New Features

This chapter describes the new hardware and software features supported on the Cisco ASR 900 Series routers in the following releases:

For information on features supported for each release, see *Feature Matrix*.

New Software Features in Cisco IOS XE Gibraltar 16.11.1a

- **Seven Segment Routing-Traffic Engineering Label Support**

  The Cisco ASR 900 routers with RSP3 modules support seven SR-TE label stack with recirculation. This router supports up to four transport labels along with one to two service labels.

  For more information, see the Segment Routing Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series Routers).

- **16 bundle members in LAG or LACP**

  For RSP3, 16 member links per port channel is supported. The restrictions for 8 member-link port channel are also applicable for 16 member-link port channel. 16 member links per port channel is supported only for 1G and 10G port-channel bundles.

  For more information, see the Ethernet Channel Configuration Guide Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

- **64 Kbps Support on C37.94 Interface Module**

  The C37.94 interface module configuration reduces latency in all the timeslots, since these timeslots are always used, and the bandwidth utilization is high with the field-programmable gate array (FPGA) configured in an unstructured mode.

  With the 64 Kbps support on C37.94 interface module, when low bandwidth applications are required, you can configure the exact number of timeslots required with specific bandwidth. The FPGA is configured in structured mode.

  For more information, see the IOT Serial Controller Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

- **Alarm Profile and Auto In-Service States**

The Alarm Profiling feature enables you to create a unique alarm profiles for chassis, card or interface module and port. You can also enable Auto-In Service (AINS) through the Alarm Profile by using the ains command. To configure the alarm profiles, you must create profiles either for the chassis, card or port and define the severities for each alarm and then attach the profile onto the corresponding chassis, card or port.

For more information, see the Auto-In Service States, Cisco IOS XE Gibraltar 16.11.x (ASR900 Series).

- **BDI statistics Support on RSP3 Module**

BDI statistics is supported on the RSP3 module. The show interface command displays the BDI statistics for the interface.

For more information, see Carrier Ethernet Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

- **BFD over Routed Pseudowire on the RSP3 Module**

BFD over Routed Pseudowire is supported on the RSP3 module.

Routed VPLS is the ability to route or bridge frames to and from the pseudowire. Routed VPLS is configured by assigning the IP address under a bridge domain interface (BDI), in addition to the configuring the **vfi** command.

Both the virtual forwarding interface (VFI), and the IP address is configured under the BDI. This configuration makes the BDI multi-functional and unique to other previously possible interfaces.

For more information, see IP Routing: BFD Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

- **Control Plane Policing Overview**

The IPv4 control packets are punted into the respective CPU queues instead of host queues, if MPLS explicit NULL labels are tagged. Use the **platform qos-feature copp-mpls enable** command, to enable CoPP on the device for MPLS explicit null scenario.

For more information, see the QoS: Policing and Shaping Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

- **CoS Marking for Local Traffic on the RSP2 Module**

CoS marking is supported on the following list of supported protocols for locally generated traffic.

- SNMP
- NTP
- TELNET
- SSH
- TFTP
- Syslog
- FTP
- DNS
- TACACS
- ICMP

Use the **platform cos-mark protocol** *protocol***cos-value** *cos-value* command to enable CoS marking on protocols.

For more information on CoS marking, see Quality of Service Configuration Guidelines, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

• **Global Table Map**

A table-map helps you to define a mapping from an integer to an integer. In the RSP3 platform, by default global table-map configuration is used to map DSCP to EXP for L3VPN services.

> **Note** Usage of policy-map for marking the EXP is not recommended as it modifies the DSCP.

For more information, see the Quality of Service Configuration Guidelines, Cisco IOS XE Fuji 16.11.x (Cisco ASR 900 Series).

• **Interworking Multiservice Gateway Access Circuit Redundancy**

Interworking Multiservice Gateway Access Circuit Redundancy (iMSG ACR) is supported on Cisco ASR 900 RSP2 and RSP3 modules. The iMSG ACR enables local switching for serial interfaces by creating a virtual serial-ACR interface. All configuration changes made on the virtual serial-ACR interface are applied automatically on both the working and protect interfaces.

