

# Cisco ASR 900U Series Route Switch Processor

Centralized network timing. Control plane and data plane elements. The Cisco® ASR 900U Route Switch Processor (RSP) is the powerful centralized engine that provides these features and more for Cisco ASR 900U Series routers. The ASR 900U Series RSPs (Figure 1) address the requirements of a converged Wide Area Network (WAN), from Carrier Ethernet technologies to advanced services such as Multiprotocol Label Switching (MPLS). The Cisco ASR 900U Series Route Switch Processor 2 (RSP2A) helps Industrial Internet of Things (IIoT) network providers add innovative traffic management and intelligent packet-switching and routing features and continue to support mission-critical operation technology systems through circuit-oriented services.

## Product Overview

The Cisco ASR 900U Series RSP modules contain separate control plane and data plane components. These include the main control plane CPU for the Cisco IOS® Software operating system and platform control software. The data-plane packet processing and traffic management are performed by the Carrier Ethernet Application-Specific Integrated Circuit (ASIC).

Figure 1. Cisco ASR 902U and ASR 903U Route Switch Processor 2A



## Features and Benefits

| Feature                                 | Benefit  |
|---|--|
| <b>Carrier Ethernet ASIC</b>            | Delivers essential Carrier Ethernet technologies such as Hierarchical Quality of Service (HQoS), IPv4, IPv6, MPLS/FlexLSP, and Hierarchical Virtual Private LAN Services (HVPLS). It provides line-rate performance and incorporates innovative traffic management capabilities while providing intelligent packet switching and routing operations.   |
| <b>Service enhancement</b>              | Provides advanced per-traffic-class metering and offer bidirectional packet-count and byte-count statistics. The service offering is enhanced with Operations, Administration, and Maintenance (OAM) functionality that includes Layer 2 Connectivity Fault Management (CFM), IP Service-Level Agreements (IP SLAs) for Layer 3, and MPLS OAM.   |
| <b>Service scale</b>                    | Provides flexible service scalability in a small footprint delivering high performance and scale for point-to-point and multipoint services, accommodating the requirements from the most demanding wireline and wireless applications.  |
| <b>Clocking and timing services</b>     | Offers integrated support for the Global Navigation Satellite System (GNSS), Building Integrated Timing Supply (BITS), 10 MHz, 1 Pulse Per Second (1 PPS), and Time Of Day (TOD) interfaces, crucial functions required in a modern unified network. As the central system clocking and timing functions for the ASR 900U Series platform, the Cisco ASR 900U RSPs support Synchronous Ethernet (SyncE) and IEEE 1588-2008 and can act as the clock source for network clocking of Time-Division Multiplexing (TDM) and SDH/SONET interfaces.<br><br>The ASR 900U Series can act as an IEEE 1588-2008 ordinary clock, boundary clock, end-to-end transparent clock, and primary clock function in an IEEE 1588-2008 timing domain. |
| <b>High availability and modularity</b> | Delivers optional intrachassis hardware redundancy for all hardware components and supports software redundancy with In-Service Software Upgrade (ISSU) support when a pair of route switch processors is inserted in the Cisco ASR 900U system chassis fully modular platform.<br><br>With two RSPs inserted in the Cisco ASR 903U, one RSP operates in active mode, and the other RSP operates in hot standby mode. The Cisco ASR 900U RSP is a Field-Replaceable Unit (FRU), and it can be Online Inserted and Removed (OIR) while the Cisco ASR 900U system is operating. The removal or failure of the active RSP in the Cisco ASR 900U system results in the automatic switchover to the standby RSP.                        |
| <b>Management interfaces</b>            | Contains the Out-Of-Band (OOB) management interfaces for the system. To offer flexible access to the router, a variety of interfaces are available for management access to the platform, including a dual-mode console port that functions as either a USB console or a serial console port.<br><br>In addition to the serial console access, the Cisco ASR 900U RSP contains an Ethernet management port that has no interaction with actual Carrier Ethernet ASIC traffic. In addition to the OOB control interfaces, a USB port can connect USB flash devices for loading Cisco IOS Software images and configurations on the platform.  |

## Fully Distributed and Unique Packet/Circuit Capabilities for Converged Access Networks

The Cisco ASR 902U/903U Route Switch Processor 2 (RSP2A) is compatible with the following interface modules:

