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New Features in Cisco IOS XE 3.9S Releases

This chapter provides information about the new features introduced in the Cisco IOS XE Release 3.9S and includes the following sections:

New Hardware Features in Cisco IOS XE Release 3.9(2)S

There are no new hardware features introduced in Cisco IOS XE Release 3.9(2)S.

New Software Features in Cisco IOS XE Release 3.9(2)S

There are no new software features introduced in Cisco IOS XE Release 3.9(2)S.

New Hardware Features in Cisco IOS XE Release 3.9(1a)S

Release 3.9(1) introduces support for the following hardware features:

- GLC-FE-100EX
- GLC-FE-100ZX
- SFP-GE-L
- SFP-GE-S
- SFP-GE-Z

New Software Features in Cisco IOS XE Release 3.9(1a)S

There are no new software features introduced in Cisco IOS XE Release 3.9(1)S.

New Hardware Features in Cisco IOS XE Release 3.9(0)S

Release 3.9(0) introduces support for the following hardware features:

- DWDM-XFP-30.33
- DWDM-XFP-31.12
- DWDM-XFP-31.90
- DWDM-XFP-32.68
- DWDM-XFP-34.25
- DWDM-XFP-35.04
- DWDM-XFP-35.82
- DWDM-XFP-36.61
- DWDM-XFP-38.19
- DWDM-XFP-38.98v
- DWDM-XFP-39.77
- DWDM-XFP-40.56
- DWDM-XFP-42.14
- DWDM-XFP-42.94
- DWDM-XFP-43.73
- DWDM-XFP-44.53
- DWDM-XFP-46.12
- DWDM-XFP-46.92
- DWDM-XFP-47.72
- DWDM-XFP-48.51
- DWDM-XFP-50.12
- DWDM-XFP-50.92
- DWDM-XFP-51.72v
- DWDM-XFP-52.52
- DWDM-XFP-54.13
- DWDM-XFP-54.94
- DWDM-XFP-55.75
- DWDM-XFP-56.55
- DWDM-XFP-58.17
- DWDM-XFP-58.98
- DWDM-XFP-59.79

- DWDM-XFP-60.61
- DWDM-XFP-C
- DWDM-XFP-1560.61

New Software Features in Cisco IOS XE Release 3.9(0)S

Release 3.9(0) introduces support for the following software features:

- BFD Echo Mode Hardware Offloading—BFD echo mode detects forwarding path failures on the remote system using echo packets; this release introduces support for hardware offloading of BFD echo mode packets for up to 255 sessions. The minimum supported timer value for offloaded BFD echo mode sessions is 3.3 ms. BFD echo offloading directs BFD echo packets to the high priority queue instead of the default queue. For more information about how to configure BFD, see IP Routing: BFD Configuration Guide, Cisco IOS XE Release 3S (Cisco ASR 903).
- BGP Support for 4-byte ASN —This release introduces support for 4-byte autonomous system numbers in both the asplain format and the asdot format as described in RFC 5396. For more information, see http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_bgp/configuration/xe-3s/asr903/irg-4byte-asn.html
- CFM Support for Trunk EFP—This release introduces support for CFM on trunk EFP interfaces. For more information about configuring EFPs, see *Configuring Ethernet Virtual Connections on the Cisco ASR 903 Router*. For more information about configuring CFM, see the *Carrier Ethernet Configuration Guide, Cisco IOS XE Release 3S (ASR 903).*
- Enhanced Object Tracking—The Enhanced Object Tracking feature separates the tracking mechanism from Hot Standby Router Protocol (HSRP) in order to create a separate standalone tracking process. The tracking process is available to other IOS processes and allows tracking of other objects in addition to the interface line-protocol state. For more information, see http://www.cisco.com/en/US/docs/ios/ios_xe/ipapp/configuration/guide/ipapp_eot_xe.html.
- Embedded Event Manager (EEM) 4.0—Embedded Event Manager (EEM) is a distributed and customized approach to event detection and recovery offered directly in a Cisco IOS device. EEM offers the ability to monitor events and take informational, corrective, or any desired EEM action when the monitored events occur or when a threshold is reached. For more information, see http://www.cisco.com/en/US/docs/ios-xml/ios/eem/configuration/xe-3s/eem-overview.html.
- IP FRR/Remote LFA FRR with L2VPN—The Loop-Free Alternate (LFA) Fast Reroute (FRR) with Layer 2 Virtual Private Network (L2VPN) feature minimizes packet loss due to link or node failure. For more information, see http://www.cisco.com/en/US/docs/ios-xml/ios/mp_l2_vpns/configuration/xe-3s/asr903/mp-l2vpn-lfa-frr.html.
- IS-IS topology of 3000 nodes—This release extends IS-IS capacity to include support for 3000 nodes. For more information about configuring IS-IS routing, see *IP Routing: Protocol-Independent Configuration Guide, Cisco IOS XE Release 3S (Cisco ASR 903)*.
- ISO OSI Routing—This release introduces support for ISO OSI routing.
- Link Layer Discovery Protocol—Link Layer Discovery Protocol (LLDP) is defined in the IEEE 802.1ab standard and allows a non-Cisco device to interact with a Cisco device that uses Cisco Discovery Protocol (CDP) for topology discovery. For more information, see http://www.cisco.com/en/US/docs/ios-xml/ios/cether/configuration/xe-3s/asr903/ce-lldp-multivend.html.

