Cisco ASR 1000 Series Aggregation Services Routers

Cisco is reinventing edge routing with the Cisco® ASR 1000 Series Aggregation Services Routers, a portfolio of midrange routers that establish a new price-to-performance class offering, benefiting both service providers and enterprises alike:

- For service providers, the Cisco ASR 1000 Series Routers facilitate more flexible, efficient, and cost-effective delivery of complex consumer and business services.
- For enterprises, the Cisco ASR 1000 Series Routers deliver a highly reliable, high-performance WAN edge solution where information, communication, collaboration, and commerce converge.

The Cisco ASR 1000 Series Routers:

- Accelerate services by offering outstanding performance and resiliency with optimized, intelligent services
- Establish a new benchmark for price-to-performance offerings in the enterprise advanced routing, service provider edge, and broadband aggregation segments
- Facilitate significant network architectural innovations in areas such as WAN aggregation, managed customer-premises-equipment (CPE) services, service provider edge services, etc.
- Reduce operating expenses (OpEx) and capital expenditures (CapEx) by facilitating managed or hosted services over identical architectures and operating environments

Product Overview

The Cisco ASR 1000 Series consists of five different versions (Figure 1): the Cisco ASR 1002 Fixed Router, the Cisco ASR 1002 Router, the Cisco ASR 1004 Router, the Cisco ASR 1006 Router, and the Cisco ASR 1013 Router. All five models use the innovative and powerful Cisco QuantumFlow Processor, which provides a huge leap in performance and resiliency for network processors.

Figure 1.   Cisco ASR 1000 Series Aggregation Services Routers

The Cisco ASR 1000 Series provides a significant enhanced value compared to prior generations of Cisco midrange routing solutions by providing more than tenfold performance improvement with services running. Additionally, the routers have hardware and software redundancy, as well as an industry-leading high-availability design.

The Cisco ASR 1000 Series delivers multiple services embedded in the Cisco QuantumFlow Processor at wire speeds of up to 40 Gbps. The services supported on the Cisco QuantumFlow Processor include security services (for example, encryption and firewall), quality of service (QoS), Network Based Application Recognition (NBAR),

Cisco IOS® Flexible Packet Matching (FPM), broadband aggregation, and Cisco Unified Border Element (SP Edition) (formerly called Session Border Control or SBC), among others.

With the separation of the control and data planes in the Cisco ASR 1000 Series Router architecture, software redundancy (on the Cisco ASR 1002 Fixed, ASR 1002, and ASR 1004 Routers) and hardware redundancy (on the Cisco ASR 1006 and ASR 1013 Routers) are provided. Additionally, the modular Cisco IOS XE Software that is introduced with the Cisco ASR 1000 Series facilitates In Service Software Upgrade (ISSU).

From a price-to-performance perspective, the Cisco ASR 1000 Series Router solution fits well between the Cisco 7200 Series and Cisco 7300 Series and the Cisco 7600 Series and Cisco Catalyst® 6000 Series Routers, thus dramatically enhancing the Cisco midrange routing portfolio (Figure 2).

Figure 2.   Cisco Midrange Routing Portfolio

More details about the individual Cisco ASR 1000 Series components such as the embedded services processors, the route processor, and the SPA interface processor (SIP) card are available in the respective data sheets:

- Cisco ASR 1000 Series Embedded Services Processors (ESPs): http://www.cisco.com/go/asr1000
- Cisco ASR 1000 Series Route Processor: http://www.cisco.com/go/asr1000
- Cisco ASR 1000 Series Shared Port Adapter Interface Processor (SIP): http://www.cisco.com/go/asr1000

Applications

Tables 1 and 2 describe enterprise and service provider application examples, respectively.

Table 1.   Cisco ASR 1000 Series Enterprise Applications

Applications	Benefits	Implementations
Superior application availability at the WAN edge: Guarantee high-priority applications by creating a virtual "glass ceiling" for lower-priority applications.	• Applies Modular QoS CLI (MQC) policies on VLANs or tunnels • Clamps an arbitrary collection of low-priority traffic to a certain bandwidth • Classifies based on differentiated services code point (DSCP), NBAR, and Cisco IOS FPM into numerous hierarchies, (one for high priority and one for low priority)	• Implements flexible hierarchies • Supports 128,000 queues • Allows all queues to have a minimum, maximum, and excess bandwidth with priority propagation
Multiservice, scalable, and secure headend: The Cisco ASR 1000 Series offers full-service IP Security (IPsec*) VPN aggregation that scales to meet the new bandwidth demands of service provider IP VPNs.	• Reduces CapEx and OpEx by migrating and consolidating to fewer Cisco ASR 1000 Series Routers • Protects investment through easy transition to much higher encryption support – offering encryption support of up to 8 Gbps with the Cisco ASR 1000 Series ESP (ASR1000-ESP20) • Offers easier management through embedded security services in Cisco QuantumFlow Processor, with no additional service modules or blades required • Optimized for QoS and IP Multicast applications	• Supports thousands of sites • Supports 4000 IPsec tunnels • Offers up to 11-Gbps encryption performance and up to 29-Gbps noncryptographic throughput support with the Cisco ASR 1000 Series 40-Gbps Embedded Services Processor (ASR1000-ESP40) engine