- Cisco ASR 900 Series 1-Port 10GE XFP Module: Supports a single 10-Gigabit Ethernet Small Form-Factor Pluggable (XFP) port.
- Cisco ASR 900 Series 8-Port 1GE RJ45 Module: Supports eight copper RJ-45 Gigabit Ethernet ports.
- Cisco ASR 900 Series 8-Port 1GE SFP Module: Supports eight Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports.
- Cisco ASR 900 Series 14-Port Serial Module: Supports 14 serial ports. The 14 ports are composed of six 12-in-1 connectors with support for asynchronous RS-232 interfaces using EIA/TIA-232 DB-25 connectors and two 68-pin connectors, which support up to 8 RS-232 and RS-485 interfaces in full- or half-duplex mode using four RS-232 connectors (DB-25, DB-9, or RJ-45).
- Cisco ASR 900 Series 16-Port T1/E1 Module: Supports 16 T1 or E1 ports. The port type is software configurable per interface module. Mixing T1 and E1 ports on a single interface module is not supported.
- Cisco ASR 900 Series 4-Port OC3/STM1 or 1-Port OC12/STM4 Module: This combination module is designed to be software configurable in four modes: 4xOC-3, 4xSTM-1, 1xOC12, and 1xSTM-4. If the module is configured for 4xOC-3 or 4xSTM-1, then the individual interfaces can be configured to be clear channel, POS, or channelized in any combination. Support of these modes is software dependent as described in the Cisco IOS XE Software for Cisco ASR 900U Series Router data sheet.

- Cisco ASR 900 Series 2-Port 10GE XFP/SFP+ Module: This module supports two 10-Gigabit Ethernet ports. Each individual port can be used as either an XFP port or as a Small Form-Factor Pluggable Plus (SFP+) port.
- Cisco ASR 900U Series 8-Port 1GE RJ45 and 1-port 10GE SFP+ Module: Supports eight copper RJ-45 Gigabit Ethernet ports and one SFP+ port.
- Cisco ASR 900U Series 8-Port 1GE SFP and 1-port 10GE SFP+ Module: Supports eight Gigabit Ethernet SFP ports and one SFP+ port.
- Cisco ASR 900 Series 8-Port T1/E1 Module: Supports 8 T1 or E1 ports. The port type is software configurable per interface module. Mixing T1 and E1 ports on a single interface module is not supported.
- Cisco ASR 900 Series 32-Port T1/E1 Module: Supports 32 T1 or E1 ports. The port type is software configurable per interface module. Mixing T1 and E1 ports on a single interface module is not supported.
- Cisco ASR 900 Series 4-port C37.94 Interface Module: Supports four C37.94 ports.
- Cisco ASR 900 Series 6-port E&M Module: Supports six E&M interfaces.

The ASR 900U interface module support is dependent on the combination of the RSP, the chassis, software version, and the interface module slot. The Cisco ASR 900U Series interface modules datasheet at

<https://www.cisco.com/c/en/us/products/collateral/routers/asr-903-series-aggregation-services-routers/datasheet-c78-738338.html> contains the compatibility matrix for the various combinations.

## Industry-Leading, Carrier-Class Cisco IOS Software

The ASR 900U Series systems are supported in Cisco IOS XE Software. The Cisco IOS XE Software is designed to provide modular packaging, feature velocity, and powerful resiliency.

The Cisco IOS XE software provides scale and serviceability for service providers by:

- Supporting the complete set of Cisco IOS Software features for a consistent experience
- Scaling advanced service delivery without affecting system performance
- Integrating applications in the network, improving security, reliability, and simplicity
- Facilitating programmability for cloud service orchestration

The software support for the Cisco ASR 902U/903U Chassis and Cisco ASR 900U Series RSP2A was added in Cisco IOS XE Software Release 16.6.1.

## Product Specifications

Tables 1 through 4 list the product specifications and compliance information for the Cisco ASR 900U RSP modules. Individual modules are identified by product number.

**Table 1.** Cisco ASR 900U RSP Product Specifications

| Product ID   | A900U-RSP2A-64<br>A900U-RSP2A-128                      |
|--|--|
| <b>Power consumption of chassis with 2 power supplies, 1 fan tray, and 1 RSP</b> | A900U-RSP2A-64: 120W<br>A900U-RSP2A-128: 180W          |
| <b>RSP memory (DRAM)</b>   | 4 GB   |
| <b>Flash memory (storage)</b>  | 2 GB   |
| <b>Ethernet interface module compatibility<sup>1</sup></b>                       | A900-IMA1X<br>A900-IMA2Z<br>A900-IMA8S<br>A900-IMA8S1Z |

