New Features

This chapter describes the new features supported on the Cisco IOS XE Everest 16.6.1.

New Hardware Features in Cisco IOS XE Everest 16.6.9

There are no new hardware features introduced for Cisco IOS XE Everest 16.6.9.

New Software Features in Cisco IOS XE Everest 16.6.9

There are no new software features introduced for Cisco IOS XE Everest 16.6.9.

New Hardware Features in Cisco IOS XE Everest 16.6.8

There are no new hardware features introduced for Cisco IOS XE Everest 16.6.8.

New Software Features in Cisco IOS XE Everest 16.6.8

There are no new software features introduced for Cisco IOS XE Everest 16.6.8.

New Hardware Features in Cisco IOS XE Everest 16.6.7

There are no new hardware features introduced for Cisco IOS XE Everest 16.6.7.

New Software Features in Cisco IOS XE Everest 16.6.7

There are no new software features introduced for Cisco IOS XE Release 16.6.7.

New Hardware Features in Cisco IOS XE Everest 16.6.6

There are no new hardware features introduced for Cisco IOS XE Everest 16.6.6.

New Software Features in Cisco IOS XE Everest 16.6.6

There are no new software features introduced for Cisco IOS XE Release 16.6.6.

New Hardware Features in Cisco IOS XE Everest 16.6.5

There are no new hardware features introduced for Cisco IOS XE Everest 16.6.5.

New Software Features in Cisco IOS XE Everest 16.6.5

There are no new software features introduced for Cisco IOS XE Release 16.6.5.

New Hardware Features in Cisco IOS XE Everest 16.6.4

There are no new hardware features introduced for Cisco IOS XE Everest 16.6.4.

New Software Features in Cisco IOS XE Everest 16.6.4

There are no new software features introduced for Cisco IOS XE Release 16.6.4.

New Software Features in Cisco IOS XE Everest 16.6.3

Card Protection for 48-port T1/E1 CEM Interface Module and 48-port T3/E3 CEM Interface Module

The card protection feature protects traffic when the interface module is out of service, a software failure occurs, or hardware issues are observed. Card protection is supported on primary and backup cards. Traffic is switched to the backup interface module when the primary interface module does not respond and vice versa. A new Y-cable is introduced to support the feature. The following maintenance commands are added in this release:

- lockout

- Force

- Manual

Note This feature does not require any change in the patch panel of the interface modules.

For more information, see Cisco ASR 900 Router Series Configuration Guide, Cisco IOS XE Fuji 16.7.x.

New Hardware Features in Cisco IOS XE Everest 16.6.1

Following are the new hardware features:

- **Support for Cisco ASR 902U and ASR 903U routers**

  The Cisco ASR 902U and ASR 903U Routers support the following RSPs:

  - A900U-RSP2A-64

  - A900U-RSP2A-128

  The Cisco ASR 902U and ASR 903U Router support all interface modules supported on the Cisco A900-RSP2-64 and A-900-RSP2-128 Modules. For more information, see Cisco ASR 903 and Cisco ASR 903U Aggregation Services Router Hardware Installation Guide and Cisco ASR 902 and Cisco ASR 902U Aggregation Services Router Hardware Installation Guide.

New Software Features in Cisco IOS XE Everest 16.6.1

Following are the new software features:

- **16K EFP QoS Support**

  Effective Cisco IOS XE Everest 16.6.1, 16K EFPs are supported on the Cisco RSP3 module. For more information, see Quality of Service Configuration Guidelines, Cisco IOS XE Everest 16.6.1 (Cisco ASR 900 Series).

- **1 PPS Pulse Width Configuration**

On the Cisco ASR 900 RSP2 module, the 1 PPS pulse bandwidth can be changed from the default value of 500 milliseconds to up to 20 microseconds. For more information, see Timing and Synchronization Configuration Guide, Cisco IOS XE Everest 16.6.1 (Cisco ASR 900 Series).

- **Alarm support for 900W**

  Effective from Cisco IOS XE Everest 16.6.1, on RSP3 module, alarm notification is enabled on 900 watts DC power supply. There are 2 input feeds for 900 watts DC power supply, if one of the input voltage is lesser than the operating voltage, critical alarm is generated for that particular feed and clears (stops) once the voltage is restored but the power supply state remains in OK state as the Other power supply is operationally up. For more information, see Cisco ASR 900 Router Series Configuration Guide, Cisco IOS XE Everest 16.6.1.

- **Auto In-Service State for Ports**

  The Cisco ASR 900 series routers with RSP3 module now support management of equipment and port state model in two modes. These modes are the transport mode and the router mode. For more information, see Auto In-Service States, Cisco IOS XE Everest 16.6.1 (ASR 900 Series).

