Data Sheet

Cisco ASR 9000 Series Aggregation Services Routers

Product Overview

The Cisco® ASR 9000 Series Aggregation Services Routers (ASR 9000 Series) represent an exciting new paradigm in edge and core routing, with exceptional scalability, carrier-class reliability, environmentally conscious design, incredible flexibility, and an attractive price-to-performance benchmark. The Cisco ASR 9000 Series has a wide product portfolio (Figure 1), ranging from the Cisco ASR 9001 (2 Rack Units [2RU]) to the Cisco ASR 9922 (44RU), with each system designed to provide true carrier-class reliability using the Cisco IOS® XR operating system, comprehensive system redundancy, and a full complement of network resiliency schemes. The Cisco ASR 9000 Series also offers service and application-level intelligence focused on optimized video delivery and mobile aggregation. Finally, the Cisco ASR 9000 Series is designed to simplify and enhance the operational and deployment aspects of service-delivery networks.

Figure 1. Cisco ASR 9000 System

The Cisco ASR 9000 Series is an operationally simple, future-optimized platform using next-generation hardware and software. The following are highlights of this next-generation platform:

- The Cisco ASR 9000 System brings increased power and simplicity to the edge, and the ASR 9000v sets the industry benchmark as a virtualized compact carrier-class converged access and aggregation platform. Using the Cisco "network virtualization" or nV technology, the Cisco ASR 9000 System offers exceptional pay-as-you-grow scale, carrier-class reliability, and simplified service provisioning.
- Cisco IOS XR Software modular operating system: The Cisco ASR 9000 Series uses the Cisco IOS XR operating system, made famous by the highly successful Cisco CRS Carrier Routing System platform in core deployments. Built for distributed systems such as the Cisco ASR 9000 Series, the Cisco IOS XR operating system uses a microkernel architecture to achieve true modularity. This modularity provides the path to nonstop operations during software image upgrades or module changes, without affecting normal platform operations.

- Fully distributed system: The Cisco ASR 9000 Series operates in a fully distributed fashion; all packet-forwarding decisions and actions take place on the individual line cards. These high-density Ethernet line cards are equipped with a specialized network processor that provides a flexible programming infrastructure with high-density Hierarchical Quality-of-Service (H-QoS) services, security, and integrated Synchronous Ethernet (SyncE). The distributed nature of the Cisco ASR 9000 Series improves resiliency by adding a new dimension in scale for features such as Bidirectional Forwarding Detection (BFD) and Ethernet Operations, Administration, and Maintenance (EOAM).
- Operationally efficient and redundant hardware: The Cisco ASR 9000 Series provides an infrastructure where all common components, Route Switch Processors (RSPs), Route Processors (RPs), switching fabric, fans and power supplies are redundant. In addition, the platform is designed to use power on an as-needed basis, depending on system requirements. Power has been modularized for a true pay-as-you-grow approach, reducing Capital Expenditures (CapEx) and providing an operationally efficient deployment. The Cisco ASR 9000 Series also provides a space-optimized small-platform option that uses the common components of the series and retains a central-office deployment-ready capability.
- Environmentally conscious design: In today's world of increasing awareness of human impact on the environment and the resultant fiscal implications, Cisco ASR 9000 Series Routers bring a fresh new "conscious" approach to product development. From optimal thermal design to the architecture of the power infrastructure, from the placement of line-card components to the pitch of each slot, every design aspect has one goal in mind: reduced environmental impact through lowered power consumption and decreased cooling requirements. Even the product packaging process was evaluated to minimize the use of packaging material and thereby reduce waste at customer locations. The Cisco ASR 9000 Series is an example of the continued Cisco commitment to efficient and future-friendly product design.
- Ready for the transition to IPv6: Cisco is delivering on our strategy of building out IPv6 next-generation networks to simplify design, deployment, and management of services for global service providers. The Cisco ASR 9000 Series Virtualized Service Module (VSM) provides a single touch point for carrier-grade IPv6 deployment across thousands of devices.

The Cisco ASR 9000 Series offers a significant added value compared to the prior generations of Carrier Ethernet routing offerings with significantly higher switching capacity, optimized power and cooling requirements, an innovative modular power architecture, a grounds-up high-availability design, and the Cisco IOS XR modular operating system to significantly lower the Total Cost of Ownership (TCO) for service providers the world over.

Solving the Challenges of Tomorrow, Today

The Cisco ASR 9000 Series is built on the premise of addressing the challenges that service providers face when deploying current networks and planning for the networks of tomorrow:

- Power-efficient deployments: The Cisco ASR 9000 Series has a significantly improved energy-efficient design thanks to its low Gbps/Watt ratio. This amazing breakthrough ultimately translates to lower power costs, lower carbon footprint, and the ability to serve more customers and deliver more services in less rack space.
- Increasing Average Revenue Per User (ARPU): Service providers may increase the price models of existing services or increase the service offerings per user. Although traditional service prices continue to decline, the Cisco ASR 9000 Series helps establish a new financial reality by facilitating reliable and scalable video, next-generation mobile aggregation, and advanced Carrier Ethernet service offerings.

