

## Cisco ASR 1000 Series Aggregation Services Routers

Cisco is reinventing edge routing with the Cisco® ASR 1000 Series Aggregation Services Routers, a new line 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 four different versions (Figure 1): the Cisco ASR 1002-Fixed Router, the Cisco ASR 1002 Router, the Cisco ASR 1004 Router, and the Cisco ASR 1006 Router. All four 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 20 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 Router) 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
<p><b>Superior application availability at the WAN edge:</b> Guarantee high-priority applications by creating a virtual "glass ceiling" for lower-priority applications.</p>	<ul style="list-style-type: none"> <li>• Applies Modular QoS CLI (MQC) policies on VLANs or tunnels</li> <li>• Clamps an arbitrary collection of low-priority traffic to a certain bandwidth</li> <li>• 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)</li> </ul>	<ul style="list-style-type: none"> <li>• Implements flexible hierarchies</li> <li>• Supports 128,000 queues</li> <li>• Allows all queues to have a minimum, maximum, and excess bandwidth with priority propagation</li> </ul>

<p><b>Multiservice, scalable, and secure headend:</b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>• Reduces CapEx and OpEx by migrating and consolidating to fewer Cisco ASR 1000 Series Routers</li> <li>• 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)</li> <li>• Offers easier management through embedded security services in Cisco QuantumFlow Processor, with no additional service modules or blades required</li> <li>• Optimized for QoS and IP Multicast applications</li> </ul>	<ul style="list-style-type: none"> <li>• Supports thousands of sites</li> <li>• Supports 4000 IPsec tunnels</li> <li>• Offers up to 8-Gbps encryption performance and up to 12-Gbps noncryptographic throughput support with the ASR1000-ESP20 engine</li> </ul>
<p><b>Embedded high-speed firewall:</b></p> <p>With the Zone-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.</p> <p>Example: An explicit policy allowing HTTP and Domain Name System (DNS) to traverse the Internet-DMZ zone boundary would be required.</p>	<ul style="list-style-type: none"> <li>• The firewall is embedded in the Cisco QuantumFlow Processor; no additional service blades or modules are required.</li> <li>• Multigigabits of bandwidth are routed while at the same time the router performs Zone-Policy Firewall and other baseline features such as QoS, IPv4, IPv6, NetFlow, etc.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Provides firewall performance of 5 to 20 Gbps at time of first availability, depending on the embedded services processor</li> <li>• Offers high-speed logging of 40,000 sessions per second with NetFlow Version 9</li> </ul>
<p><b>Managed CPE:</b></p> <p>This implementation of branch-office architecture offers powerful investment protection with services and scale.</p>	<ul style="list-style-type: none"> <li>• Helps branch office route correctly over various types of Ethernet service-level agreements (SLAs)</li> <li>• Encrypts multigigabits of bandwidth - without any additional service blades or modules</li> <li>• Optimizes the WAN to route around brownouts in the service provider network to further guarantee mission-critical applications</li> <li>• Offers a small form factor (2 rack units [2RU]) with the Cisco ASR 1002 Router, including software modularity and ISSU</li> <li>• Offers accessibility even when the Cisco IOS Software is down</li> </ul>	<ul style="list-style-type: none"> <li>• Offers first-in-industry software redundancy support, without any additional hardware module</li> <li>• Offers powerful firewall and NAT performance of 5 to 20 Gbps and 1.8- to 8-Gbps encryption support in addition to WAN optimization and voice features</li> </ul>

\* This product includes software developed by Cavium Networks.

**Table 2.** Cisco ASR 1000 Series Service Provider Applications

Applications	Benefits	Implementations
<p><b>Broadband L2TP Access Concentrator (LAC) or L2TP Network Server (LNS):</b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>• Ideal for triple-play (data, voice, and video) wholesale deployments</li> <li>• Offers integral service delivery</li> <li>• Offers per-user firewall, SBC, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Provides very high scalability of up to 32,000 subscribers and up to 16,000 tunnels</li> </ul>
<p><b>Service provider edge: Layer 3 VPN (L3VPN) provider edge:</b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>• Provides integral services in Cisco QuantumFlow Processor</li> <li>• Provides encryption, FPM, NBAR, SBC, IP Multicast, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Offers excellent multicast performance</li> <li>• Scales to 1,000 Virtual Route Forwarding (VRF) instances, 1 million Label Distribution Protocol (LDP) labels, and 4,000 access control lists (ACLs)</li> <li>• Supports up to 1 million IPv4 routes</li> <li>• Supports up to 250,000 IPv6 routes</li> </ul>

