Release Notes for Cisco ASR 900 Series Routers, Cisco IOS XE Bengaluru 17.4.x

First Published: 2020-11-30

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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 900 Series Router

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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

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	
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.

Table 5: Feature History

Feature Name	Release Information	Description
8-Port 10G SFP+ Single-Rate Interface Module (N560-IMA-8Q/4L) Support	Cisco IOS XE Cupertino 17.8.1	This release introduces the support of 8-Port 10G SFP+ Single-Rate Interface Module (N560-IMA-8Q/4L), on all slots with a default speed combination of 8X10G.

Table 6: A900-RSP3C-400 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	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
8-Port 10G SFP+ Single-Rate Interface Module (N560-IMA-8Q/4L) Support	N560-IMA-8Q/4L	All [34]
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	All
6-port E & M Interface Module	A900-IMA6EM	All
4-port C37.94 Interface Module	A900-IMA4C3794	All
14-port Serial Interface Module	A900-IMASER14A/S	All

Supported Interface Modules	Part Numbers	Slot

Combo 8-Port SFP GE and 1-Port 10GE With CEM/iMSG 20G Interface Module	A900-IMA1Z8S-CXMS	2, 3, 4, 5[5]
		
		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] Starting with Cisco IOS XE Cupertino Release 17.8.1, N560-IMA-8Q/4L is supported on all slots with a default speed combination of 8X10G.

[4] The restrictions for Cisco N560-IMA-8Q/4L interface module is same as that of Cisco A900-IMA8Z interface module.

[5] These slots are supported on 10G or 20G mode.

![note icon]

Note The restrictions for

A900-RSP3C-200-S Supported Interface Modules

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

![note icon]

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 icon]

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.

Table 7: 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[6]
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[7]
4-port C37.94 Interface Module	A900-IMA4C3794	4
6-port E & M Interface Module	A900-IMA6EM	4
14-port Serial Interface Module	A900-IMASER14A/S	4

[6] If you have a 1-port 10G IM in slot 0, then SFP combo may not be supported in slot 5.

[7] 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.

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 8: Feature History

Feature Name	Release Information	Description
8-Port 10G SFP+ Single-Rate Interface Module (N560-IMA-8Q/4L) Support	Cisco IOS XE Cupertino 17.8.1	This release introduces the support of 8-Port 10G SFP+ Single-Rate Interface Module (N560-IMA-8Q/4L), on slots 3, 4, 7, 8, 11, and 12 slots with a default speed combination of 8X10G.

Table 9: 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

RSP Module	Interface Modules	Part Number	Slot
	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[8]
	8-port T1/E1 Interface Module	A900-IMA8D	Not Supported
	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[9]
	2x40G Interface module	A900-IMA2F	3,4,7,8,11,12
	8x10G Interface module	A900-IMA8Z[10]	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

RSP Module	Interface Modules	Part Number	Slot

	Combo 8-Port SFP GE and 1-Port 10GE With CEM/iMSG 20G Interface Module	A900-IMA1Z8S-CXMS	3, 7, 11[11]
			
			 4, 8, 12[12]
			
			 5, 9, 13, 15[13]
			
			 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
	8-Port 10G SFP+ Single-Rate Interface Module	N560-IMA-8Q/4L	3, 4, 7, 8, 11, 12 [14][15]

[8] 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.

[9] 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.

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

[11] These slots are supported on 10G or 20G mode.

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

[13] These slots are supported on 10G mode.

[14] Starting with Cisco IOS XE Cupertino Release 17.8.1, N560-IMA-8Q/4L is supported on slots 3, 4, 7, 8, 11, and 12 slots with a default speed combination of 8X10G.

[15] The restrictions for Cisco N560-IMA-8Q/4L interface module is same as that of Cisco A900-IMA8Z interface module.

Cisco ASR 914 Supported Interface Modules

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

Swapping of Interface Modules

The following Ethernet interface modules support swapping on the Cisco A900-RSP3C-400-W module:

- SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)

- 2-port 40 Gigabit Ethernet Interface Module (2X40GE)

- 8-port 10 Gigabit Ethernet Interface Module (8X10GE)

• 1-port 100 Gigabit Ethernet Interface Module (1X100GE)

• OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO)

• 48 T1/E1 TDM Interface Module (48XT1/E1)

• 48 T3/E3 TDM Interface Module (48XT3/E3)

Use the **hw-module subslot default** command before performing a swap of the modules to default the interfaces on the interface module.

• OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO)

• 48 T1/E1 TDM Interface Module (48XT1/E1)

• 48 T3/E3 TDM Interface Module (48XT3/E3)

• 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

• NCS 4200 Combo 8-Port SFP GE and 1-Port 10 GE 20G Interface 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 in the chassis. Contact Cisco Sales/Support for the valid combinations.

Table 10: Cisco A900-RSP3C-400-W Supported Interface Modules and Part Numbers

RSP Module	Interface Modules	Part Number	Slot
A900-RSP3C-400-W	SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)	A900-IMA8S1Z	2,5,6,9,10,13,14,15
	1x100G Interface module	A900-IMA1C	7,8
	2x40G Interface module	A900-IMA2F	3,4,7,8,11,12
	8x10G Interface module	A900-IMA8Z	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, and 15
	OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO)	A900-IMA1Z8S-CX	3,4,7,8,11,12 **Note** Other slots are supported in the 5G mode.
	48XT1/E1 Interface module	A900-IMA48D-C	2,3,4,5,6,7,8,9,10,11,12,13,14, and 15
	48XT3/E3 Interface module	A900-IMA48T-C	2,3,4,5,6,7,8,9,10,11,12,13,14, and 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	2,3,4,5,6,7,8,9,10,13,14, and 15
	2x100G Interface module	NCS560-IMA2C/A900-IMA2C	7, 8

	Combo 8-Port SFP GE and 1-Port 10GE With CEM/iMSG 20G Interface Module	A900-IMA1Z8S-CXMS	0, 1, 2, 5, 6, 9, 10, 13, 14, 15[16]
			3, 4, 7, 8, 11, 12[17]
			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`

[16] These slots are supported on 10G mode.
[17] These slots are supported on 20G mode.

Feature Matrix

The feature matrix lists the features that are supported for each platform. For more information, see the cumulative Feature Compatibility Release Matrix on the Content Hub.

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 11: 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
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)

Metro Services	Metro IP Services	Metro Aggregation Services
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 Cisco ASR 900 Series Router Configuration Guide.

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 17.4.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.

Note   Effective Cisco IOS XE 17.3.1, secure ROMMON version of **15.6(42r)S** is supported to boot RSP3 images.

Once you upgrade to the secure BIOS ROMMON version, you cannot downgrade to non-secure ROMMON versions (lower than15.6(33r)S). The Cisco IOS XE 17.3.1 release is bundled with 15.6(42r)S ROMMON and the auto upgrade feature will upgrade all RSPs running a lower version of ROMMON to Secure 15.6 (**42**r)S ROMMON.

Table 12: IM FPGA Versions for Ethernet Phase 3 IM

Cisco IOS XE Release	IO FGPA	8 x10 FPGA	2x40 FPGA	1x100 FPGA
17.4.2	0x34	0.23	0.22	0.20
17.4.1	0x34	0.23	0.22	0.20

Table 13: 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)	Combo 8-Port SFP GE and 1-Port 10GE With CEM/iMSG 20G Interface Module (A900-IMA1Z8S-CXMS)
CEM FPGA	Cisco IOS XE 17.4.2	0x52050052	0x52420052	5G mode: 0x10210063 10G mode: 0x10530078	0x10320074	10G mode: 0x10800047 20G mode: 0x10090051
IM FPGA		1.22	1.22	1.15	2.00	0.93

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)	Combo 8-Port SFP GE and 1-Port 10GE With CEM/iMSG 20G Interface Module (A900-IMA1Z8S-CXMS)
CEM FPGA	Cisco IOS XE 17.4.1	0x52050052	0x52420052	5G mode: 0x10210063 10G mode: 0x10530078	0x10320074	10G mode: 0x10800047 20G mode: 0x10090051
IM FPGA		1.22	1.22	1.15	2.00	0.93

Table 14: HoFPGA and ROMMON 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)	Combo 8-Port SFP GE and 1-Port 10GE With CEM/iMSG 20G Interface Module (A900-IMA1Z8S-CXMS)
ROMMON	Cisco IOS XE 17.4.2	15.6(49r)S	15.6(49r)S	15.6(49r)S	15.6(49r)S	15.6(49r)S
HoFPGA (Active/ Standby)		0x10800047	0x10800047	0x10800047	0x10800047	0x10800047
ROMMON	Cisco IOS XE 17.4.1	15.6(42r)S	15.6(42r)S	15.6(42r)S	15.6(42r)S	15.6(42r)S
HoFPGA (Active/ Standby)		0x10800047	0x10800047	0x10800047	0x10800047	0x10800047

