



PRODUCT BULLETIN NO. 2137

CISCO IOS SOFTWARE RELEASE 12.2(15)BX FEATURES SUPPORTED ON THE CISCO 10000 SERIES ROUTER

This product bulletin lists the features that Cisco IOS® Software Release 12.2(15)BX supports for the Cisco® 10000 Series Router with the Performance Routing Engine (PRE-2).

FEATURES IN CISCO IOS SOFTWARE RELEASE 12.2(15)BX

The following features are supported on the Cisco 10000 Series.

Layer 2 Protocols and Encapsulations

- ATM AAL5
- ATM ARP
- ATM ILMI 3.0, 3.1, 4.0
- ATM multiplexer
- ATM OAM F4 and F5
- ATM OAM F4/F5 end-to-end or local segment loopback
- ATM ping
- ATM PVC range
- ATM SNAP
- ATM UNI 3.0, 3.1, 4.0
- ATM virtual circuit class
- ATM virtual private tunneling
- ATM: point-to-point and point-to-multipoint virtual circuits, permanent virtual circuit (PVC), soft permanent virtual path (PVP), and virtual path connections (VPCs)
- Frame Relay
- Frame Relay LMI (Cisco, Annex D, Q988 Annex A)
- HDLC
- IETF Frame Relay
- 802.1Q trunking
- MLPPP
- PPP
- RFC 2684 (RFC1483) routed IP packets

Routing

- CEF (IPv4)
- Static
- BGP4
- EIGRP
- IGRP
- IPv4 Forwarding
- IS-IS
- Network Time Protocol (NTP)
- OSPF
- RIPv1
- RIPv2

Broadband Authentication, Authorization, Accounting

- ATM Dynamic Bandwidth Selection (Changing ATM virtual circuit parameters using RADIUS)
- Configuration using RADIUS attribute-value pairs
- Domain preauthorization for dynamic tunnel selection
- Dual/multiple accounting by the Provider Edge (PE)
- Dynamic tunnel selection for PPP sessions
- Per user tunnel selection
- Input/output policing per subscriber downloadable from RADIUS
- Input/output rate limiting per subscriber downloadable from RADIUS
- IP address assignment from local pools (both configured using CLI and downloaded through RADIUS)
- Per VRF authentication, authorization, accounting (AAA) in RADIUS server group
- RADIUS attribute 52 and 53 support
- RADIUS attribute 77 support
- RADIUS attribute 82 support
- RADIUS attribute screening
- RADIUS-based accounting
- RADIUS-based authentication
- RADIUS interim accounting
- RADIUS request with VPI/VCI information
- RADIUS tunnel preference for load balance and failover
- RADIUS tunnel session load balancing and failover
- RADIUS VPI/VCI accounting

- RFC-2867 tunnel accounting
- Session per tunnel limiting
- Support for RADIUS tunnel attribute 90 and 91
- Tunnel authentication through RADIUS on LNS

Broadband Configuration and Management

- VRF-aware domain stripping
- IP address assignment from RADIUS servers (as part of AAA)
- IP quality of service (QoS) level dynamic bandwidth selection per session (LNS and PTA)
- LNS/HGW side per virtual private dialup network (VPDN) group session limiting
- Overlapping IP address pools
- PAP/CHAP authentication
- PPP in L2TP terminated (LNS) to VRF
- Range-based CLI
- RBE terminated to VRF
- Session/idle timeouts effective on LAC/LNS
- Static domain name/VPI/VCI override
- Support for bba-group command AKA MVT for PPPoE AKA PPPoE restructuring
- TACACS+ (administrator login only)
- Tunnel service authorization
- Virtual circuit autodiscovery (auto-virtual circuit provisioning)
- VLAN range command

Broadband DHCP Functions

- DHCP relay agent support for unnumbered interfaces
- DHCP relay VRF aware
- DHCP server
- DHCP VPN ID Option 82

Broadband MPLS

- Framed route VRF aware
- MPLS VPN ID
- RBE to MPLS VPN

Broadband Multicast

- PPP sessions in L2TP tunnels joining/participating in multicast groups
- PPPoA joining/participating in multicast groups
- PPPoE (both for PPPoE native on Ethernet and PPPoEoA) joining/participating in multicast groups
- RBE sessions joining/participating in multicast groups