Applications	Benefits	Implementations
Embedded high-speed firewall: With the Zone-Based Policy Firewall, the Cisco ASR 1000 Series acts as an implicit complete barrier between any interfaces not members of the same zone. An explicit zone-pair policy must be specified (using Cisco Policy Language; that is, MQC) in each direction between each zone pair. The policy establishes within the router what kind of stateful inspection (Layer 4, Layer 7, or application) and session parameters to apply to each zone pairing. Example: An explicit policy allowing HTTP and Domain Name System (DNS) to traverse the Internet-DMZ zone boundary would be required.	• The firewall is embedded in the Cisco QuantumFlow Processor; no additional service blades or modules are required. • Multigigabits of bandwidth are routed while at the same time the router performs Zone-Based Policy Firewall and other baseline features such as QoS, IPv4, IPv6, NetFlow, etc. • The Cisco ASR 1000 Series provides logging of all firewall session state off to network-management applications capable of accepting relatively huge amounts of flow data. Third-party applications can handle the session data.	• Provides firewall performance of 5 to 40 Gbps depending on the embedded services processor • Offers high-speed logging of 40,000 sessions per second with NetFlow Version 9
Managed CPE: This implementation of branch-office architecture offers powerful investment protection with services and scale.	• Helps branch office route correctly over various types of Ethernet service-level agreements (SLAs) • Encrypts multigigabits of bandwidth – without any additional service blades or modules • Optimizes the WAN to route around brownouts in the service provider network to further guarantee mission-critical applications • Offers a small form factor (2 rack units [2RU]) with the Cisco ASR 1002 Router, including software modularity and ISSU • Offers accessibility even when the Cisco IOS Software is down	• Offers first-in-industry software redundancy support, without any additional hardware module • Offers powerful firewall and Network Address Translation (NAT) performance of 5 to 40 Gbps and 1.8- to 11-Gbps encryption support in addition to WAN optimization and voice features

* This product includes software developed by Cavium Networks.

Table 2. Cisco ASR 1000 Series Service Provider Applications

Applications	Benefits	Implementations
Broadband L2TP Access Concentrator (LAC) or L2TP Network Server (LNS): The solution offers Layer 2 Tunneling Protocol (L2TP) endpoint to tunnel Point-to-Point Protocol (PPPoX) or IP sessions with bandwidth demands in the STM-1 ATM, Fast Ethernet, Gigabit Ethernet, and 10 Gigabit Ethernet range.	• Ideal for triple-play (data, voice, and video) wholesale deployments • Offers integral service delivery • Offers per-user firewall, SBC, etc.	• Provides very high scalability of up to 32,000 subscribers and up to 16,000 tunnels
Service provider edge: Layer 3 VPN (L3VPN) provider edge: Example: The solution can be deployed at the distributed provider edge, or provider edge in global VPN networks for bandwidth demands such as asymmetric DSL (ADSL), T1/E1, STM-1, STM-4, Fast Ethernet, Gigabit Ethernet, etc.	• Provides integral services in Cisco QuantumFlow Processor • Provides encryption, FPM, NBAR, SBC, IP Multicast, etc.	• Offers excellent multicast performance • Scales to 8,000 Virtual Route Forwarding (VRF) instances, 1 million Label Distribution Protocol (LDP) labels, and 4,000 access control lists (ACLs) • Supports up to 4 million IPv4 routes • Supports up to 4 million IPv6 routes
Service provider edge: High-end route reflector: You can use the solution as a route reflector for bandwidth support of 40 Gbps.	• Provides high scalability • Offers modular design of route processor and embedded services processor with hardware and software redundancy	• Scales up to 29 million IPv4 routes • Supports 64,000 Layer 3 adjacencies • Offers sufficient memory (8-GB DRAM) • Offers optional upgrade to 16-GB DRAM Note: The Cisco ASR 1002 Router ships by default with 4-GB DRAM (ASR1002). • Offers extensive Border Gateway Protocol (BGP) feature support

Applications	Benefits	Implementations
Next-generation voice and multimedia example: Cisco Unified Border Element (SP Edition): The SBC application (named Cisco Unified Border Element (SP Edition)) performs the voice and video gateway functions simultaneously with regular IP data services. No appliance or additional service blade is required. The control protocols and media protocols work transparently within a complex voice architecture.	• The WAN edge is simpler to manage because only one egress and one ingress point needs management and policy application. • With the distributed control plane and separate data-forwarding plane, the signaling and control processing remain separate from media processing. • ISSU support allows for easy addition of new-use cases. • You can use a single SBC application on the Cisco ASR 1000 Series for residential, enterprise, and service provider peering applications.	• Facilitates SBC with security, QoS, IPv4, and IPv6 (IP Unicast and IP Multicast simultaneously) • Supports 32,000 simultaneous voice calls and multimedia data of up to 40 Gbps with accounting, firewall, and call quality enabled • Integrated with inbox high-availability infrastructure and Dynamic Host Configuration Protocol (DHCP) Relay

Software

The Cisco ASR 1000 Series is supported in Cisco IOS XE Software, which was introduced with the Cisco ASR 1000 Series Routers as a modular operating system. Based on Cisco IOS Software Release 12.2SR, Cisco IOS XE Software is designed to provide modular packaging, feature velocity, and powerful resiliency. Because of the extreme flexibility and robust performance of the Cisco ASR 1000 Series ESPs, which are based on the Cisco QuantumFlow Processor technology, Network Security, Deep Packet Inspection, Cisco IOS Firewall, and many other advanced features are implemented in Cisco IOS XE Software without the need of additional hardware support (for example, in the form of a service blade).