- Managing services efficiently: The Cisco ASR 9000 Series provides leading-edge network, device, and service management through a full complement of management solutions. The Cisco Prime for Evolved Programmable Networks provides a framework for service-activation provisioning, assurance, and management. Combining these elements with a comprehensive set of Ethernet and Multiprotocol Label Switching (MPLS) Operations, Administration, and Maintenance (OAM) capabilities, the Cisco ASR 9000 Series provides an operator-friendly environment.
- Network convergence: A common objective among service providers is to migrate their networks to a single, converged infrastructure that supports all services. This goal is compelling because it ultimately results in decreased CapEx and Operating Expenses (OpEx) because of a reduction in network elements. The Cisco ASR 9000 Series is a critical component in optimizing service-transport infrastructure because of its service flexibility, comprehensive feature set, wide interface capability, and transparent integration of Carrier Ethernet and WAN interfaces as the foundation for services delivery. The Cisco ASR 9000 Series provides a powerful single solution to the providers' MultiService Edge (MSE), Ethernet-optimized MSE (E-MSE), and Carrier Ethernet needs.
- Meeting tomorrow's service requirements: Designed into the Cisco ASR 9000 Series are critical capabilities supporting the services of tomorrow. Providing increased bandwidth capabilities for network devices at economically viable prices is one of the primary criteria for true carrier transport platforms. The Cisco ASR 9000 Series can scale to unprecidented levels, providing the ideal foundation for a full suite of next-generation services. Another crucial component for true network and service convergence is the integration of service intelligence in network elements. The Cisco ASR 9000 Series is designed to offer advanced subscriber management using silicon-based security and video services. The Cisco ASR 9000 Series offers integrated Video-on-Demand (VoD) streaming and caching, inline video-quality monitoring, accelerated fast-channel change, and real-time video error correction.

Hardware

The Cisco ASR 9000 Series Aggregation Services Routers provide unsurpassed 10 Gigabit Ethernet and 100 Gigabit Ethernet scale and density. The Cisco ASR 9000 and ASR 9900 Series Routers provide an in-place upgrade roadmap to a higher density of 10 Gigabit Ethernet and 100 Gigabit Ethernet ports without the need for a complete chassis replacement. These line cards, offered in base and extended-scale configurations, are complemented by the nonblocking fabric (on the RSP for the Cisco ASR 9006, ASR 9010, ASR 9906, ASR 9910 and ASR 9904 Routers and on separate fabric cards for the Cisco ASR 9906, ASR 9910, ASR 9912 and ASR 9922 Routers), and by the innovative backplane, thermal, and power infrastructure on the chassis.

The Cisco ASR 9000 Series has a modular power architecture available in both AC and DC. The power supplies are housed in field-serviceable Power Entry Modules (PEMs), which also come in AC and DC forms. Each PEM can hold up to three or four modules depending on its corresponding type, with no power zones or placement restrictions (mixing of AC and DC supplies is not supported). Service providers can add more power as their bandwidth and feature requirements increase over time, by adding more line cards to the chassis. This capability translates to lower CapEx initially and optimal OpEx over the product life.

The Cisco ASR 9000 Series also features a fully integrated timing infrastructure, allowing the routers to take in timing inputs (for example, SynchE, Building Integrated Timing Supply [BITS], and DOCSIS® Timing Interface [DTI]) and distribute them over the backplane to each slot. This capability allows extensive support for transparent mobile convergence, mobile Radio Access Network (RAN) backhaul, and Time-Division Multiplexing (TDM) circuit emulation, without sacrificing performance or scale.

The optimized thermal infrastructure of the Cisco ASR 9000 Series is designed to be scalable to support future capacity requirements. Variable-speed high-efficiency fans provide reduced power requirements under normal operating environments while retaining the capability to cool current and future line cards under extreme conditions.

Table 1 lists the chassis hardware available for the Cisco ASR 9000 & ASR 9900 Series.

Table 1. Hardware Available for Cisco ASR 9000 & ASR 9900 Series

Product Description	Product Number
Cisco ASR 9000 & ASR 9900 Series Chassis	
Cisco ASR 9010 chassis	ASR-9010-AC-V2 ASR-9010-DC-V2 ASR-9010-SYS
Cisco ASR 9006 chassis	ASR-9006-AC-V2 ASR-9006-DC-V2 ASR-9006-SYS
Cisco ASR 9922 chassis	ASR-9922-AC ASR-9922-DC ASR-9922
Cisco ASR 9912 chassis	ASR-9912-AC ASR-9912-DC ASR-9912
Cisco ASR 9910 chassis	ASR-9910
Cisco ASR 9906 chassis	ASR-9906
Cisco ASR 9904 chassis	ASR-9904-AC ASR-9904-DC ASR-9904
Cisco ASR 9000 Series Power Infrastructure	
AC power supply, 6000W	PWR-6KW-AC-V3 PWR-6KW-AC-V3=
AC power entry module V3	A9K-AC-PEM-V3 A9K-AC-PEM-V3=
AC power supply, 3000W	PWR-3KW-AC-V2 PWR-3KW-AC-V2=
AC power entry module V2	ASR9K-AC-PEM-V2 A9K-AC-PEM-V2=
DC power supply, 4400W	PWR-4.4KW-DC-V3 PWR-4.4KW-DC-V3=
DC power entry module V3	A9K-DC-PEM-V3 A9K-DC-PEM-V3=
DC power supply, 2100W	PWR-2KW-DC-V2 PWR-2KW-DC-V2=
DC power entry module V2	ASR9K-DC-PEM-V2 A9K-DC-PEM-V2=
Cisco ASR 9000 Series Thermal Infrastructure	
Cisco ASR 9010 fan, 2 fan trays per chassis	ASR-9010-FAN ASR-9010-FAN-V2
Cisco ASR 9006 fan, 2 fan trays per chassis	ASR-9006-FAN ASR-9006-FAN-V2

