



## **Release Notes for Cisco ASR 900 Series Routers, Cisco IOS XE Dublin 17.11.x**

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# CHAPTER 1

## Introduction

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

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## Overview of Cisco ASR 900 Series Routers

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

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

## Cisco ASR 902 Router

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

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

## Cisco ASR 903 Router

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

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

## Cisco ASR 907 Router

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

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

## Cisco ASR 914 Router

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

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

## Feature Navigator

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

# Hardware Support

## Cisco ASR 902 Supported Interface Modules

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

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

| RSP                               | Interface Modules  | Part Numbers     | Slots |
|-----------------------------------|--|------------------|-------|
| A900-RSP2A-128<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) + 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 (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 <sup>1</sup> |
|                  | 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   |                  |

<sup>1</sup> 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-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: A900-RSP3C-400 Supported Interface Modules and Part Numbers**

| Supported Interface Modules                          | Part Numbers     | Slot |
|--|------------------|------|
| 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  |
| 8-port Gigabit Ethernet SFP Interface Module (8x1GE) | A900-IMA8S       | All  |

| Supported Interface Modules  | Part Numbers          | Slot                 |
|--|-----------------------|----------------------|
| 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 <sup>2</sup> |
| 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 <sup>3</sup><br><br><b>Note</b> To enable this IM on slot 0 or slot 1, do the following and reload the router:<br><br><pre>Router# configure t Router(config)# license feature service-offload enable</pre> |

<sup>2</sup> IM supports only one port of 100G with RSP3 as QSFP28 on Port 0 in both slots 4 and 5.

<sup>3</sup> 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.

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 <sup>4</sup> |
| 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 <sup>5</sup> |
| 8-Port 10 Gigabit Ethernet (8x10GE) SFP+ Interface Module with Conformal Coating                                   | <sup>6</sup> ASR900-IMA8ZCC | 0                |

<sup>4</sup> If you have a 1-port 10G IM in slot 0, then SFP combo may not be supported in slot 5.

<sup>5</sup> 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.

<sup>6</sup> 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 <sup>7</sup> |
|                  | 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 <sup>8</sup>   |
|            | 2x40G Interface module   | A900-IMA2F              | 3,4,7,8,11,12  |
|            | 8x10G Interface module   | A900-IMA8Z <sup>9</sup> | 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   |
|            | ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module  | A900-IMA1Z8S-CXMS       | 3, 7, 11 <sup>10</sup><br>4, 8, 12 <sup>11</sup><br>5, 9, 13, 15 <sup>12</sup><br><b>Note</b> To enable this IM on slot 0 or slot 1, do the following and reload the router:<br><br>Router# configure t<br>Router(config)#<br>license feature<br>service-offload<br>enable |
|            | 6-port E&M Module  | A900-IMA6EM             | All slots  |
|            | 4-port C37.94 Interface Module   | A900-IMA4C3794          | All slots  |

<sup>7</sup> 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.



- <sup>8</sup> 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.
- <sup>9</sup> Six IM slots are supported with various combinations but only five IM slots are functional at a time.
- <sup>10</sup> These slots are supported on 10G or 20G mode.
- <sup>11</sup> These slots are supported on 10G or 20G mode, only if the adjacent odd slots are empty.
- <sup>12</sup> These slots are supported on 10G mode.

## Cisco ASR 914 Supported Interface Modules

For information in interface modules supported, see [Cisco A900-RSP3C-400-W Supported Interface Modules](#).

## Feature Matrix

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

## Software Licensing Overview

The router offers the following base licenses:

- Metro Services
- Metro IP Services
- Metro Aggregation Services



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

### Smart Licensing

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

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

**Table 8: Cisco ASR 900 Software Licenses Feature Set**

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

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

The router offers the following additional feature licenses:

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




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**Note** These features require a software license to use.