Table 15: FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.4.2 Release

Platform	Interface Module	FPGA Current Version	FPGA Minimum Required Version	RSP HoFPGA Active	RSP HoFPGA Standby	ROMMON
RSP-128	A900-IMA2Z	69.22	69.22	0X0003000e	0X0003000e	15.6(43r)S
	A900-IMA8S	0.49	0.47			
	A900-IMA8T1Z	69.24	69.24			

Platform	Interface Module	FPGA Current Version	FPGA Minimum Required Version	RSP HoFPGA Active	RSP HoFPGA Standby	ROMMON
RSP3-400S	A900-IMA1C	0.2	0.2	40031	40031	15.6(42r)S
	A900-IMA8Z	0.22	0.21			
	A900-IMA8S1Z	69.24	69.24			
RSP3-400W	A900-IMA1C	0.2	0.2	20040030	20040030	15.6(42r)S
	A900-IMA2Z	69.22	69.22			

Documentation Updates

Rearrangement in the Configuration Guides

- The following are the modifications in the CEM guides.

  - Introduction of the Alarm Configuring and Monitoring Guide:

    This guide provides the following information:

    - Alarms supported for SONET and SDH, and their maintenance

    - Alarm profiling feature

    - Auto In-Service States for cards, ports, and transceivers

    For more information, see the Alarm Configuring and Monitoring Guide, Cisco IOS XE 17 (Cisco ASR 900 Series).

  - Rearrangement of Chapter and Topics in the Alarm Configuring and Monitoring Guide:

    - The Auto In-Service States Guide is now a chapter inside the Alarms Configuring and Monitoring Guide.

    - Alarms at SONET Layers topic in the following CEM guides, is added to the Alarms Configuring and Monitoring Guide:

      - 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

      - 1-Port OC-192 or 8-Port Low Rate CEM Interface Module Configuration Guide

    - The Alarm History and Alarm Profiling chapters are removed from the below CEM Technology guides, and added into the Alarm Configuring and Monitoring Guide:

      - 48-Port T1/E1 CEM Interface Module Configuration Guide

      - 48-Port T3/E3 CEM Interface Module Configuration Guide

      - 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

> • 1-Port OC-192 or 8-Port Low Rate CEM Interface Module Configuration Guide

• Configuring IEEE 802.3ad Link Bundling is now available in Ethernet Channel Configuration Guide, Cisco IOS XE 17 (Cisco ASR 900 Series).

• The following are the modifications in the High Availability Configuration Guide:

   • Installing and Upgrading Software chapter is now available in the High Availability Configuration Guide, Cisco IOS XE 17 (Cisco ASR 900 Series). This chapter is removed from Loading and Managing System Images Configuration Guide.

   • Performing Step-by-Step ISSU Upgrade section is now available in the High Availability Configuration Guide, Cisco IOS XE 17 (Cisco ASR 900 Series).

MIB Support

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

Table 16: 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 17: 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:

  http://tools.cisco.com/ITDIT/MIBS/servlet/index

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.

What's New for Cisco IOS XE Bengaluru 17.4.x

This chapter describes the new hardware and software features supported on the Cisco ASR 900 Series routers in Cisco IOS XE Bengaluru 17.4.x.

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

What's New in Hardware for Cisco IOS XE Bengaluru 17.4.2

There are no new hardware features for this release.

What's New in Software for Cisco IOS XE Bengaluru 17.4.2

There are no new software features for this release.

What's New in Hardware for Cisco IOS XE Bengaluru 17.4.1

The following optics are supported for the Cisco IOS XE Bengaluru 17.4.1 release:

- OPTICS - QSFP-100G-ER4L-S=
- OPTICS - ONS-SI-100-LX10=
- OPTICS - ONS-SE-100-BX10D=
- OPTICS - ONS-SE-100-BX10U=
- OPTICS - ONS-SI-100-FX=

For more information, see the Cisco ASR 900 Series Aggregation Services Routers Feature Optics Matrix .

