

Release Notes for Cisco ASR 900 Series Routers, Cisco IOS XE 17.13.x

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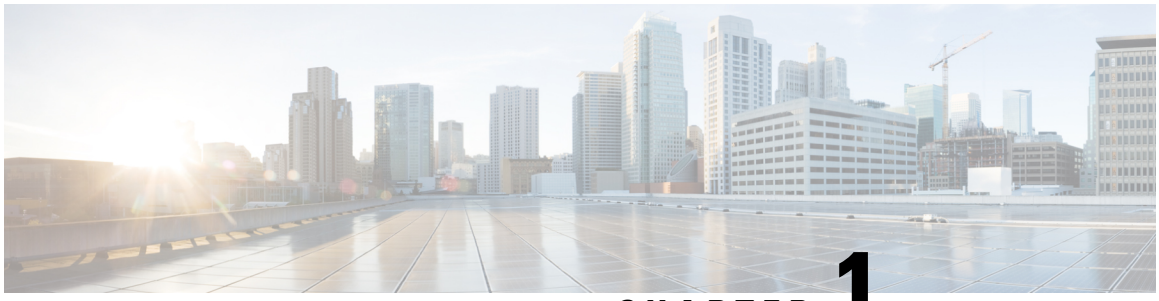
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CHAPTER 1

Introduction

The Cisco ASR 900 Series Routers are full-featured, modular aggregation platforms designed for the cost-effective delivery of converged mobile, residential, and business services. This document provides information about the IOS XE software release for the Cisco ASR 900 Series Routers.

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Overview of Cisco ASR 900 Series Routers

The Cisco ASR 900 Series Router is a fully-featured routing platform designed for the cost-effective delivery of converged mobile and business services. With full redundancy, shallow depth, low power consumption and high service scale, this 3-rack-unit (3RU) router is optimized for small aggregation and remote point-of-presence (POP) applications. The Cisco ASR 900 Series Router provides a rich and scalable feature set of Legacy, Timing, Carrier Ethernet, Layer 2 VPN (L2VPN) and Layer 3 VPN (L3VPN) services in a compact package.

The Cisco ASR 900 Series Router is a fully modular platform with support for upto 6-Interface Modules (IMs), two Route Switch Processor (RSP) slots, two power supplies and redundant fans, based on the router model. Cisco offers a wide choice of LAN and WAN interfaces available in speeds ranging from nxDS0 to 10 Gigabit Ethernet. The design of the Cisco ASR 900 Series Router delivers in-box hardware redundancy for all hardware components and supports software redundancy with In Service Software Upgrade (ISSU) and Non-Stop Forwarding (NSF) support.

Cisco ASR 902 Router

The Cisco ASR 902 Router is a full-featured aggregation platform designed for cost-effective delivery of converged mobile and business services. With shallow depth, low power consumption, and an extended

temperature range, this compact 2-rack unit (2RU) router provides high service scale and flexible hardware configuration.

Cisco ASR 903 Router

The Cisco ASR 903 Series Aggregation Services Router is a Cisco aggregation router product. This router uses an innovative and powerful forwarding technology known as the Cisco Carrier Ethernet ASIC.

The Cisco ASR 903 Series Router is a 6-Interface Module (IM), 3-RU, hardware-redundant chassis with two Route Switch Processor (RSP) slots, and six IM slots. It supports fully redundant RSPs that allow for full RSP hardware redundancy, NSF, ISSU, and future RSP service upgrades.

Cisco ASR 907 Router

The Cisco ASR 907 Router seven-rack (7RU) unit router that belongs to the Cisco ASR90x family of routers. This router complements Cisco's offerings for IP RAN solutions for the GSM, UMTS, LTE and CDMA. Given its form-factor, interface types and Gigabit Ethernet density the Cisco ASR 907 Router can also be positioned as a Carrier Ethernet aggregation platform.

The Cisco ASR 907 Router is a cost optimized, fully redundant, centralized forwarding, extended temperature, and flexible pre-aggregation router.

Cisco ASR 914 Router

The Cisco ASR 914 Router is a 14-rack unit router that belongs to the Cisco ASR 900 family of routers. This router complements Cisco's offerings for IP RAN solutions for the GSM, UMTS, LTE, and CDMA. Given its form-factor, interface types and GigabitEthernet density the Cisco ASR 914 Router can also be positioned as a Carrier Ethernet aggregation platform.

The Cisco ASR 914 Router is a cost optimized, fully redundant, centralized forwarding, extended temperature, and flexible pre-aggregation router.

Feature Navigator

You can use Cisco Feature Navigator to find information about feature, platform, and software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on cisco.com is not required.

Hardware Support

Cisco ASR 902 Supported Interface Modules

A900-RSP2-Supported Interface Modules (ASR 902 Router)

Table 1: A900-RSP2-Supported Interface Modules and Part Numbers

RSP	Interface Modules	Part Numbers	Slots
A900-RSP2A-128 A900U-RSP2A-128	8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	All
	8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
	1-port 10-Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	
	16-port T1/E1 Interface Module	A900-IMA16D	
	4-port OC3/STM-1 (OC-3) or 1-port OC12/STM-4 (OC-12) Interface Module	A900-IMA4OS	
	SFP Combo IM—8-port Gigabit Ethernet (8x1GE) + 1-port 10-Gigabit Ethernet (1x10GE)	A900-IMA8S1Z	
	Copper Combo IM—8-port Gigabit Ethernet (8x1GE) + 1-port 10-Gigabit Ethernet Interface Module (1x10GE)	A900-IMA8T1Z	
	2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
	14-port Serial Interface Module	A900-IMASER14A/S	

RSP	Interface Modules	Part Numbers	Slots
	4-port C37.94 Interface Module	A900-IMA4C3794	
A900-RSP2A-64 A900U-RSP2A-64	1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	0-2
	2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
	4-port OC3/STM-1 (OC-3) or 1-port OC12/STM-4 (OC-12) Interface Module	A900-IMA4OS	
	8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	0, 2 and 3
	8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
	16-port T1/E1 Interface Module	A900-IMA16D	
	32-port T1/E1 Interface Module	A900-IMA32D	
	8-port T1/E1 Interface Module	A900-IMA8D	
	6-port E & M Interface Module	A900-IMA6EM	
	14-port Serial Interface Module	A900-IMASER14A/S	
	4-port C37.94 Interface Module	A900-IMA4C3794	

A900-RSP3C-200-S Supported Interface Modules (ASR 902 Router)

Table 2: A900-RSP3C-200 Supported Interface Modules and Part Numbers

RSP Module	Supported Interface Modules	Part Numbers	Slot
A900-RSP3C-200-S	8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	All[1]
	8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
	1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	0 and 1
	SFP Combo IM—8-port Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet (1x10GE)	A900-IMA8S1Z	All
	Copper Combo IM—8-port Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet Interface Module (1x10GE)	A900-IMA8T1Z	
	2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
	8-port 10 Gigabit Ethernet Interface Module (8x10GE)	A900-IMA8Z	0
	2-port 40 Gigabit Ethernet QSFP Interface Module (2x40GE)	A900-IMA2F	

[1] There are restrictions using the interface modules in different slots with RSP3 module. Contact Cisco Sales/Support for the valid combinations..

