Cisco ASR 900 Series Aggregation Services Routers

Cisco® ASR 900 Series Aggregation Services Routers are full-featured, modular aggregation platforms. They're designed for the cost-effective delivery of converged mobile, residential, and business services. You get redundancy, a shallow depth, low power consumption, and high service scale in routers packed with useful features and optimized for small aggregation and remote Point-of-Presence (POP) applications.

The Cisco ASR 902 Router, Cisco ASR 903 Router, and Cisco ASR 907/914 Router (Figure 1) provide a comprehensive and scalable feature set, supporting Layer 2 VPN (L2VPN) and Layer 3 VPN (L3VPN) services in compact designs.

Figure 1. Cisco ASR 903 Router, ASR 902 Router, and ASR 907 Router

Major applications

Broadband aggregation

The modular Cisco ASR 900 Series router supports broadband aggregation for delivering "any-play" services (voice, video, data, and mobility). Designed to support thousands of subscribers, the ASR 900 Series includes Quality of Service (QoS) features that allow the routers to scale to a large number of queues per device. Combined with a highly granular, three-level hierarchical QoS algorithm, a large number of queues can result in a greatly enhanced broadband user experience. This full-featured Layer 2 and Layer 3 router supports a variety of broadband applications, including IPTV and Video on Demand (VoD), enhancing and extending the Cisco Evolved Programmable Network architecture.

Preaggregation for mobile applications

Deployed as a preaggregation platform for mobile backhaul, the ASR 900 Series router can aggregate cell sites and use Multiprotocol Label Switching (MPLS) as a transport for Radio Access Network (RAN) backhaul traffic. It also provides the timing services required in today's converged access networks by offering integrated support for the Building Integrated Timing Supply (BITS), 10 MHz, 1 Pulse Per Second (1PPS), and Time Of Day (TOD) interfaces. The router also supports Synchronous Ethernet (SyncE) and IEEE-1588, and it can act as the source for network clocking for Time-Division Multiplexing (TDM), Synchronous Digital Hierarchy (SDH), Synchronous Optical Network (SONET), Synchronous Ethernet (SyncE), and Global Positioning System (GPS) interfaces. In addition, the ASR 900 Series router can be deployed in small and rugged environments, due to its shallow depth and qualification for extended temperature ranges.

Metro Ethernet aggregation

The ASR 900 Series router is built to meet service provider requirements for Carrier Ethernet aggregation. It is optimized for remote central office and smaller aggregation sites where a full-featured, modular, small-footprint, and fully redundant aggregation platform is needed. This router offers service flexibility and delivers Layer 2, IP, and MPLS transport for advanced L2VPN, L3VPN, and multicast services.

Major differentiators

The ASR 900 Series router helps service providers deliver advanced services for residential broadband, mobile, and Metro Ethernet applications. This allows an operator to provide differentiated and cost-effective services to end users.

Flexible deployment options

The ASR 900 Series router is designed with a compact form factor to accommodate deployment in small spaces. Available with a range of mounting options, the router can be deployed in space-constrained locations such as ETSI 300-mm deep cabinets. The side-to-side airflow design allows two Cisco ASR 900 Series routers to be mounted back-to-back in a 600-mm cabinet, while the extended temperature range supported by the router allows it to be deployed in locations with minimum environmental control. Small footprint and extended temperature range support allow service providers to extend the reach of their Carrier Ethernet networks to more challenging and remote locations, yet save money on air conditioning.

High availability and modularity

The ASR 900 Series router is a modular platform. Cisco offers a choice of multiple distinct Route Switch Processors (RSPs), AC and DC power supplies, a fan tray, and a wide range of interface modules. The Ethernet interfaces are available in copper and fiber, with speeds ranging from 10 Mbps to 100 Gbps. The legacy interfaces are available in speeds ranging from nxDS0 to OC-12/STM-4 for Plesiochronous Digital Hierarchy (PDH), SDH, and SONET. The interface modules, power supplies, and fan tray are all field replaceable.

