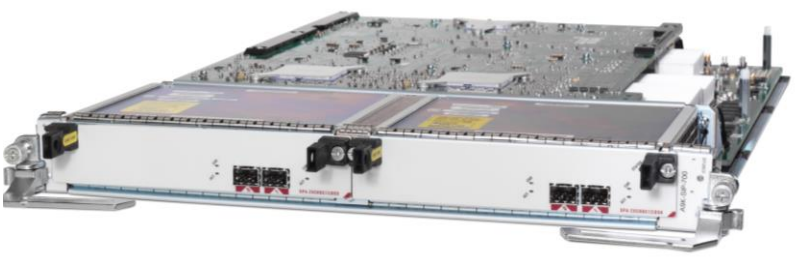
Cisco ASR 9000 Series SPA Interface Processor 700

Product Overview

The Cisco® ASR 9000 Series SPA Interface Processor (SIP) extends the unprecedented scale and flexibility of Cisco's flagship edge router. The Cisco ASR 9000 Series represent an exciting new paradigm in the world of routing with exceptional Layer 2 and Layer 3 scalability, carrier-class reliability, environmentally conscious design, incredible flexibility, and an enticing new price-to-performance benchmark. 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 SIP-700



The Cisco I-Flex design combines shared port adapters (SPAs) and SPA interface processors (SIPs), building on an extensible design that permits service prioritization for data and voice services. Enterprises and service providers customers can take advantage of improved slot economics resulting from modular port adapters that are interchangeable across Cisco routing platforms. The I-Flex design maximizes connectivity options and offers superior service intelligence through programmable interface processors.

Features and Benefits

The Cisco ASR 9000 Series SPA Interface Processor 700 (A9K-SIP-700) uses established hardware and software designs to accelerate the introduction of new, varied physical layers and help achieve a lower total cost of ownership (TCO). It is an integral part of the multiservice edge (MSE), Ethernet MSE (E-MSE) and mobile backhaul capabilities on the Cisco ASR 9000 Series. Through the use of its scalable Ethernet line cards and the A9K-SIP-700 line card, the Cisco ASR 9000 Series brings convergence to next-generation IP Radio Access Networks (IP RANs) by allowing coexistence of both Ethernet and time-division multiplexing (TDM) interfaces in the same highly scalable platform. The Cisco ASR 9000 Series MSE and E-MSE capabilities allow service providers to offer powerful business VPN services with strong service-level agreement (SLA) enforcement. Such services typically require simultaneous scale increases across multiple dimensions, for example, number of Virtual Route Forwarding (VRF) interfaces, IPv4 and IPv6 route scaling, instances of Border Gateway Protocol (BGP) Non-Stop Routing (NSR) interfaces, and so on. The Cisco ASR 9000 Series components, including the A9K-SIP-700, are designed for precisely such high-scale service integration.

Powered by the Cisco Flow Processor, the four-bay A9K-SIP-700 line card offers flexible deployable options for customers. The Cisco Flow Processor is a fully integrated and programmable chipset designed to unify massive parallel processing, advanced memory management, security, and sophisticated QoS mechanisms, as well as virtual service delivery and programmability. Cisco Flow Processor provides powerful hierarchical QoS, multidimensional scalability, and support for rich Layer 3 services and features. The A9K-SIP-700 supports dense serial channelization all the way from DS0 to OC48 speeds. For packet over SONET/SDH (POS) network architectures, it supports speeds up to OC192/STM64.

The Cisco ASR 9000 Series allows operators to deploy any combination of Layer 2 and Layer 3 service applications at an industry-leading price-to-performance ratio. The Cisco ASR 9000 SIP-700 is designed to complement this ability by, over time, extending the same scalability and reliability to the realm of traditional transport media such as TDM, Frame Relay, ATM, and POS, thereby reducing capital expenditures (CapEx) and operating expenses (OpEx), as well as reducing the time required to develop and deploy new services. It also allows service providers to continue their deployed services, keeping those revenue streams open, while simultaneously migrating to the next-generation routing platform that opens up new channels of revenue.

By seamlessly integrating within the same chassis, the SIP-700 and Ethernet line cards provide true network and device convergence – a key design goal for the Cisco ASR 9000 Series of routers. The Cisco ASR 9000 SIP-700 only utilizes one line card slot within the Cisco ASR 9000 Series chassis saving valuable line-card real estate, and can be deployed within both the Cisco ASR 9010 and 9006 without any power-zone restrictions.