Cisco ASR 903 Supported Interface Modules

A900-RSP2 Supported Interface Modules

A900-IMA2Z IM supports SFP+ and XFP on ports 0 and 1. Either SFP+ or XFP can be connected on each port. If both are connected on the same port, the port will go down.

The combination IMs (A900-IMA8S1Z, A900-IMA8T1Z) are not supported on the A900-RSP2-64 RSP module on the Cisco ASR 903 Router.

The table below is applicable for A900-RSP2A-128 and A900U-RSP2A-128 RSP modules.

Table 3: A900-RSP2A-128 Supported Interface Modules and Part Numbers

Supported Interface Modules	Part Numbers	Slot
1-port OC48/ STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-Port T1/E1 + 4-Port T3/E3 CEM Interface Module	A900-IMA3G-IMSG	2,3,4,5
8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	All
8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	
16-port T1/E1 Interface Module	A900-IMA16D	
32-port T1/E1 Interface Module	A900-IMA32D	
8-portT1/E1 Interface Module	A900-IMA8D	
4-port OC3/STM-1 (OC-3) or 1-port OC12/STM-4 (OC-12) Interface Module	A900-IMA4OS	
SFP Combo IM—8-port SFP Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet (1x10GE)	A900-IMA8S1Z	
Copper Combo IM—8-port 10/100/1000 Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet Interface Module (1x10GE)	A900-IMA8T1Z	
2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
6-port E & M Interface Module	A900-IMA6EM	
14-port Serial Interface Module	A900-IMASER14A/S	
4-port C37.94 Interface Module	A900-IMA4C3794	

The table below is applicable for A900-RSP2A-64 and A900U-RSP2A-64 RSP modules.

Table 4: A900-RSP2A-64 Supported Interface Modules and Part Numbers

Supported Interface Modules	Part Numbers	Slot
1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	0-2
2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
4-port OC3/STM-1 (OC-3) or 1-port OC12/STM-4 (OC-12) Interface Module	A900-IMA4OS	

Supported Interface Modules	Part Numbers	Slot
8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	3-5
8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
16-port T1/E1 Interface Module	A900-IMA16D	
32-port T1/E1 Interface Module	A900-IMA32D	
8-port T1/E1 Interface Module	A900-IMA8D	
6-port E & M Interface Module	A900-IMA6EM	
14-port Serial Interface Module	A900-IMASER14A/S	
4-port C37.94 Interface Module	A900-IMA4C3794	

A900-RSP3C-400-S Supported Interface Modules

The table below is applicable for A900-RSP3C-400-S RSP module.

Note If the **license feature service-offload enable** command is configured, then the following IMs are not supported in the router for RSP3:

- A900-IMA8S
- A900-IMA8T
- A900-IMA8S1Z
- A900-IMA8T1Z

Note There are certain restrictions in using the interface modules on different slots with RSP3 module. Contact Cisco Sales/Support for the valid combinations.

Note If there is any silicon oil leakage from the thermal pad of the RSP card, use a lint-free cloth moistened with IsoPropyl Alcohol (IPA) to thoroughly clean the affected area. Silicon oil leakage is an expected behaviour due to the material's properties. It is non-conductive, non-electrical, and poses no hazard to human health. The presence of silicon oil on the card is harmless and will not impact the card's functionality or system performance.

Table 5: A900-RSP3C-400 Supported Interface Modules and Part Numbers

Supported Interface Modules	Part Numbers	Slot
6-port E & M Interface Module	A900-IMA6EM	All

Supported Interface Modules	Part Numbers	Slot
4-port C37.94 Interface Module	A900-IMA4C3794	All
14-port Serial Interface Module	A900-IMASER14A/S	All
8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	All
8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	All
1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	All
SFP Combo IM—8-port SFP Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet (1x10GE)	A900-IMA8S1Z	All
Copper Combo IM—8-port 10/100/1000 Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet Interface Module (1x10GE)	A900-IMA8T1Z	All
2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	All
8-port 10 Gigabit Ethernet Interface Module (8x10GE)	A900-IMA8Z	All
1-port 100 Gigabit Ethernet Interface Module (1x100GE)	A900-IMA1C	4 or 5
2-port 100 Gigabit Ethernet (QSFP) Interface Module (2x100GE)	N560-IMA2C/A900-IMA2C	4 and 5[2]
2-port 40 Gigabit Ethernet QSFP Interface Module (2x40GE)	A900-IMA2F	4 or 5
8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module	A900-IMA8CS1Z-M	0,3,4 or 5
48-port T1/E1 Interface module	A900-IMA48D-C	All
48-port T3/E3 Interface module	A900-IMA48T-C	All
1-port OC-192 or 8-Port Low Rate CEM Interface Module	A900-IMA8S1Z-CX	2,3,4,5
4-port OC-48/OC-12/OC-3 + 12-Port A900-IMA3G-IMSG T1/E1 + 4-Port T3/E3 CEM Interface Module	A900-IMA3G-IMSG	2,3,4,5

Supported Interface Modules	Part Numbers	Slot

ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module	A900-IMA1Z8S-CXMS	2, 3, 4, 5[3]
		Note To enable this IM on slot 0 or slot 1, do the following and reload the router:
		`Router# configure t`
		`Router(config)# license feature service-offload enable`

[2] IM supports only one port of 100G with RSP3 as QSFP28 on Port 0 in both slots 4 and 5.
[3] These slots are supported on 10G or 20G mode.

A900-RSP3C-200-S Supported Interface Modules

The table below is applicable for A900-RSP3C-200-S RSP module.

Note If the **license feature service-offload enable** command is configured, then the following IMs are not supported in the router for RSP3:

- A900-IMA8S
- A900-IMA8T
- A900-IMA8S1Z
- A900-IMA8T1Z

Note There are certain restrictions in using the interface modules on different slots with RSP3 module. Contact Cisco Sales/Support for the valid combinations.

Note FAN OIR is applicable every time the IM based fan speed profile is switched to the IMA1C and IMA2F interface modules. Even though the IMs remain in the Out-of-Service state, they are still considered as present in the chassis.