One of the most innovative features is that the Cisco IOS XE Software supports dual Cisco IOS Software consolidated packages in one single Cisco ASR 1000 Series Route Processor for software redundancy in the Cisco ASR 1002, ASR 1002 Fixed, and ASR 1004 Routers. This dual Cisco IOS Software consolidated package could be the same consolidated package for backup, or a different consolidated package also on a different Cisco IOS XE Software release for resilient upgrade. Information about the compatibility of supported dual consolidated packages is available in the release notes. The (optional) hardware-redundant route processor and ESP configuration in the Cisco ASR 1006 or ASR 1013 Router does not support Cisco IOS Software redundancy in a single route processor because each of the two route processors supports one Cisco IOS XE image.

For ease of ordering, you can choose from six supported consolidated packages in each Cisco IOS XE Software release:

- IP Base without crypto
- IP Base
- Advanced IP Services
- Advanced IP Services without crypto
- Advanced Enterprise Services
- Advanced Enterprise Services without crypto

All Cisco IOS XE Software Route Processor 1 (RP1) consolidated packages are compatible across the entire Cisco ASR 1000 Series with the Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1). Similar compatibility exists for the Cisco ASR 1000 Series Route Processor 2 (ASR1000-RP2) across Cisco ASR 1004, ASR 1006, and ASR 1013 Routers. Table 3 describes each of the Cisco IOS XE consolidated packages supported on the Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1).

Data Sheet

Table 3. Descriptions of Cisco IOS XE Software Consolidated Packages for Cisco ASR 1000 Series RP1 (ASR1000-RP1), Cisco ASR 1002 (ASR1002), and ASR 1002 Fixed (ASR1002-F) Routers with integrated Cisco ASR 1000 Series RP1 (ASR1000-RP1)

Cisco IOS XE Consolidated Package	Part Number	Description
Cisco ASR 1000 Series RP1 IP BASE without Crypto	SASR1R1-IPB	• Provides low-cost base consolidated package • Offers only basic IP feature support • Satisfies export requirements for noncryptographic software
Cisco ASR 1000 Series RP1 IP Base	SASR1R1-IPBK9	• Provides low-cost base consolidated package • Offers only basic IP feature support, including Secure Shell (SSH) Protocol and Simple Network Management Protocol Version 3 (SNMPv3) support
Cisco ASR 1000 Series RP1 Advanced IP Services	SASR1R1-AISK9	• Targeted for service provider customers • Supports all features, including encryption (IPsec*, Triple Digital Encryption Standard [3DES], Advanced Encryption Standard [AES], and SSH), Lawful Intercept, and SBC • Does not support older protocols
Cisco ASR 1000 Series RP1 Advanced IP Services without Crypto	SASR1R1-AIS	• Targeted for export-restricted customers • Supports all features, including Lawful Intercept and SBC • Does not support older protocols • Does not support encryption services
Cisco ASR 1000 Series RP1 Advanced Enterprise Services	SASR1R1-AESK9	• Supports all features included in the Advanced IP Services image as well as older protocols
Cisco ASR 1000 Series RP1 Advanced Enterprise Services without Crypto	SASR1R1-AES	• Does not support encryption services • Supports all other features included in the Advanced IP Services image as well as older protocols

* This product includes software developed by Cavium Networks.

Each of the Cisco IOS XE consolidated packages consists of seven different subpackages. You can download each Cisco IOS XE consolidated package from the Cisco website. In case of upgrades for support of new features, you can upgrade the consolidated package as a whole or each of the seven subpackages as an individual subpackage. Compatibility of the different subpackages in each consolidated package is checked with a compatibility matrix.

Table 4 lists the seven software subpackages that make up each of the Cisco IOS XE consolidated packages.

Table 4. Cisco IOS XE Software Subpackages

Cisco IOS XE Subpackages	Function of Each Subpackage
RPBase	This subpackage provides the operating system software for the route processor.
RPControl	This subpackage controls the control-plane processes that interface between the Cisco IOS Software and the rest of the platform.
RPAccess (non-K9)	This subpackage is required for router access. The RP-Access subpackage (non-K9 version) is included only in the Cisco IOS XE consolidated packages that do not have cryptographic or SSH support.
RPAccess (K9)	This subpackage is required for router access. The RP-Access subpackage (K9 version) includes restricted components (Secure Sockets Layer [SSL] and SSH). The Cisco IOS XE consolidated packages with this subpackage are subject to export controls.
RPIOS	This subpackage provides the Cisco IOS Software kernel, which is where Cisco IOS Software features are stored and run. Each Cisco IOS XE consolidated package has a different Cisco IOS Software image (for example, the Cisco IOS XE consolidated package Cisco ASR 1000 Series RP 1 IP BASE WITHOUT CRYPTO contains the Cisco IOS IP BASE WITHOUT CRYPTO image).
ESPBase	This subpackage provides the ESP operating system and control processes and the ESP software.
SIPSPA	This subpackage provides the shared-port-adaptor (SPA) driver and associated field-programmable device (FPD) images.
SIPBase	This subpackage controls the SIP carrier-card operating system and control processes.

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Product Specifications

Table 5 compares the different Cisco ASR 1000 Series Routers, and Table 6 provides further Cisco ASR 1000 Series product specifications. Table 7 lists the SPAs supported; this list will be extended over time, so please check with your local Cisco account representative for information about the latest SPAs offered.