Product Description	Product Number
Cisco ASR 9922 fan, 4 fan trays per chassis	ASR-9922-FAN ASR-9922-FAN-V2 ASR-9922-FAN-V3
Cisco ASR 9912 fan, 2 fan trays per chassis	ASR-9912-FAN A9K-9912-FAN
Cisco ASR 9910 fan, 2 fan trays per chassis	ASR-9910-FAN
Cisco ASR 9906 fan, 2 fan trays per chassis	ASR-9906-FAN
Cisco ASR 9904 fan, 1 fan tray per chassis	ASR-9904-FAN A9K-9904-FAN
Cisco ASR 9010 fan filter, 1 per chassis	ASR-9010-FILTER
Cisco ASR 9006 fan filter, 1 per chassis	ASR-9006-FILTER
Cisco ASR 9922 fan filter, 1 center and 2 side filters per chassis	ASR-9922-FLTR-CEN ASR-9922-FLTR-CV2 ASR-9922-FLTR-LR
Cisco ASR 9912 fan filter, 1 center and 2 side filters per chassis	ASR-9912-FLTR-CEN ASR-9900-FLTR-LR
Cisco ASR 9910 fan filter, 1 per chassis	ASR-9910-FILTER
Cisco ASR 9906 fan filter, 1 per chassis	ASR-9906-FILTER
Cisco ASR 9904 fan filter, 1 per chassis	ASR-9904-FILTER

More details about the individual Cisco ASR 9000 Series components, such as the RSPs, the Ethernet line cards, and the Shared Port Adapter (SPA) and SPA Interface Processor (SIP) are available in the respective data sheets at: Cisco ASR 9000 Series Data Sheet Listing.

Software

Cisco ASR 9000 Series routers deliver exceptional scale, service flexibility, and high availability to Carrier Ethernet transport networks. The routers are powered by Cisco IOS XR Software, an innovative self-healing, distributed operating system designed for always-on operation while scaling system capacity up to 160 Tbps. This OS is the same operating system that powers industry-leading routers such as the Cisco CRS Carrier Routing System, bringing the same reliability, scalability, performance, and comprehensive features that have made the Cisco CRS the dominant entity in the service provider core. Cisco IOS XR Software also allows for an end-to-end IP/MPLS solution to service provider requirements based on the same software, thereby reducing the operational complexity of managing multiple operating systems. Cisco IOS XR Software Release 3.7.2 introduced s upport for the Cisco ASR 9000 Series Routers, which are designed to address the Carrier Ethernet foundation for visual networking. The Cisco ASR 9000 Series further enhances the IP Next-Generation Network (IP NGN) Carrier Ethernet design for converged, resilient, intelligent, and scalable transport of consumer, business, wholesale, and mobile services.

Cisco ASR 9000 Series Carrier Ethernet applications include business services such as Layer 2 VPN (L2VPN) and L3VPN, Internet Protocol Television (IPTV), Content-Delivery Networks (CDNs), and mobile backhaul transport networks. Features supported include Ethernet services; L2VPN; IPv4, IPv6, and L3VPN; Layer 2 and Layer 3 Multicast; IP over Dense Wavelength-Division Multiplexing (IPoDWDM); SyncE; EOAM and MPLS OAM; Layer 2 and Layer 3 Access Control Lists (ACLs); H-QoS; MPLS Traffic Engineering Fast Reroute (MPLS TE-FRR); Multichassis Link Aggregation (MC-LAG); Integrated Routing and Bridging (IRB); and Cisco Nonstop Forwarding (NSF) and Nonstop Routing (NSR).

For more information about the Cisco ASR 9000 Series IOS-XR software features supported, visit: Cisco ASR 9000 Series Product Bulletins.

Product Specifications

Table 2 provides details about the Cisco ASR 9006 and ASR 9010. Table 3 provides details about the Cisco ASR 9904. Table 4 provides details about the Cisco ASR 9906 and 9910. Table 5 provides details about the Cisco ASR 9912 and ASR 9922. All of these systems are designed to the same high standards of performance and reliability; they feature the same power and thermal innovations; and they can share the line cards, PEMs, and power supplies for maximum flexibility in your network planning. The RSPs can be shared between the Cisco ASR 9010, ASR 9006, and ASR 9904 chassis; the Cisco ASR 9922 and ASR 9912 chassis come with their own route processors and up to seven fabric cards. The Cisco ASR 9910 and ASR 9906 chassis share common RSPs and each come with their own chassis specific five fabric cards.