What's New in Software for Cisco IOS XE Bengaluru 17.4.1

Feature	Description
1-Port OC-192 or 8-Port Low Rate CEM Interface Module	
Support for all 0s and 1s BERT Patterns	Support for all 0s and 1s BERT patterns on the following Interface Modules: • 48-Port T1 or E1 CEM Interface Module • 48-Port T3 or E3 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 • 1-Port OC-192 or 8-Port Low Rate CEM Interface Module • ASR 900 Combo 8-Port SFP GE and 1-Port 10 GE 20G Interface Module
CEM and IP IW Feature Parity for A900-IMA1Z8S-CXMS and A900-IMA3G-IMSG Interface Modules	• APS and non-APS support for SDH and SONET for iMSG IPv6 interworking • NxDS0 iMSG IPv4 and NxDS0 APS iMSG IPv4 • UPSR IPv6 • IPv4 and IPv6 with VLAN handoff for both cross connect and local connect
BERT Error Injection	BERT Error injection enables you to inject errors into the BERT stream on SONET and SDH controllers. You can introduce BERT errors in a range of 1 to 255. This feature is introduced on 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 Interface Module
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.
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	
IPv6 VLAN Handoff and 4k iMSG scale	VLAN handoff supports IPv4 and IPv6 local connect and cross connect.
STS1E Framed SAToP Support on IMA3G	Support on clock recovery on STS-1e controller for framed SAToP on the following modes: • T3 • CT3 • VT-15
IP Routing: Protocol-Independent	

Feature	Description
On-Change Notifications for IS-IS State	This feature allows you to externalize the internal state of the router for the operational data and thus enables you to access the internal state of the router. It helps in sending on-change notifications to the receiver for any change of state, for example, when the adjacency goes up or down.
Segment Routing	
L2VPN over SR-TE Preferred Path	This feature allows you to configure an SR policy as the preferred path for a VPWS or VPLS pseudowire. VPWS or VPLS pseudowires between same PEs can be routed over different SR policies based on the requirements. Prior to this release, you could only steer the traffic using the SR policy for routing IPv4 traffic to a destination pseudowire (over IGP or BGP-LU).
PCE Initiated SR Policy with OSPF Autoroute Announce	This feature enables a steering mechanism in which IGPs automatically use the policy for destination's downstream of the policy end point.
Segment Routing Flexible Algorithm support for TI-LFA uLoop Avoidance, SID Leaking, and ODN with Auto-Steering	This feature allows you to compute Loop Free Alternate (LFA) paths, TI-LFA backup paths, and Microloop Avoidance paths for a particular Flexible Algorithm using the same constraints as the calculation of the primary paths for such Flexible Algorithms, for IS-IS. Inter-area leaking of Flexible Algorithm SIDs and prefixes and selectively filtering the paths that are installed to the MFI are also supported.
Telemetry (Model-Based Telemetry and Event-Based Telemetry) Support for Performance Measurement	This feature enables Model-Based Telemetry (MDT) and Event-Based Telemetry (EDT) that allow the data to be directed to a configured receiver. This data can be used for analysis and troubleshooting purposes to maintain the health of the network. The **sr_5_label_push_enable** SDM template is mandatory for this feature to function.
MPLS Basic	
Re-optimization with Tunnel Bandwidth Modification on Flex-LSP Protect Path	This feature supports Make Before Break (MBB) functionality and thus ensures there is no traffic loss when a MPLS Flex LSP tunnel runs on protect LSP (if working LSP goes down) and the tunnel bandwidth is modified. When the working LSP comes up, use the following command to manually switch from the working to protect LSP: **mpls traffic-eng switch tunnel** *tunnel-ID*.
IP Routing: BGP	
Convergence Enhancements for L3VPN Traffic over BGP PIC Edge	The BGP PIC feature is enhanced to achieve the sub-second convergence for greater than 2000 VPNv4/v6 prefixes using the hardware assisted PIC Edge functionality. Prior to this release, the BGP PIC Edge convergence could only be observed in seconds. To enable the feature, use the following new command: **platform l3vpn pic-enable**.
IP Routing: BFD	

