



Release Notes for Cisco ASR 900 Series Routers, Cisco IOS XE Amsterdam 17.1.x

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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) +	A900-IMA8S1Z	
	1-port 10-Gigabit Ethernet (1x10GE)		
	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-port T1/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: <pre>Router# configure t Router(config)# license feature service-offload enable</pre>

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 The restrictions for

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.

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-IMA3GIMSG	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-IMASER14AS	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 1415

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 17.1.1 Release

Use the **show hw-module all fpd** command to display the 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 12: IM FPGA Versions for Ethernet Phase 3 IM for Cisco IOS XE 17.1.1 Release

Cisco IOS XE Release	10 FGPA	8 x10 FGPA	2x40 FGPA	1x100 FGPA
17.1.1	0x34	0.22	0.22	0.20

Table 13: CEM and IM FPGA, HoFPGA, and ROMMON Versions for ASR 903 RSP3 and ASR 907 for Cisco IOS XE 17.1.1 Release

Category	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-IMA1ZS-CMIS)
CEM FPGA	0x52050052	0x52310052	5G mode: 0x10180062 10G mode: 0x10510078	0x10060071	10G mode: 0x10770047 20G mode: 0x10770047
IM FPGA	1.22	1.22	1.15	2.00	0.80
ROMMON	15.6(42r)S	15.6(42r)S	15.6(42r)S	15.6(42r)S	15.6(42r)S
HoFPGA (Active/ Standby)	0x00030004	0x00030004	0x00030004	0x00030004	0x00030004

Table 14: FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.1.1 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(42r)S
	A900-IMA8S	0.49	0.47			
	A900-IMA8T1Z	69.24	69.24			
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
 - 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

MIB Support

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

Table 15: 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 16: 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>



CHAPTER 2

New Features

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

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

- [New Hardware Features in Cisco IOS XE Amsterdam 17.1.1a, on page 25](#)
- [New Software Features in Cisco IOS XE Amsterdam 17.1.1a, on page 25](#)
- [New Hardware Features in Cisco IOS XE Amsterdam 17.1.1, on page 29](#)
- [New Software Features in Cisco IOS XE Amsterdam 17.1.1, on page 29](#)

New Hardware Features in Cisco IOS XE Amsterdam 17.1.1a

There are no hardware features for this release.

New Software Features in Cisco IOS XE Amsterdam 17.1.1a

- **Auto In-Service State for Transceiver**

The transceiver module is a logical entity that represents a Transceiver equipment. The module can be created using a CLI command or created automatically when the Transceiver (pluggable) is inserted into a port. The transceiver connected to port supports the Auto In-Service State (AINS) functionality. For example, if an alarm is raised during the AINS state, then the alarm is not reported, and the syslog is not generated. You need to enable AINS under the alarms profile and the profile should be attached to the corresponding port.

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

- **BGP Tracking**

The selective address tracking for Border Gateway Protocol (BGP) next hop failover with maximum-metric can be enabled using the **neighbor ip-address fall-over route-map** command.

For more information on the command, see [Cisco IOS IP Routing: BGP Command Reference](#).

- **Card Protection for STS-1 Electricals**

The router supports electrical card protection feature with 1:1 protection, or during events such as when interface module stops responding, software stops responding, or issues in other hardware components.

For more information, see [48-Port T3/E3 CEM Interface Module Configuration Guide, Cisco IOS XE 16 \(Cisco ASR 900 Series\)](#).

- **DSCP Preservation of MLDP Traffic**

The Differentiated Services Code Point (DSCP) value does not change on both the uniform and pipe modes.

For more information, see [QoS: Classification Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **EVPN Single-Homing over MPLS on RSP3**

The EVPN Single-Homing feature utilizes the functionality defined in RFC 7432 (BGP MPLS-based Ethernet VPN), to achieve single-homing between a Provider Edge (PE) and a Customer Edge (CE) device.