Table 5. Cisco ASR 1000 Series: Chassis Comparison and Specifications

Model	Cisco ASR 1002 Fixed	Cisco ASR 1002	Cisco ASR 1004	Cisco ASR 1006	Cisco ASR 1013
Physical specifications	Height: 3.5 in. (88.9 mm) Width: 17.2 in. (437.4 mm) Depth: 22 in. (558.8 mm) Weight: • 33.65 lb (15.23 kg) (with dual AC power supply and SPA blank covers) • 36.85 lb (16.75 kg) (with dual AC power supply, blank covers, and Cisco ASR 1000 Series 2.5-Gbps ESP) • No SPAs included **Note:** The Cisco ASR 1002 Fixed Router has the route processor, embedded services processor, and SIP integrated.	Height: 3.5 in. (88.9 mm) Width: 17.2 in. (437.4 mm) Depth: 22 in. (558.8 mm) Weight: • 33.65 lb (15.23 kg) (with dual AC power supply and SPA blank covers) • 36.85 lb (16.75 kg) (with dual AC power supply, blank covers, and Cisco ASR 1000 Series 5-Gbps ESP [ASR1000-ESP5]) • No SPAs included **Note:** The Cisco ASR 1002 has the route processor and SIP integrated.	Height: 7 in. (177.8 mm) Width: 17.2 in. (437.4 mm) Depth: 22 in. (558.8 mm) Weight: 68.7 lb (31.16 kg) (with dual AC power supply, SPA blank covers, Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10), Cisco ASR 1000 Series RP1 (ASR1000-RP1), Cisco ASR 1000 Series 10-Gbps SIP (ASR1000-SIP10) (two), and no SPAs)	Height: 10.5 in. (266.7 mm) Width: 17.2 in. (437.4 mm) Depth: 22 in. (558.8 mm) Weight: 98.70 lb (44.77 kg) (with dual AC power supply, SPA and route processor and SIP blank covers, two Cisco ASR 1000 Series 10-Gbps ESPs (ASR1000-ESP10), two Cisco ASR 1000 Series RP1s (ASR1000-RP1), three Cisco ASR 1000 Series 10-Gbps SIPs (ASR1000-SIP10), and no SPAs)	Height: 22.8 in. (579.1 mm) Width: 17.2 in. (437.4 mm) Depth: 22 in. (558.8 mm) Weight: 184.0 lb (83.46 kg) (with redundant AC power supply, SPA and route processor and SIP blank covers, two Cisco ASR 1000 Series 40-Gbps ESPs (ASR1000-ESP40), two Cisco ASR 1000 Series RP2s (ASR1000-RP2), six Cisco ASR 1000 Series 40-Gbps SIPs (ASR1000-SIP40), and no SPAs)
Shared port adapters	1 SPA slot	3 SPA slots	8 SPA slots	12 SPA slots	24 SPA slots
Cisco ASR 1000 Series ESP	Integrated in chassis	1 ESP slot	1 ESP slot	2 ESP slots	2 ESP slots
Route processor	Integrated in chassis	Integrated in chassis	1 route-processor slot	2 route-processor slots	2 route-processor slots
Number of SIPs supported	Integrated in chassis	Integrated in chassis	2	3	6
Redundancy	Software: Yes	Software: Yes	Software: Yes	Hardware: Yes	Hardware: Yes
Built-in Gigabit Ethernet ports	Yes: 4-Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports	Yes: 4-Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports	0	0	0
Airflow	Front-to-back	Front-to-back	Front-to-back	Front-to-back	Front-to-back

Note: The 2RU chassis and 2RU-F chassis (ASR1002 and ASR1002-F, respectively) come by default with 4-GB DRAM, and 4 GB is required for the software-redundancy implementation, which is also of high interest for the managed customer-premises-equipment (CPE) application.

Table 6. Cisco ASR 1000 Series: Detailed Specifications

Cisco ASR 1000 Series	Cisco ASR 1002 Fixed Router	Cisco ASR 1002 Router	Cisco ASR 1004 Router	Cisco ASR 1006 Router	Cisco ASR 1013
Embedded Services Processor					
ESP support	Cisco ASR 1000 Series 2.5-Gbps ESP	Cisco ASR 1000 Series 5-Gbps ESP (ASR1000-ESP5), Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10), and noncrypto Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10-N)	Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10), noncrypto Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10-N), and Cisco ASR 1000 Series 20-Gbps ESP (ASR1000-ESP20)	Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10), noncrypto Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10-N), Cisco ASR 1000 Series 20-Gbps ESP (ASR1000-ESP20), and Cisco ASR 1000 Series 40-Gbps ESP (ASR1000-ESP40)	Cisco ASR 1000 Series 40-Gbps ESP (ASR1000-ESP40)
ESP bandwidth	2.5 Gbps	5 to 10 Gbps	10 to 20 Gbps	10 to 40 Gbps	40 Gbps
ESP memory	Cisco ASR 1000 Series 2.5-Gbps ESP: 1-GB DRAM default; 1-GB DRAM maximum	Cisco ASR 1000 Series 5-Gbps ESP (ASR1000-ESP5): 1-GB DRAM default; 1-GB DRAM maximum Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10) and Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10): 2-GB DRAM default; 2-GB DRAM maximum	Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10) and Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10): 2-GB DRAM default; 2-GB DRAM maximum Cisco ASR 1000 Series 20-Gbps ESP (ASR1000-ESP20): 4-GB DRAM default; 4-GB DRAM maximum	Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10) and Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10): 2-GB DRAM default; 2-GB DRAM maximum Cisco ASR 1000 Series 20-Gbps ESP (ASR1000-ESP20): 4-GB DRAM default; 4-GB DRAM maximum Cisco ASR 1000 Series 40-Gbps ESP (ASR1000-ESP40): 8-GB DRAM default: 8-GB DRAM maximum	Cisco ASR 1000 Series 40-Gbps ESP (ASR1000-ESP40): 8-GB DRAM default: 8-GB DRAM maximum
Route Processors					
Route Processor	Integrated in the chassis: Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1); The Cisco ASR 1000 Series RP2 (ASR1000-RP2) is not supported on Cisco ASR 1002 Fixed Router (ASR1002-Fixed)	Integrated in the chassis: Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1)	Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1): Supported as a module on the Cisco ASR 1004 and ASR 1006 Cisco ASR 1000 Series Route Processor 2 (ASR1000-RP2): Supported as a module on the Cisco ASR 1004, ASR 1006, and ASR 1013	Same as for Cisco ASR 1004	Cisco ASR 1000 Series Route Processor 2 (ASR1000-RP2): Supported as a module on the Cisco ASR 1004, ASR 1006, and ASR 1013
Route-processor memory	• Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1) is integrated in the chassis of the Cisco ASR 1002 Fixed Router. • Cisco ASR 1002 Fixed Router comes with 4-GB DRAM (default and maximum). • Cisco ASR 1002 Fixed Router offers 8-GB Embedded USB memory (EUSB) support (partitioned: two 32-MB for nonvolatile RAM (NVRAM) and the rest for mass storage).	• Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1) is integrated in the chassis of the Cisco ASR 1002. • Cisco ASR 1002 comes with 4-GB DRAM (default and maximum). • The router offers 8-GB EUSB support (partitioned: two 32-MB for NVRAM and the rest for mass storage).	• Cisco ASR 1000 Series Route Processor (ASR1000-RP1): 2-GB DRAM default; 4-GB DRAM maximum • 1-GB EUSB memory support (partitioned: two 32-MB for NVRAM and the rest for mass storage) • For mass storage: Hard-disk drive (40-GB) or solid-state drive (32-GB) support (will be offered later).	Same as for Cisco ASR 1004	• Cisco ASR 1000 Series Route Processor 2 (ASR1000-RP2): 8-GB DRAM default; 16-GB DRAM maximum • 2-GB EUSB memory support • For mass storage: Hard disk drive (80-GB)

