configuration examples 4-38
configuring 4-11
configuring the provider edge router 4-21
configuring the set cos cos-inner command 4-33
disabling 4-35
double-tag to double-tag translation 4-9
double-tag to single-tag translation 4-8
Gigabit Ethernet WAN 4-7
out of range packets 4-10
prerequisites 4-11, 4-15
QinQ transparent tunneling 4-9
restrictions 4-12, 4-15
unspecified in-range packets 4-10
QoS
any transport over MPLS (AToM) 11-79
AToMPLS ingress 11-88
channelized/unchannelized 12-port CT3/T1 OSMs 7-5
Channelized OC-12/T1 OSMs 6-11
channelized OC-12/T3 OSMs 5-5
display EoMPLS traffic policy 11-87
EoMPLS example 11-86
FRoMPLS ingress 11-88
Gigabit Ethernet WAN 4-7
minimum rates 9-5, 9-12
MPLS 11-14
on EoMPLS VLAN 11-87
POS/SDH OSM 3-6
traffic shaping 11-81, 11-85
VPLS 11-135
VPLS, per-VLAN shaping 11-135
QoS (quality of service)
operation, verifying 11-16
quality of service
class-based traffic shaping 9-4
on OSMs 9-1
unsupported frame relay-specific features 9-22

quality of service configuration
display the configuration of a service policy 9-9
low latency queueing 9-11
priority to a class within a policy map 9-12
queue limit 9-17
service policy in the policy map 9-8
traffic shaping 9-5
weighted random early detection (WRED) 9-14
queue limit 9-17

R

related documentation xiv
router ID format 11-23

S

set cos cos-inner command 4-33
Shared Spanning Tree Protocol (SSTP) 8-19
show commands 3-12
show policy-map command 9-9
show policy-map interface command 9-9
show vlan internal usage command 4-13
SONET and SDH Configuration Commands 8-31
Spanning-Tree Protocol (STP) 8-18

T

traffic shaping 11-81
transmit clock 2-3

U

upgrade guidelines 11-27

V

virtual private LAN services (VPLS) 11-114
associating attachment circuit with the VSI at the PE 11-129
basic configuration 11-119
configuration example 11-130
configuring MPLS in the PE 11-126
configuring MPLS WAN interface on the PE 11-125
configuring PE layer 2 interface to the CE 11-119
configuring the VFI in the PE 11-127
overview 11-114
QoS 11-135
restrictions 11-115
services 11-117
supported features 11-116
supported OSMs 11-118
vlan internal allocation policy command 4-13
VLAN mode 11-28

W

weighted random early detection (WRED) 9-14

X

xconnect command 11-27