

Cisco ASR 9000 Series Aggregation Services Routers

Product Overview

The Cisco® ASR 9000 Series represent an exciting new paradigm in the world of Carrier Ethernet transport with exceptional scalability, carrier-class reliability, environmentally conscious design, incredible flexibility, and an enticing new price-to-performance benchmark. It is Carrier Ethernet evolution, redefined.

The Cisco ASR 9000 Series has two form factors (Figure 1): the Cisco ASR 9010 Router and the Cisco ASR 9006 Router. Cisco ASR 9000 Series Routers are 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 Series



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

- Cisco IOS XR modular operating system: The Cisco ASR 9000 Series leverages Cisco IOS XR operating system made famous by the highly successful Cisco CRS Carrier Routing System platform in core deployments. Cisco IOS XR operating system is purpose-built for distributed systems such as the Cisco ASR 9000 Series and 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, that is, 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. 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 (E-OAM).”
- Operationally efficient and redundant hardware: The Cisco ASR 9000 Series provides an infrastructure where all common components, Route Switch Processors (RSPs), switching fabric, fans, and power supplies, are completely redundant. In addition, the platform is designed such that power is used 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 again providing an operationally efficient deployment. The Cisco ASR 9000 also provides a space-optimized small-platform option which uses the Series’ common components and retains a central office deployment-ready capability using a patent pending side-to-back airflow design.
- 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 had one goal in mind – reduced environmental impact through lowered power consumption and decreased cooling requirement. 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.

The Cisco ASR 9000 Series offers a significant value-add compared to the prior generations of Carrier Ethernet routing offerings by more than doubling the switching capacity (up to 400 Gbps per line-card slot), optimizing power and cooling requirements, offering an innovative modular power architecture, incorporating a ground-up High Availability design, and taking advantage of 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 upon 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. While 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. Cisco Active Network Abstraction (ANA) provides a framework for service activation provisioning, assurance, and management. Combining these elements with a comprehensive set of Ethernet and Multiprotocol Label Switching (MPLS) OAM capabilities, the Cisco ASR 9000 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 less

CapEx and operating expenses (OpEx) because of a reduction in network elements. The Cisco ASR 9000 is a critical component in optimizing service transport infrastructure because of its service flexibility, rich feature set, wide interface capability and seamless 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' Multi Service Edge (MSE), Ethernet optimized MSE (E-MSE) and Carrier Ethernet (CE) needs.

- Meeting tomorrow's service requirements: Designed into the Cisco ASR 9000 are critical capabilities enabling 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 can scale up to 400 Gbps per slot and up to 6.4 Tbps per system, 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 has been designed to offer advanced subscriber management as well as use the QuantumFlow Processor to deliver silicon-based security services and video. Video being the "voice" of tomorrow, the Cisco ASR 9000 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 provides an in-place upgrade roadmap to a switching capacity of up to 400 Gbps per slot without the need for a complete chassis replacement. This game changing ball is set rolling with a set of high density GE and 10GE Ethernet Services line cards utilizing versatile network processors to support an array of Carrier Ethernet applications. These Line-Cards, offered in base and extended-scale configurations, are complemented by the non-blocking fabric on the Route Switch Processor (RSP) and the future ready Back-Plane (BP), thermal and power infrastructure on the chassis.

The modular power architecture of Cisco ASR 9000 Series (available in both AC and DC versions) is powered by three different power supplies: 3-kW AC, 2-kW DC, and 1.5-kW DC. The power supplies are housed in field-serviceable Power Entry Modules (PEMs), which come in the AC and DC forms. Each PEM can hold up to 3 modules – of 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, requiring addition of 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 (Synchronous Ethernet, Building Integrated Timing Supply [BITS], Data Over Cable Service Interface Specification [DOCSIS] Timing Interface [DTI] etc.) and distribute them over the backplane to each slot. This capability allows rich 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 the future capacity requirements. Variable-speed high-efficiency fans provide reduced power requirements under normal operating environments while retaining capability to cool current and future line cards under extreme conditions.