Cisco ASR 1000 Series	Cisco ASR 1002 Fixed Router	Cisco ASR 1002 Router	Cisco ASR 1004 Router	Cisco ASR 1006 Router	Cisco ASR 1013
SIPs	Integrated in chassis: Cisco ASR 1000 Series 10-Gbps SIP Carrier Card (ASR1000-SIP10)	Integrated in chassis: Cisco ASR 1000 Series 10-Gbps SIP Carrier Card (ASR1000-SIP10)	Cisco ASR 1000 Series 10-Gbps SIP Carrier Card (ASR1000-SIP10) Supported as a module on the Cisco ASR 1004 and ASR 1006	Cisco ASR 1000 Series 10-Gbps SIP Carrier Card (ASR1000-SIP10) Cisco ASR 1000 Series 40-Gbps SIP Carrier Card (ASR1000-SIP40) Supported as a module on the Cisco ASR 1004, ASR 1006, and ASR 1013	Same as for Cisco ASR 1006
Embedded hardware-based encryption	Yes: On Cisco ASR 1000 Series 2.5-Gbps ESP with up to 1.0 Gbps	Yes: On Cisco ASR 1000 Series 5-Gbps ESP (ASR1000-ESP5) with up to 1.8 Gbps and on Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10) with up to 4 Gbps No support: On noncrypto Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10-N)	Yes: On Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10) with up to 4 Gbps and on Cisco ASR 1000 Series 20-Gbps ESP (ASR1000-ESP20) with up to 8 Gbps No support: On noncrypto Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10-N)	Yes: On Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10) with up to 4 Gbps, Cisco ASR 1000 Series 20-Gbps ESP (ASR1000-ESP20) with up to 8 Gbps, and Cisco ASR 1000 Series 40-Gbps ESP (ASR1000-ESP40) with up to 11 Gbps No support: On noncrypto Cisco ASR 1000 Series 10-Gbps ESP (ASR1000-ESP10-N)	Yes: On Cisco ASR 1000 Series 40-Gbps ESP (ASR1000-ESP40) with up to 11 Gbps No support on noncrypto Cisco ASR 1000 Series ESP
Minimum Cisco IOS XE Software Release	Cisco IOS XE Software Release 2.4.0	Cisco IOS XE Software Release 2.1	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002 except Cisco ASR 1000 Series 40-Gbps ESP (ASR1000-ESP40) requires Cisco IOS XE Software Release 3.1.0S	Cisco IOS XE Software Release 3.1.0S
Rack-mounting	Yes: 19-inch	Yes: 19-inch	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Wall-mounting	No	No	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
External USB flash memory	1-GB USB flash memory support	1-GB USB flash memory support	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002