The design of the Cisco ASR 907 and ASR 903 routers delivers in-box hardware redundancy and supports software redundancy with In-Service Software Upgrade (ISSU) support when a pair of route switch processors is inserted in the chassis.

Operational efficiency

The ASR 900 Series router features essential capabilities that help service providers simplify and automate the management of their networks, promoting efficiency gains in the deployment and operation of the networks. The router provides proactive diagnostic tools including Generic Online Diagnostics (GOLD) which help service providers avoid potential problems before they occur, troubleshoot any problems, and implement solutions when problems are diagnosed.

System design

The ASR 900 Series routers are built as fully modular systems with a future-ready design. The router chassis supports online field replacement and upgrades of all components. The Cisco ASR 907 Router is designed to contain one fan tray, up to three power supplies, two Route Switch Processor (RSP) cards, and up to 16 interface module cards. The Cisco ASR 903 Router is designed to contain one fan tray, two power supplies, two RSP cards, and up to six interface module cards. The ASR 902 Router uses the same design as the ASR 903 Router, but due to its smaller size, it has four interface module cards and one RSP card. All components support online replacement and field upgrades, with the exception of the RSP card on the ASR 902 Router, which requires the system to be brought down for a replacement or upgrade.

Fan tray

ASR 900 Series routers have a single fan tray slot, which must be populated for the system to operate. The fan tray contains redundant fans. The systems continue to operate on a single fan failure. The systems have been designed to remain operational during the replacement of the fan tray. The duration of the fan tray replacement has a hard time limit imposed on reinsertion of the fan tray depending on the system's ambient temperature. In addition to cooling the chassis, the fan tray also contains a connector for dry-contact inputs and several system-level alarm LEDs.

The A902-FAN-E, A903-FAN-E, and A907-FAN-E modules all support an optional field-serviceable dust filter. The dust filter space of the A903-FAN-E and A902-FAN-E fan trays reduces their respective cooling capacity. This can result in a smaller operating temperature range for the total system, especially in combination with RSP3C and interface modules with more than 40G throughput capacity. Consult your account team for more details.

Power supply

A variety of AC and DC power supplies are available for ASR 900 Series routers. Depending on the system module configuration of a larger capacity power supply might be needed. The system supports operation on a single power supply, while two or more power supplies will function in a load-share configuration. Mixing of AC and DC power supplies in a single operational chassis is supported.

Route Switch Processor

The Cisco ASR 900 Route Switch Processor (RSP) is the centralized card in the system performing the data-plane, network-timing, and control-plane functions for the system.

The RSP engine form factor of the Cisco ASR 902 and ASR 903 routers is identical and can be moved between these two chassis types. However, the form factor of the Cisco ASR 907 RSP engine is different and can currently not be shared across different chassis types.

One RSP slot is provided in the ASR 902 Router, while the ASR 907 and ASR 903 routers have two RSP slots. The Cisco ASR 900 RSP is a Field Replaceable Unit (FRU).

Interface modules

Cisco ASR 900 Series routers have interface module slots. The Cisco ASR 902 Router contains four slots (slots 0 to 3). The Cisco ASR 903 Router contains six slots (slots 0 to 5), and the Cisco ASR 907/914 Router contains sixteen slots (slots 0 to 15). The supported combination of interface modules depends on the RSP and other interface modules used in the system as well as the chassis that is used.

Software

ASR 900 Series routers are supported in Cisco IOS® XE S Software, which is a modular operating system. This software is designed to provide modular packaging, feature velocity, and powerful resiliency. For more information on the supported features and software capabilities, see the Cisco IOS XE Software for Cisco ASR 900 Series Aggregation Services Router data sheet.