Feature	Description
BFD over G8032 and Multi EFP BDI	Scale numbers for BFD and hardware offload are enhanced for the Cisco RSP2 and Cisco RSP3 modules.
Cisco ASR 900 Router Series	
Increase Maximum MTU Size	Maximum Transmission Unit (MTU) is increased to a maximum of 9644 bytes on the Cisco RSP3 module. You can configure the MTU bytes using the **mtu** *bytes* command.
VLAN Translation for RSP3	VLAN translation provides flexibility in managing VLANs and Metro Ethernet-related services. You can configure 1:1 and 2:1 VLAN translations using the **sdm prefer enable_vlan_translation** command on the Cisco RSP3 module.
CCP User Secret and Enable Secret masking	To support Common Criteria Policy validation for the masked secret.
IP Multicast: Multicast	
Multicast SLA Measurment with MLDP	Display of aggregated egress multicast stats for BDI interfaces on Head node, which is part of the MLDP core is supported.
Upgrading the Software on the Cisco ASR 900 Series Routers	
Secondary ROMMON Partition Auto Upgrade	This feature supports secondary ROMMON partition auto upgrade after a successful primary ROMMON partition is complete.
IP SLAs	
Configurable User-Defined and EMIX Packet Size	This feature allows you to configure user-defined and Enterprise traffic (EMIX) packet sizes. Use the following commands to configure user-defined and EMIX packet sizes: • **packet-size user-defined***packet size* • **packet-size emix sequence** *emix-sequence*[**u-value** *u-value value*]
IOT Interface Modules	
Support for A900-IMA6EM and A900-IMA4C3794 on A900-RSP3C-400-S and Cisco A900-RSP3C-200	This feature supports A900-IMA6EM and A900-IMA4C3794 interface modules on the Cisco A900-RSP3C-400, and on slot 4 on Cisco A900-RSP3C-200.

Other Supported Features in this Release

- **Programmability Features**
    - Complete YANG Model for Ethernet EVC Configuration—An Ethernet Virtual Connection (EVC) is defined by the Metro-Ethernet Forum (MEF) as an association between two or more user network

interfaces that identifies a point-to-point or multipoint-to-multipoint path within the service provider network. An EVC is a conceptual service pipe within the service provider network.

- Complete YANG Model for CFM Configuration—Ethernet Connectivity Fault Management (CFM) is an end-to-end per-service-instance Ethernet layer operations, administration, and maintenance (OAM) protocol. It includes proactive connectivity monitoring, fault verification, and fault isolation for large Ethernet metropolitan-area networks (MANs) and WANs.

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/1741

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.

For more information, see *Programmability Configuration Guide, Cisco IOS XE Bengaluru 17.4.x*.

C H A P T E R 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.

Resolved Caveats – Cisco IOS XE Bengaluru 17.4.2

Caveat ID Number	Description
CSCvu99207	Router: Incorrect STP forwarding state programming in platform
CSCvw56612	LOTR : Router show lic CLI does not show port details
CSCvw59531	Auto negotiation failing when CU SFP connected to 100m port
CSCvw64784	CEM ACR: Not able to reuse same clock id on another controller After deleted clock id.
CSCvw71447	RSP3: interface flaps step-by-step issu procedure post sso
CSCvw71735	Async Line raw-socket packet-length Configure to 0 on Switchover

Caveat ID Number	Description
CSCvw81102	RSP3: copy recent standby logs & corefiles to Active
CSCvw85511	Router: BDI interface is causing high cpu usage
CSCvw93411	Interface counters not incrementing after 2yrs, 22+ weeks on Router
CSCvx01642	PPPoE tag circuit-id remote-id should not be trusted if the interface is in untrusted mode
CSCvx24923	HS1 2.43 FPGA commit for reload/brom select issue
CSCvx25220	BERT is running cannot remove mode observed while running BERT on unframed mode
CSCvx42987	On XE 17.4.1 , for mode VT1-15 , when counters are enabled on controllers , o/p of LOP is showing IP
CSCvx55831	Ingress Policy with set qos-group action is creating extra TCAM entry with match on Egress Policy

Resolved Caveats – Cisco IOS XE Bengaluru 17.4.2 - Platform Independent

Caveat ID Number	Description
CSCvv79677	Router crashed after BGP flaps
CSCvx19209	ISIS crash in isis_sr_tilfa_compute_protection
CSCvx26650	On configuring route tag under ISIS, TI-lFA is not forming repair path

Open Caveats – Cisco IOS XE Bengaluru 17.4.2

There are no open caveats for this release.

Resolved Caveats – Cisco IOS XE Bengaluru 17.4.1

Caveat ID Number	Description
CSCvn47496	ENH : RSP3C request for over riding restriction "MVPN-GRE VRF-SM: RP must be at Encap PE"
CSCvs34482	ISSU not working on RSP2 nodes
CSCvt33153	Mcast stats: Traceback seen with message "mroute_stats_update"

