

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

Cisco ASR 900 Series Router

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 100 Gigabit Ethernet. The design of the Cisco ASR 900 Series Router delivers in-box hardware redundancy for all hardware components and supports software redundancy with In Service Software Upgrade (ISSU) and Non-Stop Forwarding (NSF) support.

Cisco ASR 902 Router

The Cisco ASR 902 Router is a full-featured aggregation platform designed for cost-effective delivery of converged mobile and business services. With shallow depth, low power consumption, and an extended temperature range, this compact 2-rack unit (2RU) router provides high service scale and flexible hardware configuration.

Cisco ASR 903 Router

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

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

Cisco ASR 907 Router

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

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

Cisco ASR 914 Router

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

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

Feature Navigator

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

Hardware Support

Cisco ASR 902 Supported Interface Modules

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

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

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

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

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

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

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

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

Cisco ASR 903 Supported Interface Modules

A900-RSP2 Supported Interface Modules

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

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

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

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

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

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

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

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

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

A900-RSP3C-400-S Supported Interface Modules

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

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

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

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

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

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

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

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

Supported Interface Modules	Part Numbers	Slot

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

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

A900-RSP3C-200-S Supported Interface Modules

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

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

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

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

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

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

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

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

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

Cisco ASR 907 Supported Interface Modules

Supported Interface Modules

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

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

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

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

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

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

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

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

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

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

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

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

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

12 These slots are supported on 10G mode.

Cisco ASR 914 Supported Interface Modules

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

Swapping of Interface Modules

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

Use the **hw-module subslot default** command before performing a swap of the modules to default the interfaces on the interface 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 of **hw-module subslot default** command is not supported on the following interface modules.

- 1-port 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 (A900-IMA3G-IMSG)
- ASR 900 Combo 8-Port SFP GE and 1-Port 10 GE 20G Interface Module (A900-IMA1Z8S-CXMS)

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 8: 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[13]
			3, 4, 7, 8, 11, 12[14]
			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`

[13] These slots are supported on 10G mode.
[14] These slots are supported on 20G mode.

Feature Matrix

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

Software Licensing Overview

The router offers the following base licenses:

- Metro Services
- Metro IP Services
- Metro Aggregation Services

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

Smart Licensing

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

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

Table 9: 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)
Synchronous Ethernet	—	VPLS and HVPLS

Metro Services	Metro IP Services	Metro Aggregation Services
IPv4 and IPv6 host connectivity	—	Pseudowire redundancy
—	—	MR-APS and mLACP

The router offers the following additional feature licenses:

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

Note These features require a software license to use.

Determining the Software Version

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

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

Upgrading to a New Software Release

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

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

Upgrading the FPD Firmware

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

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

ROMMON Version

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

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

Note ROMMON upgrade is mandatory to boot RSP3 images.

Supported FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.6.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's an FPGA upgrade during ISSU, it causes 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 can't 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 upgrades all RSPs running a lower version of ROMMON to Secure 15.6 (**42**r)S ROMMON.

Table 10: IM FPGA Versions for Ethernet Phase 3 IM

Cisco IOS XE Release	IO FGPA	8 x10 FPGA	2x40 FPGA	1x100 FPGA
17.6.8	0x34	0.21	0.22	0.20
17.6.7	0x34	0.21	0.22	0.20
17.6.6a	0x34	0.21	0.22	0.20
17.6.6	0x34	0.21	0.22	0.20
17.6.5	0x34	0.21	0.22	0.20
17.6.4	0x34	0.21	0.22	0.20
17.6.3	0x34	0.21	0.22	0.20
17.6.2	0x34	0.21	0.22	0.20
17.6.1	0x34	0.21	0.22	0.20
17.5.1	0x34	0.21	0.22	0.20