Note If there is any silicon oil leakage from the thermal pad of the RSP card, use a lint-free cloth moistened with IsoPropyl Alcohol (IPA) to thoroughly clean the affected area. Silicon oil leakage is an expected behaviour due to the material's properties. It is non-conductive, non-electrical, and poses no hazard to human health. The presence of silicon oil on the card is harmless and will not impact the card's functionality or system performance.

Table 6: A900-RSP3C-200 Supported Interface Modules and Part Numbers

Supported Interface Modules	Part Numbers	Slot
8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	All
8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	0, 2 or 4
SFP Combo IM—8-port SFP Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet (1x10GE)	A900-IMA8S1Z	1-5[4]
Copper Combo IM—8-port 10/100/1000 Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet Interface Module (1x10GE)	A900-IMA8T1Z	0-4
2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
8-port 10 Gigabit Ethernet Interface Module (8x10GE)	A900-IMA8Z	4
2-port 40 Gigabit Ethernet QSFP Interface Module (2x40GE)	A900-IMA2F	4
4-port OC-48/OC-12/OC-3 + 12-Port A900-IMA3G-IMSG T1/E1 + 4-Port T3/E3 CEM Interface Module	A900-IMA3G-IMSG	2-5[5]
8-Port 10 Gigabit Ethernet (8x10GE) SFP+ Interface Module with Conformal Coating	[6]ASR900-IMA8Z-CC	0

[4] If you have a 1-port 10G IM in slot 0, then SFP combo may not be supported in slot 5.
[5] If slot 0 has 8X10G IM and you want to insert IMA-3G-IMSG to slot 5, then insert 8X10G IM on slot 6, by using the **hw-module subslot 0/0 A900-IMA8Z mode 6-Port** command.
[6] Supported only from release XE-17.13.1 onwards.

Cisco ASR 907 Supported Interface Modules

Supported Interface Modules

Note If the **license feature service-offload enable** command is configured, then the following IMs are not supported in the router for RSP3:

- A900-IMA8S
- A900-IMA8T
- A900-IMA8S1Z
- A900-IMA8T1Z

Note There are certain restrictions in using the interface modules on different slots in the chassis. Contact Cisco Sales and Support for the valid combinations.

Table 7: A900-RSP3 Supported Interface Modules and Part Numbers

RSP Module	Interface Modules	Part Number	Slot
A900-RSP3C-400-W	8-port Gigabit Ethernet SFP Interface Module (8X1GE)	A900-IMA8S	0,1,2,5,6,9,10,13,14,15
	8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8X1GE)	A900-IMA8T	0,1,2,5,6,9,10,13,14,15
	1-port 10 Gigabit Ethernet XFP Interface Module (1X10GE)	A900-IMA1X	Not Supported
	SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)	ASR900-IMA8S1Z	2,5,6,9,10,13,14,15
	Copper Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet Interface Module (1X10GE)	ASR900-IMA8T1Z	2,5,6,9,10,13,14,15
	2-port 10 Gigabit Ethernet Interface Module (2X10GE)	ASR900-IMA2Z	3,4,7,8,11,12
	16-port T1/E1 Interface Module	A900-IMA16D	Not Supported
	14-port Serial Interface Module	A900-IMASER14A/S	3,4,7,8,11,12[7]
	8-port T1/E1 Interface Module	A900-IMA8D	Not Supported

RSP Module	Interface Modules	Part Number	Slot
	32-port T1/E1 Interface Module	A900-IMA32D	Not Supported
	1x100G Interface module	A900-IMA1C	7 and 8
	2-port 100 Gigabit Ethernet (QSFP) Interface Module (2X100GE)	A900-IMA2C	7 and 8[8]
	2x40G Interface module	A900-IMA2F	3,4,7,8,11,12
	8x10G Interface module	A900-IMA8Z[9]	3,4,7,8,11,12
	8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module	A900-IMA8CS1Z-M	0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15
	1-port OC-192 or 8-Port Low Rate CEM Interface Module	A900-IMA8S1Z-CX	3,4,7,8,11,12 (10 G Mode) 0,1,2,5,6,9,10,13,14,15 (5 G Mode)
	48-port T1/E1 Interface module	A900-IMA48D-C	2,3,4,5,6,7,8,9,10,11,12,13,14,15
	48-port T3/E3 Interface module	A900-IMA48T-C	2,3,4,5,6,7,8,9,10,11,12,13,14,15
	1-port OC48/ STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-Port T1/E1 + 4-Port T3/E3 CEM Interface Module	A900-IMA3G-IMSG	3,5,7,9,11,13,15

	ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module	A900-IMA1Z8S-CXMS	3, 7, 11[10]
			4, 8, 12[11]
			5, 9, 13, 15[12]
			Note To enable this IM on slot 0 or slot 1, do the following and reload the router:
			`Router# configure t`
			`Router(config)# license feature service-offload enable`

	6-port E&M Module	A900-IMA6EM	All slots
	4-port C37.94 Interface Module	A900-IMA4C3794	All slots

[7] The serial IM will not work on slots 11 and 12, if the IMs A900-IMA8T or A900-IMA8S is inserted on any slot in the router.
[8] The IMs A900-IMA6EM, A900-IMASER14A/S, and A900-IMA4C3794 can be installed in slots 3, 4, 7, 8, 11, 12. Slots 3, 4 and 11, 12 have dependency with 1 Gigabit Ethernet IMs. These IMs can be placed in slots 3 only if Gigabit Ethernet IM is

not present in slot 5. These IMs can be placed in slots 4 only if Gigabit Ethernet IM is not present in slot 6. These IMs can be placed in slots 11 only if Gigabit Ethernet IM is not present in slots 1, 5, 9, 13, and 15. These IMs can be placed in slots 12 only if Gigabit Ethernet IM is not present in slots 0,2,6,10 and 14.

9 Six IM slots are supported with various combinations but only five IM slots are functional at a time.

10 These slots are supported on 10G or 20G mode.

11 These slots are supported on 10G or 20G mode, only if the adjacent odd slots are empty.

12 These slots are supported on 10G mode.

Cisco ASR 914 Supported Interface Modules

For information in interface modules supported, see Cisco A900-RSP3C-400-W Supported Interface Modules.

Feature Matrix

The feature matrix lists the features that are supported for each platform.

Software Licensing Overview

The router offers the following base licenses:

- Metro Services
- Metro IP Services
- Metro Aggregation Services

Note Starting with Cisco IOS XE Cupertino 17.7.1, licenses are not enabled by default. We recommend that you move to Smart Licensing.

Smart Licensing

Starting with Cisco IOS XE Cupertino 17.7.1, PAK licenses are no longer available. When you purchase the Cisco IOS XE Cupertino 17.7.1 release or later, Smart Licensing is enabled by default. We recommend that you move to Smart Licensing before upgrading to Cisco IOS XE Cupertino 17.7.1 or a higher release, for a seamless experience.

