Cisco ASR 903 Route Switch Processor 1

The Cisco® ASR 903 Route Switch Processor 1 (RSP1) is the powerful centralized network timing, control plane, and data plane engine that powers the Cisco ASR 903 Router (Figure 1). The Cisco ASR 903 RSP1 is designed to address the requirements of service provider converged networks.

Figure 1. Cisco ASR 903 Route Switch Processor 1

Route Switch Processor Features

The Cisco ASR 903 RSP1 module contains separate control plane and data plane components. The module contains the main control plane CPU for the Cisco IOS® XE operating system and platform control software. The data plane packet processing and traffic management is performed by the Cisco Carrier Ethernet application-specific integrated circuit (ASIC).

Cisco Carrier Ethernet ASIC

Powered by Cisco Carrier Ethernet ASIC and designed specifically for the needs of service providers, the Cisco ASR 903 Router delivers essential Carrier Ethernet technologies, including hierarchical quality of service (HQoS), IPv4, IPv6, Multiprotocol Label Switching (MPLS), and Hierarchical Virtual Private LAN Services (HVPLS). The ASIC provides line-rate performance and supports advanced services including access control list (ACL) and HQoS without affecting performance. This Carrier Ethernet ASIC incorporates innovative traffic management capabilities while providing intelligent packet switching and routing operations.

Service Enhancement

With the Cisco ASR 903 Router, each service is assigned enhanced QoS and security attributes. The ASR 903 Router accomplishes advanced per-traffic-class metering and offers 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 agreement (SLA) for Layer 3, and MPLS OAM.

Service Scale

The Cisco ASR 903 Router delivers flexible service scalability in a small footprint. This router delivers high performance and high scale for point-to-point and multipoint VPN services. The HQoS capabilities of the Cisco ASR 903 Router scale to eight queues per service, three levels of scheduling, and buffer sizes capable of accommodating today's most demanding wireline and wireless applications.

There are two versions of the Cisco ASR 903 RSP1, which provide the same capabilities and throughput, while differing in service scale. The differences in service scale are outlined in Table 4. Mixing of different-scale RSP versions in the same Cisco ASR 903 chassis is not supported.

Clocking and Timing Services

The Cisco ASR 903 Route Switch Processor 1 contains the central system clocking and timing functions for the Cisco ASR 903 platform, which are required in a modern unified backhaul network. The route switch processor offer integrated support for the Building Integrated Timing Supply (BITS), 10 MHz, 1 Pulse Per Second (1 PPS) and Time Of Day (TOD) interfaces. The Cisco ASR 903 Series platform also supports synchronous Ethernet (SyncE), IEEE 1588-2008 and can act as the clock source for network clocking of time-division multiplexing (TDM) and SDH/SONET interfaces.

The Cisco ASR 903 Series can act as a IEEE 1588-2008 Ordinary Clock, Boundary Clock, end to end Transparent Clock, and Master Clock function in an IEEE 1588-2008 timing domain.

High Availability and Modularity

The Cisco ASR 903 Router is a fully modular platform. The design of the router delivers optional intra-chassis hardware redundancy for all hardware components and supports software redundancy with In Service Software Upgrade (ISSU) support when a pair of route switch processors are inserted in the chassis.

With two RSPs inserted in the Cisco ASR 903 Router, one RSP operates in active mode and the other RSP operates in hot standby mode. The Cisco ASR 903 RSP1 is a field replaceable unit (FRU) and can be online inserted and removed (OIR) while the system is operating. The removal or failure of the active RSP results in the automatic switchover to the standby RSP.

Management Interfaces

The Cisco ASR 903 Route Switch Processor 1 contains the out of band (OOB) management interfaces for the system. To offer flexibility to access the router, there are a variety of interfaces for management access to the platform. This includes a dual-mode console port that functions as either a USB console or a serial console port. In addition to the serial console access, the Cisco ASR 903 RSP1 contains an Ethernet management port that has no interaction with the actual Carrier Ethernet ASIC traffic. In addition to the OOB control interfaces, there is an USB port to connect USB flash devices for loading Cisco IOS XE Software images and configurations on the platform.

Interface Module Compatibility

The Cisco ASR 903 Router has six interface module slots. There are two types of interface module slots. Four slots (slots 0 to 3) support all of the available interface modules. The remaining two slots (slots 4 and 5) support only the Gigabit Ethernet and TDM interface modules; the 10-Gigabit Ethernet modules are not supported in these slots. Interface Module Slot 5 is limited to a maximum of seven Gigabit Ethernet ports with the Cisco ASR 903 RSP1.