Network management

Cisco ASR 900 Series routers are supported in Cisco Prime™ for Evolved Programmable Network architectures. Cisco Prime for Evolved Programmable Networks is an end-to-end network management solution that drastically simplifies the design, provisioning, and management of carrier-grade networks. It is a comprehensive solution that centralizes and automates service design, fulfillment, assurance, and performance analysis to help service providers and enterprises lower their costs while meeting high customer expectations.

Table 1 lists the hardware parts available for Cisco ASR 900 Series routers.

Table 1.   Hardware components for Cisco ASR 900 Series routers

Part Number	Description
ASR 902 System Components	
ASR-902	ASR 902 Router Chassis
ASR-902=	ASR 902 Router Chassis, Spare
A902-FAN-E	ASR 902 Enhanced FAN Tray with FAN Filter Slot
A902-FAN-E=	ASR 902 Enhanced FAN Tray with FAN Filter Slot, Spare
A902-FAN-F	ASR 902 FAN Tray Filter
A902-FAN-F=	ASR 902 FAN Tray Filter, Spare
A902-FAN-F-B=	ASR 902 FAN Tray Filter Blank Panel, Spare
A902-CAB-BRACKET=	ASR 902 Cable Guide Bracket, Spare
A902-RCKMNT-ETSI=	ETSI Rack Mount Option for the Cisco ASR 902, Spare
A902-RCKMNT-19IN=	EIA 19in Rack Mount Option for the Cisco ASR 902, Spare
ASR 903 System Components	
ASR-903	ASR 903 Router Chassis
ASR-903=	ASR 903 Router Chassis, Spare
A903-FAN	ASR 903 FAN Tray
A903-FAN=	ASR 903 FAN Tray, Spare
A903-FAN-E	ASR 903 Enhanced FAN Tray with FAN Filter Slot
A903-FAN-E=	ASR 903 Enhanced FAN Tray with FAN Filter Slot, Spare
A903-FAN-F	ASR 903 FAN Tray Filter
A903-FAN-F=	ASR 903 FAN Tray Filter, Spare
A903-FAN-F-B=	ASR 903 FAN Tray Filter Blank Panel, Spare
A903-RCKMNT-ETSI=	ETSI Rack Mount Option for the Cisco ASR 903, Spare
A903-RCKMNT-19IN=	EIA 19in Rack Mount Option for the Cisco ASR 903, Spare
A903-CAB-GUIDE=	ASR 903 Cable Guide Bracket, Spare
A903-CAB-BRACKET=	ASR 903 Cable Guide Bracket Option, Spare

Part Number	Description
ASR 907 System Components	
ASR-907	ASR 907 Router Chassis
ASR-907=	ASR 907 Router Chassis, Spare
A907-FAN-E	ASR 907 Enhanced FAN Tray with FAN Filter Slot
A907-FAN-E=	ASR 907 Enhanced FAN Tray with FAN Filter Slot, Spare
A907-FAN-F=	ASR 907 FAN Tray Filter, Spare
A907-FAN-F-B=	ASR 907 FAN Tray Filter Blank Panel, Spare
A907-RCKMNT-ETSI=	ETSI Rack Mount Option for the Cisco ASR 907, Spare
A907-RCKMNT-19IN=	EIA 19in Rack Mount Option for the Cisco ASR 907, Spare
A907-CAB-BRACKET=	ASR 907 Cable Guide Bracket, Spare
ASR 900 Common Equipment	
A900-PWR550-A	ASR 900 550W AC Power Supply
A900-PWR550-A=	ASR 900 550W AC Power Supply, Spare
A900-PWR550-D-E	ASR 900 550W DC Power Supply With Enhanced Power Connector
A900-PWR550-D-E=	ASR 900 550W DC Power Supply With Enhanced Power Connector, Spare
A900-PWR1200-A	ASR 900 1200W AC Power Supply
A900-PWR1200-A=	ASR 900 1200W AC Power Supply, Spare
A900-PWR1200-D	ASR 900 1200W DC Power Supply
A900-PWR1200-D=	ASR 900 1200W DC Power Supply, Spare
A900-PWR-BLANK=	ASR 900 Power Supply Blank Cover, Spare
A900-RSPA-BLANK=	ASR 900 Route Switch Processor Type-A Blank Cover, Spare
A9XX-RSPB-BLANK=	ASR 900 Route Switch Processor Type-B Blank Cover, Spare
A900-IMA-BLANK=	ASR 900 Interface Module Type-A Blank Cover, Spare
A900-IMA-BLNK-DEF=	ASR 900 Interface Module Type-A Blank Cover with deflector, Spare