Table 11: 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 17.6.8	0x52110052	0x52510052	5G mode: 0x10050065 10G mode: 0x10010079	0x10020076	10G mode: 0x10160051 20G mode: 0x10160051
IM FPGA		1.22	1.22	1.15	2.00	0.93
CEM FPGA	Cisco IOS XE 17.6.7	0x52110052	0x52510052	5G mode: 0x10050065 10G mode: 0x10010079	0x10020076	10G mode: 0x10160051 20G mode: 0x10160051
IM FPGA		1.22	1.22	1.15	2.00	0.93
CEM FPGA	Cisco IOS XE 17.6.6a[15]	0x52110052	0x52510052	5G mode: 0x10050065 10G mode: 0x10010079	0x10020076	10G mode: 0x10160051 20G mode: 0x10160051
IM FPGA		1.22	1.22	1.15	2.00	0.93
CEM FPGA	Cisco IOS XE 17.6.6[16]	0x52110052	0x52510052	5G mode: 0x10050065 10G mode: 0x10010079	0x10020076	10G mode: 0x10160051 20G mode: 0x10160051
IM FPGA		1.22	1.22	1.15	2.00	0.93
CEM FPGA	Cisco IOS XE 17.6.5	0x52110052	0x52510052	5G mode: 0x10050065 10G mode: 0x10010079	0x10020076	10G mode: 0x10160051 20G mode: 0x10160051
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 17.6.4	0x52110052	0x52510052	5G mode: 0x10050065 10G mode: 0x10010079	0x10020076	10G mode: 0x10160051 20G mode: 0x10160051
IM FPGA		1.22	1.22	1.15	2.00	0.93
CEM FPGA	Cisco IOS XE 17.6.3	0x52110052	0x52510052	5G mode: 0x10050065 10G mode: 0x10010079	0x10020076	10G mode: 0x10160051 20G mode: 0x10160051
IM FPGA		1.22	1.22	1.15	2.00	0.93
CEM FPGA	Cisco IOS XE 17.6.2	0x52110052	0x52510052	5G mode: 0x10050065 10G mode: 0x10010079	0x10020076	10G mode: 0x10160051 20G mode: 0x10160051
IM FPGA		1.22	1.22	1.15	2.00	0.93
CEM FPGA	Cisco IOS XE 17.6.1	0x52110052	0x52520052	5G mode: 0x10090065 10G mode: 0x10070079	0x10030076	10G mode: 0x 10290051 20G mode: 0x 10290051
IM FPGA		1.22	1.22	1.15	2.00	0.93
CEM FPGA	Cisco IOS XE 17.5.1	0x52050052	0x52420052	5G mode: 0x10210063 10G mode: 0x10530078	0x10020076	10G mode: 0x10090051 20G mode: 0x10090051
IM FPGA		1.22	1.22	1.15	2.00	0.93

[15] The FPGA version of the Interface Module A900-IMASER14A/S for this release is 2.6.
[16] The FPGA version of the Interface Module A900-IMASER14A/S for this release is 2.6.

Table 12: FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.6.1 Release

Platform	Interface Module	FPGA Current Version	FPGA Minimum Required Version	RSP HoFPGA Active	RSP HoFPGA Standby	ROMMON
RSP2-128	A900-IMA2Z	69.22	69.22	0X00030011	0X00030011	15.6(48r)S
	A900-IMA8S	0.75	0.75			
	A900-IMA8T1Z	69.32	69.24			
RSP3-400S	A900-IMA1C	0.20	0.20	40035	40035	15.6(49r)S
	A900-IMA8Z	0.23	0.21			
	A900-IMA8S1Z	**69.24**	**69.24**			
RSP3-400W	A900-IMA1C	0.20	0.20	20040034	20040034	15.6(49r)S
	A900-IMA2Z	**69.22**	**69.22**			

Table 13: FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.6.2, 17.6.3, and 17.6.4 Releases

Platform	Interface Module	FPGA Current Version	FPGA Minimum Required Version	RSP HoFPGA Active	RSP HoFPGA Standby	ROMMON
RSP2-128	A900-IMA2Z	69.22	69.22	0X00030011	0X00030011	15.6(48r)S
	A900-IMA8S	0.75	0.75			
	A900-IMA8T1Z	69.32	69.24			
RSP3-400S	A900-IMA1C	0.20	0.20	40035	40035	15.6(49r)S
	A900-IMA8Z	0.23	0.21			
	A900-IMA8S1Z	**69.24**	**69.24**			
RSP3-400W	A900-IMA1C	0.20	0.20	20040034	20040034	15.6(49r)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 OCx CEM Interface Module Configuration Guide. This guide covers the features of the following OCx 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 (A900-IMA3G-IMSG)