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## 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 on 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 firmware 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 17.11.x Release

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

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



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

**Table 9: IM FPGA Versions for Ethernet Phase 3 IM**

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

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

| Category | Release              | 48-port T1/E1 CEM Interface Module FPGA (A900-IMA48D-C) | 48-port T3/E3 CEM Interface Module FPGA (A900-IMA48T-C) | 1-port OC-192 Interface Module + 8-port Low Rate Interface Module FPGA (A900-IMA8S1Z-CX) | 1-port OC-48/STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-port T3/E3 CEM Interface Module (A900-IMA3G-IMSG) | ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (A900-IMA1Z8S-CXMS) |
|----------|----------------------|---|---|--|--|---|
| IM FPGA  | Cisco IOS XE 17.11.1 | 1.22  | 1.22  | 1.15   | 2.00   | 0.95  |
| CEM FPGA |                      | 7.0   | 5.6   | 5G mode: 6.5<br>10G mode: 7.9  | 9.3  | 10G mode: 7.4<br>20G mode: 7.5  |
| IM FPGA  | Cisco IOS XE 17.10.1 | 1.22  | 1.22  | 1.15   | 2.00   | 0.95  |
| CEM FPGA |                      | 6.0   | 5.2   | 5G mode: 6.5<br>10G mode: 7.9  | 9.3  | 10G mode: 7.3<br>20G mode: 7.3  |
| IM FPGA  | Cisco IOS XE 17.9.2  | 1.22  | 1.22  | 1.15   | 2.00   | 0.95  |
| CEM FPGA |                      | 6.0   | 5.2   | 5G mode: 6.5<br>10G mode: 7.9  | 9.1  | 10G mode: 7.2<br>20G mode: 7.2  |
| IM FPGA  | Cisco IOS XE 17.9.1  | 1.22  | 1.22  | 1.15   | 2.00   | 0.95  |
| CEM FPGA |                      | 6.0   | 5.2   | 5G mode: 6.5<br>10G mode: 7.9  | 9.1  | 10G mode: 7.2<br>20G mode: 7.2  |
| IM FPGA  | Cisco IOS XE 17.8.1  | 1.22  | 1.22  | 1.15   | 2.00   | 0.93  |
| CEM FPGA |                      | 6.0   | 5.2   | 5G mode: 6.5<br>10G mode: 7.9  | 9.0  | 10G mode: 7.0<br>20G mode: 6.0  |
| IM FPGA  | Cisco IOS XE 17.7.1  | 1.22  | 1.22  | 1.15   | 2.00   | 0.93  |
| CEM FPGA |                      | 0x52110052  | 0x52510052  | 5G mode:<br>0x10090065<br><br>10G mode:<br>0x10070079                                    | 0x10030076   | 10G mode: 0x10290051<br><br>20G mode: 0x10290051  |
| IM FPGA  | Cisco IOS XE 17.6.1  | 1.22  | 1.22  | 1.15   | 2.00   | 0.93  |
| CEM FPGA |                      | 0x52110052  | 0x52520052  | 5G mode:<br>0x10090065<br><br>10G mode:<br>0x10070079                                    | 0x10030076   | 10G mode: 0x10290051<br><br>20G mode: 0x10290051  |

| Category | Release             | 48-port T1/E1 CEM Interface Module FPGA (A900-IMA48D-C) | 48-port T3/E3 CEM Interface Module FPGA (A900-IMA48T-C) | 1-port OC-192 Interface Module + 8-port Low Rate Interface Module FPGA (A900-IMA8S1Z-CX) | 1-port OC-48/STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-port T3/E3 CEM Interface Module (A900-IMA3G-IMSG) | ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (A900-IMA1ZS-CXMS) |
|----------|---------------------|---|---|--|--|--|
| IM FPGA  | Cisco IOS XE 17.5.1 | 1.22  | 1.22  | 1.15   | 2.00   | 0.93   |
| CEM FPGA |                     | 0x52050052  | 0x52420052  | 5G mode:<br>0x10210063<br><br>10G mode:<br>0x10530078                                    | 0x10020076   | 10G mode:<br>0x10090051<br><br>20G mode:<br>0x10090051   |