| Product ID  | A900U-RSP2A-64<br>A900U-RSP2A-128   |
|---|---|
| <b>TDM and ATM interface module compatibility<sup>1</sup></b> | A900-IMA8T<br>A900-IMA8T1Z<br>A900-IMA8D<br>A900-IMA16D<br>A900-IMA32D<br>A900-IMA4OS   |
| <b>IoT interface module compatibility<sup>1</sup></b>         | A900-IMASER14A/S<br>A900-IMA4C3794<br>A900-IMA6EM   |
| <b>Maximum Transmission Unit (MTU)</b>                        | <b>Configurable MTU of up to 9216 bytes, for bridging on Gigabit Ethernet, 10 and 100 Gigabit Ethernet</b>  |
| <b>Maximum interface throughput<sup>2</sup></b>               | A900-RSP2A-64: 64 Gbps<br>A900-RSP2A-128: 128 Gbps  |
| <b>IP version 4 performance</b>                               | A900U-RSP2A-64: 95 Mpps<br>A900U-RSP2A-128: 180 Mpps  |
| <b>IP version 6 performance</b>                               | A900U-RSP2A-64: 95 Mpps<br>A900U-RSP2A-128: 180 Mpps  |
| <b>Management ports</b>                                       | Copper 10/100/1000Base-T LAN management port - RJ45 connector port<br>Console/Aux RS232 serial ports - RJ45 connector port<br>Console - USB 2.0 type A receptacle connector port  |
| <b>Timing ports<sup>3</sup></b>                               | BITS simultaneous input and output (J1/T1/E1) - RJ48 connector port<br>1 pps input - mini-coax connector port<br>1 pps output - mini-coax connector port<br>2.048/10 MHz input - mini-coax connector port<br>2.048/10 MHz output - mini-coax connector port |
| <b>External USB flash memory</b>                              | <b>Mass storage - USB 2.0 type A receptacle connector port</b>  |
| <b>Shipment package size in inches (LxWxH)</b>                | 14.38x14.38x6.25  |
| <b>Shipment package weight</b>                                | 6.2 lbs.  |
| <b>MTBF at 104°F (40°C) operating temperature</b>             | 400,000 hours   |

<sup>1</sup> Interface module and protocol support is dependent on software version, RSP version, chassis, and slot number combinations. See release notes for more details.

<sup>2</sup> Higher combined interface bandwidth may be accepted in the router configuration, though beyond the maximum interface throughput the functionality of the router cannot be guaranteed. Oversubscription of RSP2 is not supported. See release notes for more details.

<sup>3</sup> J1 BITS clocking mode is dependent on software version and might only be supported in future software releases.

**Table 2.** Maximum Single-Dimensional Service Scale<sup>1,2,3,4</sup>

| Product ID                       | A900U-RSP2A-64<br>A900U-RSP2A-128 |
|----------------------------------|-----------------------------------|
| <b>MAC addresses</b>             | 16,000                            |
| <b>Bridge domains</b>            | 4,000                             |
| <b>Ethernet flow points</b>      | 3,998                             |
| <b>L3 interfaces</b>             | 1,000                             |
| <b>IPv4 routes</b>               | 20,000                            |
| <b>IPv6 routes</b>               | 4,000                             |
| <b>Multicast routes</b>          | 1,000                             |
| <b>MPLS VPN</b>                  | 128                               |
| <b>MPLS labels</b>               | 15,994                            |
| <b>EoMPLS tunnels per system</b> | 4,000                             |
| <b>VPLS instances</b>            | 2,000                             |
| <b>Queues</b>                    | A900U-RSP2A-64: 4,000             |

| Product ID                           | A900U-RSP2A-64<br>A900U-RSP2A-128  |
|--------------------------------------|--|
| Classifications                      | A900U-RSP2A-128: 8,000<br>A900U-RSP2A-64: 5,000<br>A900U-RSP2A-128: 10,000 |
| Ingress policers                     | A900U-RSP2A-64: 3,000<br>A900U-RSP2A-128: 6,000                            |
| Class maps                           | 1,000  |
| Queue counters (packet and byte)     | A900U-RSP2A-64: 4,000<br>A900U-RSP2A-128: 8,000                            |
| Policer counters (packet and byte)   | A900U-RSP2A-64: 9,000<br>A900U-RSP2A-128: 18,000                           |
| IPv4 ACL entries <sup>4</sup>        | 1,500  |
| BFD sessions                         | 1,000  |
| IEEE 802.1ag (CFM) at 3.3ms interval | 1,000  |

- <sup>1</sup> Not all services can be scaled at maximum scale concurrently (multidimensional service scale). The preceding numbers are unidirectional scale numbers.
- <sup>2</sup> The scale numbers are hardware capabilities. The actual scale might be limited in a specific software release and only become available in a future software release.
- <sup>3</sup> [Scale depends on switch device template used.](#)
- <sup>4</sup> Maximum 500 access control entries per ACL.