Ethernet Interface Modules and Multiservice Interface Modules

The ASR 903 RSP1 is compatible with the following interface modules.

- Cisco ASR 900 Series 1-Port 10GE XFP Interface Module: Supports a single 10-Gigabit Ethernet Small Form-Factor Pluggable (XFP) port.
- Cisco ASR 900 Series 8-Port Cu Gigabit Ethernet Interface Module: Supports eight Copper RJ-45 Gigabit Ethernet ports.
- Cisco ASR 900 Series 8-Port SFP Gigabit Ethernet Interface Module: Supports eight Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports.
- Cisco ASR 900 Series 14-Port Serial Interface Module: Supports 14 serial ports. The 14 ports are comprised 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 4 RS-232 connectors (DB-25, DB-9, or RJ-45).
- Cisco ASR 900 Series 16-Port T1/E1 Interface Module: Supports 16 T1 or E1 ports. The port type is software configurable per interface module; mixing of T1 and E1 ports on a single interface module is not supported.
- Cisco ASR 900 Series 4-Port OC3/STM-1 or 1-Port OC12/STM-4 Interface 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 903 Router data sheet.

Software

The Cisco ASR 903 Router is supported in Cisco IOS XE S Software, a modular operating system. Cisco IOS XE Software is designed to provide modular packaging, feature velocity, and powerful resiliency. The software supports Cisco software activation on the Cisco ASR 903 Router. Table 1 describes the two Cisco IOS XE universal consolidated packages supported on the router. The functionality is enforced through the appropriate technology package licenses. The available features and related licensing is described in the Cisco IOS XE Software for Cisco ASR 903 Router data sheet.

Table 1. Universal Cisco IOS XE Software Consolidated Packages for Cisco ASR 903 RSP1

Cisco IOS XE Consolidated Package	Part Number	Description
Cisco ASR 903 Series RSP1 IOS XE Universal	SASR903R1U	• Provides a consolidated software package • Satisfies export requirements for non-cryptographic software
Cisco ASR 903 Series RSP1 IOS XE - No Payload Encryption	SASR903R1NPEK9	• Provides a consolidated software package • Includes SSH and SNMPv3 support

Table 2 lists the hardware parts available for Cisco ASR 903 RSP1.

Table 2. Hardware Components for Cisco ASR 903 RSP1

Part Number	Description
A903-RSP1A-55	ASR 903 Route Switch Processor 1, Base Scale
A903-RSP1A-55=	ASR 903 Route Switch Processor 1, Base Scale, Spare
A903-RSP1B-55	ASR 903 Route Switch Processor 1, Large Scale
A903-RSP1B-55=	ASR 903 Route Switch Processor 1, Large Scale, Spare
Cisco ASR 903 Accessories	
A903-RSPA-BLANK=	ASR 903 Route Switch Processor Type-A Blank Cover, Spare

Product Specifications

Tables 3 through 6 list the product specifications and compliance information for the Cisco ASR 903 Route Switch Processor 1.

Table 3. Cisco ASR 903 Router System Specifications

Description	A903-RSP1A-55	A903-RSP1B-55
Power consumption of chassis with 2 power supplies, 1 fan tray and 1 RSP	195W	210W
Power consumption of standby RSP	100W	100W
RSP memory	2 GB	4 GB
Service scale[1]	Base service scale	Large service scale
Ethernet interface module compatibility	A900-IMA1X A900-IMA8S A900-IMA8T	
TDM and ATM interface module compatibility	A900-IMA16D A900-IMA4OS A900-IMASER14A/S	
Maximum transmission unit (MTU)	Configurable MTU of up to 9216 bytes, for bridging on Gigabit Ethernet and 10 Gigabit Ethernet	
IP version 4 performance	65 Mpps	
IP version 6 performance	65 Mpps	
Management ports[2]	Copper 10/100/1000Base-T LAN management port - RJ45 connector port Console/Aux RS232 serial ports - RJ45 connector port Console - USB 2.0 type A receptacle connector port	
Timing ports	BITS simultaneous input and output (T1/E1) - RJ48 connector port 1PPS input - mini-coax connector port 1PPS output - mini-coax connector port 2.048/10MHz input - mini-coax connector port 2.048/10MHz output - mini-coax connector port	
External USB flash memory	Mass storage - USB 2.0 type A receptacle connector port	

1. Detailed service scale differences for the main functions is listed in Table 4.
2. At one moment in time either the USB console port or the RS232 Serial Console/Aux port can be active. These ports cannot be active concurrently.