Table 11: FPGA, HoFPGA, and ROMMON Versions for Cisco IOS XE 17.11.1 Release

| Platform  | Interface Module | FPGA Current Version | FPGA Minimum Required Version | RSP HoFPGA Active | RSP HoFPGA Standby | ROMMON     |
|-----------|------------------|----------------------|-------------------------------|-------------------|--------------------|------------|
| RSP2-128  | A900-IMA2Z       | 69.24                | 69.24                         | 0X00030011        | 0X00030011         | 15.6(54r)S |
|           | A900-IMA8S       | 0.75                 | 0.75                          |                   |                    |            |
|           | A900-IMA8T1Z     | 69.32                | 69.32                         |                   |                    |            |
| RSP3-400S | A900-IMA1C       | 0.20                 | 0.20                          | 40035             | 40035              | 15.6(57r)S |
|           | A900-IMA8Z       | 0.22                 | 0.21                          |                   |                    |            |
|           | A900-IMA8S1Z     | 69.32                | 69.32                         |                   |                    |            |
| RSP3-400W | A900-IMA1C       | 0.20                 | 0.20                          | 20040034          | 20040034           | 15.6(57r)S |
|           | A900-IMA2Z       | 69.24                | 69.24                         |                   |                    |            |

## MIB Support

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

Table 12: Supported MIBs

| Supported MIBs                  |                              |                             |
|---------------------------------|------------------------------|-----------------------------|
| BGP4-MIB (RFC 1657)             | CISCO-IMAGE-LICENSE-MGMT-MIB | MPLS-LDP-STD-MIB (RFC 3815) |
| CISCO-BGP-POLICY-ACCOUNTING-MIB | CISCO-IMAGE-MIB              | MPLS-LSR-STD-MIB (RFC 3813) |
| CISCO-BGP4-MIB                  | CISCO-IPMROUTE-MIB           | MPLS-TP-MIB                 |

|                                 |                                     |                                    |
|---------------------------------|-------------------------------------|------------------------------------|
| CISCO-BULK-FILE-MIB             | CISCO-LICENSE-MGMT-MIB              | MSDP-MIB                           |
| CISCO-CBP-TARGET-MIB            | CISCO-MVPN-MIB                      | NOTIFICATION-LOG-MIB (RFC 3014)    |
| CISCO-CDP-MIB                   | CISCO-NETSYNC-MIB                   | OSPF-MIB (RFC 1850)                |
| CISCO-CEF-MIB                   | CISCO-OSPF-MIB                      | OSPF-TRAP-MIB (RFC 1850)           |
| CISCO-CLASS-BASED-QOS-MIB       | CISCO-OSPF-TRAP-MIB                 | PIM-MIB (RFC 2934)                 |
| CISCO-CONFIG-COPY-MIB           | CISCO-PIM-MIB                       | RFC1213-MIB                        |
| CISCO-CONFIG-MAN-MIB            | CISCO-PROCESS-MIB                   | RFC2982-MIB                        |
| CISCO-DATA-COLLECTION-MIB       | CISCO-PRODUCTS-MIB                  | RMON-MIB (RFC 1757)                |
| CISCO-EMBEDDED-EVENT-MGRMIB     | CISCO-PTP-MIB                       | RSVP-MIB                           |
| CISCO-ENHANCED-MEMPOOL-MIB      | CISCO-RF-MIB                        | SNMP-COMMUNITY-MIB (RFC 2576)      |
| CISCO-ENTITY-ALARM-MIB          | CISCO-RTTMON-MIB                    | SNMP-FRAMEWORK-MIB (RFC 2571)      |
| CISCO-ENTITY-EXT-MIB            | CISCO-SONET-MIB                     | SNMP-MPD-MIB (RFC 2572)            |
| CISCO-ENTITY-FRU-CONTROLMIB     | CISCO-SYSLOG-MIB                    | SNMP-NOTIFICATION-MIB (RFC 2573)   |
| CISCO-ENTITY-SENSOR-MIB         | DS1-MIB (RFC 2495)                  | SNMP-PROXY-MIB (RFC 2573)          |
| CISCO-ENTITY-VENDORTYPE-OID-MIB | ENTITY-MIB (RFC 4133)               | SNMP-TARGET-MIB (RFC 2573)         |
| CISCO-FLASH-MIB                 | ENTITY-SENSOR-MIB (RFC 3433)        | SNMP-USM-MIB (RFC 2574)            |
| CISCO-FTP-CLIENT-MIB            | ENTITY-STATE-MIB                    | SNMPv2-MIB (RFC 1907)              |
| CISCO-IETF-ISIS-MIB             | EVENT-MIB (RFC 2981)                | SNMPv2-SMI                         |
| CISCO-IETF-PW-ATM-MIB           | ETHERLIKE-MIB (RFC 3635)            | SNMP-VIEW-BASED-ACM-MIB (RFC 2575) |
| CISCO-IETF-PW-ENET-MIB          | IF-MIB (RFC 2863)                   | SONET-MIB                          |
| CISCO-IETF-PW-MIB               | IGMP-STD-MIB (RFC 2933)             | TCP-MIB (RFC 4022)                 |
| CISCO-IETF-PW-MPLS-MIB          | IP-FORWARD-MIB                      | TUNNEL-MIB (RFC 4087)              |
| CISCO-IETF-PW-TDM-MIB           | IP-MIB (RFC 4293)                   | UDP-MIB (RFC 4113)                 |
| CISCO-IF-EXTENSION-MIB          | IPMROUTE-STD-MIB (RFC 2932)         | CISCO-FRAME-RELAY-MIB              |
| CISCO-IGMP-FILTER-MIB           | MPLS-LDP-GENERIC-STD-MIB (RFC 3815) | IF-MIB                             |
| CISCO-AAA-SERVER-MIB            | —                                   | —                                  |