For more information, see 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 Configuration Guide Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

• **IPv4 Layer 3 Termination on HDLC or PPP Serial Interfaces**

IPv4 Layer 3 termination on HDLC or PPP serial interfaces is supported for RSP3 module on the Cisco ASR 900 Series 4-Port OC3/STM-1 or 1-Port OC12/STM-4 Module (A900-IMA3G-IMSG).

IPv4 routing can be performed using standard routing protocols such as OSPF, BGP, IS-IS, EIGRP, and RIP.

For more information, see 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 Configuration Guide Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series)

• **IP SLA for Pseudowire on the RSP2 Module**

The IP SLAs VCCV operation supports Virtual Circuit Connectivity Verification (VCCV) for Pseudo-Wire Emulation Edge-to-Edge (PWE3) services across MPLS networks.

The IP SLAs VCCV operation type is based on the **ping mpls pseudowire** command, which checks MPLS LSP connectivity across an Any Transport over MPLS (AToM) virtual circuit (VC) by sending a series of pseudo-wire ping operations to the specified destination PE router.

For more information on IP SLA for Pseudowire, see IP SLAs Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

• **IP SLA v2 UDP Jitter Probe on the RSP3 Module**

The IP SLA v2 UDP jitter probe feature provides link monitoring with UDP packets carrying timestamp information, called probe. The RX or TX timestamp information provides monitoring of better UDP statistics and accuracy.

For more information see the IP SLAs Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

- **IPv4 Unicast Generic Routing Encapsulation Tunnel**

IPv4 Unicast Generic Routing Encapsulation Tunnel is supported on ASR 900 RSP2 module.

For more information, see the MPLS: Layer 3 VPNs Configuration Guide, Cisco IOS XE Fuji 16.11.x, (Cisco ASR 900 Series).

- **Layer 2 Hardware Protocol Forwarding on RSP3**

With Layer 2 Hardware Protocol Forwarding feature, the Layer 2 control protocol frames coming from cross-connect and local connect are transparently forwarded to the destination through hardware without getting punted to the CPU.

For more information, see the Carrier Ethernet Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

- **Policer Adjustment in QoS Policy Map**

Policers are configured usually at a value range of 64,000–10 G where as the hardware policer is programmed only to discrete value. The policer rate received is less than that of the configured CIR and PIR values. The policer adjustment feature is added to adjust the CIR and PIR values of hardware policer either to match the configured value or to the next higher value available in hardware.

The policer adjustment feature is supported on the RSP2 module.

For more information, see the QoS: Policing and Shaping Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series) .

- **Programmability Features for the Cisco RSP2 Module**

    - Kill Telemetry Subscription—The ability to delete a dynamic model driven telemetry dynamic subscription using either one of the following options:

        - The **clear telemetry ietf subscription** Cisco IOS command

        - The **<kill-subscription>** RPC

    - NETCONF and RESTCONF Service Level Access Control Lists—Enable you to configure an IPv4 or IPv6 access control list (ACL) for NETCONF and RESTCONF sessions.

        Clients that do not conform to the configured ACL are not allowed to access the NETCONF or RESTCONF subsystems. When service-level ACLs are configured, NETCONF and RESTCONF connection requests are filtered based on the source IP address.

    - YANG Data Models—For the list of Cisco IOS XE YANG models available with this release, navigate to https://github.com/YangModels/yang/tree/master/vendor/cisco/xe/16111.

        Revision statements embedded in the YANG files indicate if there has been a model revision. The README.md file in the same GitHub location highlights changes that have been made in the release.

- **PTP Asymmetry Readjustment**

PTP asymmetry readjustment can be performed on each PTP node to compensate for the delay in the network.

For more information, see Timing and Synchronization Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

• **QoS Overhead Accounting**

Overhead accounting enables the router to account for packet overhead when shaping traffic to a specific rate.

This accounting ensures that the router executes quality of service (QoS) features on the actual bandwidth used by subscriber traffic.

The overhead accounting feature enables the router to account for downstream Ethernet frame headers when applying shaping to packets. The traffic scheduler allows a minimum amount of value more than the configured rate at the port, in addition to the excess bytes configured on that port.