**Table 3.** Environmental Specifications

|   | Cisco ASR 900U Series System   |
|---|--|
| Operating environment and altitude <sup>1</sup> | -40 to 65°C operating temperature (DC operation, with the 900W or 1200W power supplies)<br>-40 to 65°C operating temperature (AC operation, with the 1200W power supplies)<br>-5 to 50°C operating temperature (AC operation, with the 550W power supplies)<br>-60 to 1800m operating altitude (for full operating temperature range)<br>Up to 4000m operating altitude (at up to 40°C temperature)  |
| Outside plant                                   | For an outside plant installation, it is required that the system be protected against airborne contaminants, dust, moisture, insects, pests, corrosive gases, polluted air, or other reactive elements present in the outside air. To achieve this level of protection, it is recommended that the unit be installed in a fully sealed enclosure. Examples of such cabinets include IP65 cabinets with heat exchanger complying with Telcordia GR487. |
| Relative humidity                               | 5 to 95%, noncondensing  |
| Acoustic noise <sup>2</sup>                     | Acoustic noise peak operation complies with Network Equipment Building Standards (NEBS) GR-63-Core Issue 4 sound power level of 78 dB at 27°C operation as measured by the ANSI S12.10/ISO 7779 NAIS noise measurement test standard.  |
| Storage environment                             | Temperature: -40 to 70°C altitude: 15,000 ft. (4570m)  |
| Seismic   | Zone 4   |
| Hazardous substances                            | Reduction of Hazardous Substances (ROHS) 6   |

- <sup>1</sup> Minimum temperature range of chassis, fan tray, RSP engine, power supply, optics, and interface modules will dictate the supported operating temperature range. Maximum cooling fan tray module is assumed.
- <sup>2</sup> The above values are for normal (nonfailure) operation. When operating with a fan failure, the above may be exceeded.

**Table 4.** Safety and Compliance

| Type            | Standards   |
|-----------------|---|
| Safety          | <ul style="list-style-type: none"> <li>UL 60950-1, 2<sup>nd</sup> edition</li> <li>CAN/CSA C22.2 No. 60950-1-07 2<sup>nd</sup> edition</li> <li>IEC 60950-1, 2<sup>nd</sup> edition</li> <li>EN 60950-1, 2<sup>nd</sup> edition</li> <li>AS/NZS 60950.1:2003</li> </ul> |
| Electromagnetic | <ul style="list-style-type: none"> <li>FCC CFR47 Part 15 Class A</li> </ul>   |

| Type  | Standards   |
|---|---|
| <b>Emissions compliance</b>                 | <ul style="list-style-type: none"> <li>• EN55022, class A</li> <li>• CISPR22, class A</li> <li>• ICES-003, class A</li> <li>• EN 300 386, class A</li> <li>• VCCI, class A</li> <li>• KN22, class A</li> <li>• EN61000-3-2 to EN61000-3-3</li> </ul>  |
| <b>Immunity compliance</b>                  | <ul style="list-style-type: none"> <li>• EN 300 386</li> <li>• EN 61000-6-1</li> <li>• EN 50082-1</li> <li>• CISPR24</li> <li>• EN 55024</li> <li>• KN 24</li> <li>• EN 50121-3-2, EN 50121-4</li> <li>• EN/KN 61000-4-2, -3, -4, -5, -6, -8, -11, -12, -16, -17, -29</li> </ul>  |
| <b>NEBS</b>                                 | <ul style="list-style-type: none"> <li>• GR-3108-CORE (Outside Plant)</li> <li>• GR-63-CORE</li> <li>• GR-1089-CORE</li> <li>• SR-3580 NEBS Level 3</li> </ul>  |
| <b>ETSI</b>                                 | <ul style="list-style-type: none"> <li>• ETS/EN 300 119 Part 4</li> <li>• ETS/EN 300 019 - Storage: Class 1.2, Transportation: Class 2.3, In-Use/Operational: Class 3.2</li> <li>• ETS/EN 300 753</li> </ul>  |
| <b>Network synchronization</b>              | <ul style="list-style-type: none"> <li>• GNSS</li> <li>• ANSI T1.101</li> <li>• GR-1244-CORE</li> <li>• GR-253-CORE</li> <li>• ITU-T G.813</li> <li>• ITU-T G.823</li> <li>• ITU-T G.824</li> <li>• ITU-T G.703 clause 5</li> <li>• ITU-T G.703 clause 9</li> <li>• ITU-T G.8261/Y.1361</li> <li>• ITU-T G.781</li> <li>• ITU-T G.8262</li> <li>• ITU-T G.8264</li> <li>• ITU-T G.8265.1</li> <li>• ITU-T G.8275.1</li> <li>• IEEE 1588-2008</li> </ul> |
| <b>Power utility compliance<sup>1</sup></b> | <ul style="list-style-type: none"> <li>• IEEE 1613 Class 2</li> <li>• IEC 61850-3</li> </ul>  |

