

Feature History

The following table lists the new and modified features supported on the following OCx CEM Interface Module Configuration Guide in Cisco IOS XE 17 on Cisco NCS 4206 and Cisco NCS 4216 routers.

The OCx Interface Modules supported are:

- 1-port OC-192 or 8-9ort Low Rate CEM Interface Module
- 1-port OC-48/STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-port T3/E3 CEM Interface Module
- NCS 4200 1-port OC-192 or 8-port Low Rate CEM 20G Bandwidth Interface Module

Feature	Description
Cisco IOS XE 17.15.1b	
Invalid Flag attribute in performance monitoring data (PMON)	A new attribute, "Invalid," is introduced in the PMON data in the **show controller** output. The "Invalid" flag associated with Near End and Far End datasets indicates that the dataset is not valid and shouldn't be considered for performance analysis.
Clear Counters command	• Unlike the previous release, where the **clear counters** command reset the old dataset, from this release onwards, the command resets all the PMON datasets, including the current dataset. • You can clear the PMON data for a specific interface module on the device using the **clear controller hw-module** command.
Cisco IOS XE Dublin 17.10.1	
Frame Relay Configuration extended to RSP2 Module	You can configure frame relay on the iMSG serial interface for the following interface modules: • 1-port OC-48/STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-port T3/E3 CEM interface module

Feature	Description
Multilink Frame Relay (MFR) for IP Interworking	You can configure MFR encapsulation on serial interface for IPv4 and IPv6 interworking for the following interface modules: • 1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module (NCS4200-3GMS) • 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (NCS4200-1T8S-20CS) Multiple physical interfaces can be combined into a single bundle, and this frame relay interface supports more bandwidth than that is available from any single physical interface. The ease to add or remove physical interfaces dynamically so that you can modify the total bandwidth available on that interface. The resilience that is provided when multiple physical interfaces are provisioned on a single bundle so that when some of the physical interfaces fail, the bundle continues to support the frame relay service.
QoS on Layer 3-terminated MLPPP Interface	You can configure QoS features such as classification, shaping, queuing, bandwidth, and weighted random early detection on the layer 3-terminated MLPPP interfaces at the egress direction for the following interface modules: • 1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module (NCS4200-3GMS) • 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (NCS4200-1T8S-20CS)
Cisco IOS XE Cupertino 17.9.1	
QoS Support on Serial Interfaces	QoS is supported on serial interfaces. You can apply service policies on egress of L3 terminated serial interfaces with both HDLC and PPP encapsulation. By implementing QoS policies on serial interfaces you can shape, classify, or prioritize the data.
MLPPP ACR support for IPv4 or IPv6 Interworking Multiservice Gateway (iMSG)	MLPPP ACR is supported for IPv4 or IPv6 iMSG on: • NCS 4200 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (NCS4200-1T8S-20CS) Now, you can increase the bandwidth of a specific OCx port using MLPPP. The restrictions for MLPPP interworking are applicable to iMSG ACR.
Cisco IOS XE Cupertino 17.8.1	

Feature	Description
Frame Relay Support for IP Interworking	Support for frame relay encapsulation on iMSG serial interface for the following interface modules: • 1-port OC-48/STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4-port T3/E3 CEM interface module • 1-port OC-192 or 8-port low rate CEM 20G bandwidth interface module Frame Relay being a streamlined protocol facilitates higher performance and greater efficiency.
Cisco IOS XE Bengaluru 17.5.1	
GR-820-CORE Performance Monitoring	The **`show controller tabular`** command enables you to view the performance monitoring details in tabular form as per GR-820-Core standards.
MLPPP IP Termination on all Serial Physical and Logical Interfaces	This release supports Layer 3 termination using IPv6 addressing on MLPPP interfaces for the 1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM interface module. In releases earlier, with IPv4 addressing, you can scale up to 512 MLPPP bundles. Now with IPv6 addressing, the MLPPP bundles can be scaled up to 1024.
Unframed Framing Support on E1 and Channel STM links	In this release, a new framing mode unframed is supported for the 1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module. With the unframed mode, you can create serial interfaces under the electrical E1 mode.
Cisco IOS XE Bengaluru 17.4.1	
CEM and IP IW Feature Parity for A900-IMA1Z8S-CXMS and A900-IMA3G-IMSG Interface Modules	• APS and non-APS Support—APS and non-APS support for SDH and SONET for iMSG IPv6 interworking • APS and NxDS0 iMSG IPv4—NxDS0 iMSG IPv4 and NxDS0 APS iMSG IPv4 • UPSR IPv6—UPSR IPv6 • VLAN Handoff—IPv4 and IPv6 with VLAN handoff for both cross connect and local connect
DCC Termination	Support for DCC Termination on 1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module. The Data Communication Channel (DCC) feature uses the SONET or SDH Operation Administration and Maintenance (OAM) channel to manage devices that support SONET or SDH interfaces. SONET or SDH standards support extensive operations, administration, management, and provisioning (OAM&P) capabilities.
IPv6 VLAN Handoff Support	VLAN handoff supports IPv4 and IPv6 local connect and cross connect.
Cisco IOS XE Amsterdam 17.3.1	