Table 13: Unverified MIBs

| Unverified MIBs                 |                                       |                                    |
|---------------------------------|---------------------------------------|------------------------------------|
| ATM-MIB                         | CISCO-IETF-DHCP-SERVER-EXT-MIB        | EXPRESSION-MIB                     |
| CISCO-ATM-EXT-MIB               | —                                     | HC-ALARM-MIB                       |
| CISCO-ATM-IF-MIB                | CISCO-IETF-PPVPN-MPLS-VPN-MIB         | HC-RMON-MIB                        |
| CISCO-ATM-PVC-MIB               | CISCO-IP-STAT-MIB                     | IEEE8021-CFM-MIB                   |
| CISCO-ATM-PVCTRAP-EXTN-MIB      | CISCO-IPSLA-ETHERNET-MIB              | IEEE8021-CFM-V2-MIB                |
| CISCO-BCP-MIB                   | CISCO-L2-CONTROL-MIB                  | IEEE8023-LAG-MIB                   |
| CISCO-CALLHOME-MIB              | CISCO-LAG-MIB                         | INT-SERV-GUARANTEED-MIB            |
| CISCO-CIRCUIT-INTERFACE-MIB     | CISCO-MAC-NOTIFICATION-MIB            | INTEGRATED-SERVICES-MIB            |
| CISCO-CONTEXT-MAPPING-MIB       | CISCO-MEMORY-POOL-MIB                 | MPLS-L3VPN-STD-MIB<br>(RFC 4382)   |
| CISCO-EIGRP-MIB                 | CISCO-NHRP-EXT-MIB                    | MPLS-LDP-ATM-STD-MIB<br>(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](http://www.cisco.com/c/en/us/td/docs/wireless/asr_900/mib/guide/asr903mib.html)

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

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

## Additional References

### Product Information

- [Cisco ASR 900 Series Aggregation Services Routers Data Sheets](#)

### Hardware Installation Guides

- [Cisco ASR 900 Series Aggregation Services Routers Hardware Guides](#)

### Software Configuration Guides

- [Cisco ASR 900 Series Aggregation Services Routers Configuration Guides](#)

### Regulatory Compliance and Safety Information

- [Regulatory Compliance and Safety Information for the Cisco ASR 900 Series Aggregation Services Routers](#)

### Field Notices and Bulletins

- Field Notices—We recommend that you view the field notices for this release to determine whether your software or hardware platforms are affected. You can find field notices at [http://www.cisco.com/en/US/support/tsd\\_products\\_field\\_notice\\_summary.html](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](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](mailto: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](mailto:accessibility@cisco.com).