If you are using Cisco IOS XE Bengaluru 17.6.1 or an earlier release version, Smart Licensing is not enabled by default. To enable Smart Licensing, see Software Activation Configuration Guide (Cisco IOS XE ASR 900 Series).

Table 8: Cisco ASR 900 Software Licenses Feature Set

Metro Services	Metro IP Services	Metro Aggregation Services
—	Includes all features in Metro Services	Includes all features in Metro IP Services

Metro Services	Metro IP Services	Metro Aggregation Services
QoS, with deep buffers and hierarchical QoS (HQOS)	IP routing (RIP, OSPF, EIGRP, BGP, IS-IS)	MPLS (LDP and VPN)
Layer 2: 802.1d, 802.1q	PIM (SM, DM, SSM), SSM mapping	MPLS TE and FRR
Ethernet Virtual Circuit (EVC)	BFD	MPLS OAM
Ethernet OAM (802.1ag, 802.3ah)	Multi-VRF CE (VRF lite) with service awareness (ARP, ping, SNMP, syslog, trace-route, FTP, TFTP)	MPLS-TP
Multiple Spanning Tree (MST) and Resilient Ethernet Protocol (REP)	IEEE 1588-2008 Ordinary Slave Clock and Transparent Clock	Pseudowire emulation (EoMPLS, CESoPSN, and SAToP)
Synchronous Ethernet	—	VPLS and HVPLS
IPv4 and IPv6 host connectivity	—	Pseudowire redundancy
—	—	MR-APS and mLACP

The router offers the following additional feature licenses:

- ATM
- IEEE 1588-2008 Boundary Clock/Master Clock
- OCx-overview- Port License

Note These features require a software license to use.

Determining the Software Version

You can use the following commands to verify your software version:

- Consolidated Package—**show version**
- Individual sub-packages—**show version installed** (lists all installed packages)

Upgrading to a New Software Release

Only the latest consolidated packages can be downloaded from Cisco.com; users who want to run the router using individual subpackages must first download the image from Cisco.com and extract the individual subpackages from the consolidated package.

For information about upgrading to a new software release, see the Upgrading the Software on the Cisco ASR 900 Series Routers .

Upgrading the FPD Firmware

FPD Firmware packages are bundled with the software package. FPD upgrade is automatically performed ont the router.

If you like to manually change the FPD Firmware software, use the **upgrade hw-module subslot 0/0 fpd bundle** to perform FPD frmware upgrade.

ROMMON Version

We recommend you to upgrade the ROMMON version to 15.6(49r)S.

For more information on the ROMMON package, see Cisco Software Download.

Note ROMMON upgrade is mandatory to boot RSP3 images.

Supported FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.13.x Release

Use the **show hw-module all fpd** command to display the IM FPGA version on the router.

The below table lists the FPGA version for the software releases.

Note If there is an FPGA upgrade during ISSU, it will cause traffic disruption. TDM interface modules get reset irrespective of FPGA upgrade during the ISSU.

Table 9: IM FPGA Versions for Ethernet Phase 3 IM

Cisco IOS XE Release	IO FGPA	8 x10 FPGA	2x40 FPGA	1x100 FPGA
17.13.1	0x34	0.21	0.22	0.20
17.12.1	0x34	0.21	0.22	0.20
17.11.1a	0x34	0.21	0.22	0.20
17.10.1	0x34	0.21	0.22	0.20
17.9.2	0x34	0.21	0.22	0.20
17.9.1	0x34	0.21	0.22	0.20
17.8.1	0x34	0.21	0.22	0.20
17.7.1	0x34	0.21	0.22	0.20
17.6.1	0x34	0.21	0.22	0.20
17.5.1	0x34	0.21	0.22	0.20

Table 10: CEM and IM FPGA Versions for ASR 903 RSP3 and ASR 907

Category	Release	48-port T1/E1 CEM Interface Module FPGA (A900-IMA48D-C)	48-port T3/E3 CEM Interface Module FPGA (A900-IMA48T-C)	1-port OC-192 Interface Module + 8-port Low Rate Interface Module FPGA (A900-IMA8S1Z-CX)	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 (A900-IMA3G-IMSG)	ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (A900-IMA1Z8S-CXMS)
IM FPGA	Cisco IOS XE 17.13.1	1.22	1.22	1.15	2.00	0.95
CEM FPGA		70140070	CAS: 72010072 Non-CAS: 56020056	5G mode: 10090065 10G mode: 10070079	CAS: 10810095 Non-CAS: 10950093	20G CAS: 10240075 10G and 20G Non-CAS: 11160074
IM FPGA	Cisco IOS XE 17.12.1	1.22	1.22	1.15	2.00	0.95
CEM FPGA		7.0	7.2	5G mode: 6.5 10G mode: 7.9	9.3	10G mode: 7.4 20G mode: 7.5
IM FPGA	Cisco IOS XE 17.11.1	1.22	1.22	1.15	2.00	0.95
CEM FPGA		7.0	5.6	5G mode: 6.5 10G mode: 7.9	9.3	10G mode: 7.4 20G mode: 7.5
IM FPGA	Cisco IOS XE 17.10.1	1.22	1.22	1.15	2.00	0.95
CEM FPGA		6.0	5.2	5G mode: 6.5 10G mode: 7.9	9.3	10G mode: 7.3 20G mode: 7.3
IM FPGA	Cisco IOS XE 17.9.2	1.22	1.22	1.15	2.00	0.95
CEM FPGA		6.0	5.2	5G mode: 6.5 10G mode: 7.9	9.1	10G mode: 7.2 20G mode: 7.2
IM FPGA	Cisco IOS XE 17.9.1	1.22	1.22	1.15	2.00	0.95
CEM FPGA		6.0	5.2	5G mode: 6.5 10G mode: 7.9	9.1	10G mode: 7.2 20G mode: 7.2
IM FPGA	Cisco IOS XE 17.8.1	1.22	1.22	1.15	2.00	0.93
CEM FPGA		6.0	5.2	5G mode: 6.5 10G mode: 7.9	9.0	10G mode: 7.0 20G mode: 6.0