For more information, see QoS: Policing and Shaping Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series)

• **RS232 Async with E2E Signaling Support**

The RS232 async mode supports carrying signals defined between data circuit-terminating equipment (DCE) and data terminal equipment (DTE). The RS232 async mode can be enabled or disabled.

For more information, see the Cisco ASR 900 Router Series Configuration Guide, Cisco IOS XE Gibraltar 16.11.x.

• **Segment Routed Traffic Engineering On-Demand Next Hop Color-extended Community Support and Constraints**

Segment Routed Traffic Engineering (SR-TE) policy configuration supports the following features. The **segment-routing traffic-eng** command is introduced to configure the following features under segment routing.

  • Color-extended community—An egress router adds the color extended community to the BGP updates that require a Traffic-Engineered path and a SR-TE policy is created on the ingress router for the Color-Endpoint pair.

  • Affinity constraints—Affinity is a 32-bit constraint used by the path computation and path calculation for calculating paths that take the affinity constraint into account. Affinity constraints let you assign, or map, and color names for path affinities. After mappings are defined, the attributes can be referred to by the corresponding color name.

  • Disjointness constraints—Disjointness describes two or more services that must be completely disjoint of each other. Disjointness is useful for providing traffic flow redundancy in the network.

For more information, see the Segment Routing Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series Routers).

• **Segment Routing Label Recirculation for TI-LFA**

The Cisco ASR 900 router with RSP3 module supports more than one SR-TE label in both, the primary and backup paths. This increase in number of labels is achieved by recirculating the FRR backup path.

For more information, see the Segment Routing Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series Routers).

• **Target Identifier Address Resolution Protocol**

When a device needs to send a data packet to another device, it has to know the Network Service Access Point (NSAP) corresponding to the TID of the other device. This mandates the device to request this information either directly from the remote device or from another intermediate device along the network. This functionality is provided by a protocol called Target Identifier Address Resolution Protocol (TARP).

For more information, see the 1-Port OC-192 or 8-Port Low Rate CEM Interface Module Configuration Guide, Cisco IOS XE Everest 16.11.x (Cisco ASR 900 Series).

- **Unidirectional Path Switching Ring Over HDLC**

A Unidirectional Path Switching Ring (UPSR) over HDLC is supported on Cisco ASR 900 RSP2 and RSP3 modules.

In an access network, the UPSR serial traffic is processed with an HDLC encapsulation protocol. UPSR is supported on modes such as VT 1.5, STS 3c, and T3.

For more information, see 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 Configuration Guide Cisco IOS XE Gibraltar 16.11.x (Cisco ASR 900 Series).

- **Video Template - IPv4 QoS classifications**

The max-qos-video template supports increased QoS support to 4000 and decreases IPv4 ACL to 2000.

For more information, see the Cisco ASR 900 Router Series Configuration Guide, Cisco IOS XE Gibraltar 16.11.x.

New Hardware Features in Cisco IOS XE Gibraltar 16.11.1a

- **2X100 Gigabit Interface Module**

The 2-port 100 Gigabit Ethernet Interface Module (A900-IMA2C) supports one mode of operation with 100 Gbps of traffic and QSFP28 optics.

In the Cisco IOS XE Gibraltar 16.11.1a release, the 2-port 100 Gigabit Ethernet Interface Module supports only one 100G QSFP28 optics on Port 0. Port 1 is disabled with RSP3.

Note For the ASR 903 or ASR 907 series router, the N560-IMA2C interface module is supported.

For more information, see the following guides:

- Cisco ASR 903 and ASR 903U Aggregation Services Router Hardware Installation Guide
- Cisco ASR 907 and ASR 907U Aggregation Service Router Hardware Installation Guide

- **RS422 pinout details**

Cable to be used: 4-port EIA-232 DCE, 10ft, Female D.

Pinout of the DB25 connector to be hooked up to the RS232-to-RS422 converter.

- TXD+ pin 4—This is the RTS pin for RS232 that functions as TXD+ for RS422.
- TXD- pin 20—This is the DTR pin for RS232 that functions as TXD- for RS422.
- RXD+ pin 5—This is the CTS pin for RS232 that functions as RXD+ for RS422.
- RXD- pin 6—This is the DSR pin for RS232 that functions as RXD- for RS422.