Caveat ID Number	Description
CSCvt42842	RSP3-400S: Flood of "SKB received from Kernel, and could not find SA" kernel logs
CSCvt58155	rsp3c: Kernel crash bcmINTR rcu_check_callback
CSCvt64706	CPU HOG due to constant soft-parity errors
CSCvt69921	RSP2-128: CMAND core during SSO
CSCvt72171	v173 card protection after doing im_oir traffic is not happening on NCS4200-48T3E3-CE1
CSCvt74987	v1731: tunnels with more than 1500b certificate is not coming up
CSCvt75327	v1731: Traffic is not happend after doing sso in Imsg_Mixmode
CSCvt76777	17.3.1: Adj error object on removing sr-label-preferred
CSCvt78211	A900-IMA3G-IMSG: Serial interface gets blocked after reaching count of 700 for non acr and non pg
CSCvt82525	ASR 900 crash while IPV6 updating prefixes
CSCvt96614	More than 1 second TI-LFA convergence is seen with 250 PDP and 250 PFP tunnels
CSCvu13886	v174: card protection performing shut/no shut on the CPG sts1e, could see SLOS alarm on the Peer.
CSCvu18276	ASR903 Standby RSP3 crash during IOS upgrade
CSCvu29991	Historic performance intervals are not present for STS1 E interfaces in CLI as well as SNMP MIB
CSCvu30972	ASR903: All readings for Power supply unit reflect as zero though the unit is functional
CSCvu31393	[RSP3-poch-Mcast]: igmp queries are not egressing out of poch in a sequence
CSCvu36636	ASR900 ROMMON region 0 and 1 verification CLI
CSCvu38550	For VCOP configured with type DS3, Applique type should be Subrate T3 instead of Channelized T3/T1
CSCvu43329	Remote Loopback: Far end did not go into loop for T3 RL in A900-IMA1Z8S-CX
CSCvu45472	A900-IMA3G-IMSG: Serial interface gets blocked after reaching count of 700 for acr and pg
CSCvu45833	ISSU : 1612-173 : CEM Ckt stuck at Setup Failed
CSCvu51472	Support for SAToP payload 64 byte & dejitter 2 ms in LOTR IM's
CSCvu57879	OIR of A900-IMA48T-C IM in bay 12 affects RX traffic of A900-IMA1Z8S-CX IM in bay 0
CSCvu66126	OC192 APS Group Stuck with Signal Fail condition

Caveat ID Number	Description
CSCvu67675	17.3.1: RSP3: >3000ms TI-LFA convergence is seen with SR PFP configured
CSCvu78801	PPPoE VSA tags gets overwritten at each PPPoE IA
CSCvu83291	Memory leak due to QoS policer
CSCvu92797	RSP3-VZ: Observing traceback while executing IM-OIR cleanup test.
CSCvu95940	RSP2: Egress QoS policy config missing on PoCh member link flap
CSCvu97978	XE BIT : RSP2 node crashed with core generation in 16.12 throttle
CSCvv10139	Uea-iomd phase1 IM FPD ugprade Ver-0x4B commit
CSCvv13495	17.1.1. Loopback local not working on T3 card protection physically connected ports
CSCvv18671	RSP3-400S: Kernel crash - arch_cpu_idle+0x30/0xa0 during SSO Soak
CSCvv24059	Crash is noticed on RSP when EMPLSINTD is exhausted.
CSCvv31617	e2e circuit not pinging serial interface up and line protocol up

Open Caveats – Cisco IOS XE Bengaluru 17.4.1

Caveat ID Number	Description
CSCvv33300	Alarm-profile : APS configured for Au-4 mode t3 , e3 after SSO alarms are removed
CSCvv72192	IMA2Z IM, xfp and sfp+ are present then XFP is removed LED still shows as green
CSCvw15076	16.12.3-75.1/75.2 With VP and Fixed port the ptp state shows freq-locked
CSCvw34109	PTP RX failure due to LSMPI buffer exhaustion
CSCvv43263	17.4.1: RSP3: BGP PIC edge cutover convergence is high for Global prefixes with VPLS_stats enabled
CSCvv40904	RSP3-400S: kernel crash during SSO secfp_MapPolInSA+0x134/0x5f0
CSCvw34109	PTP failure due to LSMPI buffer exhaustion

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

- From the Cisco IOS XE 16.5.1 and 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.

- 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 port within this port group is configured with OC48 rate, the other port cannot be used.

- RS422 pinout works only on ports from 0 to 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.

- ISSU is not supported between a Cisco IOS XE 3S release and the Cisco IOS XE Bengaluru 17.4.x release.

- 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.

- 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.

- 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 900 RSP3 module.

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

- 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 diskspace of 2 MB is required in the boot flash memory file system for a successful ROMMON auto upgrade process. For a diskspace 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 exhibited by running the pyang tool with the **lint** flag are currently non-critical 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.