Category	Release	48-port T1/E1 CEM Interface Module FPGA (A900-IMA48D-C)	48-port T3/E3 CEM Interface Module FPGA (A900-IMA48T-C)	1-port OC-192 Interface Module + 8-port Low Rate Interface Module FPGA (A900-IMA8S1Z-CX)	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 (A900-IMA3G-IMSG)	ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (A900-IMA1Z8S-CXMS)
IM FPGA	Cisco IOS XE 17.7.1	1.22	1.22	1.15	2.00	0.93
CEM FPGA		0x52110052	0x52510052	5G mode: 0x10090065 10G mode: 0x10070079	0x10030076	10G mode: 0x 10290051 20G mode: 0x 10290051
IM FPGA	Cisco IOS XE 17.6.1	1.22	1.22	1.15	2.00	0.93
CEM FPGA		0x52110052	0x52520052	5G mode: 0x10090065 10G mode: 0x10070079	0x10030076	10G mode: 0x 10290051 20G mode: 0x 10290051
IM FPGA	Cisco IOS XE 17.5.1	1.22	1.22	1.15	2.00	0.93
CEM FPGA		0x52050052	0x52420052	5G mode: 0x10210063 10G mode: 0x10530078	0x10020076	10G mode: 0x10090051 20G mode: 0x10090051

Table 11: FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.13.1 Release

Platform	Interface Module	FPGA Current Version	FPGA Minimum Required Version	RSP HoFPGA Active	RSP HoFPGA Standby	ROMMON
RSP2-128	A900-IMA2Z	69.24	69.24	0X00030011	0X00030011	15.6(54r)S
	A900-IMA8S	0.75	0.75			
	A900-IMA8T1Z	69.32	69.32			
RSP3-400S	A900-IMA1C	0.2	0.20	19052734	19052734	15.6(52r)S
	A900-IMA8Z	0.21	0.21			
	A900-IMA8S1Z	69.32	69.32			
RSP3-400W	A900-IMA1C	0.2	0.20	19052734	19052734	15.6(52r)S
	A900-IMA2Z	69.24	69.24			

MIB Support

The below table summarizes the supported MIBs on the Cisco ASR 900 Series Router.

Table 12: Supported MIBs

Supported MIBs		
BGP4-MIB (RFC 1657)	CISCO-IMAGE-LICENSE-MGMT-MIB	MPLS-LDP-STD-MIB (RFC 3815)
CISCO-BGP-POLICY-ACCOUNTING-MIB	CISCO-IMAGE-MIB	MPLS-LSR-STD-MIB (RFC 3813)
CISCO-BGP4-MIB	CISCO-IPMROUTE-MIB	MPLS-TP-MIB
CISCO-BULK-FILE-MIB	CISCO-LICENSE-MGMT-MIB	MSDP-MIB
CISCO-CBP-TARGET-MIB	CISCO-MVPN-MIB	NOTIFICATION-LOG-MIB (RFC 3014)
CISCO-CDP-MIB	CISCO-NETSYNC-MIB	OSPF-MIB (RFC 1850)
CISCO-CEF-MIB	CISCO-OSPF-MIB	OSPF-TRAP-MIB (RFC 1850)
CISCO-CLASS-BASED-QOS-MIB	CISCO-OSPF-TRAP-MIB	PIM-MIB (RFC 2934)
CISCO-CONFIG-COPY-MIB	CISCO-PIM-MIB	RFC1213-MIB
CISCO-CONFIG-MAN-MIB	CISCO-PROCESS-MIB	RFC2982-MIB
CISCO-DATA-COLLECTION-MIB	CISCO-PRODUCTS-MIB	RMON-MIB (RFC 1757)
CISCO-EMBEDDED-EVENT-MGRMIB	CISCO-PTP-MIB	RSVP-MIB
CISCO-ENHANCED-MEMPOOL-MIB	CISCO-RF-MIB	SNMP-COMMUNITY-MIB (RFC 2576)
CISCO-ENTITY-ALARM-MIB	CISCO-RTTMON-MIB	SNMP-FRAMEWORK-MIB (RFC 2571)
CISCO-ENTITY-EXT-MIB	CISCO-SONET-MIB	SNMP-MPD-MIB (RFC 2572)
CISCO-ENTITY-FRU-CONTROLMIB	CISCO-SYSLOG-MIB	SNMP-NOTIFICATION-MIB (RFC 2573)
CISCO-ENTITY-SENSOR-MIB	DS1-MIB (RFC 2495)	SNMP-PROXY-MIB (RFC 2573)
CISCO-ENTITY-VENDORTYPE-OID-MIB	ENTITY-MIB (RFC 4133)	SNMP-TARGET-MIB (RFC 2573)
CISCO-FLASH-MIB	ENTITY-SENSOR-MIB (RFC 3433)	SNMP-USM-MIB (RFC 2574)
CISCO-FTP-CLIENT-MIB	ENTITY-STATE-MIB	SNMPv2-MIB (RFC 1907)
CISCO-IETF-ISIS-MIB	EVENT-MIB (RFC 2981)	SNMPv2-SMI
CISCO-IETF-PW-ATM-MIB	ETHERLIKE-MIB (RFC 3635)	SNMP-VIEW-BASED-ACM-MIB (RFC 2575)
CISCO-IETF-PW-ENET-MIB	IF-MIB (RFC 2863)	SONET-MIB

CISCO-IETF-PW-MIB	IGMP-STD-MIB (RFC 2933)	TCP-MIB (RFC 4022)
CISCO-IETF-PW-MPLS-MIB	IP-FORWARD-MIB	TUNNEL-MIB (RFC 4087)
CISCO-IETF-PW-TDM-MIB	IP-MIB (RFC 4293)	UDP-MIB (RFC 4113)
CISCO-IF-EXTENSION-MIB	IPMROUTE-STD-MIB (RFC 2932)	CISCO-FRAME-RELAY-MIB
CISCO-IGMP-FILTER-MIB	MPLS-LDP-GENERIC-STD-MIB (RFC 3815)	IF-MIB
CISCO-AAA-SERVER-MIB	—	—