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

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





## CHAPTER 2

# What's New for Cisco IOS XE Dublin 17.11.x

- [What's New in Hardware for Cisco IOS XE Dublin 17.11.1a, on page 21](#)
- [What's New in Software for Cisco IOS XE Dublin 17.11.1a, on page 21](#)

## What's New in Hardware for Cisco IOS XE Dublin 17.11.1a

There are no new features in this release.

## What's New in Software for Cisco IOS XE Dublin 17.11.1a

| Feature                           | Description   |
|-----------------------------------|---|
| CEM                               |   |
| Support for 3-in-24 BERT Patterns | Support for 3-in-24 BERT patterns on the following interfaces modules and mode: <ul style="list-style-type: none"><li>• <a href="#">48-port T1 or E1 interface module</a></li><li>• <a href="#">48-port T3 or E3 interface module</a></li><li>• <a href="#">1-Port OC-48 or 4-Port OC-12/OC-3 CEM Interface Module</a></li><li>• <a href="#">ASR 900 Combo 8-Port SFP GE and 1-Port 10 GE 20G Interface Module</a></li><li>• <a href="#">STS-1 mode</a></li></ul> |

| Feature   | Description  |
|---|--|
| <a href="#">System CESoP NxDS0 BERT</a>                       | <p>You can configure BERT patterns at the DS0 level on the following interface modules for both the system and line directions.</p> <ul style="list-style-type: none"> <li>• 48-Port T1 or E1 CEM interface module</li> <li>• 48-Port T3 or E3 CEM interface module</li> <li>• 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</li> <li>• ASR 900 Combo 8-port SFP GE and 1-port 10 GE 20G interface module</li> </ul> <p>You can configure speed with bandwidth of 56 kbps or 64 kbps along with the BERT pattern.</p> <p>With DS0 level BERT configuration, you can verify the end-to-end connectivity.</p>                               |
| <a href="#">Frame Relay Port Mode</a>                         | <p>Frame Relay (FR) port mode provides transport between two Provider Edge (PE) devices, where the complete FR frame is transported using the same encapsulation configured for the HDLC or FR pseudowire. On the PE device, the multiple FR Virtual Circuits (VCs) are carried over a single interface and the traffic is passed into a single transparent HDLC or FR pseudowire in an MPLS network. Thus with port mode, there are many-to-one mappings between multiple FR VCs and a pseudowire in a secure manner.</p> <p>You can configure HDLC or FR port mode on the following interface modules:</p> <ul style="list-style-type: none"> <li>• A900-IMA3G-IMSG and A900-IMA1Z8S-CXMS</li> </ul> |
| Layer 3 Termination for Frame Relay and Multilink Frame Relay | <p>You can configure layer 3 termination on the Frame Relay (FR) and Multilink Frame Relay (MFR) sub interfaces for the following interface modules:</p> <ul style="list-style-type: none"> <li>• A900-IMA3G-IMSG and A900-IMA1Z8S-CXMS</li> </ul> <p>You can assign IP address on the FR or MFR sub interface and terminate the Layer 3 traffic where ever required in the network.</p> <ul style="list-style-type: none"> <li>• <a href="#">Layer 3 Termination for Frame Relay</a></li> <li>• <a href="#">Multilink Frame Relay (MFR) Layer 3 Termination</a></li> </ul>  |
| <b>IP Routing: BFD</b>  |  |
| <a href="#">Micro BFD Support on Port Channel with EFPs</a>   | <p>A Micro Bidirectional Forwarding Detection (Micro-BFD) session can detect failures in member links of a port channel. You can now enable Micro-BFD sessions for a port channel on which Ethernet flow Point (EFP) or service instance is configured. This feature ensures that traffic is forwarded to a member link only when the micro-BFD session for that member link is in the UP state.</p> <p>As part of this feature, the <b>source-service-instance number</b> keyword has been added to the <b>port-channel bfd</b> command. The specified service instance provides the source IP address for the micro-BFD session.</p>   |
| <b>QoS</b>  |  |