Feature	Description
ACR and DCR Scale Support	Adaptive Clock Recovery (ACR) and Differential Clock Recovery (DCR) are techniques used for Circuit Emulation (CEM) to recover clocks on the Cisco RSP3 module.
DCC Support	The Data Communication Channel (DCC) feature uses the SONET or SDH Operation Administration and Maintenance (OAM) channel to manage devices that support SONET or SDH interfaces on the Cisco RSP3 module.
Interworking Multiservice Gateway Access Circuit Redundancy (iMSG ACR) support for NCS 4200 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (NCS4200-1T8S-20CS)	The iMSG ACR feature is supported on serial interfaces for SONET and SDH ACR on the Cisco ASR RSP3 module. DCC and MS features are also supported.
IP Interworking with VLAN Handoff	VLAN handoff enables the support for IP interworking Pseudowire. IP interworking Pseudowire enables the service provider to terminate the TDM circuit early in the network and transport the IP payload on HDLC, PPP, or MLPPP links, over the MPLS core to the Ethernet network.
Interworking Support for nxDS0	Interworking function (IWF) for PPP/HDLC is supported on Ethernet for E1/STM1 ports. This support is extended at nxDS0 level to speed up the GSR TDM migration.
MLPPP ACR support for IPv4 or IPv6 Interworking Multiservice Gateway (iMSG)	MLPPP ACR is supported for IPv4 or IPv6 iMSG on the Cisco ASR RSP3 module. The restrictions for MLPPP interworking are applicable to iMSG ACR.
Cisco IOS XE Amsterdam 17.1.1	
IPv4 Interworking Support for MLPPP Interfaces	The Multilink Point-to-Point (MLPPP) interworking supports IPv4 Layer 2 VPN Interworking with T1 or E1 bundles on the Cisco RSP3 module. The MLPPP interworking enables service providers (offering relatively low-speed links) to use MLP and spread traffic across them in their MPLS networks. The MPLS Multilink PPP feature reduces the number of Interior Gateway Protocol (IGP) adjacencies and facilitates load sharing of traffic.
IPv6 Interworking Support for MLPPP Interfaces	The Multilink Point-to-Point (MLPPP) interworking supports IPv6 Layer 2 VPN Interworking with T1 or E1 bundles on the Cisco RSP3 module. The MLPPP interworking enables service providers (offering relatively low-speed links) to use MLP and spread traffic across them in their MPLS networks. The MPLS Multilink PPP feature reduces the number of Interior Gateway Protocol (IGP) adjacencies and facilitates load sharing of traffic.

Feature	Description
IPv6 Interworking Pseudowire Support on HDLC or PPP Serial Interfaces	The IPv6 interworking is supported for Layer 2 VPN interworking mode. The IPv6 interworking is supported only for HDLC or PPP to Ethernet. Layer 3 termination is supported with serial interfaces with HDLC or PPP encapsulation.
IPv6 Support for Interworking Multiservice Gateway Access Circuit Redundancy	The IPv6 interworking is supported with ACR for Layer 2 VPN.