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

Table 1. Hardware Available for Cisco ASR 9000 Series

Product Description	Product Number
Cisco ASR 9000 Series Chassis	
Cisco ASR 9010 chassis	ASR-9010-AC ASR-9010-DC
Cisco ASR 9006 chassis	ASR-9006-AC ASR-9010-DC
Cisco ASR 9000 Series Power Infrastructure	
AC, power supply, 3000 Watts	A9K-3KW-AC
DC, power supply, 2100 Watts	A9K-2KW-DC
DC, power supply, 1500 Watts	A9K-1.5KW-DC
Cisco ASR 9000 Series Thermal Infrastructure	
Cisco ASR 9010 fan, 2 fan-trays per chassis	ASR-9010-FAN
Cisco ASR 9006 fan, 2 fan-trays per chassis	ASR-9006-FAN
Cisco ASR 9010 fan filter, 1 per chassis	ASR-9010-FILTER
Cisco ASR 9006 fan filter, 1 per chassis	ASR-9006-FILTER

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

- [Cisco ASR 9000 Series Route Switch Processor](#)
- [Cisco ASR 9000 Series Ethernet Line Cards](#)
- [Cisco ASR 9000 Series SPA Interface Processor 700](#)

Software

The Cisco ASR 9000 Series Router delivers exceptional scale, service flexibility, and high availability into Carrier Ethernet transport networks. It is powered by Cisco IOS XR Software – an innovative self-healing, distributed operating system designed for always-on operation while scaling system capacity up to 6.4 Tbps. This 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 feature richness to the world of Carrier Ethernet that has made the Cisco CRS the dominant entity in the Service Provider core. It 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 support for the Cisco ASR 9000 Series Router, which is designed to address the Carrier Ethernet foundation for visual networking. The Cisco ASR 9000 further enhances the IP Next-Generation Network (NGN) Carrier Ethernet design for converged, resilient, intelligent, and scalable services 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, 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; IPoDWDM, Synchronous Ethernet (SyncE), Ethernet OA&M/Multiprotocol Label Switching (MPLS) OA&M, Layer 2 and Layer 3 access control lists (ACLs), H-QoS, MPLS Traffic Engineering Fast Reroute (MPLS TE-FRR), Multi-chassis LAG (MC-LAG), Integrated Routing and Bridging (IRB) and Nonstop Forwarding/Nonstop Routing (NSF/NSR).

Cisco IOS XR Software Releases 4.0.0 and 4.0.1 introduce the support for a comprehensive portfolio of shared port adaptors (SPAs) to facilitate the multiservice edge (MSE) and Ethernet MSE (E-MSE) capability on the Cisco ASR 9000 Series. The Cisco ASR 9000 Series MSE and E-MSE capabilities allow enterprises to offer powerful business VPN services with strong SLA (service-level agreement) enforcement. Such services typically require simultaneous

scale increases across multiple dimensions, for example, the number of Virtual Route Forwarding (VRF) interfaces, IPv4 and IPv6 route scaling, Bidirectional Forwarding Detection (BFD) sessions and instances of Border Gateway Protocol (BGP) Non-Stop Routing (NSR) interfaces. A Cisco ASR 9000 Series system configuration requiring high multiple dimensional scale requires the A9K-RSP-8G to support the increased system scale.

Table 2 provides a snapshot of the software features the Cisco ASR 9000 Series offers. For complete details please refer to the product bulletin.

Table 2. Software Feature Highlights

Features
Cisco IOS XR Software
<ul style="list-style-type: none"> • Modular software design • OS infrastructure protection • Process and thread protection • In Service Software Upgrade (ISSU) • Process restart • State checkpoint
Ethernet Services
<ul style="list-style-type: none"> • Ethernet Virtual Connections (EVCs) • Flexible VLAN classification • Flexible VLAN translation • IEEE bridging • IEEE 802.1s Multiple Spanning Tree (MST) • MST Access Gateway • L2VPN <ul style="list-style-type: none"> ◦ Virtual Private LAN Services (VPLS), Hierarchical VPLS (H-VPLS), Virtual Private Wire Service (VPWS), Ethernet over MPLS (EoMPLS), pseudowire redundancy, and multisegment pseudowire stitching
Layer 3 Services
<ul style="list-style-type: none"> • Layer 3 Routing <ul style="list-style-type: none"> ◦ IPv4 Routing (Border Gateway Protocol [BGP], Intermediate System-to-Intermediate System [IS-IS], and Open Shortest Path First [OSPF]), Route Policy Language (RPL), Hot Standby Router Protocol (HSRP), Virtual Router Redundancy Protocol (VRRP), IPv6 Routing, and BGP Prefix Independent Convergence (PIC) • MPLS <ul style="list-style-type: none"> ◦ Label Distribution Protocol (LDP), Targeted LDP (T-LDP), Resource Reservation Protocol (RSVP), Differentiated Services (DiffServ)-aware traffic engineering, MPLS L3VPN (including Carrier Supporting Carrier [CSC]), IPv6 Provider Edge and IPv6 VPN to Provider Edge ◦ MPLS Traffic Engineering (including TE-FRR) ◦ MPLS TE Preferred Path
Multiservice Edge (MSE) and Ethernet MSE (E-MSE)
<ul style="list-style-type: none"> • Packet Over SONET and Packet Over Synchronous Digital Hierarchy (SDH) • Non-Ethernet interface support up to OC192/STM64 • Frame Relay, Point-to-Point Protocol (PPP), High-Level Data Link Control (HDLC), • Frame Relay Fragmentation.16 (FRF.16) Multilink Frame Relay (MLFR), Multilink Point-to-Point Protocol (MLPPP), Link Fragment Interleaving, FRF.12 • Any Transport over MPLS (AToM) • Internet Protocol header Compression (IPHC) • Link Noise Monitoring (LNM) • System granularity scales down to nxDS0 • Full Netflow
QoS
<ul style="list-style-type: none"> • More than 3 million queues per system • Class-Based Weighted Fair Queuing (CBWFQ) • Weighted Random Early Detection (WRED) • Priority Queuing with propagation • 2-rate 3-color (2R3C) Policing • Modular QoS CLI (MQC) • 4-level H-QoS • In-Service Modification