<sup>1</sup> Consult your Cisco account team for more details.

## Ordering Information

Table 5 describes the Cisco IOS XE Software universal consolidated packages supported on the system, which include all Cisco IOS XE Software functionalities and features enabled. Table 6 lists the hardware parts available for Cisco ASR 900U RSP modules.

**Table 5.** Universal Cisco IOS XE Software Packages for Cisco ASR 900U RSP Modules

| Cisco IOS XE Consolidated Package                           | Part Number       | Description  |
|---|-------------------|--|
| Cisco ASR 900 RSP2 IOS XE UNIVERSAL - NO PAYLOAD ENCRYPTION | SASR900R2NPEK9166 | <ul style="list-style-type: none"> <li>• Provides a consolidated package</li> <li>• Offers complete Cisco IOS XE Software feature support</li> </ul> |

**Table 6.** Hardware Components for Cisco ASR 900U RSP modules

| Part Number                           | Description   |
|---------------------------------------|---|
| <b>A900U-RSP2A-64</b>                 | ASR 900U Route Switch Processor 2 - 64G, Base Scale         |
| <b>A900U-RSP2A-64=</b>                | ASR 900U Route Switch Processor 2 - 64G, Base Scale, spare  |
| <b>A900U-RSP2A-128</b>                | ASR 900U Route Switch Processor 2 - 128G, Base Scale        |
| <b>A900U-RSP2A-128=</b>               | ASR 900U Route Switch Processor 2 - 128G, Base Scale, spare |
| <b>Cisco ASR 900U RSP Accessories</b> |   |
| <b>A90X-RSPA-BLANK=</b>               | ASR 90X Route Switch Processor Type-A Blank Cover, spare    |
| <b>A90X-RSPB-BLANK=</b>               | ASR 90X Route Switch Processor Type-B Blank Cover, spare    |

## Warranty Information

Warranty information is available on Cisco.com at the [Product Warranties](#) page.

## Service and Support

Cisco offers a wide range of services programs to help accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, promoting high levels of customer satisfaction. Cisco Services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, refer to Cisco Technical Support Services or Cisco Advanced Services.

Cisco is committed to reducing your total cost of ownership. Cisco offers a portfolio of technical support services to help ensure that Cisco products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 7 are available as part of the Cisco Carrier Ethernet Switching Service and Support solution and are available directly from Cisco and through resellers.

**Table 7.** Service and Support

| Advanced Services  | Features   | Benefits  |
|--|--|---|
| <b>Cisco Total Implementation Solutions (TIS), available directly from Cisco</b><br><b>Cisco Packaged TIS, available through resellers</b>   | <ul style="list-style-type: none"> <li>Project management</li> <li>Site survey, configuration, and deployment</li> <li>Installation, test, and cutover</li> <li>Training</li> <li>Major moves, adds, and changes</li> <li>Design review and product staging</li> </ul> | <ul style="list-style-type: none"> <li>Supplement existing staff</li> <li>Help ensure functions meet needs</li> <li>Mitigate risk</li> </ul>  |
| <b>Cisco SP Base Support and Service Provider-Based Onsite Support, available directly from Cisco</b><br><b>Cisco Packaged Service Provider-Based Support, available through resellers</b> | <ul style="list-style-type: none"> <li>24-hour access to software updates</li> <li>Web access to technical repositories</li> <li>Telephone support through the Cisco Technical Assistance Center (TAC)</li> <li>Advance replacement of hardware parts</li> </ul>       | <ul style="list-style-type: none"> <li>Facilitate proactive or expedited problem resolution</li> <li>Lower total cost of ownership by taking advantage of Cisco expertise and knowledge</li> <li>Reduce network downtime</li> </ul> |

## Cisco Capital

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