Table 2. Cisco ASR 9006 and ASR 9010[1]

Specification	Model	
	Cisco ASR 9006	Cisco ASR 9010
Categories		
Physical specifications	Height: 17.50 in. (444.5 mm) (10 RU) Width: 17.38 in. (441.45 mm) Depth: • With doors: 29.05 in. (737.9 mm) • Without doors: 29.05 in. (737.9 mm) Weight: • 89.55 lb (40.7 kg) (chassis with PEM) 150 lb (65.91 kg) (fully loaded, excluding linecards and power modules) – RSP, two v2 FAN trays, PEMs	Height: 36.75 in. (933.45 mm) (21 RU) Width: 17.38 in. (441.45 mm) Depth: • With doors: 29.03 in. (737.4 mm) • Without doors: 28.24 in. (717.3 mm) Weight: • 155.6 lb (70.73 kg) (chassis with PEM) 231.6 lb (105.27 kg) (fully loaded, excluding linecards and power modules) – RSP, two v2 fan trays, PEMs
Slot orientation	Horizontal	Vertical
Cisco ASR 9000 Series RSP	Dual redundant RSPs with integrated fabric in 2 slots	Dual redundant RSPs with integrated fabric in 2 slots
Cisco ASR 9000 Series line cards	4 line-card slots	8 line-card slots
"Commons" components	2 RSPs 2 fan trays 1 PEM (either DC or AC) 1 fan filter	2 RSPs 2 fan trays 2 PEMs (either DC or AC) 1 fan filter
Reliability and availability	Fabric redundancy Fan redundancy Feed redundancy Power-supply redundancy RSP redundancy Software redundancy	Fabric redundancy Fan redundancy Feed redundancy Power-supply redundancy RSP redundancy Software redundancy
Rack mounting	19-in. default 21- and 23-in. adapters available **Note:** Minimum 17.75-in. opening between posts is needed for proper operation	19-in. default 21- and 23-in. adapters available **Note:** Minimum 17.75-in. opening between posts is needed for proper operation
Cabinet mounting	Yes **Note:** Doors not recommended in enclosed cabinets	Yes **Note:** Doors not recommended in enclosed cabinets

[1] Specific features depend on hardware and software.

Specification	Model	
	Cisco ASR 9006	Cisco ASR 9010
Wall mounting	No	No
Airflow	Right-to-back, Front-to-back with baffle	Front-to-back
Performance		
Fabric	One per RSP: • Active/active nonblocking operation mode in dual-RSP redundant configuration • Fully redundant in dual-RSP redundant configuration • Built-in service-intelligence and traffic-prioritization capability	One per RSP: • Active/active nonblocking operation mode in dual-RSP redundant configuration • Fully redundant in dual-RSP redundant configuration • Built-in service-intelligence and traffic-prioritization capability
Thermal	Two fan trays: • 6 high-efficiency fans per tray • Variable-speed fans for optimal thermal performance • No single point of failure	Two fan trays: • 12 high-efficiency fans per tray • Variable-speed fans for optimal thermal performance • No single point of failure
Power		
Modularity	Pay-as-you-grow power for future scalability, available in AC and DC. Multiple power module types: • 3 kW AC power module • 2.1 kW DC power module **Note:** Mixing of AC and DC modules is not supported	Pay-as-you-grow power for future scalability, available in AC and DC. Multiple power module types: • 6 kW and 3 kW AC power modules • 4.4 kW and 2.1 kW DC power modules **Note:** Mixing of AC and DC modules is not supported
Redundancy	• AC: N+N redundancy • DC: N+1 redundancy • Power module redundancy • A/B Feed redundancy	• AC: N+N redundancy • DC: N+1 redundancy • Power module redundancy • A/B Feed redundancy • PEM redundancy
Power zones	No power zone restrictions Fully load-sharing power infrastructure	No power zone restrictions Fully load-sharing power infrastructure
Power input	Worldwide ranging AC (200-240V; 50-60 Hz; 16A maximum) Worldwide ranging DC (-40 to -72V; 50A nominal, 60A maximum)	Worldwide ranging AC (200-240V; 50-60 Hz; 16A maximum) Worldwide ranging DC (-40 to -72V; 50A nominal, 60A maximum)
Power-module airflow	Front-to-back	Front-to-back
Environmental Specifications (All Entries Applicable to Cisco ASR 9006 and ASR 9010)		
Operating temperature (nominal)	41 to 104ºF (5 to 40ºC)	
Operating temperature (short-term)[2]	ASR 9006: 23 to 131ºF (-5 to 55ºC) ASR 9010: 23 to 122ºF (-5 to 50ºC)	
Operating humidity (nominal) (relative humidity)	5 to 90%	
Storage temperature	-40 to 158ºF (-40 to 70ºC)	
Storage (relative humidity)	5 to 93%	
Operating altitude	-60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)	

[2] Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year. (This number refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)