- **Channel Associated Signaling (CAS)**

  CAS is a method of signaling, where the signaling information is carried over a signaling resource that is specific to a particular channel. For each channel, there is a dedicated and associated signaling channel.

  The Cisco ASR 900 Router with RSP2 module supports CAS with the 8x T1/E1 interface modules and is interoperable with the E and M interface cards.

  > **Note** The Cisco ASR 900 Router supports CAS only in the E1 mode for the 8x T1/E1 interface cards. Use the card type e1 slot/subslot command to configure controller in the E1 mode.

  For more information, see Time Division Multiplexing Configuration Guide, Cisco IOS XE Everest 16.6.1 (Cisco ASR 900 Series).

- **Configuring Data Communication Channel**

  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.

  The following overhead bytes are specified in the standards as the OAM channels that carry management information, alarms, and management commands:

  - D1 to D3 bytes of the Section overhead

  - D4 to D12 bytes of the Line overhead

  These overhead bytes are referred to as the Data Communication Channel (DCC). ITU-G.7712 has defined the following three DCC network domains:

  - OSI DCC network

  - IP DCC network

  - OSI+IP DCC network

Effective Cisco IOS XE Everest 16.6.1 release, only OSI DCC network and IP DCC network are supported, which implies that same type of network resides on either side of the router.

- **Configuring MSP on 1-Port OC192/STM-64 or 8-Port OC3/12/48/STM-1/-4/-16 Module**

Multiplex Section Protection (MSP) is a protection mechanism for SDH networks that enables SDH connections to switch to another SDH circuit when a circuit failure occurs. A protection interface serves as the backup interface for the working interface. When the working interface fails, the protection interface quickly assumes its traffic load.

The SDH protection schemes comply with GR-253 and ITU-T G.783. It allows Optical Interface Module to work seamlessly as SDH Add or Drop Multiplexers (ADMs). The implementation of the above protection schemes allows a pair of SDH lines or paths to be configured for line or path redundancy. In the event of a fiber cut, the active line or path switches automatically to the standby line or path up to 60 milliseconds (2/5/10 millisecond for holdover and 50 millisecond switchovers).

- **Configuring SDH on 1-Port OC192/STM-64 or 8-Port OC3/12/48/STM-1/-4/-16 Module**

Synchronous Digital Hierarchy (SDH) is used in Europe by the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) that defines optical signals and a synchronous frame structure for multiplexed digital traffic. SDH equipment is accepted everywhere except North America.

Prior to Cisco IOS XE Everest 16.5.1, Synchronous Optical NETwork (SONET) was supported on 1-Port OC192/STM-64 or 8-Port OC3/12/48/STM-1/-4/-16 Module for NCS 4200 Series Routers. SONET equipment is generally used in North America. 4-Port OC3 STM1 or 1-Port OC12 STM4 Module did not support all possible combinations of the SDH hierarchy.

Effective Cisco IOS XE Everest 16.6.1, SDH is supported on 1-Port OC192/STM-64 or 8-Port OC3/12/48/STM-1/-4/-16 Module along with SONET for NCS 4200 Series Routers. The IM supports the entire SDH hierarchy (except VC-2/C-2).

- **Configuring SNCP on 1-Port OC192/STM-64 or 8-Port OC3/12/48/STM-1/-4/-16 Module**

SNCP is a protection mechanism for SDH networks that enables SDH connections to switch to another SDH circuit when a circuit failure occurs. A protection interface serves as the backup interface for the working interface. When the working interface fails, the protection interface quickly assumes its traffic load.

The SDH protection schemes comply with GR-253 and ITU-T G.783. It allows Optical Interface Module to work seamlessly as SDH Add or Drop Multiplexers (ADMs). The implementation of the above protection schemes allows a pair of SDH lines or paths to be configured for line or path redundancy. In the event of a fiber cut, the active line or path switches automatically to the standby line or path up to 60 milliseconds (2/5/10 millisecond for holdover and 50 millisecond switchovers).

- **Displaying OBFL Information**

The **show logging onboard hw_errors** command is introduced to display any hardware error in the setup. For more information, see System Logging Guide, Cisco IOS XE Everest 16.6.1 (Cisco ASR 900 Series).

- **DS1 and DS3 Card Protection**

DS1 and DS3 card protection feature is required to protect traffic when the interface module is out of service, if there is any software failure, or any hardware issues. Effective Cisco IOS XE Everest 16.6.1, only non-revertive 1:1 switching mode is supported. This feature is only supported on T1 and T3 interface modules. Card protection has primary and backup cards. Traffic is switched to back up the interface module when the primary interface module does not respond and vice versa.