Fully integrated with the Cisco ASR 9000 Series synchronization circuitry, the Cisco ASR 9000 SIP-700 line cards provide standards-based line-interface functions for delivering and deriving transport-class network timing, allowing support of network-synchronized services and applications such as mobile backhaul and TDM migration.

Product Specifications

Table 1 lists specifications for the Cisco ASR 9000 SIP-700 line card.

Table 1. Cisco ASR 9000 SIP-700 Specifications[1]

Feature	Description
Chassis compatibility	All Cisco ASR 9000 Series chassis
Software compatibility	Cisco IOS XR Software Release 3.9 or later
Density	Up to 4 single-height SPAs **or** Up to 2 double-height SPAs **or** A combination of the two – subject to above restrictions
Interface Capabilities	A9K-SIP-700 supports following SPA interface types: ◦ CHT1/E1 ◦ CT3/DS0 ◦ T3/E3 ◦ OC3 / STM1 ◦ ChOC3 / ChSTM1 ◦ OC12 / STM4 ◦ ChOC12 / ChSTM4 ◦ OC48 / STM16 ◦ ChOC48 / ChSTM16 ◦ OC192 / STM64

[1] Specific scale support is hardware and software dependent.

Feature	Description
Routing and Service capabilities	• IPv4 and IPv6 Routing. Some of the supported features include: ◦ BGP ◦ Intermediate System-to-Intermediate System (IS-IS) ◦ Open Shortest Path First (OSPF) ◦ Route Policy Language (RPL) ◦ BGP Prefix Independent Convergence (PIC) ◦ Multiprotocol Label Switching (MPLS) ◦ Multicast Virtual Private Network (MVPN) ◦ IPv6 Provider Edge (6PE) ◦ IPv6 Virtual Private Network to Provider Edge (6vPE) ◦ Traffic Engineering Fast Re-Route (TE-FRR), and Layer 3 VPN (L3VPN) services ◦ Packet over SONET ◦ Packet over SDH ◦ Frame Relay Point-to-Point Protocol (PPP) ◦ High-Level Data Link Control (HDLC) ◦ Multilink Point-to-Point Protocol (MLPPP) ◦ Multilink Frame Relay (MLFR) ◦ Link Fragmentation and Interleaving (LFI) ◦ Internet Protocol Header Compression (IPHC) ◦ Link Noise Monitoring (LNM), Any Transport over MPLS (AToM) ◦ Full Netflow
Synchronization	Derives and provides synchronization to and from SONET/SDH interfaces. Interworks with Synchronous Ethernet (SyncE) support on the Ethernet interfaces and network synchronization interfaces on the Cisco ASR 9000 Route Switch Processor (RSP).
Reliability and high availability	• Online Insertion and Removal (OIR) without affecting system traffic • Multi-Router Automatic Protection Service (MR-APS) is a Cisco developed feature that provides protection against various hardware and software faults, including catastrophic system failure. MR-APS builds on the Telcordia Technologies -defined APS standard by adding Protect Group Protocol (PGP) communication between redundant routers. The SONET APS signaling and the PGP communication convey system state and SONET link state information between the Working and Protect routers. Upon failure of the network links or one of the routers, a backup path is available to prevent loss of service. • Inter-Chassis Stateful Switchover (IC-SSO) for PPP consists of a collection of Cisco IOS XR Software subfeatures that provide switchover of PPP sessions to a backup router in the event of network or router failure. The feature integrates the MR-APS, IP Fast Reroute (FRR), and Simple Server Redundancy Protocol (SSRP) features to provide fast switchover of PPP data traffic. • Bi-directional Forwarding Detection (BFD) provides rapid failure detection times between forwarding engines, while maintaining low overhead. It also provides a single, standardized method of link/device/protocol failure detection at any protocol layer and over any media.
Manageability	• Cisco IOS XR Software includes industry-standard management interfaces, including modular command-line interface (CLI), Simple Network Management Protocol (SNMP), and native XML interfaces. • Cisco Active Network Abstraction (ANA) is a flexible, vendor-neutral management framework for a multi-technology, multiservice network environment. Operating between the network and the operations-support-system (OSS) layer, Cisco ANA aggregates virtual network elements (VNEs) into a software-based virtual network, much as real network elements create the real-world network. Cisco ANA dynamically discovers network components and tracks the status of network elements in near real time. • Cisco ANA offers service providers: ◦ Simplified integration of OSS applications with network information ◦ A flexible common infrastructure for managing network resources ◦ Consistent procedures and interfaces for all network elements