| Feature   | Description   |
|---|---|
| <b>Timing and Synchronization</b>                       |   |
| <a href="#">NTP Support for IPv6 Networks</a>           | Network Time Protocol (NTP) synchronizes device clocks across networks to maintain system accuracy. In this release, NTP supports IPv6 multicast networks. The NTP server sends clock updates as multicast messages to the clients across IPv6 networks. As NTP packets are sent only to the intended clients, it reduces timing traffic in the network.  |
| <b>Programmability</b>                                  |   |
| <a href="#">gNMI Dial-Out Using gRPC Tunnel Service</a> | <p>This feature allows you to configure a network device (tunnel client) to register certain targets (preapproved services) with a gRPC tunnel server through the CLI. These targets are defined as ports on the network device.</p> <p>You can use the gRPC tunnel server to forward connections from external clients, such as gRPC Network Management Interface (gNMI)/gRPC Network Operations Interface (gNOI), to connect to the network device without establishing a direct connection.</p> <p>The following commands are introduced for the tunnel and target configurations respectively:</p> <ul style="list-style-type: none"> <li>• <b>gnxi grpctunnel destination</b> <i>server name</i></li> <li>• <b>gnxi grpctunnel target</b></li> </ul>   |
| <b>Software Activation</b>                              |   |
| <a href="#">No License Snapshot Support</a>             | License snapshot won't be generated starting from this release and the software relies only on the existing snapshot for any PAK license information.   |
| <b>Strong Crypto Algorithms</b>                         |   |
| Strong Crypto Algorithms                                | <p>We strongly recommend stronger cryptographic algorithms instead of weak cryptographic algorithms, such as RSA keys of less than 2048 bits, MD5 for authentication, DES, and 3DES for encryption. Soon, such weak algorithms will no longer be allowed by default. An explicit configuration is required to continue using such weak algorithms.</p> <p>For SNMP v3 users with weak cryptographic properties, the SNMP operations to the device will fail, resulting in loss of management access to device through SNMP. Similarly, if the RSA key pair is not updated to be at least 2048 bits for SSH, the SSH server will be disabled, resulting in loss of remote access to the device through SSH.</p> <p>For more information on how to migrate to stronger cryptographic algorithms for SNMP, see the Field Notice Number: <a href="#">FN72509</a>.</p> <p>For more information on how to migrate to stronger cryptographic algorithms for SSH, see Field Notice Number: <a href="#">FN72511</a>.</p> |
| <b>YANG</b>   |   |

| Feature  | Description  |
|--|--|
| YANG Support for show l2vpn atom vc detail Command | <p>The Cisco-IOS-XE-l2vpn-oper native model is a collection of YANG definitions for L2VPN services operational data. Additional leaves and lists are now supported in the following sensor path:</p> <p><b>Cisco-IOS-XE-l2vpn-oper/l2vpn-oper-data/l2vpn-services/l2vpn-atom-vc-info</b></p> <p>With this model, you can get detailed information, such as the L2VPN service name, service type, interface name, peer address, status, encapsulation type, virtual circuit ID, and packet information by using a NETCONF RPC.</p> <p>In earlier releases, you could perform this action by using the following CLI:</p> <p><b>show l2vpn atom vc detail</b></p> <p><b>Note</b> There is existing YANG support for the following related CLIs in the <b>Cisco-IOS-XE-l2vpn-oper</b> native model:</p> <ul style="list-style-type: none"> <li>• <b>show l2vpn service xconnect peer peer_id vcid vcid</b></li> <li>• <b>show l2vpn atom commands</b></li> </ul> <p>YANG Data Models—For the list of Cisco IOS XE YANG models available with this release, navigate to <a href="https://github.com/YangModels/yang/tree/main/vendor/cisco/xe">https://github.com/YangModels/yang/tree/main/vendor/cisco/xe</a>. Revision statements embedded in the YANG files indicate if there has been a model revision. The README.md file in the same GitHub location highlights changes that have been made in the release.</p> |