- 1-Port OC-192 or 8-Port Low Rate CEM Interface Module (A900-IMA8S1Z-CX)
- ASR 900 Combo 8-Port SFP GE and 1-Port 10 GE 20G Interface Module (A900-IMA1Z8S-CXMS)
- 1-port OC-192 or 8-port Low rate CEM interface module

This features of the OCx interface modules are combined and reorganized as follows:

- Overview of the interface modules
- SONET and SDH configuration
- Interworking Multiservice Gateway (iMSG) that includes serial interfaces, iMSG ACR, multilink interfaces, and VLAN handoff
- OCx protection that includes Automatic protection switching (APS), Multiplex Section Protection (MSP), Unidirectional Path Switching Ring (UPSR), and Subnetwork Connection Protection (SNCP)
- Data Communication Channel (DCC) and Target Identifier Address Resolution Protocol (TARP)
- Bandwidth for OCx Modules

For more information, see the OCx CEM Interface Module 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 14: 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 15: Unverified MIBs

Unverified MIBs		
ATM-MIB	CISCO-IETF-DHCP-SERVER-EXT-MIB	EXPRESSION-MIB
CISCO-ATM-EXT-MIB	—	HC-ALARM-MIB
CISCO-ATM-IF-MIB	CISCO-IETF-PPVPN-MPLS-VPN-MIB	HC-RMON-MIB
CISCO-ATM-PVC-MIB	CISCO-IP-STAT-MIB	IEEE8021-CFM-MIB
CISCO-ATM-PVCTRAP-EXTN-MIB	CISCO-IPSLA-ETHERNET-MIB	IEEE8021-CFM-V2-MIB
CISCO-BCP-MIB	CISCO-L2-CONTROL-MIB	IEEE8023-LAG-MIB
CISCO-CALLHOME-MIB	CISCO-LAG-MIB	INT-SERV-GUARANTEED-MIB

CISCO-CIRCUIT-INTERFACE-MIB	CISCO-MAC-NOTIFICATION-MIB	INTEGRATED-SERVICES-MIB
CISCO-CONTEXT-MAPPING-MIB	CISCO-MEMORY-POOL-MIB	MPLS-L3VPN-STD-MIB (RFC 4382)
CISCO-EIGRP-MIB	CISCO-NHRP-EXT-MIB	MPLS-LDP-ATM-STD-MIB (RFC 3815)
CISCO-ERM-MIB	CISCO-NTP-MIB	MPLS-LDP-MIB
CISCO-ETHER-CFM-MIB	CISCO-PING-MIB	MPLS-TE-STD-MIB
CISCO-ETHERLIKE-EXT-MIB	CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB	MPLS-VPN-MIB
CISCO-EVC-MIB	CISCO-RTTMON-ICMP-MIB	NHRP-MIB
CISCO-HSRP-EXT-MIB	CISCO-RTTMON-IP-EXT-MIB	RFC2006-MIB (MIP)
CISCO-HSRP-MIB	CISCO-RTTMON-RTP-MIB	RMON2-MIB (RFC 2021)
CISCO-IETF-ATM2-PVCTRAP-MIB	CISCO-SNMP-TARGET-EXT-MIB	SMON-MIB
CISCO-IETF-ATM2-PVCTRAP-MIBEXTN	CISCO-TCP-MIB	VRRP-MIB
CISCO-IETF-BFD-MIB	CISCO-VRF-MIB	—
CISCO-IETF-DHCP-SERVER-MIB	ETHER-WIS (RFC 3637)	—

MIB Documentation

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

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

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

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

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

Additional References

Product Information

- Cisco ASR 900 Series Aggregation Services Routers Data Sheets

Hardware Installation Guides

- Cisco ASR 900 Series Aggregation Services Routers Hardware Guides

Software Configuration Guides

- Cisco ASR 900 Series Aggregation Services Routers Configuration Guides

Regulatory Compliance and Safety Information

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

Field Notices and Bulletins

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

Accessibility Features in the Cisco ASR 900 Series Routers

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

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

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

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