Specification	Model	
	Cisco ASR 9006	Cisco ASR 9010
Regulatory Compliance (All Entries Applicable to Cisco ASR 9006 and ASR 9010)		
Network Equipment Building Standards (NEBS)	Cisco ASR 9006 and ASR 9010 Routers are designed to meet: • SR-3580: NEBS Criteria Levels (Level 3) • GR-1089-CORE: NEBS EMC and Safety • GR-63-CORE: NEBS Physical Protection • VZ.TPR.9205: Verizon TEEER	
ETSI standards	Cisco ASR 9006 and ASR 9010 Routers are designed to meet: • EN300 386: Telecommunications Network Equipment (EMC) • ETSI 300 019 Storage Class 1.1 • ETSI 300 019 Transportation Class 2.3 • ETSI 300 019 Stationary Use Class 3.1	
EMC standards emission	Cisco ASR 9006 and ASR 9010 Routers are designed to meet: • FCC Class 47CFR15 A • ICES 003 Class A • AS/NZS CISRP22 Class A • CISPR 22 (EN55022) Class A • VCCI Class A • BSMI Class A • IEC/EN 61000-3-12: Power Line Harmonics • IEC/EN 61000-3-11: Voltage Fluctuations and Flicker • EN55022: Information Technology Equipment (Emissions) • EN 50121-4: Railway EMC	
EMC standards immunity	Cisco ASR 9006 and ASR 9010 Routers are designed to meet: • IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8kV Contact, 15kV Air) • IEC/EN-61000-4-3: Radiated Immunity (10V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2kV Power, 1kV Signal) • IEC/EN-61000-4-5: Surge AC Port (4kV CM, 2kV DM) • IEC/EN-61000-4-5: Signal Surge Ports (1kV) • IEC/EN-61000-4-5: Surge DC Port (1kV CM, 1kV DM) • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m) • IEC/EN-61000-4-11: Voltage DIPS, Short Interruptions, and Voltage Variations • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: Generic Immunity Standard • EN 50121-4: Railway EMC	
Safety	Cisco ASR 9006 and ASR 9010 Routers are designed to meet: • UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • ACA TS001 • AS/NZS 60950 • FDA Code of Federal Regulations Laser Safety	

Table 3. Cisco ASR 9904[3]

Specification	Model
	Cisco ASR 9904
Categories	
Physical specifications	Height: 10.38 in. (263.65x mm) (6 RU) Width: 17.57 in. (446.28 mm) Depth: 25.02 in. (635.51 mm) Weight: • 62 lb (28.2 kg) (V2 PEM AND chassis) • 114.05 lb (51.84 kg) (2 RSP, Fan Tray, PEM)
Slot orientation	Horizontal
Cisco ASR 9000 Series RSP	Dual redundant RSPs with integrated fabric in 2 slots
Fabric	-
Cisco ASR 9000 Series line cards	2 line-card slots
"Commons" components	2 RSPs 1 fan tray 1 PEM (either DC or AC) 1 fan filter
Reliability and availability	Fabric redundancy Feed redundancy Power-supply redundancy Route processor redundancy Software redundancy
Rack mounting	19-in. 21- and 23-in. adapters available **Note:** Minimum 17.75-in. opening between posts is needed for proper operation.
Cabinet mounting	Yes
Wall mounting	No
Airflow	Right-to-left, front-to-back with baffle
Performance	
Fabric	One per RSP: • Active/active nonblocking operation mode in dual-RSP redundant configuration • Fully redundant in dual-RSP redundant configuration • Built-in service-intelligence and traffic-prioritization capability
Thermal	One fan tray: • 12 high-efficiency fans per tray • Variable-speed fans for optimal thermal performance
Power	
Modularity	Pay-as-you-grow power for future scalability, available in AC and DC. Multiple power module types: • 3 kW AC power module • 2.1 kW DC power module **Note:** Mixing of AC and DC modules is not supported
Redundancy	• AC: N+N redundancy • DC: N+1 redundancy • Power module redundancy • A/B Feed redundancy

[3] Specific features depend on hardware and software.

Specification	Model
	Cisco ASR 9904
Power zones	No power zone restrictions Fully load-sharing power infrastructure
Power input	Worldwide ranging AC (200-240V; 50-60 Hz; 16A maximum) Worldwide ranging DC (-40 to -72V; 50A nominal, 60A maximum)
Power module airflow	Front-to-back
Environmental Specifications	
Operating temperature (nominal)	41 to 104ºF (5 to 40ºC)
Operating temperature (short-term)[4]	23 to 131ºF (-5 to 55ºC) for ASR 9904 23 to 122ºF (-5 to 50ºC) for ASR 9910
Operating humidity (nominal) (relative humidity)	5 to 90%
Storage temperature	-40 to 158ºF (-40 to 70ºC)
Storage (relative humidity)	5 to 93%
Operating altitude	-60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)
Regulatory Compliance	
Network Equipment Building Standards (NEBS)	The Cisco ASR 9904 Router is designed to meet (qualification in progress): • SR-3580: NEBS Criteria Levels (Level 3) • GR-1089-CORE: NEBS EMC and Safety • GR-63-CORE: NEBS Physical Protection • VZ.TPR.9205: Verizon TEEER
ETSI standards	The Cisco ASR 9904 Router is designed to meet (qualification in progress): • EN300 386: Telecommunications Network Equipment (EMC) • ETSI 300 019 Storage Class 1.1 • ETSI 300 019 Transportation Class 2.3 • ETSI 300 019 Stationary Use Class 3.1
EMC standards emission	The Cisco ASR 9904 Router is designed to meet: • FCC Class 47CFR15 A • ICES 003 Class A • AS/NZS CISRP22 Class A • CISPR 22 (EN55022) Class A • VCCI Class A • BSMI Class A • IEC/EN 61000-3-12: Power Line Harmonics • IEC/EN 61000-3-11: Voltage Fluctuations and Flicker • EN55022: Information Technology Equipment (Emissions) • EN 50121-4: Railway EMC
EMC standards immunity	The Cisco ASR 9904 Router is designed to meet: • IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8kV Contact, 15kV Air) • IEC/EN-61000-4-3: Radiated Immunity (10V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2kV Power, 1kV Signal) • IEC/EN-61000-4-5: Surge AC Port (4kV CM, 2kV DM) • IEC/EN-61000-4-5: Signal Surge Ports (1kV) • IEC/EN-61000-4-5: Surge DC Port (1kV CM, 1kV DM) • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m) • IEC/EN-61000-4-11: Voltage DIPS, Short Interruptions, and Voltage Variations • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: Generic Immunity Standard • EN 50121-4: Railway EMC