Table 13: Unverified MIBs

Unverified MIBs		
ATM-MIB	CISCO-IETF-DHCP-SERVER-EXT-MIB	EXPRESSION-MIB
CISCO-ATM-EXT-MIB	—	HC-ALARM-MIB
CISCO-ATM-IF-MIB	CISCO-IETF-PPVPN-MPLS-VPN-MIB	HC-RMON-MIB
CISCO-ATM-PVC-MIB	CISCO-IP-STAT-MIB	IEEE8021-CFM-MIB
CISCO-ATM-PVCTRAP-EXTN-MIB	CISCO-IPSLA-ETHERNET-MIB	IEEE8021-CFM-V2-MIB
CISCO-BCP-MIB	CISCO-L2-CONTROL-MIB	IEEE8023-LAG-MIB
CISCO-CALLHOME-MIB	CISCO-LAG-MIB	INT-SERV-GUARANTEED-MIB
CISCO-CIRCUIT-INTERFACE-MIB	CISCO-MAC-NOTIFICATION-MIB	INTEGRATED-SERVICES-MIB
CISCO-CONTEXT-MAPPING-MIB	CISCO-MEMORY-POOL-MIB	MPLS-L3VPN-STD-MIB (RFC 4382)
CISCO-EIGRP-MIB	CISCO-NHRP-EXT-MIB	MPLS-LDP-ATM-STD-MIB (RFC 3815)
CISCO-ERM-MIB	CISCO-NTP-MIB	MPLS-LDP-MIB
CISCO-ETHER-CFM-MIB	CISCO-PING-MIB	MPLS-TE-STD-MIB
CISCO-ETHERLIKE-EXT-MIB	CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB	MPLS-VPN-MIB
CISCO-EVC-MIB	CISCO-RTTMON-ICMP-MIB	NHRP-MIB
CISCO-HSRP-EXT-MIB	CISCO-RTTMON-IP-EXT-MIB	RFC2006-MIB (MIP)
CISCO-HSRP-MIB	CISCO-RTTMON-RTP-MIB	RMON2-MIB (RFC 2021)
CISCO-IETF-ATM2-PVCTRAP-MIB	CISCO-SNMP-TARGET-EXT-MIB	SMON-MIB
CISCO-IETF-ATM2-PVCTRAP-MIBEXTN	CISCO-TCP-MIB	VRRP-MIB

CISCO-IETF-BFD-MIB	CISCO-VRF-MIB	—
CISCO-IETF-DHCP-SERVER-MIB	ETHER-WIS (RFC 3637)	—

MIB Documentation

The following resources provide more detail about MIBs on the Cisco ASR 900 Series Router:

- Cisco ASR 900 Series Router MIB Guide—For information about the Cisco ASR 903 Series Router product implementation of the MIB protocol, see *Cisco ASR 903 Series Aggregation Services Router MIB Specifications Guide* at the following location:

  http://www.cisco.com/c/en/us/td/docs/wireless/asr_900/mib/guide/asr903mib.html

- MIB Locator—To locate and download MIBs for selected platforms, Cisco IOS and Cisco IOS XE releases, and feature sets, use Cisco MIB Locator found at the following location:

  https://snmp.cloudapps.cisco.com/Support/SNMP/do/BrowseOID.do?local=en

Additional References

Product Information

- Cisco ASR 900 Series Aggregation Services Routers Data Sheets

Hardware Installation Guides

- Cisco ASR 900 Series Aggregation Services Routers Hardware Guides

Software Configuration Guides

- Cisco ASR 900 Series Aggregation Services Routers Configuration Guides

Regulatory Compliance and Safety Information

- Regulatory Compliance and Safety Information for the Cisco ASR 900 Series Aggregation Services Routers

Field Notices and Bulletins

- Field Notices—We recommend that you view the field notices for this release to determine whether your software or hardware platforms are affected. You can find field notices at http://www.cisco.com/en/US/support/tsd_products_field_notice_summary.html.
- Bulletins—You can find bulletins at http://www.cisco.com/en/US/products/sw/iosswrel/ps5012/prod_literature.html.

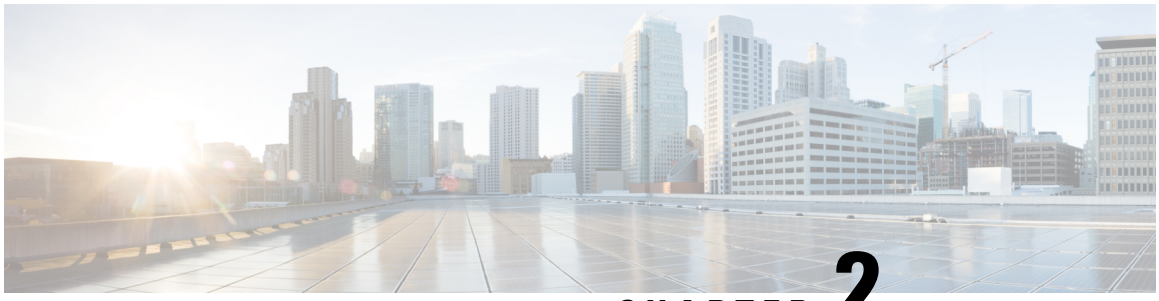
Accessibility Features in the Cisco ASR 900 Series Routers

For a list of accessibility features in Cisco ASR 900 Series Routers, see the Voluntary Product Accessibility Template (VPAT) on the Cisco website, or contact accessibility@cisco.com.

All product documents are accessible except for images, graphics, and some charts. If you would like to receive the product documentation in audio format, braille, or large print, contact accessibility@cisco.com.

End-of-Life and End-of-Sale Notices

For End-of-Life and End-of-Sale Notices for the Cisco ASR 900 Series Routers, see https://www.cisco.com/c/en/us/products/routers/asr-903-series-aggregation-services-routers/eos-eol-notice-listing.html.



CHAPTER 2

What's New for Cisco IOS XE Dublin 17.13.x

- What's New in Hardware for Cisco IOS XE 17.13.1, on page 23
- What's New in Software for Cisco IOS XE 17.13.1, on page 23

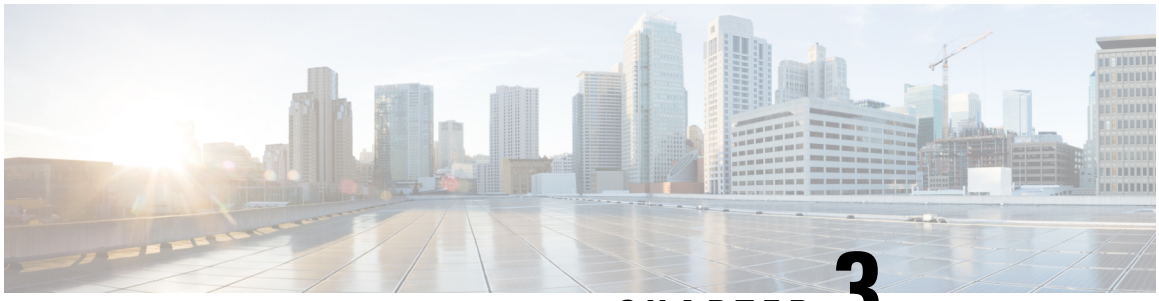
What's New in Hardware for Cisco IOS XE 17.13.1

Optics	Description
Optics	This release launches the following new optics on selective hardware within the product portfolio. For details refer to the Transceiver Module Group (TMG) Compatibility Matrix. SFP-TS-OC3STM1-I and SFP-TS-OC12STM4-I Optics support is extended to the following chassis: • A900-RSP2A-128 These TSOP smart SFPs can operate in the low latency mode and is used for rail signaling. **Note** The support for the ONS-SC-155-TSOP and ONS-SC-622-TSOP are deprecated and are replaced with the new TSoPs SFP-TS-OC3STM1-I and SFP-TS-OC12STM4-I optics, respectively. The software functionalities of the new TSoPs remain the same as the earlier TSoPs.