Cisco ASR 1000 Series	Cisco ASR 1002 Fixed Router	Cisco ASR 1002 Router	Cisco ASR 1004 Router	Cisco ASR 1006 Router	Cisco ASR 1013
Power Requirements					
Redundant power supply	Yes: Dual power supply by default; option of either AC or DC power supply **Note:** A mix of one AC and one DC power supply is not supported. The spare AC and DC power supplies for Cisco ASR 1002 Fixed Router (ASR1002-F) are the same as those for Cisco ASR 1002 (ASR1002) (ASR1002-PWR-AC= and ASR1002-PWR-DC=, respectively).	Yes: Dual power supply by default; option of either AC or DC power supply **Note:** A mix of one AC and one DC power supply is not supported.	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Yes: Quad power supplies (redundant pairs) by default; option of either AC or DC power supplies **Note:** A mix of AC and DC power supplies is not supported.
Power input	Worldwide ranging AC (85 to 264V; 120 or 240V; 60 or 50 Hz nominal) Worldwide ranging DC (–40.5 to –72: –48V nominal)	Worldwide ranging AC (85 to 264V; 120 or 240V; 60 or 50 Hz nominal) Worldwide ranging DC (–40.5 to –72: –48V nominal)	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Worldwide ranging AC (180 to 264V; 240V; 60 or 50 Hz nominal) Worldwide ranging DC (-40.5 to -72; –48V nominal)
Power consumption	• Maximum (DC): 590W • Maximum (AC): 560W • Maximum (Out): 470W	• Maximum (DC): 590W • Maximum (AC): 560W • Maximum (out): 470W	• Maximum (DC): 1020W • Maximum (AC): 960W • Maximum (out): 765W	• Maximum (DC): 1700W • Maximum (AC): 1600W • Maximum (out): 1275W	• Maximum (DC): 4200W • Maximum (AC – High Line): 4000W • Maximum (out): 3390W
Airflow	Front to back	Front to back	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Environmental Specifications					
Operating temperature (nominal)	41 to 104ºF (5 to 40ºC)	41 to 104ºF (5 to 40ºC)	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Operating temperature (short-term)	23 to 131ºF (–5 to 55ºC)	23 to 131ºF (–5 to 55ºC)	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Operating humidity (nominal) (relative humidity)	10 to 85%	10 to 85%	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Operating humidity (short-term)	5 to 90%	5 to 90%	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Storage temperature	–38 to 150ºF (–39 to 70ºC)	–38 to 150ºF (–39 to 70ºC)	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Storage (relative humidity)	5 to 95%	5 to 95%	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Operating altitude	–60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)	–60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002

Cisco ASR 1000 Series	Cisco ASR 1002 Fixed Router	Cisco ASR 1002 Router	Cisco ASR 1004 Router	Cisco ASR 1006 Router	Cisco ASR 1013
Regulatory Compliance					
Network Equipment Building Standards (NEBS)	GR-1089 and GR-63	GR-1089 and GR-63	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
EMC standards	• FCC 47 CFR Part 15 Class A • VCCI Class A • AS/NSZ Class A • ICES-003 Class A • EN55022/CISPR 22 Information Technology Equipment (Emissions) • EN55024/CISPR 24 Information Technology Equipment (Immunity) • EN300 386 Telecommunications Network Equipment (EMC) • EN50082-1/EN61000-6-1 Generic Immunity Standard	• FCC 47 CFR Part 15 Class A • VCCI Class A • AS/NSZ Class A • ICES-003 Class A • EN55022/CISPR 22 Information Technology Equipment (Emissions) • EN55024/CISPR 24 Information Technology Equipment (Immunity) • EN300 386 Telecommunications Network Equipment (EMC) • EN50082-1/EN61000-6-1 Generic Immunity Standard	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
CE marking	• UL60950-1 • CSA C22.2 No. 60950-1-03 • EN 60950-1 • IEC 60950-1 • AS/NZS 60950.1	• UL60950-1 • CSA C22.2 No. 60950-1-03 • EN 60950-1 • IEC 60950-1 • AS/NZS 60950.1	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002

Table 7. Supported SPAs on the Cisco ASR 1000 Series

Product Description	Form Factor	Product Number
Serial and Channelized SPA		
Cisco 8-Port Channelized T1/E1 Shared Port Adapter	Single height	SPA-8XCHT1/E1
Cisco 4-Port Channelized T3 (DS-0) Shared Port Adapter	Single height	SPA-4XCT3/DS0
Cisco 2-Port Channelized T3 (DS-0) Shared Port Adapter	Single height	SPA-2XCT3/DS0
Cisco 2-Port Clear Channel T3/E3 Shared Port Adapter	Single height	SPA-2XT3/E3
Cisco 4-Port Clear Channel T3/E3 Shared Port Adapter	Single height	SPA-4XT3/E3
Cisco 1-port Channelized STM-1/OC-3c to DS-0 Shared Port Adapter	Single height	SPA-1XCHSTM1/OC3
Cisco 1-port Channelized OC-12/STM-4 SPA	Double height	SPA-1XCHOC12/DS0
Ethernet SPA		
Cisco 4-Port 10BASE-T/100BASE Fast Ethernet Shared Port Adapter, V-2	Single height	SPA-4X1FE-TX-V2
Cisco 8-Port 10BASE-T/100BASE Fast Ethernet Shared Port Adapter, V-2	Single height	SPA-8X1FE-TX-V2
Cisco 2-Port Gigabit Ethernet Shared Port Adapter, Version 2	Single height	SPA-2X1GE-V2
Cisco 5-Port Gigabit Ethernet Shared Port Adapter, Version 2	Single height	SPA-5X1GE-V2
Cisco 8-Port Gigabit Ethernet Shared Port Adapter, Version 2	Single height	SPA-8X1GE-V2
Cisco 10-Port Gigabit Ethernet Shared Port Adapter, Version 2	Double height	SPA-10XGE-V2
Cisco 1-Port 10 Gigabit Ethernet Shared Port Adapter, Version 2	Single height	SPA-1X10GE-L-V2
Packet over SONET/SDH (PoS)		
Cisco 2-Port OC3-c/STM-1c PoS Shared Port Adapter	Single height	SPA-2XOC3-POS
Cisco 4-Port OC3-c/STM-1c PoS Shared Port Adapter	Single height	SPA-4XOC3-POS