[4] Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year. (This number refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)

Specification	Model
	Cisco ASR 9904
Safety	The Cisco ASR 9904 Router is designed to meet: • UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • ACA TS001 • AS/NZS 60950 • FDA Code of Federal Regulations Laser Safety

Table 4. Cisco ASR 9906 and ASR 9910[5]

Specification	Model	
	Cisco ASR 9906	Cisco ASR 9910
Categories		
Physical specifications	Height: 24.39 in.(619.50mm) (14RU) Width: 17.60 in. (447.04 mm) Depth: 31.45 in. (798.83 mm) Weight: • 131.5 lb (59.65 kg) (Chassis with 1 PEM) • 212.5 lb (96.4 kg) (2 Fan Trays, 2 RSP, 5 Fabric Cards, 1 PEM)	Height: 36.69 in.(931.9mm) (21RU) Width: 17.60 in. (447.04 mm) Depth: • With Air Reflector: 39.63 in. (1006.6mm) • Without Air Reflector: 30.41 in. (772.4mm) Weight: • 170 lb (77.27 kg) (Chassis with 2 PEMs) • 302.25 lb (137.38 kg) (2 Fan Trays, 2 RSP, 5 Fabric Cards, 2 PEMs)
Slot orientation	Vertical	Vertical
Cisco ASR 9000 Series RSP	Dual redundant RSPs with integrated fabric in 2 slots	Dual redundant RSPs with integrated fabric in 2 slots
Fabric	6 + 1 redundant fabrics (2 located on the RSP, 5 on dedicated switch fabric cards)	6 + 1 redundant fabrics (2 located on the RSP, 5 on dedicated switch fabric cards)
Cisco ASR 9000 Series line cards	4 line-card slots	8 line-card slots
"Commons" components	2 RSPs 5 fabric cards 2 fan trays 1 PEM (either DC or AC) 1 fan filter	2 RSPs 5 fabric cards 2 fan trays 2 PEMs (either DC or AC) 1 fan filter
Reliability and availability	Fabric redundancy Fan redundancy Feed redundancy Power-supply redundancy Route processor redundancy Software redundancy	Fabric redundancy Fan redundancy Feed redundancy Power-supply redundancy Route processor redundancy Software redundancy
Rack mounting	19-in. 21- and 23-in. adapters available Slide rails available for 4 post racks	19-in. 21- and 23-in. adapters available Slide rails available for 4 post racks
Cabinet mounting	Yes	Yes
Wall mounting	No	No
Airflow	Front-to-back	Front-to-back

[5] Specific features depend on hardware and software.

Specification	Model	
	Cisco ASR 9906	Cisco ASR 9910
Performance		
Fabric	One per RSP and five dedicated switch fabric card slots: • Support for 6 + 1 redundancy • Operate in active/active nonblocking mode • Built-in service-intelligence and traffic-prioritization capability	One per RSP and five dedicated switch fabric card slots: • Support for 6 + 1 redundancy • Operate in active/active nonblocking mode • Built-in service-intelligence and traffic-prioritization capability
Thermal	Two fan trays: • 7 high-efficiency fans per tray • Variable-speed fans for optimal thermal performance • No single point of failure	Two fan trays: • 12 high-efficiency fans per tray • Variable-speed fans for optimal thermal performance • No single point of failure
Power		
Modularity	Pay-as-you-grow power for future scalability, available in AC and DC. Multiple power module types: • 6 kW AC power modules • 4.4 kW DC power modules **Note:** Mixing of AC and DC modules is not supported	Pay-as-you-grow power for future scalability, available in AC and DC. Multiple power module types: • 6 kW AC power modules • 4.4 kW DC power modules **Note:** Mixing of AC and DC modules is not supported
Redundancy	• AC: N+N redundancy • DC: N+1 redundancy • Power module redundancy • A/B Feed redundancy • PEM redundancy	• AC: N+N redundancy • DC: N+1 redundancy • Power module redundancy • A/B Feed redundancy • PEM redundancy
Power zones	No power zone restrictions Fully load-sharing power infrastructure	No power zone restrictions Fully load-sharing power infrastructure
Power input	Worldwide ranging AC (200-240V; 50-60 Hz; 16A maximum) Worldwide ranging DC (-40 to -72V; 50A nominal, 60A maximum)	Worldwide ranging AC (200-240V; 50-60 Hz; 16A maximum) Worldwide ranging DC (-40 to -72V; 50A nominal, 60A maximum)
Power module airflow	Front-to-back	Front-to-back
Environmental Specifications (All Entries Applicable to Cisco ASR 9906 and ASR 9910)		
Operating temperature (nominal)	41 to 104ºF (5 to 40ºC)	
Operating temperature (short-term)[6]	23 to 131ºF (-5 to 55ºC) for ASR 9906 23 to 122ºF (-5 to 50ºC) for ASR 9910	
Operating humidity (nominal) (relative humidity)	5 to 90%	
Storage temperature	-40 to 158ºF (-40 to 70ºC)	
Storage (relative humidity)	5 to 93%	
Operating altitude	-60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)	
Regulatory Compliance (All Entries Applicable to Cisco ASR 9906 and ASR 9910)		
Network Equipment Building Standards (NEBS)	Cisco ASR 9906 and ASR 9910 Routers are designed to meet (qualification in progress): • SR-3580: NEBS Criteria Levels (Level 3) • GR-1089-CORE: NEBS EMC and Safety • GR-63-CORE: NEBS Physical Protection • VZ.TPR.9205: Verizon TEEER	