For more information, see the [MPLS Layer 2 VPNs Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **EVPN-VPWS Single Homing over Segment Routing**

EVPN-VPWS single homing is a BGP control plane solution for point-to-point services. It has the ability to forward traffic from one network to another using Ethernet Segment without MAC lookup. EVPN-VPWS single homing works on both IP and SR core. IP core is used to support BGP while the SR core is used to switch packets between the endpoints.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **Facility Protocol Status Support**

The routers report the protocol status using syslog or trap alarm notifications. Few syslogs and traps are not cleared when the router gets disconnected or reloaded. As a result, the alarms are not notified.

To avoid this, a new command, show facility protocol status, is introduced that displays the output of the following routing protocols status at any interval of time: IS-IS, OSPF, BGP, LDP, PTP, HSRP, BFD, TE tunnels, Bundles, pseudowires, EVPN pseudowires, CFM, SYncE, and sensor threshold violations.

For more information, see the [Cisco ASR 900 Router Series Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **IPSLAs TWAMP Responder**

The IETF Two-Way Active Measurement Protocol (TWAMP) defines a standard for measuring round-trip network performance between any two devices that support the TWAMP protocols. The TWAMP control protocol is used to set up performance measurement sessions. It is also used to send and receive performance measurement probes.

For more information on TWAMP Responder, see the [IP SLAs Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **IPv4 Interworking Support for MLPPP Interfaces**

The Multilink Point-to-Point (MLPPP) interworking supports IPv4 Layer 2 VPN Interworking with T1 or E1 bundles on the Cisco RSP3 module. The MLPPP interworking enables service providers (offering relatively low-speed links) to use MLP and spread traffic across them in their MPLS networks. The MPLS Multilink PPP feature reduces the number of Interior Gateway Protocol (IGP) adjacencies and facilitates load sharing of traffic.

For more information, see [1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **IPv6 Interworking Support for MLPPP Interfaces**

The Multilink Point-to-Point (MLPPP) interworking supports IPv4 or IPv6 Layer 2 VPN Interworking with T1 or E1 bundles on the Cisco RSP3 module. The MLPPP interworking enables service providers (offering relatively low-speed links) to use MLP and spread traffic across them in their MPLS networks. The MPLS Multilink PPP feature reduces the number of Interior Gateway Protocol (IGP) adjacencies and facilitates load sharing of traffic.

For more information, see [1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **IPv6 Interworking Pseudowire Support on HDLC or PPP Serial Interfaces**

The IPv6 interworking is supported for Layer 2 VPN interworking mode. The IPv6 interworking is supported only for HDLC or PPP to Ethernet. Layer 3 termination is supported with serial interfaces with HDLC or PPP encapsulation.

For more information, see [1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **IPv6 Support for Interworking Multiservice Gateway Access Circuit Redundancy**

The IPv6 interworking is supported with ACR for Layer 2 VPN.

For more information, see [1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **L3VPN Support on mLACP**

Layer 3 VPN on multichassis LACP (mLACP) is supported in the Cisco RSP3 Module using the **port-channel mc-lag** command.

For more information on the mLACP support, see [Ethernet Channel Configuration Guide Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **Lawful Intercept**

The Lawful Intercept (LI) feature provides electronic surveillance as authorized by a judicial or administrative order for service provider routers. The Lawful Intercept is based on RFC3924 and Simple Network Management Protocol Version 3 (SNMPv3) provisioning architecture.

For more information on Lawful Intercept, see the [System Security Configuration Guide, Cisco IOS XE 17\(Cisco ASR 900 Series\)](#).

- **PTP Multiprofile**

The Precision Time Protocol (PTP) is a protocol used to synchronize clocks throughout a network. The PTP Multiprofile support is configured on a PTP boundary clock by translating one PTP profile at PTP slave port to other PTP profile at PTP master port. To translate PTP properties from one profile to other, a special type of **inter-op** clock-port is introduced. This special clock-port is configured with the required profile and domain information.

For more information on the PTP Multiprofile, see the [Timing and Synchronization Configuration Guide, Cisco IOS XE A17\(Cisco ASR 900 Series\)](#).

- **Oversubscription Support for A900-IMA8CS1Z-M**

Egress packet classification is performed based on priority-based flow-control (PFC) to ensure that there are no drop in packets.