Features
Multicast <ul style="list-style-type: none"> • IPv4 Multicast <ul style="list-style-type: none"> ◦ Source-based and shared distribution trees, Protocol Independent Multicast sparse mode (PIM-SM), PIM Source Specific Multicast (PIM SSM), Automatic route processing (AutoRP), Multiprotocol BGP (MBGP), Multicast Virtual Private Network (MVPN), and Multicast Source Discovery Protocol (MSDP) • Internet Group Management Protocol Versions 2 and 3 (IGMPv2 and v3) <ul style="list-style-type: none"> ◦ IGMPv2 and v3 snooping
Manageability and Availability <ul style="list-style-type: none"> • High Availability <ul style="list-style-type: none"> ◦ Cisco IOS XR high-availability feature set, MPLS TE-FRR, BFD, 802.3ad Link Aggregation Bundles, NSF, Multi-Chassis Link Aggregation (MC-LAG) and NSR • Manageability <ul style="list-style-type: none"> ◦ Cisco IOS XR manageability feature set, Cisco ANA, MIB, XML, and Simple Network Management Protocol (SNMP) • OAM <ul style="list-style-type: none"> ◦ Ethernet OAM (IEEE 802.3ah and IEEE 802.1ag) ◦ MPLS OAM (label switched path [LSP] ping, LSP traceroute, and Virtual Circuit Connectivity Verification [VCCV])
Security <ul style="list-style-type: none"> • Cisco IOS XR Software: Cisco IOS XR Software provides comprehensive network security features, including access control lists (ACLs); control-plane protection; routing authentications; authentication, authorization, and accounting (AAA) and TACACS+; Secure Shell (SSH) Protocol; SNMPv3; and leading Routing Policy Language (RPL) support. • Layer 2 ACLs: You can use this security feature to filter packets under an EVC based on MAC addresses. • Layer 3 ACLs: This feature provides ACL matching by IPv4 packet attributes. • Security: Many critical security features are supported: <ul style="list-style-type: none"> ◦ 802.1ad Layer 2 Control Protocol (L2CP) and bridge-protocol-data-unit (BPDU) filtering ◦ MAC limiting per EFP or bridge domain ◦ Unicast, multicast, and broadcast storm-control blocking on any interface or port ◦ Unknown Unicast Flood Blocking (UUFb) ◦ Dynamic Host Configuration Protocol (DHCP) snooping ◦ Unicast Reverse Path Forwarding (URPF) ◦ Control-plane security ◦ Dynamic ARP Inspection (DAI) ◦ IP Source Guard (IPSG)
MIB <ul style="list-style-type: none"> • Support for a large number of hardware and product-specific as well as software feature MIBs; following is a partial list of MIBs supported; Cisco has further documentation available on any restrictions related to these MIBs as part of the "Cisco ASR 9000 MIB Guide"; the SNMP implementation and related details are also provided in the "System Manageability White Paper": <ul style="list-style-type: none"> ◦ IP-MIB (RFC4293), CISCO-BULK-FILE-MIB, CISCO-CONFIG-COPY-MIB, CISCO-CONFIG-MAN-MIB, CISCO-ENHANCED-IMAGE-MIB, CISCO-ENHANCED-MEMORY-POOL-MIB, CISCO-ENTITY-FRU-CONTROL-MIB, CISCO-ENTITY-SENSOR-MIB, ENTITY-MIB, CISCO-ENTITY-ASSET-MIB, ENTITY-STATE-MIB, ENTITY-SENSOR-MIB, CISCO-ENTITY-ALARM-MIB, CISCO-FLASH-MIB, CISCO-IF-EXTENSION-MIB, CISCO-MEMORY-POOL-MIB, CISCO-RF-MIB (1:1 RP Card), CISCO-SYSLOG-MIB, EVENT-MIB, IF-MIB as well as RFC1213-MIB, SNMP-COMMUNITY-MIB, SNMP-FRAMEWORK-MIB, SNMP-NOTIFICATION-MIB, SNMP-TARGET-MIB, IPv6-MIB, BRIDGE-MIB, DOT3-OAM-MIB, CISCO-IETF-PW-MIB, CISCO-CLASS-BASED-QOS-MIB, ETHERLIKE-MIB, BGP4-MIB including Cisco extensions, MPLS TE STD MIB, TE-FRR-MIB, and CISCO-IETF-IPMROUTE-MIB, IEEE-8021-CFM-MIB, DOT3-OAM-MIB