## 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.

- [Resolved Caveats - Cisco IOS XE Dublin 17.11.1a, on page 25](#)
- [Open Caveats - Cisco IOS XE Dublin 17.11.1a, on page 26](#)
- [Cisco Bug Search Tool, on page 27](#)

## Resolved Caveats - Cisco IOS XE Dublin 17.11.1a

| Identifier                 | Headline  |
|----------------------------|---|
| <a href="#">CSCwc80493</a> | APS - K2 byte not reflecting proper value during LRDI and LAIS conditions.                    |
| <a href="#">CSCwd87661</a> | Router Fan running at high speed and creating noise(Fan PID A903-FAN-H) - SW version 17.03.04 |
| <a href="#">CSCwd16666</a> | Ony in 3GMS OC3 port with network loop Bert pattern is not syncing                            |
| <a href="#">CSCwd40951</a> | Cem getting removed successfully even with wrong T1 number provided from same T3/E3           |
| <a href="#">CSCwd66728</a> | ASR903-RSP-3C - uea_mgr crash seen with uea_brcm_update_hw_stats                              |
| <a href="#">CSCwd38074</a> | Alarm reporting to IOS and L-bit propagation missing with STS-1E, CT-3, and E1 mode           |

| Identifier                 | Headline  |
|----------------------------|---|
| <a href="#">CSCwe19162</a> | ASR903:RSP3: After SSO: False Alarm on CNAAP  |
| <a href="#">CSCwd11926</a> | Need support for dual options in CLI for setting clock rate for x21                                   |
| <a href="#">CSCwd09785</a> | Overhead DCC tunnel pseudowire not working in port 8 of NCS4200-1T8S-10CS                             |
| <a href="#">CSCwc41115</a> | APS 1+1 Uni - Tx K2 to reflect Rx K1 channel number   |
| <a href="#">CSCwd28121</a> | STS-1E & CT-3;E1 loopback syslog and alarm reporting issues   |
| <a href="#">CSCwd28107</a> | RSP3: Bundle rommon version 15.6(57r)S to polaris_dev   |
| <a href="#">CSCwc65971</a> | RSP3: MPLS pseudowire - Incorrect label stack pushed to packet  |
| <a href="#">CSCwd05100</a> | IM booting up on unsupported slot   |
| <a href="#">CSCwd04198</a> | A900-IMASER14A/S: when configurations are pasted in a specific order, line config is missing          |
| <a href="#">CSCwd16099</a> | Not able to unconfigure channel-group under STS-48c when 192 STS are used                             |
| <a href="#">CSCwd26330</a> | IMA3G does not generate FEBE's when BPV, P-bit, C-bit error are detected on the T3 port               |
| <a href="#">CSCwd48164</a> | EVPN statd resource leak after protocol flaps   |
| <a href="#">CSCwd44817</a> | After router reload E1 framing gets changed to unframed in SDH VC12 mode with channe-group config     |
| <a href="#">CSCwc10211</a> | IMSG: Random VT's are down with LP_AIS due to Peer IMOIR with scale config with AU-4/tug-3/vc11-T1    |
| <a href="#">CSCwe13024</a> | ASR900-RSP2: All readings for Power supply unit reflect as zero though the unit is functional         |
| <a href="#">CSCwd67723</a> | In IMA32D/IMA8D card, sometimes change in E1 controller config(after ctrlr flap) results in IM reboot |
| <a href="#">CSCwd26357</a> | rs485 with half-duplex configuration when reloaded, it gets into default full-duplex mode             |
| <a href="#">CSCwd86980</a> | High traffic drop is observed on RPFO   |
| <a href="#">CSCwb68238</a> | CSPN SSH requirement  |

