

# 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 and ASR 903 Router (Figure 1) provide a comprehensive and scalable feature set of Layer 2 VPN (L2VPN) and Layer 3 VPN (L3VPN) services in compact designs.

**Figure 1.** Cisco ASR 903 Router and ASR 902 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, quality of service (QoS) on the Cisco ASR 900 Series router is capable of scaling up to a large number of queues per device. This large number of queues, combined with a highly granular QoS algorithm (three-level hierarchical QoS), results in a greatly enhanced broadband user experience. This full-featured Layer 2 and Layer 3 switch router supports a variety of broadband applications including IPTV and video on demand (VoD), enhancing and extending the Cisco IP Next-Generation Network (IP NGN) architecture.

### Pre-Aggregation for Mobile Applications

Deployed as a pre-aggregation platform for mobile backhaul, the Cisco ASR 900 Series router can aggregate cell sites and use Multiprotocol Label Switching (MPLS) as a transport for Radio Access Network (RAN) backhaul traffic. The Cisco ASR 900 Series router 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 Cisco ASR 900 Series router also supports synchronous Ethernet (SyncE) and IEEE-1588, and can act as the source for network clocking for time-division multiplexing (TDM), SDH and SONET, SyncE, and GPS interfaces. In addition to the timing services, the Cisco ASR 900 Series router can be deployed in small and harsh environments, due to its shallow depth and qualification for extended temperature ranges.

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## **Metro Ethernet Aggregation**

The Cisco 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, fully redundant aggregation platform is needed. The Cisco ASR 900 Series router offers service flexibility and delivers Layer 2, IP, and MPLS transport for advanced L2VPN, L3VPN, and multicast services.

## **Major Differentiators**

The Cisco 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 Cisco 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 ASR 900 Series router allows the router to be deployed in locations with minimum environmental control. Small footprint and extended temperature range support allows service providers to extend the reach of their Carrier Ethernet networks to more challenging and remote locations and yet save money on air conditioning.

## **High Availability and Modularity**

The Cisco ASR 900 Series router is a fully 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 speed ranging from 10 Mbps to 10 Gbps. The legacy interfaces are available in speeds ranging from nxDS0 to OC-12/STM-4 for PDH, SDH, and SONET. The interface modules, power supplies, and fan tray are all field replaceable.

The design of the Cisco ASR 903 Router 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 Cisco ASR 900 Series router features essential capabilities that help service providers simplify and automate the management of their networks, resulting in efficiency gains in the deployment and operation of the networks. The Cisco ASR 900 Series router provides proactive diagnostic tools including Generic On-Line Diagnostics (GOLD) which will help service providers avoid potential problems before they occur, troubleshoot any problems, and when these are diagnosed, implement solutions.

## **System Design**

The Cisco ASR 900 Series routers are built as a fully modular system, with a future-ready design. The Cisco ASR 903 Router chassis supports online field replacement and upgrades of all components. The chassis is designed to contain one fan tray, two power supplies, two RSP cards, and up to six interface module cards. The Cisco ASR 902 Router uses the same design as the Cisco 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, which requires the system to be brought down for a replacement or upgrade.

## Fan Tray

Cisco ASR 900 Series routers have a single fan tray slot, which must be populated for the system to operate. The fan tray contains an optional field serviceable dust filter and redundant fans. The systems will continue to operate on a single fan failure. The systems have been designed to remain operational during the replacement of the fan tray. In addition to cooling the chassis, the fan tray also contains a connector for dry-contact inputs and several system-level alarm LEDs.

## Power Supply

Both an AC and a DC power supply are available for the Cisco ASR 900 Series routers. The system supports operation on a single power supply, while with two power supplies, both 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.

One RSP slot is provided in the Cisco ASR 902 Router, while the Cisco ASR 903 router has two RSP slots. The RSP is a field replaceable unit (FRU).

## Interface Modules

Cisco ASR 900 Series routers have interface module slots. The ASR 902 Router contains four slots (slots 0 to 3), and the ASR 903 Router contains six slots (slots 0 to 5). These interface module slots support all of the available interface modules. The supported combination of interface modules depends on the RSP used in the system.

## Software

The Cisco ASR 900 Series routers are supported in Cisco IOS® XE S Software, which is a modular operating system. Cisco IOS XE 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 IP Next Generation Networks (IP NGN). Cisco Prime for IP NGN 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
<b>ASR 902 System Components</b>	
<b>ASR-902</b>	ASR 902 Router Chassis
<b>ASR-902=</b>	ASR 902 Router Chassis, Spare
<b>A902-FAN-E</b>	ASR 902 Enhanced FAN Tray with FAN Filter Slot
<b>A902-FAN-E=</b>	ASR 902 Enhanced FAN Tray with FAN Filter Slot, Spare
<b>A902-FAN-F</b>	ASR 902 FAN Tray Filter

Part Number	Description
A902-FAN-F=	ASR 902 FAN Tray Filter, Spare
A902-FAN-F-B	ASR 902 FAN Tray Filter Blank panel
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
<b>ASR 903 System Components</b>	
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
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-BRACKET=	ASR 903 Cable Guide Bracket, Spare
<b>ASR 900 Common Equipment</b>	
A900-PWR550-A	ASR 900 550W AC Power Supply
A900-PWR550-A=	ASR 900 550W AC Power Supply, Spare
A900-PWR550-D	ASR 900 550W DC Power Supply
A900-PWR550-D=	ASR 900 550W DC 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-PWR-BLANK=	ASR 900 Power Supply Blank Cover, Spare
A900-RSPA-BLANK=	ASR 900 Route Switch Processor Type-A Blank Cover, Spare
A900-IMA-BLANK=	ASR 900 Interface Module Type-A Blank Cover, Spare
A900-PWR-BLANK=	ASR 900 Power Supply Blank Cover, Spare

## Product Specifications

Tables 2 through 4 list the product, power, and environmental specifications for the Cisco ASR 900 Routers. Table 5 provides safety and compliance information.