Product Specifications

Figure 2. Cisco ASR 9000 Series (with Optional Doors)



Table 3 provides details on the two chassis variants of the Cisco ASR 9000 Series: the Cisco ASR 9010 and the Cisco ASR 9006. Both of these systems are designed to the same high standards of performance and reliability, feature the same power and thermal innovations, and can share the RSPs, line cards (LCs), PEMs, and power supplies – for maximum flexibility in your network planning.

Table 3. Product Specifications¹

Model	Cisco ASR 9010	Cisco ASR 9006
Categories		
Physical Specifications	Height: 36.75 in. (933.5 mm) Width: 17.5 in. (444.5 mm) Depth: <ul style="list-style-type: none"> • With doors: 31.45 in. (798.8 mm) • Without doors: 28.65 in (727.2 mm) Weight: <ul style="list-style-type: none"> • 191 lbs (86.8 kg) (Unloaded) • 375 lb (170.5 kg) (maximum) 	Height: 17.5 in. (444.5 mm) Width: 17.5 in. (444.5 mm) Depth: <ul style="list-style-type: none"> • With doors: 31.45 in. (798.8 mm) • Without doors: 28.65 in (727.2 mm) Weight: <ul style="list-style-type: none"> • 110 lbs (50 kg) (Unloaded) • 230 lbs (106.8 kg) (Fully Loaded)
Slot Orientation	Vertical	Horizontal
Cisco ASR 9000 Series RSP	Dual redundant RSPs in 2 slots	Same as Cisco ASR 9010
Cisco ASR 9000 Series LCs	Eight line card slots	Four line card slots
“Commons” Components	Two RSPs Two fan trays Two PEMs (either DC or AC) One fan filter	Two RSPs Two fan trays One PEM (either DC or AC) One fan filter
Reliability and Availability	Fabric redundancy Fan redundancy Feed redundancy Power-supply redundancy RSP redundancy Software redundancy	Same as Cisco ASR 9010

