

# 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<br>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) +<br>1-port 10-Gigabit Ethernet (1x10GE) | A900-IMA8S1Z | |
| | Copper Combo IM—8-port Gigabit Ethernet (8x1GE)<br>+ 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<br>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<br>(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]<br>**Note** To enable this IM on slot 0 or slot 1, do the following and reload the router:<br>`Router# configure t`<br>`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 |
| | 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[7] |
| | 2x40G Interface module | A900-IMA2F | 3,4,7,8,11,12 |
| | 8x10G Interface module | A900-IMA8Z[8] | 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)<br>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[9]<br>4, 8, 12[10]<br>5, 9, 13, 15[11]<br>**Note** To enable this IM on slot 0 or slot 1, do the following and reload the router:<br>`Router# configure t`<br>`Router(config)# license feature service-offload enable` |
| | 6-port E&M Module | A900-IMA6EM | Not Supported |
| | 4-port C37.94 Interface Module | A900-IMA4C3794 | Not Supported |

7 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.

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

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

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

11 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<br>**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[12]<br>3, 4, 7, 8, 11, 12[13]<br>**Note** To enable this IM on slot 0 or slot 1, do the following and reload the router:<br>`Router# configure t`<br>`Router(config)# license feature service-offload enable` |

[12] These slots are supported on 10G mode.
[13] 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 17.5.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 10: IM FPGA Versions for Ethernet Phase 3 IM*

| Cisco IOS XE Release | IO FGPA | 8 x10 FPGA | 2x40 FPGA | 1x100 FPGA |
|---|---|---|---|---|
| 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 17.5.1 | 0x52050052 | 0x52420052 | 5G mode: 0x10210063<br>10G mode: 0x10530078 | 0x10020076 | 10G mode: 0x10090051<br>20G mode: 0x10090051 |
| IM FPGA | | 1.22 | 1.22 | 1.15 | 2.00 | 0.93 |

*Table 12: 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 17.5.1 | 15.6(47r)S | 15.6(47r)S | 15.6(47r)S | 15.6(47r)S | 15.6(47r)S |
| HoFPGA (Active/ Standby) | | 0x52050052 | 0x52420052 | 0x10230063 | 0x10020076 | 0x10090051 |

*Table 13: FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.5.1 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 | 0X00030010 | 0X00030010 | 15.6(43r)S |
| | A900-IMA8S | 0.75 | 0.75 | | | |
| | A900-IMA8T1Z | 69.32 | 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 | 40035 | 40035 | 15.6(42r)S |
| | A900-IMA8Z | 0.21 | 0.21 | | | |
| | A900-IMA8S1Z | 69.24 | 69.24 | | | |
| RSP3-400W | A900-IMA1C | 0.2 | 0.2 | 20040034 | 20040034 | 15.6(42r)S |
| | A900-IMA2Z | 69.22 | 69.22 | | | |

# Documentation Updates

The following are the modifications to the CEM guides.

- **CEM Generic Guide**

  This guide covers CEM features, configurations, verifications, and examples that are common to the following CEM 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

  The CEM features are:

  - Circuit Emulation
    - CEM Classes
    - CEM Parameters
  - CEM Pseudowire
  - Clock Recovery
  - BERT and BERT Patterns for:
    - T1
    - T3
    - OCX
    - STS
  - CEM over MPLS QoS

- RSP-based Non-Intrusive Monitor Ports
- Support for Static MPLS Labels on Cisco RSP3 Module

For more information, see the CEM Generic Configuration Guide, Cisco IOS XE 17 (Cisco ASR 900 Series) .

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

  This guide covers the following information:

  - Introduction to the 48-Port T1/E1 CEM Interface Module—Provides basic information on interface module.
  - Supported Features and Configurations—Provides information on restrictions, configurations, and verification examples of supported features on interface module.
  - Monitoring the T1 or E1 Interface Module—Provides information on how features to monitor the interface module.
  - Troubleshooting the T1 or E1 Interface Module—Provides information on troubleshooting the interface module.
  - Additional References—Provides additional information about the interface module.

  For more information, see the 48-Port T1 or E1 CEM Interface Module Configuration Guide, Cisco IOS XE 17 (Cisco ASR 900 Series) .

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

  This guide covers the following information:

  - Introduction to the 48-Port T3/E3 CEM Interface Module—Provides basic information on interface module.
  - Supported Features and Configurations—Provides information on restrictions, configurations, and verification examples of supported features on interface module.
  - Monitoring the T1 or E1 Interface Module—Provides information on how features to monitor the interface module.
  - Troubleshooting the T1 or E1 Interface Module—Provides information on troubleshooting the interface module.
  - Providing Redundancy Support At the Interface Module—Provides information on providing redundancy support at the interface module.
  - Additional References—Provides conceptual information of STS-1 frame, STS-1 overhead, asynchronous mapping for T3 or E3 CEP, and alarms for T3 or E3 CEP.

  For more information, see the 48-Port T3/E3 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.