[6] Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year. (This number refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)

Specification	Model	
	Cisco ASR 9906	Cisco ASR 9910
ETSI standards	Cisco ASR 9906 and ASR 9910 Routers are designed to meet (qualification in progress): • EN300 386: Telecommunications Network Equipment (EMC) • ETSI 300 019 Storage Class 1.1 • ETSI 300 019 Transportation Class 2.3 • ETSI 300 019 Stationary Use Class 3.1	
EMC standards emission	Cisco ASR 9906 and ASR 9910 Routers are designed to meet: • FCC Class 47CFR15 A • ICES 003 Class A • AS/NZS CISRP22 Class A • CISPR 22 (EN55022) Class A • VCCI Class A • BSMI Class A • IEC/EN 61000-3-12: Power Line Harmonics • IEC/EN 61000-3-11: Voltage Fluctuations and Flicker • EN55022: Information Technology Equipment (Emissions) • EN 50121-4: Railway EMC	
EMC standards immunity	Cisco ASR 9906 and ASR 9910 Routers are designed to meet: • IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8kV Contact, 15kV Air) • IEC/EN-61000-4-3: Radiated Immunity (10V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2kV Power, 1kV Signal) • IEC/EN-61000-4-5: Surge AC Port (4kV CM, 2kV DM) • IEC/EN-61000-4-5: Signal Surge Ports (1kV) • IEC/EN-61000-4-5: Surge DC Port (1kV CM, 1kV DM) • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m) • IEC/EN-61000-4-11: Voltage DIPS, Short Interruptions, and Voltage Variations • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: Generic Immunity Standard • EN 50121-4: Railway EMC	
Safety	Cisco ASR 9904 and ASR 9910 Routers are designed to meet: • UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • ACA TS001 • AS/NZS 60950 • FDA Code of Federal Regulations Laser Safety	

Table 5. Cisco ASR 9912 and ASR 9922[7]

Specification	Model	
	Cisco ASR 9912	Cisco ASR 9922
Categories		
Physical specifications	Height: 52.5 in. (1333.5 mm) (30 RU) Width: 17.60 in. (447.04 mm) Depth: • With door: 30.03 in. (762.76 mm) • Without doors: 29.25 in. (742.95mm) Weight: • 231.25 lb (105.11 kg) (3 PEMs and chassis) • 389.55 lb (177.07 kg) (3 PEMs, 2 Fan Trays, 2 RP2, and 5 Fabric Card 2)	Height: 77 in. (1955.4 mm) (44 RU) Width: 17.60 in. (447.04 mm) Depth: • With doors: 30.68 in. (779.27 mm) • Without doors: 30.19 in. (766.82 mm) Weight: • 413 lb (187.73 kg) (4 PEM AND chassis) • 639.5 lb (290.7 kg) (2 RP2, 7 Fabric Cards 2, 4 Fan Trays, and 4 PEMs)

[7] Specific features depend on hardware and software.