Broadband Protocols

- L2TP LAC (access side may be PPPoA, PPPoEoA, and PPPoE natively on Ethernet and 802.1Q)
- L2TP multihop
- L2TP tunnels over tag interfaces
- Managed LNS (L2TP (LNS) to VRF)
- Multihop VPDN
- Path MTU discovery support on the LAC
- PPP IPCP subnet negotiation
- PPP sessions inside of L2TP tunnels (LNS functions only)
- PPPoA autosense for multiplexer encapsulation
- PPPoA termination
- PPPoA to MPLS VPN
- PPPoE and RBE on the same virtual circuit
- PPPoE on Ethernet and 802.1Q
- PPPoE termination
- PPPoE to MPLS VPN
- PPPoX and RBE autosense for LLC/SNAP encapsulation
- RBE subinterface grouping
- RFC1483/2684 routed sessions in to MPLS VPNs
- Routing with bridged encapsulations (RBE) (both numbered and unnumbered interfaces)

Broadband QoS

- Input and output MQC policing
- The ability to reflect the TOS setting from the inner IP header to the outer IP header
- Classification and IP QoS marking (DSCP, precedence) per session

Broadband Security

- Per VRF AAA
- RPF (to the individual subscriber level)
- Unicast RPF check

Broadband VPDN and L2TP

- L2TP LNS tunnel failover
- L2TP stop CCN/CDN failover
- L2TP tunnel sharing
- L2TP tunnel switching
- The ability to clear the DF bit for packets going in to the L2TP tunnel on the LAC

High Availability

- Fast software upgrades
- HSRP
- Online insertion and removal
- Route Processor Redundancy (RPR+)
- Single-router APS (SR-APS)
- VRF HSRP

Link Efficiency

- Multilink Frame Relay (MLFR)
- MLPPP fragmentation (LFI)

MPLS Basic

- P functions (push, pop, and swap)
- PE functions (label imposition/disposition)
- Label Distribution Protocol (LDP)
- Tag Distribution Protocol (TDP)
- OSPF sham link

MPLS Interconnect Applications

- InterProvider InterAS

MPLS PE-CE Encapsulations

- 802.1Q
- ATM RFC1483
- Frame Relay
- MLFR
- MLPPP fragmentation (LFI)
- PPP/HDLC

MPLS PE-CE Routing

- EBGp
- EIGRP
- OSPF
- RIPv2
- Static

MPLS PE-P Encapsulations

- ATM frame mode (L-VC and TE over ATM)
- Ethernet and 802.1P
- POS/SDH

MPLS PE-PE Routing

- BGP hub and spoke
- BGP site of origin
- iBGP
- Limiting VRF routes
- Multiprotocol BGP
- Traffic load balancing on tag interfaces

MPLS VPN

- MPLS VPN (P)
- MPLS VPN (PE)
- MPLS CLI
- MPLS ping
- MPLS traceroute
- VFR description
- VRF aware DHCP/BootP

- VRF static ARP
- VRF static route

MPLS QoS

- Default copy of IP precedence to EXP bits—ingress path (IP to MPLS)

MPLS Traffic Engineering

- Autobandwidth
- AutoRoute
- Basic MPLS TE single area (OSPF, ISIS)
- Implicit null
- Midpoint
- MPLS TE configurable path metrics
- Multiarea (and single area) OSPF support TE
- PBR into traffic engineered tunnels
- RSVP (tunnel set up)
- Static tunnel definitions
- TE over ATM tag interfaces
- Traffic engineering (MPLS RRR) headend support
- Tunnel metric—relative, absolute

Multicast

- IP
- CGMP
- DVMRP
- Encapsulation and link support (except MPLS VPNs)
- IGMPv1
- IGMPv2
- MBGP
- MBGP and MSDP
- Multicast routing monitor (MRM)
- Multicast static routes
- PIM (sparse and dense) v1
- PIM (sparse and dense) v2

Quality of Service

- 802.1P (classification/marketing) support for PPPoE and Ethernet interfaces
- ATM Class of Service UBR, VBR-nrt
- BGP QoS Policy Propagation (QPPB)
- Classification and IP QoS marking (DSCP, precedence) per interface or per virtual circuit
- Excessive information rate (EIR)
- Frame Relay Traffic Shaping (FRTS)
- Input/output rate limiting per subscriber
- Marking (ATM-CLP)
- Marking (IP precedence, DSCP)
- Modular CLI
- Nested policy maps
- Per virtual circuit shaping
- Policing
- Policing per subinterface, per virtual circuit
- PQ-CBWFQ
- QoS with MLPPP
- RTP per interface or per virtual circuit
- Simultaneous input and output policing (IP level only)
- Traffic shaping
- Turbo QoS
- Two-color policing
- RED
- WRED (IP precedence)
- ACL number
- BGP traffic index
- Configurable queue size
- DSCP
- IP precedence
- Per virtual circuit queuing
- QoS groups



Security

- ACLs
- RPF (RPF check Strict; uRPF)
- Netflow (ingress)
- SYN rate limiting

GRE Tunnels

- Per-destination load balancing
- Reassembly of IP fragmented packets (in Parallel Express Forwarding)
- Policy-Based Routing (PBR)
- Trap filtering

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