This feature does not require any change in the patch panel of the interface modules. A new Y-cable is introduced to support the feature. Effective Cisco IOS XE Everest 16.6.1, the virtual controller only supports CEM level configuration and all other configurations are supported on both the physical interface modules.

- **Microwave Adaptive Code Modulation Enhancement**

A new ITU-T G.8031/Y.1731 Ethernet Bandwidth Notification Message (ETH-BNM) is used to notify the change of bandwidth of link from the microwave radio to the Ethernet switch. If the node receives the bandwidth information, it triggers the EEM script and takes action on the signal degradation to provide optimal bandwidth.

For information, see the Carrier Ethernet Configuration Guide, Cisco IOS XE Everest 16.6.1 (Cisco ASR 900 Series).

- **mVPN GRE over Physical Interface**

Effective Cisco IOS-XE Everest 16.6.1, mVPN GRE is supported over physical interface on the Cisco ASR 900 RSP3 module. For more information, see IP Multicast: Multicast Configuration Guide, Cisco IOS XE Everest 16.6.1 (Cisco ASR 900 Series).

- **PVST+/RPVST+**

Cisco ASR routers can use the per-VLAN spanning-tree plus (PVST+) protocol based on the IEEE 802.1D standard and Cisco proprietary extensions, or the rapid per-VLAN spanning-tree plus (rapid-PVST+) protocol based on the IEEE 802.1w standard. For more information, see LAN Switching Configuration Guide Cisco IOS XE Everest 16.6.1, (Cisco ASR 900 Series).

- **QoS Support on Port Channel LACP Active Active**

Link Aggregation Control Protocol (LACP) supports the automatic creation of ether channels by exchanging LACP packets between LAN ports. Cisco IOS XE Everest 16.6.1 release introduces the support of QoS on port channel LACP active active mode. A maximum of eight member links form a port channel and thus the traffic is transported through the port channel. This feature is supported on Cisco RSP3 Module.

- **Routed Pseudowire and VPLS**

Effective Cisco IOS-XE Everest 16.6.1, routed pseudowire and VPLS are supported on the Cisco RSP3 module. For more information, see MPLS Layer 2 VPNs Configuration Guide, Cisco IOS XE Everest 16.5.1 (Cisco ASR 900 Series).

- **Segment Routing – Traffic Engineering (SR-TE)**

Effective Cisco IOS-XE Everest 16.6.1, SR-TE is supported on the Cisco RSP2 module. It provides a simple, automated, and scalable architecture to engineer traffic flows in a network. For more information, see Segment Routing for Cisco IOS XE Everest 16.6.1.

- **Segment Routing Enhancement**

Effective Cisco IOS-XE Everest 16.6.1, segment routing feature is enhanced to include the following:

  - SR-TE On Demand LSP
  - SR-TE On Demand Next Hop
  - OAM Support
  - Dynamic PCC

For more information, see Segment Routing for Cisco IOS XE Everest 16.6.1.

- **Split Horizon Enhancements**

  The **efp_feat_ext** template is introduced on the RSP3 module. This template when enabled allows configuration of two split-horizon groups on the EVC bridge-domain. For more information, see Carrier Ethernet Configuration Guide (Cisco ASR 900 Series). For information on **efp_feat_ext** command see Cisco IOS Multiprotocol Label Switching Command Reference.

- **Tributary Unit-Alarm Indication Signal (TU-AIS)**

  TU-AIS alarms are higher order alarms compared to the AIS alarms. Effective Cisco IOS-XE Everest 16.6.1, TU-AIS alarms are generated and detected when the TDM circuits go down on the access layer of the network topology or a failure occurs in MPLS domain due to which SAToP connectivity goes down. TU-AIS alarms are supported on the OC3 IM in Cisco ASR 900 RSP1 and RSP2 modules. For more information, see Cisco ASR 900 Series Router Configuration Guide, Cisco IOS XE Everest 16.6.1.

- **TWAMP support on MPLS/VPLS interface**

  Effective Cisco IOS-XE Everest 16.6.1, time stamping is supported on MPLS/VPLS interfaces. For more information, see IP SLAs Configuration Guide, Cisco IOS XE Everest 16.6.1 (Cisco ASR 900).

- **VPLS over IP FRR , rLFA , BGP PIC, RFC 3107 intra, and inter AS**

  Effective with Cisco IOS XE Everest 16.6.1, Cisco ASR 900 RSP3 module supports VPLS over IP FRR, rLFA, BGP PIC, RFC 3107 intra, and inter AS. For more information, see MPLS Layer 2 VPNs Configuration Guide, Cisco IOS XE Everest 16.6.1 (Cisco ASR 900 Series).