Product Description	Form Factor	Product Number
Cisco 8-Port OC3-c/STM-1c PoS Shared Port Adapter	Single height	SPA-8XOC3-POS
Cisco 1-port Channelized STM-1/OC-3c to DS-0 Shared Port Adapter	Single height	SPA-1XCHSTM1/OC3
Cisco 4-port OC-3/STM-1 POS Shared Port Adapters	Single height	SPA-4XOC3-POS-V2
Cisco 1-Port OC-12c/STM-4c PoS Shared Port Adapter	Single height	SPA-1XOC12-POS
Cisco 2-Port OC-12c/STM-4 PoS Shared Port Adapter	Single height	SPA-2XOC12-POS
Cisco 4-Port OC-12c/STM-4 PoS Shared Port Adapter	Single height	SPA-4XOC12-POS
Cisco 8-Port OC-12c/STM-4 PoS Shared Port Adapter	Single height	SPA-8XOC12-POS
Cisco 1-port OC-48/STM-16 POS/RPR Shared Port Adapters	Single height	SPA-1XOC48POS/RPR
Cisco 2-port OC-48/STM-16 POS/RPR Shared Port Adapters	Single height	SPA-2XOC48POS/RPR
Cisco 4-port OC-48/STM-16 POS/RPR Shared Port Adapters	Single height	SPA-4XOC48POS/RPR
Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter with XFP Optics	Single height	SPA-OC192POS-XFP
ATM/CEoP SPA		
Cisco 1-Port OC3c/STM1c ATM Shared Port Adapter	Single height	SPA-1XOC3-ATM-V2
Cisco 3-Port OC3c/STM1c ATM Shared Port Adapter	Single height	SPA-3XOC3-ATM-V2
Cisco 1-Port OC12c/STM4c ATM Shared Port Adapter	Single height	SPA-1XOC12-ATM-V2

This list will be extended over time. Please check with your local Cisco account representative for information about the latest SPA and SFP support on the Cisco ASR 1000 Series Routers.

Availability

The Cisco ASR 1000 Series is orderable and shipping.

Ordering Information

To place an order, visit the [Cisco Ordering Home Page](#).

Table 8 gives hardware component ordering information, Table 9 gives software (consolidated packages) and license ordering information, and Table 10 gives the respective software spare ordering information. Not all of the available product numbers are listed in Tables 8 and 9. For additional product numbers, including the Cisco ASR 1000 Series bundle offerings, please check the Cisco price list or contact your local Cisco account representative.

Table 8.   Ordering Information for Cisco ASR 1000 Series Hardware

Product Number	Product Description
Cisco ASR 1000 Series Chassis	
ASR1002-F	Cisco ASR1002 System, Fixed ESP, 4 built-in GE, 4GB DRAM
ASR1002	Cisco ASR1002 Chassis,4 built-in GE, Dual P/S,4GB DRAM
ASR1002=	Cisco ASR1002 Chassis,4 built-in GE, Dual P/S,4GB DRAM, spare
ASR1004	Cisco ASR1004 Chassis, Dual P/S
ASR1004=	Cisco ASR1004 Chassis, Dual P/S, spare
ASR1006	Cisco ASR1006 Chassis, Dual P/S
ASR1006=	Cisco ASR1006 Chassis, Dual P/S, spare
ASR1013	Cisco ASR1013 Chassis, Redundant P/S
ASR1013=	Cisco ASR1013 Chassis, Redundant P/S, spare
Cisco ASR 1000 Series Embedded Services Processor	
ASR1000-ESP5	ASR1K Embedded Services Processor,5Gbps,Crypto,ASR1002 only
ASR1000-ESP5=	ASR1K Embedded Services Processor,5G,Crypto,1002 only,spare
ASR1000-ESP10	Cisco ASR1000 Embedded Services Processor, 10G,
ASR1000-ESP10=	Cisco ASR1000 Embedded Services Processor, 10G,,Spare

Product Number	Product Description
ASR1000-ESP10-N	Cisco ASR1000 Embedded Services Processor, 10G,Non Crypto
ASR1000-ESP10-N=	Cisco ASR1000 Embedded Services Processor, 10G,Non Crypto, Spare
ASR1000-ESP20	Cisco ASR1000 Embedded Services Processor, 20G,
ASR1000-ESP20=	Cisco ASR1000 Embedded Services Processor, 20G,,Spare
ASR1000-ESP40	Cisco ASR1000 Embedded Services Processor, 40G
ASR1000-ESP40=	Cisco ASR1000 Embedded Services Processor, 40G Spare
Cisco ASR 1000 Series Route Processor	
ASR1000-RP1	Cisco ASR1000 Route Processor 1, 2GB DRAM
ASR1000-RP1=	Cisco ASR1000 Route Processor 1, 2GB DRAM, spare
ASR1000-RP2	Cisco ASR1000 Route Processor 2, 8GB DRAM
ASR1000-RP2=	Cisco ASR1000 Route Processor 2, 8GB DRAM, Spare
Cisco ASR 1000 Series SPA Interface Processor	
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10
ASR1000-SIP10=	Cisco ASR1000 SPA Interface Processor 10, spare
ASR1000-SIP40	Cisco ASR1000 SPA Interface Processor 40
ASR1000-SIP40=	Cisco ASR1000 SPA Interface Processor 40, Spare
Cisco ASR 1000 Series USB Memory Options	
MEMUSB-1024FT	1GB USB Flash Token for Cisco ASR 1000 Series
MEMUSB-1024FT=	1GB USB Flash Token for Cisco ASR 1000 Series, spare