For more information on oversubscription, see [Cisco ASR 900 Router Series Configuration Guide, Cisco IOS XE 17](#).

- **Segment Routing Low Latency Network Slice**

This feature allows the advertisement and reception of the extended TE link delay metrics without any additional configuration required in IS-IS, OSPF or BGP-IS. When the link delay values are configured, they are flooded in the PCE topology and when the path computation is requested, these values are used for path calculation.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17\(Cisco ASR 900 Series\)](#).

- **Segment Routing Performance Measurement Link Delay Metrics**

Network performance metrics such as packet loss, delay, delay variation, and bandwidth utilization is a critical measure for traffic engineering (TE) in service provider networks. These metrics provide network operators with information about characteristics of their networks for performance evaluation and helps to ensure compliance with service level agreements. The service-level agreements (SLAs) of service providers depend on the ability to measure and monitor these network performance metrics.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **SR-TE Policy for MPLS TE**

The Cisco ASR 900 Series routers with Cisco RSP2 module support the newer segment routed Traffic Engineering (SR-TE) policy and you can enable the policy using the **segment-routing traffic-eng** command.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series Routers\)](#).

- **SR-TE ODN Color Extended Community for Layer 3 VPN**

The Cisco ASR 900 Series routers with Cisco RSP2 module support the color extended community with the following feature support:

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

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series Routers\)](#).

- **Traps and Performance MIBs for GNSS**

A new MIB, CISCO-GNSS-MIB, is introduced for GNSS.

For more information, see the [Timing and Synchronization Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

New Hardware Features in Cisco IOS XE Amsterdam 17.1.1

There are no hardware features for this release.

New Software Features in Cisco IOS XE Amsterdam 17.1.1

- **EVPN Single-Homing over MPLS on RSP3**

The EVPN Single-Homing over MPLS feature utilizes the functionality defined in RFC 7432 (BGP MPLS-based Ethernet VPN), to achieve single-homing between a Provider Edge (PE) and a Customer Edge (CE) device.

For more information, see the [MPLS Layer 2 VPNs Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **EVPN-VPWS Single Homing over Segment Routing**

EVPN-VPWS single homing is a BGP control plane solution for point-to-point services. It has the ability to forward traffic from one network to another using Ethernet Segment without MAC lookup. EVPN-VPWS single homing works on both IP and SR core. IP core is used to support BGP while the SR core is used to switch packets between the endpoints.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **Programmability Features**

The following Programmability features are supported from this release:

- gRPC Network Management Interface (gNMI)—Model-driven configuration and retrieval of operational data using the gNMI capabilities, GET and SET RPCs.
- Model Driven Telemetry - gNMI Dial-In—Support for telemetry subscriptions and updates over a gRPC Network Management Interface (gNMI).
- TLS for gRPC Dial-Out—Support for TLS for gRPC dial-out.

For more information, see the [Programmability Guide, Cisco IOS XE Amsterdam 17.1.x](#).

- **SADT Overhead Accounting**

FPGA measures parameters such as throughput, frame loss, jitter, and delay for SADT.

FPGA has the capability to generate and measure only 1 Gbps traffic rate and hence maximum throughput cannot be achieved.

To overcome this limitation, use the **platform y1564 shadow-session-enable** command to replicate the packets 10 times in FPGA.

For more information, see [IP SLAs Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **Segment Routing Low Latency Network Slice**

This feature allows the advertisement and reception of the extended TE link delay metrics without any additional configuration required in IS-IS, OSPF or BGP-IS. When the link delay values are configured,

they are flooded in the PCE topology and when the path computation is requested, these values are used for path calculation.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **Segment Routing Performance Measurement Link Delay Metrics**

Network performance metrics such as packet loss, delay, delay variation, and bandwidth utilization is a critical measure for traffic engineering (TE) in service provider networks. These metrics provide network operators with information about characteristics of their networks for performance evaluation and helps to ensure compliance with service level agreements. The service-level agreements (SLAs) of service providers depend on the ability to measure and monitor these network performance metrics.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series\)](#).