Feature	Description
MIBs	Support for a large number of hardware and product-specific as well as software feature MIBs; following is a partial list of MIBs supported: • ENTITY-MIB, • CISCO-ENTITY-SENSOR-MIB • CISCO-ENTITY-ASSET-MIB • CISCO-ENTITY-FRU-CONTROL-MIB. • IF-MIB, DS1-MIB • SONET-MIB • CISCO-SONET-MIB • BFD-MIB
Physical dimensions (H x W x D); weight	14 x 1.72 x 20.5 in.; 14 lb
Power	375W (maximum)
Operating temperature (nominal)	41 to 104ºF (5 to 40ºC)
Operating temperature (short-term)[2]	23 to 131ºF (–5 to 55ºC)
Operating humidity (nominal) (relative humidity)	10 to 85%
Storage temperature	–40 to 158ºF (–40 to 70ºC)
Storage (relative humidity)	5 to 95% Note: Not to exceed 0.024 kg water per kg of dry air
Operating altitude	–60 to 4000m (up to 2000m conforms to IEC, EN, UL, and CSA 60950 requirements)

Approvals and Compliance

As is expected of any component of the Cisco ASR 9000 Series of routers, the SIP line card achieves extensive compliance, demonstrating its carrier-class focus and capabilities. Table 2 gives compliance information.

Table 2. Compliance and Agency Approvals for Cisco ASR 9000 SIP-700

Item	Specifications
Network Equipment Building Standards (NEBS)	This product is designed to meet the following requirements: • 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	• 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 • EN55022: Information Technology Equipment (Emissions) • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: Generic Immunity Standard
EMC standards	• FCC Class A • ICES 003 Class A • AS/NZS 3548 Class A • CISPR 22 (EN55022) Class A • VCCI Class A • BSMI Class A • IEC/EN 61000-3-2: Power Line Harmonics • IEC/EN 61000-3-3: Voltage Fluctuations and Flicker • EN 50121-4: Railway EMC

[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.)

Item	Specifications
Immunity	• 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 Ports (1kV) • IEC/EN-61000-4-5: Surge DC Port (1kV) • 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 • EN 50121-4: Railway EMC
Safety	• UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • ACA TS001 • AS/NZS 60950 • FDA-Code of Federal Regulations Laser Safety

Pluggable Interfaces

Please see the Cisco ASR 9000 Transceiver Module data sheet for a complete list of transceivers supported by the A9K-SIP-700 SPAs.

System Requirements

Cisco ASR 9000 SIP-700 line cards can be deployed in any Cisco ASR 9000 Series platform starting with Cisco IOS XR Software Release 3.9.0.

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. This support complements the high-queue (-E) class of Ethernet Line-cards that are designed for use in high-touch high-scale business-VPN E-MSE services. 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, and so on. A Cisco ASR 9000 Series system configuration requiring high multiple dimensional scale requires the A9K-RSP-8G to support the increased system scale.

Ordering Information

The Cisco ASR 9000 SIP-700 is available in a single version capable of handling multiple SPA types. This single version provides high-scale, powerful H-QoS, high queue density, and interface flexibility. Software licenses are not required on the Cisco ASR 9000 SIP-700.

Table 3 provides ordering information for the Cisco ASR 9000 SIP-700 line card.

Table 3. Ordering Information

Product Name	Part Number
Cisco ASR 9000 SPA Interface Processor-700	A9K-SIP-700
Cisco ASR 9000 SPA Interface Processor-700, Spare	A9K-SIP-700=

To place an order, visit Cisco Ordering Home Page or refer to Table 3.

Downloading the Software

Visit the Cisco Software Center to download the latest Cisco IOS XR Software Release.

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 to protect your network investment, optimize network operations, and prepare the 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.

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For More Information

For more information about the Cisco ASR 9000 Series SIP-700 line cards, visit the Cisco ASR 9000 Series homepage or contact your local Cisco account representative.

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