<p><b>Service provider edge: High-end route reflector:</b></p> <p>You can use the solution as a route reflector for bandwidth support of 20 Gbps.</p>	<ul style="list-style-type: none"> <li>• Provides high scalability</li> <li>• Offers modular design of route processor and embedded services processor with hardware and software redundancy</li> </ul>	<ul style="list-style-type: none"> <li>• Scales up to 1 million IPv4 routes or 250,000 IPv6 routes</li> <li>• Supports 64,000 Layer 3 adjacencies</li> <li>• Offers sufficient memory (2-GB DRAM)</li> <li>• Offers optional upgrade to 4-GB DRAM</li> </ul> <p>Note: The Cisco ASR 1002 Router ships by default with 4-GB DRAM (ASR1002).</p> <ul style="list-style-type: none"> <li>• Offers extensive Border Gateway Protocol (BGP) feature support</li> </ul>
<p><b>Next-generation voice and multimedia example: Cisco Unified Border Element (SP Edition):</b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>• The WAN edge is simpler to manage because only one egress and one ingress point needs management and policy application.</li> <li>• With the distributed control plane and separate data-forwarding plane, the signaling and control processing remain separate from media processing.</li> <li>• ISSU support allows for easy addition of new-use cases.</li> <li>• You can use a single SBC application on the Cisco ASR 1000 Series for residential, enterprise, and service provider peering applications.</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitates SBC with security, QoS, IPv4, and IPv6 (IP Unicast and IP Multicast simultaneously)</li> <li>• Supports 32,000 simultaneous voice calls and multimedia data of up to 20 Gbps with accounting, firewall, and call quality enabled</li> <li>• Integrated with inbox high-availability infrastructure and Dynamic Host Configuration Protocol (DHCP) Relay</li> </ul>

## Software

The Cisco ASR 1000 Series is supported in Cisco IOS XE Software, which is 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, Cisco 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 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). Table 3 describes each of the Cisco IOS XE consolidated packages.

**Table 3.** Descriptions of Cisco IOS XE Software Consolidated Packages for ASR1000-RP1 and ASR1002 and ASR1002-F with integrated ASR1000-RP1

Cisco IOS XE Consolidated Package	Part Number	Description
Cisco ASR 1000 Series RP1 IP BASE W/O CRYPTO	SASR1R1-IPB	<ul style="list-style-type: none"> <li>• Provides low-cost base consolidated package</li> <li>• Offers only basic IP feature support</li> <li>• Satisfies export requirements for noncryptographic software</li> </ul>
Cisco ASR 1000 Series RP1 IP BASE	SASR1R1-IPBK9	<ul style="list-style-type: none"> <li>• Provides low-cost base consolidated package</li> <li>• Offers only basic IP feature support, including Secure Shell (SSH) Protocol and Simple Network Management Protocol Version 3 (SNMPv3) support</li> </ul>
Cisco ASR 1000 Series RP1 ADVANCED IP SERVICES	SASR1R1-AISK9	<ul style="list-style-type: none"> <li>• Targeted for service provider customers</li> <li>• Supports all features, including encryption (IPsec*, Triple Digital Encryption Standard [3DES], Advanced Encryption Standard [AES], and SSH), Lawful Intercept, and SBC</li> <li>• Does not support older protocols</li> </ul>
Cisco ASR 1000 Series RP1 ADVANCED IP SERVICES W/O CRYPTO	SASR1R1-AIS	<ul style="list-style-type: none"> <li>• Targeted for export restricted customers</li> <li>• Supports all features, including Lawful Intercept, and SBC</li> <li>• Does not support older protocols</li> <li>• Does not support encryption services</li> </ul>
Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE SERVICES	SASR1R1-AESK9	<ul style="list-style-type: none"> <li>• Supports all features included in the ADVANCED IP SERVICES image as well as older protocols</li> </ul>
Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE SERVICES W/O CRYPTO	SASR1R1-AES	<ul style="list-style-type: none"> <li>• Does not support encryption services</li> <li>• Supports all other features included in the ADVANCED IP SERVICES image as well as older protocols</li> </ul>

\* 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
<b>RPBase</b>	This subpackage provides the operating system software for the route processor.
<b>RPControl</b>	This subpackage controls the control-plane processes that interface between the Cisco IOS Software and the rest of the platform.
<b>RPAccess (non-K9)</b>	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 support or SSH support.
<b>RPAccess (K9)</b>	This subpackage is required for router access. The RP-Access sub-package (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.