What's New in Software for Cisco IOS XE 17.13.1

Feature	Description
CEM	
Framed SAToP System BERT	You can configure SATOP system BERT with framing under CEM circuits on T1 or E1 interfaces and verify if the BERT is stable and transmitted end-to-end.

Feature	Description
MFR End-to-End Mode	This feature enables transporting legacy MFR traffic over packet switching core. You can now configure an end-to-end mode for frame relay pseudowire on the MFR interfaces for the following interface modules: • A900-IMA3G-IMSG • A900-IMA1Z8S-CXMS
User-defined Remote Loopback on T1 Interfaces	You can customize the loopback codes on T1 in a 16-bit format in contrast to the standard 6-bit loop code on the 48-port T1 interface module.
IP SLA	
Out-of-order Packet Counter on the Cisco RSP3 Module	You can configure Out-of-order packet counter for FPGA-based SAT on the Cisco RSP3 module.



CHAPTER 3

Caveats

This chapter describes open and resolved severity 1 and 2 caveats and select severity 3 caveats:

- The "Open Caveats" sections list open caveats that apply to the current release and may apply to previous releases. A caveat that is open for a prior release and is still unresolved applies to all future releases until it is resolved.
- The "Resolved Caveats" sections list caveats resolved in a specific release, but open in previous releases.

The bug IDs are sorted alphanumerically.

Note The Caveats section includes the bug ID and a short description of the bug. For details on the symptoms, conditions, and workaround for a specific caveat you must use the Bug Search Tool.

- Open Caveats - Cisco IOS XE 17.13.1, on page 25
- Resolved Caveats - Cisco IOS XE 17.13.1, on page 25
- Cisco Bug Search Tool, on page 26

Open Caveats - Cisco IOS XE 17.13.1

Identifier	Headline
CSCwh85621	ASR 903 Layer 2 CEF interface is unavailable.
CSCwh80239	ASR900 RSP3 - IP SLA multicast configuration is not working.

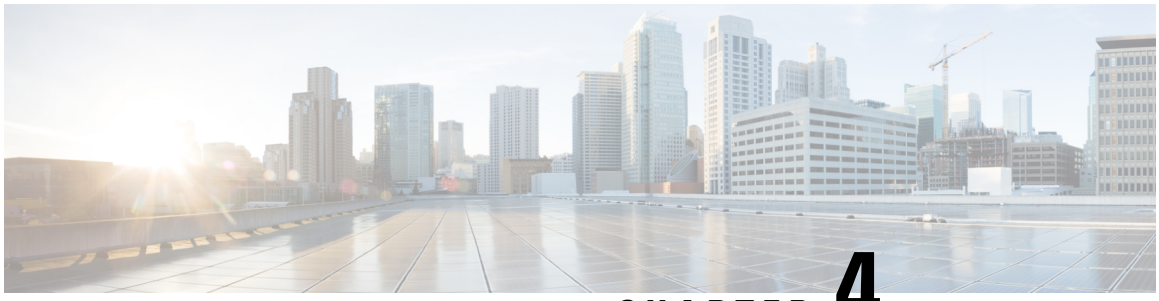
Resolved Caveats - Cisco IOS XE 17.13.1

Identifier	Headline
CSCwf14167	RSP3: uea_mgr memory leak on ARP probes
CSCwf27439	IMD timer value update for ISSU process

Identifier	Headline
CSCwf90667	ASR903:IMA8Z:frequent reloads of IM due to high temp- FAN speed mismatch
CSCwf42164	No snmp trap link-status get re-added after IM reload
CSCwe82657	VIN P2/0, VOUT P2/2, VIN P4/0 & VOUT P4/2 alarms upon SSO
CSCwf77276	ASR903: memory leak seen on chunk module when BDI routed network traffic flow along with mac move
CSCwf49426	PAIS alarm get reported after IM OIR.
CSCwf77316	ASR900/RSP3: MPLS incorrect label programmed with scenarios of double implicit-null
CSCwf69937	The portchannel does not come up on adding recommended configs till we reload the router
CSCwf18367	RSP3 : uea_mgr RIFID leak/comsumption for Muticast routes
CSCwf07736	cem interface counters momentarily report error when x21 xconnect is cleared and re-established
CSCwh42209	RSS memory increment continuously seen uea_mgr process upon system event
CSCwf54249	With CPG, STS1e configuration is giving %ERROR: Standby doesn't support this command
CSCwf86864	CEM traffic flow is dropped in one direction due to DEI bit set from 4202
CSCwf37941	ACL config under serial interface makes dut crash during unconfig
CSCwh30217	A900-IMA3G-IMSG: With rate of OC12 we see "threshold sf-ber 3" getting added under sh run

Cisco Bug Search Tool

Cisco Bug Search Tool (BST), the online successor to Bug Toolkit, is designed to improve effectiveness in network risk management and device troubleshooting. You can search for bugs based on product, release, and keyword, and aggregates key data such as bug details, product, and version. For more details on the tool, see the help page located at http://www.cisco.com/web/applicat/cbsshelp/help.html



CHAPTER 4

Restrictions and Limitations

Note The error message "PLATFORM-1-NOSPACE: SD bootflash : no space alarm assert" may occur in the following scenarios:

- Any sector of SD Card gets corrupted
- Improper shut down of router
- power outage.

This issue is observed on platforms which use EXT2 file systems.

We recommend performing a reload of the router. As a result, above alarm will not be seen during the next reload due to FSCK(file systems check) execution.

However, If the error persists after a router reload, we recommend to format the bootflash or FSCK manually from IOS.

- Embedded Packet Capture (EPC) is not supported on ASR 900 routers.
- From the Cisco IOS XE 16.6.1 releases, In-Service Software Upgrade (ISSU) is not supported on the router to the latest releases. For more information on the compatible release versions, see ISSU Support Matrix.
- ISSU is not supported between a Cisco IOS XE 3S release and the Cisco IOS XE Bengaluru 17.6.x release.
- The port restriction on 1-port OC-192 or 8-port low rate CEM interface module is on port pair groups. If you have OC48 configured on a port, the possible port pair groups are 0–1, 2–3, 4–5, 6–7. If one of the ports within this port group is configured with OC48 rate, the other port cannot be used.
- RS422 pinout works only on ports 0–7.
- The **ip cef accounting** command is *not* supported on the router.
- Configuration sync does *not* happen on the Standby RSP when the active RSP has Cisco Software Licensing configured, and the standby RSP has Smart Licensing configured on the router. If the active RSP has Smart Licensing configured, the state of the standby RSP is undetermined. The state could be pending or authorized as the sync between the RSP modules is not performed.