Table 4. Maximum Single-Dimensional Service Scale[1, 2]

Description	A903-RSP1A-55	A903-RSP1B-55
MAC addresses	16,000	256,000
Bridge domains	4,000	4,000
Ethernet flow points	4,000	8,000
L3 interfaces	256	1,000
IPv4 routes	20,000	80,000
IPv6 routes	6,000	40,000
Multicast routes	1,000	8,000
MPLS VPN	128	1,000
MPLS labels	15,994	64,000
EoMPLS tunnels per system	2,000	8,000
VPLS instances	2,000	2,000
Queues	4,000	32,000
Classifications	5,000	24,000
Ingress policers	2,000	16,000
Class maps	1,000	4,000
Queue counters (packet and byte)	4,000	128,000
Policer counters (packet and byte)	6,000	96,000
IPv4 ACL entries[3]	1,500	16,000

1. Not all services can be scaled at maximum scale concurrently (multidirectional service scale), above numbers are unidirectional scale numbers.
2. The scale numbers are hardware capabilities. The actual scale may be limited in a specific software release and only become available in a future software release.
3. Maximum 500 access control entries per ACL.

Table 5. Environmental Specifications

Description	Cisco ASR 903 Router
Operating environment and altitude	-40ºC to 65ºC operating temperature (DC operation) -60m to 1800m operating altitude (for full operating temperature range) Up to 4000m operating altitude (at up to +40ºC temperature)
Relative humidity	5% to 95%, noncondensing
Acoustic noise[1]	Acoustic noise peak operation maximum 55 dBA sound pressure level, bystander position for rack mount products at 20ºC operation as measured by ISO 7779 NAIS noise measurement test standard Acoustic noise peak operation compliant to the Network Equipment Building Standards (NEBS) GR-63-Core Issue 3 sound power level of 78dB at 27ºC operation as measured by the ANSI S12.10/ISO 7779 NAIS noise measurement test standard
Storage environment	Temperature: -40 to +70ºC Altitude: 15,000ft (4570m)
Seismic	Zone 4

1. The above are for normal (nonfailure) operation. When operating with a fan failure, the above may be exceeded.

Table 6. Safety and Compliance

Type	Standards
Safety	• UL 60950-1, 2nd edition • CAN/CSA C22.2 No. 60950-1-07 2nd edition • IEC 60950-1, 2nd edition • EN 60950-1, 2nd edition • AS/NZS 60950.1:2003
Electromagnetic	• FCC CFR47 Part 15 Class A
Emissions compliance	• EN55022, class A • CISPR22, class A • ICES-003, class A • EN 300 386, class A • VCCI, class A • KN22, class A • EN61000-3-2 to EN61000-3-3
Immunity compliance	• EN 300 386 • EN 61000-6-1 • EN 50082-1 • CISPR24 • EN 55024 • KN 24 • EN 50121-4 • EN/KN 61000-4-2 to EN/KN 61000-4-6 • EN/KN 61000-4-8 • EN/KN 61000-4-11
NEBS[1]	• GR-63-CORE Issue 3 • GR-1089-CORE Issue 5 • SR-3580 NEBS Level 3
ETSI	• ETS/EN 300 119 Part 4 • ETS/EN 300 019 - Storage: Class 1.2, Transportation: Class 2.3, In-Use/Operational: Class 3.2 • ETS/EN 300 753
Network synchronization	• ANSI T1.101 • GR-1244-CORE • GR-253-CORE • ITU-T G.813 • ITU-T G.823 • ITU-T G.824 • ITU-T G.703 clause 5 • ITU-T G.703 clause 9 • ITU-T G.8261/Y.1361 • ITU-T G.781 • ITU-T G.8262 • ITU-T G.8264 • IEEE1588-2008

[1]. Notable exceptions: Fans do not have filters, and all cabling is provided through the front panel.

Warranty Information

Find warranty information on Cisco.com at the Product Warranties page.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in 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 minimizing 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
Cisco Total Implementation Solutions (TIS), available directly from Cisco Cisco Packaged TIS, available through resellers	• Project management • Site survey, configuration, and deployment • Installation, text, and cutover • Training • Major moves, adds, and changes • Design review and product staging	• Supplement existing staff • Help ensure functions meet needs • Mitigate risk
Cisco SP Base Support and Service Provider-Based Onsite Support, available directly from Cisco Cisco Packaged Service Provider- Based Support, available through resellers	• 24-hour access to software updates • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance Replacement of hardware parts	• Facilitate proactive or expedited problem resolution • Lower total cost of ownership by taking advantage of Cisco expertise and knowledge • Minimize network downtime

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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