Specification	Model	
	Cisco ASR 9912	Cisco ASR 9922
Slot orientation	Vertical	Vertical
Cisco ASR 9000 Series RSP	RSPs segregated into route processor and fabric cards	RSPs segregated into route processor and fabric cards
Route processor	Dual redundant route processors in 2 slots	Dual redundant route processors in 2 slots
Fabric cards	6 + 1 redundant fabric cards	6 + 1 redundant fabric cards
Cisco ASR 9000 Series line cards	10 line-card slots	20 line-card slots
"Commons" components	2 route processors 7 fabric cards 2 fan trays 3 PEMs (either DC or AC) 1 center fan filter, 2 side fan filters	2 route processors 7 fabric cards 4 fan trays 4 PEMs (either DC or AC) 1 center fan filter, 2 side fan filters
Reliability and availability	Fabric redundancy Fan redundancy Feed redundancy Power-supply redundancy Route-processor redundancy Software redundancy	Fabric redundancy Fan redundancy Feed redundancy Power-supply redundancy Route-processor redundancy Software redundancy
Rack mounting	19-in. 21- and 23-in. adapters available	19-in. 21- and 23-in. adapters available
Cabinet mounting	Yes **Note:** Doors not recommended in enclosed cabinets	Yes **Note:** Doors not recommended in enclosed cabinets
Wall mounting	No	No
Airflow	Front-to-back	Front-to-back
Performance		
Fabric	Seven switch fabric card slots: • Support for 6 + 1 redundancy • Operate in active/active nonblocking mode • Built-in service-intelligence and traffic-prioritization capability	Seven switch fabric card slots: • Supports 6 + 1 redundancy • Operate in active/active nonblocking mode • Built-in service-intelligence and traffic-prioritization capability
Thermal	Two fan trays: • 12 high-efficiency fans per tray • Variable-speed fans for optimal thermal performance • No single point of failure	Four fan trays: • 12 high-efficiency fans per tray • Variable-speed fans for optimal thermal performance • No single point of failure
Power		
Modularity	Pay-as-you-grow power for future scalability, available in AC and DC Multiple power module types: • 6 kW and 3 kW AC power modules • 4.4 kW and 2.1 kW DC power modules **Note:** Mixing of AC and DC modules is not supported	Pay-as-you-grow power for future scalability, available in AC and DC Multiple power module types: • 6 kW and 3 kW AC power modules • 4.4 kW and 2.1 kW DC power modules **Note:** Mixing of AC and DC modules is not supported
Redundancy	• AC: N+N redundancy • DC: N+1 redundancy • Power module redundancy • A/B Feed redundancy • PEM redundancy	• AC: N+N redundancy • DC: N+1 redundancy • Power module redundancy • A/B Feed redundancy • PEM redundancy
Power zones	No power zone restrictions Fully load-sharing power infrastructure	No power zone restrictions Fully load-sharing power infrastructure

Specification	Model	
	Cisco ASR 9912	Cisco ASR 9922
Power input	Worldwide ranging AC (200-240V; 50-60 Hz; 16A maximum) Worldwide ranging DC (-40 to -72V; 50A nominal, 60A maximum)	Worldwide ranging AC (200-240V; 50-60 Hz; 16A maximum) Worldwide ranging DC (-40 to -72V; 50A nominal, 60A maximum)
Power module airflow	Front-to-back	Front-to-back
Environmental Specifications (All Entries Applicable to Cisco ASR 9912 and ASR 9922)		
Operating temperature (nominal)	41 to 104ºF (5 to 40ºC)	
Operating temperature (short-term)[8]	23 to 131ºF (-5 to 55ºC)	
Operating humidity (nominal) (relative humidity)	5 to 90%	
Storage temperature	-40 to 158ºF (-40 to 70ºC)	
Storage (relative humidity)	5 to 93%	
Operating altitude	-60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)	
Regulatory Compliance (All Entries Applicable to Cisco ASR 9912 and ASR 9922)		
Network Equipment Building Standards (NEBS)	Cisco ASR 9912 and ASR 9922 Routers are designed to meet: • SR-3580: NEBS Criteria Levels (Level 3) • GR-1089-CORE: NEBS EMC and Safety • GR-63-CORE: NEBS Physical Protection • VZ.TPR.9205: Verizon TEEER	
ETSI standards	Cisco ASR 9912 and ASR 9922 Routers are designed to meet: • EN300 386: Telecommunications Network Equipment (EMC) • ETSI 300 019 Storage Class 1.1 • ETSI 300 019 Transportation Class 2.3 • ETSI 300 019 Stationary Use Class 3.1	
EMC standards emission	Cisco ASR 9912 and ASR 9922 Routers are designed to meet: • FCC Class 47CFR15 A • ICES 003 Class A • AS/NZS CISRP22 Class A • CISPR 22 (EN55022) Class A • VCCI Class A • BSMI Class A • IEC/EN 61000-3-12: Power Line Harmonics • IEC/EN 61000-3-11: Voltage Fluctuations and Flicker • EN55022: Information Technology Equipment (Emissions) • EN 50121-4: Railway EMC	
EMC standards immunity	Cisco ASR 9912 and ASR 9922 Routers are designed to meet: • IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8kV Contact, 15kV Air) • IEC/EN-61000-4-3: Radiated Immunity (10V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2kV Power, 1kV Signal) • IEC/EN-61000-4-5: Surge AC Port (4kV CM, 2kV DM) • IEC/EN-61000-4-5: Signal Surge Ports (1kV) • IEC/EN-61000-4-5: Surge DC Port (1kV CM, 1kV DM) • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m) • IEC/EN-61000-4-11: Voltage DIPS, Short Interruptions, and Voltage Variations • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: Generic Immunity Standard • EN 50121-4: Railway EMC	

[8] Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year. (This number refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)

Specification	Model	
	Cisco ASR 9912	Cisco ASR 9922
Safety	Cisco ASR 9912 and ASR 9922 Routers are designed to meet: • UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • ACA TS001 • AS/NZS 60950 • FDA Code of Federal Regulations Laser Safety	

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