Table 9.   Ordering Information for Cisco ASR 1000 Series Software Consolidated Packages and Licenses

Product Number	Product Description
Cisco ASR 1000 Series Consolidated Packages	
SASR1R1-IPB	Cisco ASR 1000 Series RP1 IP Base without Crypto
SASR1R1-IPBK9	Cisco ASR 1000 Series RP1 IP BASE
SASR1R1-AISK9	Cisco ASR 1000 Series RP1 Advanced IP Services
SASR1R1-AIS	Cisco ASR 1000 Series RP1 Advanced IP Services without Crypto
SASR1R1-AESK9	Cisco ASR 1000 Series RP1 Advanced Enterprise Services
SASR1R1-AES	Cisco ASR 1000 Series RP1 Advanced Enterprise Services without Crypto
SASR1R2-IPB	Cisco ASR 1000 Series RP2 IP Base without Crypto
SASR1R2-IPBK9	Cisco ASR 1000 Series RP2 IP Base
SASR1R2-AISK9	Cisco ASR 1000 Series RP2 Advanced IP Services
SASR1R2-AIS	Cisco ASR 1000 Series RP2 Advanced IP Services without Crypto
SASR1R2-AESK9	Cisco ASR 1000 Series RP2 Advanced Enterprise Services
SASR1R2-AES	Cisco ASR 1000 Series RP2 Advanced Enterprise Services without Crypto
Cisco ASR 1000 Series Licenses	
Cisco ASR 1000 Series Licenses-Security	
FLASR1-IPSEC-RTU	Encryption Right-To-Use Feature Lic for ASR1000 Series
FLASR1-FW-RTU	Firewall Right-To-Use Feature Lic for ASR1000 Series
FLASR1-FWNAT-RED	Firewall/NAT Stateful Inter-Chassis Redundancy License
FLASR1-FPI-RTU	Flex. Pack. Insp. Right-To-Use Feat Lic for ASR1000 Series
FLASR1-IOSRED-RTU	SW Redundancy Right-To-Use Feat Lic for ASR1000 Series
Cisco ASR 1000 Series Licenses-Broadband	
FLASR1-LI-RTU	ASR1000 Lawful Intercept RTU
FLASR1-BB-RTU	Broadband Right-To-Use Feature Lic for ASR1000 Series

Product Number	Product Description
FLASR1-BB-4K	Broadband 4K Sessions Feature Lic for ASR1000 Series
FLASR1-BB-16K	Broadband 16K Sessions Feature Lic for ASR1000 Series
FLASR1-BB-32K	Broadband 32K Sessions Feature Lic for ASR1000 Series
Cisco ASR 1000 Series Licenses-Cisco Unified Border Element	
FLASR1-CUBES-250P	CUBE(SP) 250 Calls Perpetual Lic for ASR 1000 Series
FLASR1-CUBES-2KP	CUBE(SP) 2K Calls Perpetual Lic for ASR 1000 Series
FLASR1-CUBES-4KP	CUBE(SP) 4K Calls Perpetual Lic for ASR 1000 Series
FLASR1-CUBES-16KP	CUBE(SP) 16KCalls Perpetual Lic for ASR 1000 Series
FLASR1-CUBES-32KP	CUBE(SP) 32K Calls Perpetual Lic for ASR 1000 Series
FLASR1-CUBES-TPEX	CUBE(SP) Perpetual Lic for ASR 1000 Series in B2BTP Exchange

All Cisco IOS XE Software Route Processor 1 consolidated packages are compatible across the entire Cisco ASR 1000 Series with the Cisco ASR 1000 Series RP1 (ASR1000-RP1). The feature licenses listed in Table 9 are also available as spares.

To download the Cisco ASR 1000 Series consolidated packages of a specific Cisco IOS XE Software release, go to Download Software, click "Router Software", and go to Cisco ASR 1000 Series Aggregation Services Routers.

Table 10. Ordering Information for Cisco ASR 1000 Series Software Spares

Product Number	Product Description
Cisco ASR 1000 Series Software Spare	
ASR1000-SW-SPARECD	Cisco ASR 1000 Series Software Spare CD
CDASR1000R1-IPB=	Cisco ASR 1000 RP1 IP Base without crypto, spare
CDASR1000R1-IPBK9=	Cisco ASR 1000 RP1 IP Base, spare
CDASR1000R1-AISK9=	Cisco ASR 1000 RP1 Advanced IP Services, spare
CDASR1000R1-AESK9=	Cisco ASR 1000 RP1 Advanced Enterprise Services, spare

Upgrade Paths

Cisco ASR 1000 Series Routers are included in the standard Cisco Technology Migration Program (TMP). Refer to http://www.cisco.com/go/TMP and contact your local Cisco account representative for program details.

Cisco Services for the Enterprise WAN Edge

Cisco and our certified partners can help make your enterprise WAN edge deployment a success with a broad portfolio of services based on proven methodologies. We can help you establish a secure, resilient WAN architecture and successfully integrate security and Cisco Unified Communications technologies with bandwidth to support video, collaboration, branch-office solutions, and growth in alignment with your business goals.

The Cisco lifecycle approach to services defines the requisite activities at each phase of the solution lifecycle. Planning and design services expedite solution adoption. Award-winning technical support increases operational efficiency. Optimization services improve performance, resiliency, stability, and predictability and prepare your network and teams for change. For more information, please visit http://www.cisco.com/go/services.

For More Information

For more information about the Cisco ASR 1000 Series, visit http://www.cisco.com/go/asr1000 or contact your local Cisco account representative.