¹ Specific features are hardware and software dependent

Model	Cisco ASR 9010	Cisco ASR 9006
Rack Mounting	Yes <ul style="list-style-type: none"> • 19-inch • 21 and 23 inch adapters available 	Same as Cisco ASR 9010 Note: Minimum 17.75-in. opening between posts is needed for proper operation.
Cabinet Mounting	Yes Note: Doors not recommended in enclosed cabinets	Same as Cisco ASR 9010
Wall Mounting	No	Same as Cisco ASR 9010
Airflow	Front-to-back	Side-to-back
Performance		
Chassis Switching Capacity²	Up to 6.4 Tbps	Up to 3.2 Tbps
Fabric	One per RSP <ul style="list-style-type: none"> • Active / Active non-blocking operation mode in dual RSP redundant configuration. • Fully redundant in dual RSP redundant configuration • Built-in service-intelligence and traffic-prioritization capability 	Same as Cisco ASR 9010
Thermal	Two fan trays <ul style="list-style-type: none"> • Twelve high-efficiency fans per tray • Variable-speed fans for optimal thermal performance • No single point of failure 	Two fan trays <ul style="list-style-type: none"> • Six high-efficiency fans per tray • Variable-speed fans for optimal thermal performance • No single point of failure
Power		
Modularity	<ul style="list-style-type: none"> • Up to 6 power modules (AC or DC) for future scalability Multiple power module types <ul style="list-style-type: none"> • 3-kW AC power module • 2.1 and 1.5-kW DC power modules Note: Mixing of AC and DC modules is not supported. DC modules can be mixed and matched.	<ul style="list-style-type: none"> • Up to 3 power modules (AC or DC) for future scalability Multiple power module types <ul style="list-style-type: none"> • Same as Cisco ASR 9010 Note: Mixing of AC and DC modules is not supported. DC modules can be mixed and matched.
Redundancy	<ul style="list-style-type: none"> • Module redundancy: 1:N–1:1 • Feed redundancy • PEM redundancy 	<ul style="list-style-type: none"> • Module redundancy: 1:N–1:1 • Feed redundancy
Power Zones	None <ul style="list-style-type: none"> • Fully load-sharing power infrastructure 	Same as Cisco ASR 9010
Power Input	Worldwide ranging AC (200–240V; 50–60 Hz; 16A maximum) Worldwide ranging DC (–40 to –72V; 50A nominal, 60A maximum)	Same as Cisco ASR 9010
Power Consumption³	Typical: 3140 Watts (full LC component)	Typical: 1900 Watts (full LC component)
Power Module Airflow	Front-to-back	Same as Cisco ASR 9010
Environmental Specifications		
Operating Temperature (nominal)	41 to 104°F (5 to 40°C)	Same as Cisco ASR 9010
Operating Temperature (short-term)⁴	23 to 131°F (–5 to 55°C)	Same as Cisco ASR 9010
Operating Humidity (nominal) (relative humidity)	5 to 95%	Same as Cisco ASR 9010
Operating Humidity (short-term)	5 to 90% Note: Not to exceed 0.024 kg water per kg of dry air	Same as Cisco ASR 9010
Storage Temperature	–40 to 158°F (–40 to 70°C)	Same as Cisco ASR 9010
Storage (relative humidity)	5 to 95% Note: Not to exceed 0.024 kg water per kg of dry air.	Same as Cisco ASR 9010
Operating altitude	–60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950)	Same as Cisco ASR 9010

² In dual-RSP mode

³ The system infrastructure is designed to work through 1.5kW – 9kW range while meeting redundancy requirements. Quoted Max power consumption extends over all operating conditions (e.g. short-term conditions specified in Environmental Specifications)

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.)

Model	Cisco ASR 9010	Cisco ASR 9006
	requirements)	
Regulatory Compliance		
Network Equipment Building Standards (NEBS)	Cisco ASR 9010 is designed to meet (qualification in progress): <ul style="list-style-type: none"> • 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 	Same as Cisco ASR 9010
European Telecommunications Standards Institute (ETSI) Standards	Cisco ASR 9010 is designed to meet (qualification in progress): <ul style="list-style-type: none"> • 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 	Same as Cisco ASR 9010
EMC Standards Emission	Cisco ASR 9010 is designed to meet: <ul style="list-style-type: none"> • 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 	Same as Cisco ASR 9010
EMC Standards Immunity	Cisco ASR 9010 is designed to meet: <ul style="list-style-type: none"> • 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 	Same as Cisco ASR 9010
Safety	Cisco ASR 9010 is designed to meet: <ul style="list-style-type: none"> • UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • ACA TS001 • AS/NZS 60950 • FDA – Code of Federal Regulations Laser Safety • OSHA acoustic requirements 	Same as Cisco ASR 9010

Cisco Services for Cisco ASR 9000

Through a lifecycle services approach, Cisco delivers comprehensive support for service providers to help them successfully deploy, operate, and optimize their IP Next-Generation Networks (IP NGNs). Cisco Services for the Cisco ASR 9000 Aggregation Services Routers provide the services and proven methodologies that help assure service deployment with substantial return on investment, operational excellence, optimal performance, and high availability. These services are delivered using leading practices, tools, processes, and lab environments developed specifically for Cisco ASR 9000 deployments and postimplementation support. The Cisco Services team addresses your specific requirements, mitigates risk to existing revenue-generating services, and helps accelerate time to market for new network services.

For more information about Cisco Services, contact your local Cisco account representative or visit:

<http://www.cisco.com/go/spservices>.

Ordering Information

To place an order, visit the Cisco Ordering Home Page. For more details about how to order, please refer to the Cisco ASR 9000 Series ordering guide.



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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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