Product specifications

Tables 2 through 4 list the product, power, and environmental specifications for the Cisco ASR 900 Series routers. Tables 5 and 6 provide safety, compliance, and certification information.

Table 2.   Cisco ASR 900 Series router system specifications

Description	Cisco ASR 902 Router	Cisco ASR 903 Router	Cisco ASR 907 Router
Physical specifications[1]	Height: 3.56 in. (90.424 mm) - 2RU Width: 17.44 in. (443 mm) Depth: 9.22 in. (234.2 mm) Weight: • 24.04 lb (10.9 kg) with one RSP, two DC power supplies, and loaded with a typical combination of interface module cards • 9.48 lb (4.3 kg) for an empty chassis • 30 lb shipment weight	Height: 5.22 in. (132.6 mm) - 3RU Width: 17.44 in. (443 mm) Depth: 9.22 in. (234.2 mm) Weight: • 34.17 lb (15.5 kg) with two RSPs, two DC power supplies, and loaded with a typical combination of interface module cards • 11.2 lb (5.1 kg) for an empty chassis • 38 lb shipment weight	Height: 12.22 in. (310.38 mm) - 7RU Width: 17.44 in. (443 mm) Depth: 9.22 in. (234.2 mm) Weight: • 69.32 lb (31.4 kg) with two RSPs, two DC power supplies, and loaded with a typical combination of interface module cards • 34.9 lb (15.9 kg) for an empty chassis • 58 lb shipment weight
Rack mounts	ETSI rack mount kit 19 in. rack mount kit 23 in. rack mount kit		
Power supplies	2 power supply slots	2 power supply slots	3 power supply slots[2, 3]
Interface modules	4 interface module slots	6 interface module slots	16 interface module slots

Description	Cisco ASR 902 Router	Cisco ASR 903 Router	Cisco ASR 907 Router
Route switch processors	1 RSP slot	2 RSP slots	2 RSP slots
Fan tray	1 fan tray with fan redundancy 2 dry contact input alarms on the fan tray	1 fan tray with fan redundancy 4 dry contact input alarms on the fan tray	
Air flow	Side-to-side airflow; inlet on the right side, outlet on the left side when looking from the front		
Power supplies	Up to 2 power supplies (AC or DC) Modules operate in load-share mode System can operate on a single power supply and supports mixing of one AC and one DC power supplies in a single chassis.		Up to 3 power supplies (AC or DC) Modules operate in load share mode System can operate on a single power supply and supports mixing of AC and DC power supplies in a single chassis.
Chassis MTBF at 40ºC operating temperature	900,000 hours	900,000 hours	1,585,000 hours
Fan Tray MTBF at 40ºC operating temperature	600,000 hours	600,000 hours	1,329,000 hours

[1] Measured from the front of the chassis (excluding handles from the power supply, fan tray, and interface modules installed in the chassis).

[2] More then 2 power supply modules only supported for certain power supplies and software releases. Consult your account team for more details.

[3] ASR 907 is not compatible with the A900-PWR550-D, A900-PWR550-D-E or A900-PWR550-A power supplies.