- Evaluation mode feature licenses may not be available to use after disabling, and enabling the smart licensing on the RSP2 module. A reload of the router is required.
- Ingress counters are not incremented for packets of the below format on the RSP3 module for the 10-Gigabit Ethernet interfaces, 100-Gigabit Ethernet interfaces, and 40-Gigabit Ethernet interfaces:

  Packet Format

  MAC header---->VLAN header---->Length/Type

  When these packets are received on the RSP3 module, the packets are not dropped, but the counters are not incremented.
- T1 SAToP, T3 SAToP, and CT3 are supported on an UPSR ring only with local connect mode. Cross-connect configuration of T1, T3, and CT3 circuits to UPSR are not supported.
- PTP is not supported when 8-port 10-Gigabit Ethernet interface module is in oversubscribed mode.
- Port channel 61–64 is not supported in the 16.11.1a release. The range of configurable port channel interfaces has been limited to 60.
- Effective with Cisco IOS XE Everest 16.6.1, the VPLS over Port-channel (PoCH) scale is reduced from 48 to 24 for Cisco ASR 903 RSP3 module.



Note The PoCH scale for Cisco ASR 907 routers is 48.

- The frame drops may occur for packets with packet size of less than 100 bytes, when there is a line rate of traffic over all 1G or 10G interfaces available in the system. This restriction is applicable only on RSP2 module, and is not applicable for RSP3 module.
- One Ternary Content-Addressable Memory (TCAM) entry is utilized for Segment Routing Performance Measurement. This is required for the hardware timestamping to function.
- While performing an auto upgrade of ROMMON, only primary partition is upgraded. Use the **upgrade rom-mon filename** command to upgrade the secondary partition of the ROMMON during the auto upgrade. However, the router can be reloaded during the next planned reload to complete the secondary ROMMON upgrade. This is applicable to ASR 903 and ASR 907 routers.
- In the Cisco IOS XE 17.1.1 release, the EVPN EVI type is VLAN-based by default, and while configuring for the EVPN EVI type, it is recommended to configure the EVPN EVI type as VLAN-based, VLAN bundle and VLAN aware model.
- For Cisco IOS XE Gibraltar Release 16.9.5, Cisco IOS XE Gibraltar Release 16.12.3, and Cisco IOS XE Amsterdam 17.1.x, a minimum disk space of 2 MB is required in the boot flash memory file system for a successful ROMMON auto upgrade process. For a disk space lesser than 2 MB, ROMMON auto upgrade fails and the router reboots. This is applicable to Cisco ASR 903 and Cisco ASR 907 routers.
- In the Cisco IOS XE 16.12.1, 17.1.1, and 17.2.1 releases, IPsec is not supported on the Cisco RSP3 module.
- CEM circuit provisioning issues may occur during downgrade from Cisco IOS XE Amsterdam 17.3.1 to any lower versions or during upgrade to Cisco IOS XE Amsterdam 17.3.1 from any lower versions, if the CEM scale values are greater than 10500 APS/UPSR in protected CEM circuits. So, ensure that the CEM scale values are not greater than 10500, during ISSU to or from 17.3.1.

- Some router models are not fully compliant with all IETF guidelines as exemplified by running the pyang tool with the **lint** flag. The errors and warnings that are exhibited by running the pyang tool with the **lint** flag are currently noncritical as they do not impact the semantic of the models or prevent the models from being used as part of the toolchains. A script has been provided, "check-models.sh", that runs pyang with **lint** validation enabled, but ignoring certain errors. This allows the developer to determine what issues may be present.

  As part of model validation for the Cisco IOS XE Amsterdam 17.3.1 release, "LEAFREF_IDENTIFIER_NOT_FOUND" and "STRICT_XPATH_FUNCTIONS" error types are ignored.

- Test Access Port (TAP) is not supported when the iMSG VLAN handoff feature is enabled on the same node.

- Data Communication Channel (DCC) is not supported in the A900-IMA1Z8S-CXMS interface module for the Cisco IOS XE Cupertino 17.8.1 release.

- In Cisco IOS XE Dublin 17.12.1, for mLDP Partitioned multicast distribution tree (MDT) to work with PIM-Sparse Mode (SM) traffic, configure only a single ingress PE and ensure that the **strict-rpf interface** command is disabled. Configuring multiple PE ingress is not allowed.

- SF and SD alarms are not supported on T1 and T3 ports for the following interface modules:
  - A900-IMA3G-IMSG
  - A900-IMA48D-C
  - A900-IMA48T-C

- In RSP2 and RSP3 modules, during In-Service Software Upgrade (ISSU), interface modules undergo FPGA upgrade.

  The following table details the IM Cisco IOS XE versions during ISSU with respect to FPGA upgrade and the impact of traffic flow for these IMs:

Table 14: Impact on IM during ISSU and FPGA Upgrade

IM	IM Version During ISSU	Pre-ISSU FPGA Upgrade	Post-ISSU Impact on IM	FPGA Version post ISSU
Phase 1	Cisco IOS XE 17.3.x or earlier version to Cisco IOS XE 17.4.x	FPGA upgrade completes and IM starts after the reload process. FPGA version (phase -1) - 0.47	Traffic is impacted during upgrade.	0.75

IM	IM Version During ISSU	Pre-ISSU FPGA Upgrade	Post-ISSU Impact on IM	FPGA Version post ISSU
Phases 1 and 2	Version earlier to Cisco IOS XE 17.8.x	FPGA upgrade completes and IM starts after the reload process. • FPGA version (Phase 1)— 0.47 • FPGA version (Phase 2) • A900-IMA8Z—0922 • Combo IM: 69.24	Traffic is impacted during upgrade.	• FPGA version (Phase 1)—0.75 • FPGA version (Phase 2) • A900-IMA8Z—0924 • Combo IM: 69.32
Phase 1	Cisco IOS XE 17.4.1 or later versions to Cisco IOS XE 17.8.1	IM FPGA already upgraded with the latest version and reload is not required.	Traffic is not impacted.	0.75

For more information on the FPGA versions, see Supported FPGA, HoFPGA, and ROMMON Versions.

Refer the following table for supported IMs:

Table 15: ASR 900 Supported Ethernet Interface Module

Phase 1 IM	Phase 2 IM	Phase 3 IM
A900-IMA8S	A900-IMA8S1Z	A900-IMA8Z
A900 -IMA8T	A900-IMA8T1Z	A900-IMA2F
A900-IMA1X	A900-IMA2Z	A900-IMA2C