- L2VPN Protocol Support—This release introduces support for additional L2VPN protocols including L2TP and UDP. For more information, see http://www.cisco.com/en/US/docs/ios-xml/ios/mp_l2_vpns/configuration/xe-3s/l2vpn-prot-based.html
- Microwave Adaptive Bandwidth Modulation Enhancement—This release introduces support for Adaptive Bandwidth Modulation on G.8032 and E-OAM microwave connections, which allow Ethernet switches to optimize traffic forwarding rules based on microwave link capacity. For more information, see
  - http://www.cisco.com/en/US/docs/routers/asr903/feature/guide/mw_acm.html
  - http://www.cisco.com/en/US/docs/ios-xml/ios/cether/configuration/xe-3s/asr903/ce-cfm-adapt-bandwidth.html.
- MPLS on MLPPP Interfaces—This release introduces support for MPLS on MLPPP interfaces. For more information about configuring MPLS, see the *MPLS Basic MPLS Configuration Guide, Cisco IOS XE Release 3S (Cisco ASR 903)*. For more information about configuring MLPPP interfaces, see http://www.cisco.com/en/US/docs/routers/asr903/software/guide/chassis/Release3.9.0S/ASR903-Chassis-SW-39.html.
- MPLS -TP Linear Protection/PSC support—Linear Protection on MPLS-TP based transport networks using the RFC 6378 standard. For more information, see http://www.cisco.com/en/US/docs/ios-xml/ios/mp_basic/configuration/xe-3s/asr903/mp-basic-xe-3s-asr903-book.html.
- MVPN—The Multicast VPN (MVPN) feature provides the ability to support multicast over a Layer 3 Virtual Private Network (VPN). For more information, see http://www.cisco.com/en/US/docs/ios-xml/ios/ipmulti_mvpn/configuration/xe-3s/asr903/imc_cfg_mc_vpn.html.
- On-Demand Y.1731PM Probe Execution—This release introduces support for IPSLA Y1731 SLM enhancements that enable real-time Ethernet service troubleshooting for users without configuration privileges. This feature supports on-demand Synthetic Loss Measurement (SLM) operations that can be run by issuing a single command in privileged EXEC mode. For more information, see http://www.cisco.com/en/US/docs/ios-xml/ios/ipsla/configuration/xe-3s/sla_y1731_demand.html
- OC-12 HDLC, PPP, and MLPPP support—This release introduces support for HDLC, PPP, and MLPPP on OC-12 interfaces. For more information, see http://www.cisco.com/en/US/docs/routers/asr903/software/guide/chassis/Release3.9.0S/ASR903-Chassis-SW-39.html.
- POS (Packet over SONET/SDH) on OC12 IM card—This release introduces support for Packet over SONET (POS) and SDH on OC-12 interfaces. For more information, see http://www.cisco.com/en/US/docs/routers/asr903/software/guide/chassis/Release3.9.0S/ASR903-Chassis-SW-39.html
- PTP over Native Ethernet—This release introduces support for IEEE 1588-2008 Precision Time Protocol (PTP) on native Ethernet interfaces; this allows the router to deliver the PTP payload within an Ethernet packet. For more information, see http://www.cisco.com/en/US/docs/routers/asr903/software/guide/chassis/Release3.9.0S/ASR903-Chassis-SW-39.html.
- QoS Ingress Exp Bit Marking—This release introduces support for ingress QoS marking of MPLS Exp bits on TDM and ATM pseudowires. For more information, see http://www.cisco.com/en/US/docs/routers/asr903/software/guide/chassis/Release3.9.0S/ASR903-Chassis-SW-39.html.

- QoS Match on EFP—This release introduces support for QoS matching on EFP interfaces. For more information, see http://www.cisco.com/en/US/docs/routers/asr903/software/guide/chassis/Release3.9.0S/ASR903-Chassis-SW-39.html.
- QoS on OC-3 and OC-12 Interfaces—This release introduces support for two-level QoS policies on OC-3/OC-12 serial, MLPPP, and PoS interfaces. For more information, see http://www.cisco.com/en/US/docs/routers/asr903/software/guide/chassis/Release3.9.0S/ASR903-Chassis-SW-39.html.
- QoS Support for Ether Channels—This release introduces support for QoS policies on Etherchannel interfaces. For more information, see http://www.cisco.com/en/US/docs/routers/asr903/software/guide/chassis/Release3.9.0S/ASR903-Chassis-SW-39.html.