Cisco ASR 9001 Aggregation Services Router - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The Cisco ASR 9001 Aggregation Services Router represents a paradigm shift in compact, carrier-grade routing, delivering 120 Gbps of nonblocking, full-duplex fabric capacity within a space-efficient two-rack-unit (2RU) form factor. Engineered as a key component of the Cisco ASR 9000 Series, this platform is optimized for service provider edge and enterprise WAN core deployments, providing a high-capacity Provider Edge (PE) router solution without compromising on feature richness or performance. By leveraging the modular Cisco IOS XR operating system, the ASR 9001 ensures feature parity with its larger chassis siblings, enabling network operators to standardize on a single, resilient software image across diverse hardware footprints. This platform is meticulously designed for high availability and scalability, offering a robust, future-proof foundation for delivering advanced Carrier Ethernet, IP/MPLS, and next-generation network services.



HARDWARE ARCHITECTURE & SILICON

SYSTEM ON-CHIP ARCHITECTURE: The ASR 9001 integrates a high-performance Route Switch Processor (RSP) alongside a sophisticated forwarding engine complex. At its core, the system is built around two identical Network Processors (NPs). This distributed forwarding architecture allows all interfaces—both fixed and modular—to support advanced features such as Hierarchical Quality of Service (H-QoS) typically found on larger 'Services Edge' line cards. The Route Processor features a 4-core CPU complex with a higher clock rate than previous-generation RSPs, delivering control plane performance that is approximately equivalent to the RSP440, ensuring robust routing table processing and protocol convergence .

INTERFACE CONFIGURABILITY: The base chassis provides four fixed 10 Gigabit

Ethernet SFP+ ports for immediate connectivity . To enhance deployment flexibility, the router features two modular bays that accept a variety of Modular Port Adapters (MPAs), including options for 20x1GE (SFP), 2x10GE (XFP), 4x10GE (XFP), and 1x40GE (QSFP+). This modularity allows for tailored interface combinations, supporting mixed 1/10/40 Gigabit Ethernet densities in a compact footprint, providing investment protection and scalability .

KEY FEATURES & ROUTING LOGIC

- CARRIER-CLASS OPERATING SYSTEM: Powered by Cisco IOS XR Software, a self-healing, distributed operating system designed for always-on operation. This provides end-to-end IP/MPLS solutions and reduces operational complexity by standardizing on a single OS across the network .
- HIGH-PERFORMANCE ROUTING: The integrated RSP with 8 GB RAM is capable of holding several million routes, making the ASR 9001 suitable for use as a dedicated route-reflector appliance or a high-scale PE router .
- COMPREHENSIVE SERVICE SUPPORT: Supports a full suite of features including Ethernet Services, L2VPN, L3VPN, IPv4 and IPv6, multicast, Hierarchical Quality of Service (HQoS), MPLS Traffic Engineering Fast Reroute (MPLS TE-FRR), Multichassis Link Aggregation (MC-LAG), and Cisco Nonstop Forwarding (NSF) and Nonstop Routing (NSR) .
- ADVANCED SYNCHRONIZATION AND TIMING: Features hardware-based IEEE

1588 support for precise packet-based timing delivery. It also includes redundant, centralized network synchronization support through two independent clock source connections: Building Integrated Timing Supply (BITS) and Synchronization Supply Unit (SSU) with DOCSIS Timing Interface (DTI), alongside a GPS input for Stratum-1 clocking .

- CONTROL PLANE EXTENSION: Includes two 10 G out-of-band Ethernet communications ports that support Network Virtualization (nV) technology for high-availability cluster applications, enabling control plane separation and scaling .

- REDUNDANT POWER AND COOLING: Supports hot-swappable, redundant AC or DC power supplies (A9K-750W-AC / A9K-750W-DC) and features a side-to-side airflow cooling design to ensure high reliability in diverse operating environments .

COMPLIANCE & STANDARDS

The Cisco ASR 9001 Router is designed to meet and exceed rigorous industry standards for telecommunications equipment, ensuring interoperability and reliability in carrier and enterprise networks.

- NETWORK EQUIPMENT BUILDING STANDARDS (NEBS): Designed to meet SR-3580 (NEBS Criteria Levels Level 3), GR-1089-CORE (NEBS EMC and Safety),

and GR-63-CORE (NEBS Physical Protection) .

- ETSI STANDARDS: Designed to meet EN300 386 (Telecommunications Network Equipment EMC), ETSI 300 019 (Storage, Transportation, and Stationary Use classes), EN55022 (Emissions), and EN55024 (Immunity) .

- EMC AND SAFETY: Compliant with FCC Class A, ICES 003 Class A, CISPR 22 Class A, VCCI Class A, and AS/NZS 3548 Class A standards. Safety certifications include UL/CSA/IEC/EN 60950-1 and IEC/EN 60825 Laser Safety .

- IMMUNITY: Tested for stringent immunity standards including IEC/EN-61000-4-2 (ESD), IEC/EN-61000-4-3 (Radiated Immunity), and IEC/EN-61000-4-5 (Surge) .

TECHNICAL SPECIFICATIONS

The Cisco ASR 9001 delivers its performance through a carefully balanced hardware architecture, engineered for low latency and high throughput. Key performance metrics include:

- SYSTEM THROUGHPUT: 120 Gbps of nonblocking, full-duplex fabric capacity .

- FORWARDING ENGINE: Dual Network Processors (NPs) providing distributed forwarding plane architecture for enhanced performance and scale .

- CONTROL PLANE PROCESSOR: 4-core CPU complex with 8 GB RAM (RP memory) and 8 GB memory for the forwarding complex .

Category	Specification
Form Factor	2-Rack-Unit (2RU) Standard 19-inch Rack-Mountable
Switching Capacity	120 Gbps Nonblocking, Full-Duplex Fabric Capacity
Integrated Interfaces	4 x 10 Gigabit Ethernet SFP+ Ports
Modular Port Adapters	20x1GE (SFP), 2x10GE (XFP), 4x10GE (XFP), 1x40GE (QSFP+)
Route Processor Memory	8 GB RAM (RP Memory) / 8 GB RAM (Forwarding Complex Memory)
Power Supply	Dual Hot-Swappable Redundant AC (A9K-750W-AC) or DC (A9K-750W-DC), N+1 Protected
Typical / Max Power Consumption	425 W / 525 W
Physical Dimensions (H x W x D)	3.47 x 17.42 x 18.5 in (88.2 x 442 x 470 mm)
Weight (Fully Configured)	37.91 lbs (17.2 kg)
Airflow	Side-to-Side
Operating Temperature (Nominal)	41° to 104°F (5° to 40°C)

ORDERING SKU INFORMATION

For flexible procurement, the Cisco ASR 9001 is available through multiple SKUs, accommodating both new deployments and refresh initiatives.

- ASR-9001: Cisco ASR 9001 Chassis Bundle (includes chassis, fan, and power supplies) .
- ASR-9001-BUN: Cisco ASR 9001 Chassis Bundle .
- ASR-9001-S: Cisco ASR 9001-S Router with 60 Gbps capacity (upgradable to 120 Gbps via license) .
- ASR-9001-RF: Cisco ASR 9001 Remanufactured Router .
- A9K-750W-AC: 750W AC Power Supply Module for ASR 9001 .
- A9K-750W-DC: 750W DC Power Supply Module for ASR 9001 .
- Modular Port Adapters (MPAs) are orderable separately to meet specific interface requirements .