- **SR-TE Policy for MPLS TE**

The Cisco ASR 900 Series routers with Cisco RSP2 module support the newer segment routed Traffic Engineering (SR-TE) policy and you can enable the policy using the **segment-routing traffic-eng** command.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series Routers\)](#).

- **SR-TE ODN Color Extended Community for Layer 3 VPN**

The Cisco ASR 900 Series routers with Cisco RSP2 module support the color extended community with the following feature support:

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

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco ASR 900 Series Routers\)](#).



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.

- [Cisco Bug Search Tool](#), on page 31
- [Open Caveats – Cisco IOS XE Amsterdam 17.1.1a](#), on page 31
- [Resolved Caveats – Cisco IOS XE Amsterdam 17.1.1a](#), on page 32
- [Open Caveats – Cisco IOS XE Amsterdam 17.1.1](#), on page 32
- [Resolved Caveats – Cisco IOS XE Amsterdam 17.1.1](#), on page 32

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>

Open Caveats – Cisco IOS XE Amsterdam 17.1.1a

Caveat ID Number	Description
CSCvm31596	ASR903 RSP3C-400-S going in hang state

Caveat ID Number	Description
CSCVq61092	Elboron IM keeps Reloading or Router Reloads once silently, beyond 400 CEM circuits on Port 8-OC192
CSCvr39624	10G Interface stays down with 16.9.3 Image Upgrade
CSCvr42356	Changing IP addresses on LAN interface results in traffic failing over IPSec tunnel
CSCvr50508	Router_RP_0_fman_rp crash on applying conditional crypto debug
CSCvr61371	BFD remains down when using PBR on BDI/interface
CSCvr80364	ASR914 running 16.9.3- CEM circuits stuck in down state after RSP switchover
CSCvr91953	Kernel - spinlock lockup TCP driver rsp3c crash
CSCvs25267	IPSEC Not Supported in 17.1.1 and 16.12.1.
CSCvw34109	PTP failure due to LSMPI buffer exhaustion

Resolved Caveats – Cisco IOS XE Amsterdam 17.1.1a

Caveat ID Number	Description
CSCvm84355	[SVSP-299]-linkDown trap should not be sent when the port is in AINS mode-[SVSPE-570]
CSCvp91087	PRBS/BERT line is not working on pdh de1 of 3GMS IM

Open Caveats – Cisco IOS XE Amsterdam 17.1.1

Caveat ID Number	Description
CSCvr59626	RSP2_HA: Standby RP goes for a crash upon continuous rep interface flap
CSCvw34109	PTP failure due to LSMPI buffer exhaustion

Resolved Caveats – Cisco IOS XE Amsterdam 17.1.1

Caveat ID Number	Description
CSCvm84355	[SVSP-299]-linkDown trap should not be sent when the port is in AINS mode-[SVSPE-570]
CSCvp91087	PRBS/BERT line is not working on pdh de1 of 3GMS IM



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.
- Crash may be observed on the router when:
 - EoMPLS, CEM, ATM and IMA Pseudowire Redundancy (PW-redundancy) configurations exist while switchover and fail-back of the pseudowires are being triggered, and the **show platform hardware pp active pw compls** command is executed.
- 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 Amsterdam 17.1.x release.
- This following restrictions are applicable only to Cisco RSP2 module.
 - Traffic is dropped when packets of size 64 to 100 bytes are sent on 1G and 10G ports.
 - For 64-byte packets, traffic drop is seen at 70% and beyond of the line rate.
 - For 90-byte packets, traffic drop is seen at 90% and beyond of the line rate.
 - For 95-byte packets, traffic drop is seen at 95% and beyond of the line rate.
 - Traffic is dropped when:
 - Traffic is sent on a VRF interface.
 - Traffic is sent across layer 2 and layer 3.

However, traffic is not dropped when the packet size is greater than 100 bytes, even if the packets are sent bi-directionally at the line rate.

- 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.
- In the Cisco IOS XE 16.12.1 and 17.1.1 releases, IPSec is not supported on the Cisco RSP3 module.
- 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.
- Effective with Cisco IOS XE Everest 16.6.1, the Port-channel (PoCH) scale is reduced to 24 from 48 for Cisco ASR 900 RSP3 module.



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