## Open Caveats - Cisco IOS XE Dublin 17.11.1a

| Identifier                 | Headline  |
|----------------------------|---|
| <a href="#">CSCwd88680</a> | High Convergence after Port channel member failure. |

| Identifier                 | Headline  |
|----------------------------|---|
| <a href="#">CSCwd05362</a> | Performance issue on router platform.                                   |
| <a href="#">CSCwe42290</a> | Netconf intermittent connection issue due to checksum issue.            |
| <a href="#">CSCwe34672</a> | High CPU on ptp_uea process.  |
| <a href="#">CSCwe33848</a> | RSP3: Micro-bfd failed when trunk EFP is configured on the port channel |

## Cisco Bug Search Tool

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







## CHAPTER 4

# Restrictions and Limitations



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

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

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

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

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

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

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

#### Packet Format

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

When these packets are received on the RSP3 module, the packets are not dropped, but the counters are not incremented.

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




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

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

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

As part of model validation for the Cisco IOS XE Amsterdam 17.3.1 release, "LEAFREF\_IDENTIFIER\_NOT\_FOUND" and "STRICT\_XPATH\_FUNCTIONS" error types are ignored.

- Test Access Port (TAP) is not supported when the iMSG VLAN handoff feature is enabled on the same node.
- Data Communication Channel (DCC) is not supported in the A900-IMA1Z8S-CXMS interface module for the Cisco IOS XE Cupertino 17.8.1 release.
- In RSP2 and RSP3 modules, during In-Service Software Upgrade (ISSU), interface modules undergo FPGA upgrade.

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

**Table 14: Impact on IM during ISSU and FPGA Upgrade**

| IM             | IM Version During ISSU  | Pre-ISSU FPGA Upgrade   | Post-ISSU Impact on IM              | FPGA Version post ISSU  |
|----------------|---|---|-------------------------------------|---|
| Phase 1        | Cisco IOS XE 17.3.x or earlier version to Cisco IOS XE 17.4.x | FPGA upgrade completes and IM starts after the reload process.<br>FPGA version (phase -1) - 0.47  | Traffic is impacted during upgrade. | 0.75  |
| Phases 1 and 2 | Version earlier to Cisco IOS XE 17.8.x                        | FPGA upgrade completes and IM starts after the reload process. <ul style="list-style-type: none"> <li>• FPGA version (Phase 1)— 0.47</li> <li>• FPGA version (Phase 2) <ul style="list-style-type: none"> <li>• A900IMA8Z-622</li> <li>• Combo IM: 69.24</li> </ul> </li> </ul> | Traffic is impacted during upgrade. | <ul style="list-style-type: none"> <li>• FPGA version (Phase 1)—0.75</li> <li>• FPGA version (Phase 2) <ul style="list-style-type: none"> <li>• A900IMA8Z-624</li> <li>• Combo IM: 69.32</li> </ul> </li> </ul> |
| Phase 1        | Cisco IOS XE 17.4.1 or later versions to Cisco IOS XE 17.8.1  | IM FPGA already upgraded with the latest version and reload is not required.  | Traffic is not impacted.            | 0.75  |

For more information on the FPGA versions, see [Supported FPGA, HoFPGA, and ROMMON Versions](#).

Refer the following table for supported IMs:

**Table 15: ASR 900 Supported Ethernet Interface Module**

| <b>Phase 1 IM</b> | <b>Phase 2 IM</b> | <b>Phase 3 IM</b> |
|-------------------|-------------------|-------------------|
| A900-IMA8S        | A900-IMA8S1Z      | A900-IMA8Z        |
| A900-IMA8T        | A900-IMA8T1Z      | A900-IMA2F        |
| A900-IMA1X        | A900-IMA2Z        | A900-IMA2C        |