Table 3.   Power specifications

Description	Cisco ASR 900 Series Router
Power consumption	Maximum input power 1350W (including loss). This is equivalent to 4600 BTU per hr. Typical input power depends on the actual configuration and can be checked using the Cisco power calculator tool at https://tools.cisco.com/cpc/
AC input voltage and frequency	Voltage range: 85 to 264 VAC, nominal 115 to 230 VAC Frequency Range: 47 to 63 Hz, nominal 50 to 60 Hz
AC Power Supply MTBF at 40ºC operating temperature	300,000 hours
DC input voltage	For 550W DC power supply, voltage range: 19.2V to 72V DC, nominal +24V DC, -48V/–60V DC. For 1200W DC power supply, voltage range: –40.8V to –72V DC, nominal –48V/–60V DC
DC Power Supply MTBF at 40ºC operating temperature	300,000 hours
Power Supply shipment packaging size (LxWxH)	15.44 in. x 9.44 in. x 4.31 in.
Power Supply shipment weight	3.6 lbs.

Table 4.   Environmental specifications

Description	Cisco ASR 900 Series Router
Operating environment and altitude[1]	–40 to 65ºC operating temperature (DC operation, with both the 550W and the 1200W power supplies) –40 to 65ºC operating temperature (AC operation, with the 1200W power supply) –5 to 55ºC operating temperature (AC operation, with 550W AC power supply)[2] 0 to 40ºC operating temperature (AC operation, with 550W AC power supply) –60 to 1800m operating altitude (for full operating temperature range) Up to 4000m operating altitude (at up to 40ºC temperature)
Outside plant	For an outside plant installation, it is required that the router 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 Telecordia GR487.
Relative humidity	5 to 95%, noncondensing

Description	Cisco ASR 900 Series Router
Acoustic noise[3]	Acoustic noise peak operation complies with Network Equipment Building Standards (NEBS) GR-63-Core Issue 3 sound power level of 78 dB at 27ºC operation as measured by the ANSI S12.10/ISO 7779 NAIS noise measurement test standard.
Storage environment	Temperature: –40 to 70ºC altitude: 15,000 ft (4570m)
Seismic	Zone 4
Hazardous substances	Reduction of Hazardous Substances (ROHS) 6

[1] 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.

[2] Not more than the following in a one-year period: 96 consecutive hours, or 360 hours total, or 15 occurrences.

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

Table 5.   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
Power substation system compliance	- IEC-61850-3 (2002) (Cisco ASR 903) - IEEE1613 (2009) (Cisco ASR 903) - IEC 60870-2-2 Am Class (Cisco ASR 907) and IEC 60870-2-2 Bm Class (Cisco ASR 902 / Cisco ASR 903)
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

Type	Standards
Network synchronization	• ANSI T1.101 • GR-1244-CORE • GR-253-CORE • ITU-T G.703 clause 5 • ITU-T G.703 clause 9 • ITU-T G.781 • ITU-T G.813 • ITU-T G.823 • ITU-T G.824 • ITU-T G.8261/Y.1361 • ITU-T G.8262 • ITU-T G.8264 • IEEE1588-2008

[1.] Notable exception: All cabling is provided through the front panel.

Table 6.   Certifications

Description	Cisco ASR 900 Series Router
Common Criteria	Cisco ASR 902 Router and Cisco ASR 903 Router running Cisco IOS XE Software 3.13(1)S
FIPS	FIPS 140 validated cryptographic module, Cisco ASR 902 Router and Cisco ASR 903 Router running Cisco IOS XE Software 3.13(1)S
MEF[1]	Carrier Ethernet (CE) 1.0 and CE 2.0. MEF 9 and MEF 14
IEEE 1588-2008[1]	1588™ SLAVE (IEEE CONFORMITY ASSESSMENT PROGRAM) • IEEE 1588TM Conformity Test Suite for Frequency Synchronization in Telecommunications Networks - Packet Slave Clock • IEEE Std 1588TM-2008 and Recommendation ITU-T G.8265.1 (10/2010) with Amendments 1 (04/2011) and 2 (10/2012)

[1] Applicable to RSP1A, RSP1B, and RSP2A configurations.

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
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 • Reduce network downtime

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