**Table 2.** Cisco ASR 900 Router System Specifications

Description	Cisco ASR 902 Router	Cisco ASR 903 Router
<b>Physical specifications<sup>1</sup></b>	Height: 3.56 in. (90.424 mm) - 2RU Width: 17.44 in. (443 mm) Depth: 9.22 in. (234.2 mm) Weight: <ul style="list-style-type: none"> <li>• 24.04 lb (10.9 kg) with one RSP, two DC power supplies, and loaded with a typical combination of interface module cards</li> <li>• 9.48 lb (4.3 kg) for an empty chassis</li> </ul>	Height: 5.22 in. (132.6 mm) - 3RU Width: 17.44 in. (443 mm) Depth: 9.22 in. (234.2 mm) Weight: <ul style="list-style-type: none"> <li>• 34.17 lb (15.5 kg) with two RSPs, two DC power supplies, and loaded with a typical combination of interface module cards</li> <li>• 11.2 lb (5.1kg) for an empty chassis</li> </ul>

Description	Cisco ASR 902 Router	Cisco ASR 903 Router
<b>Rack mounts</b>	ETSI rack mount kit 19 in. rack mount kit	
<b>Interface modules</b>	4 interface module slots	6 interface module slots
<b>Route switch processors</b>	1 RSP slot	2 RSP slots
<b>Fan trays</b>	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
<b>Air flow</b>	Side-to-side airflow; inlet on the right side, outlet on the left side when looking from the front	
<b>Power supplies</b>	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.	

<sup>1</sup>. Measured from the front of the chassis (excluding handles from the power supply, fan tray, and interface modules installed in the chassis)

**Table 3.** Power Specifications

Description	Cisco ASR 900 Router
<b>Power consumption</b>	Maximum input power 600W (including loss). This is equivalent to 2150 BTU per hr. Typical input power is less than 400W
<b>AC input voltage and frequency</b>	Voltage range: 85V AC to 264V AC, nominal 115V AC to 230V AC Frequency Range: 47Hz to 63Hz, nominal 60Hz to 50Hz
<b>DC input voltage</b>	Voltage range: -19.2V DC to -72V DC, nominal -24V DC to -48V DC

**Table 4.** Environmental Specifications

Description	Cisco ASR 900 Router
<b>Operating environment and altitude<sup>1</sup></b>	-40°C to 65°C operating temperature (DC operation) -5°C to 55°C operating temperature (AC operation) <sup>2</sup> 0°C to 40°C operating temperature (AC operation) -60m to 1800m operating altitude (for full operating temperature range) Up to 4000m operating altitude (at up to +40°C temperature)
<b>Outside plant</b>	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
<b>Relative humidity</b>	5 to 95%, noncondensing
<b>Acoustic noise<sup>3</sup></b>	Acoustic noise peak operation maximum 55 dBA sound pressure level, bystander position for rack mount products at 20°C 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 27°C operation as measured by the ANSI S12.10/ISO 7779 NAIS noise measurement test standard
<b>Storage environment</b>	Temperature: -40 to +85°C altitude: 15,000 ft (4570m)
<b>Seismic</b>	Zone 4

<sup>1</sup>. Optics used may limit the temperature range.

<sup>2</sup>. Not more than the following in a one-year period: 96 consecutive hours, or 360 hours total, or 15 occurrences.

<sup>3</sup>. 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
<b>Safety</b>	<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>
<b>Electromagnetic</b>	<ul style="list-style-type: none"> <li>• FCC CFR47 Part 15 Class A</li> </ul>
<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 50121-4</li> <li>• EN/KN 61000-4-2 to EN/KN 61000-4-6</li> <li>• EN/KN 61000-4-8</li> <li>• EN/KN 61000-4-11</li> </ul>
<b>Power substation system compliance<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• IEC-61850-3 (2002)</li> <li>• IEEE1613 (2009)</li> </ul>
<b>NEBS<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• GR-63-CORE Issue 3</li> <li>• GR-1089-CORE Issue 5</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>• ANSI T1.101</li> <li>• GR-1244-CORE</li> <li>• GR-253-CORE</li> <li>• ITU-T G.703 clause 5</li> <li>• ITU-T G.703 clause 9</li> <li>• ITU-T G.781</li> <li>• ITU-T G.813</li> <li>• ITU-T G.823</li> <li>• ITU-T G.824</li> <li>• ITU-T G.8261/Y.1361</li> <li>• ITU-T G.8262</li> <li>• ITU-T G.8264</li> <li>• IEEE1588-2008</li> </ul>

<sup>1</sup>. Notable exception: Using external protection for 5kV surge compliance.

<sup>2</sup>. Notable exception: 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 6 are available as part of the Cisco Carrier Ethernet Switching Service and Support solution and are available directly from Cisco and through resellers.

**Table 6.** Service and Support

Advanced Services	Features	Benefits
<p><b>Cisco Total Implementation Solutions (TIS), available directly from Cisco</b></p> <p><b>Cisco Packaged TIS, available through resellers</b></p>	<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>
<p><b>Cisco SP Base Support and Service Provider-Based Onsite Support, available directly from Cisco</b></p> <p><b>Cisco Packaged Service Provider- Based Support, available through resellers</b></p>	<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>• Minimize network downtime</li> </ul>



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