Cisco IOS XE Subpackages	Function of Each Subpackage
<b>RPIOS</b>	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 W/O CRYPTO contains the Cisco IOS IP BASE W/O CRYPTO image).
<b>ESPBase</b>	This subpackage provides the ESP operating system and control processes and the ESP software.
<b>SIPSPA</b>	This subpackage provides the shared-port-adaptor (SPA) driver and associated field-programmable device (FPD) images.
<b>SIPBase</b>	This subpackage controls the SIP carrier-card operating system and control processes.

## 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
<b>Physical specifications</b>	Height: 3.5 in. (88.9 mm) Width: 17.2 in. (437.4 mm) Depth: 22 in. (558.8 mm) Weight: <ul style="list-style-type: none"> <li>33.65 lb (15.23 kg) (with dual AC power supply and SPA blank covers)</li> <li>36.85 lb (16.75 kg) (with dual AC power supply, blank covers, and Cisco ASR 1000 Series ESP2.5)</li> <li>No SPAs included</li> </ul> <b>Note:</b> The Cisco ASR 1002-Fixed 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: <ul style="list-style-type: none"> <li>33.65 lb (15.23 kg) (with dual AC power supply and SPA blank covers)</li> <li>36.85 lb (16.75 kg) (with dual AC power supply, blank covers, and Cisco ASR 1000 Series ESP5 [ASR1000-ESP5])</li> <li>No SPAs included</li> </ul> <b>Note:</b> 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 ESP10 (ASR1000-ESP10), Cisco ASR 1000 Series RP1 (ASR1000-RP1), Cisco ASR 1000 Series SIP10 (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 ESP10s (ASR1000-ESP10), two Cisco ASR 1000 Series RP1s (ASR1000-RP1), three Cisco ASR 1000 Series SIP10s (ASR1000-SIP10), and no SPAs)
<b>Shared port adapters</b>	1 SPA slot	3 SPA slots	8 SPA slots	12 SPA slots
<b>Cisco ASR 1000 Series ESP</b>	Integrated in chassis	1 ESP slot	1 ESP slot	2 ESP slots
<b>Route processor</b>	Integrated in chassis	Integrated in chassis	1 route-processor slot	2 route-processor slots
<b>Number of SIPs supported</b>	Integrated in chassis	Integrated in chassis	2	3
<b>Redundancy</b>	Software: Yes	Software: Yes	Software: Yes	Hardware: Yes
<b>Built-in Gigabit Ethernet ports</b>	Yes: 4 Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports	Yes: 4 Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports	0	0
<b>Airflow</b>	Front-to-back	Front-to-back	Front-to-back	Front-to-back

**Note:** The 2RU chassis and 2RU-F chassis (ASR1002 and ASR1002-F) 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 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
<b>Embedded Services Processor</b>				
ESP support	2.5-Gbps Cisco ASR 1000 Series ESP	5-Gbps Cisco ASR 1000 Series ESP (ASR1000-ESP5), 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10) and non crypto 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10-N)	10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10), non crypto 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10-N) and 20-Gbps Cisco ASR 1000 ESP (ASR10000-ESP20)	10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10), non crypto 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10-N) and 20-Gbps Cisco ASR 1000 ESP (ASR10000-ESP20)
ESP bandwidth	2.5 Gbps	5 to 10 Gbps	10 to 20 Gbps	Same as for Cisco ASR 1004
ESP memory	2.5-Gbps Cisco ASR 1000 Series ESP: 1-GB DRAM default; 1-GB DRAM maximum	5-Gbps Cisco ASR 1000 Series ESP (ASR1000-ESP5): 1-GB DRAM default; 1-GB DRAM maximum 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10) and 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10): 2-GB DRAM default; 2-GB DRAM maximum	10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10) and 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10): 2-GB DRAM default; 2-GB DRAM maximum 20-Gbps Cisco ASR 1000 ESP (ASR10000-ESP20): 4-GB DRAM default; 4-GB DRAM maximum	Same as for Cisco ASR 1004
<b>Route Processors</b>				
Route Processor 1	Integrated in the chassis: Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1). ASR1000-RP2 is not supported on 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	Same as for Cisco ASR 1004
Route-processor memory	<ul style="list-style-type: none"> <li>Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1) is integrated in the chassis of the Cisco ASR 1002-Fixed.</li> <li>Cisco ASR 1002-Fixed comes with 4-GB DRAM (default and maximum).</li> <li>Cisco ASR 1002-Fixed offers 8-GB Embedded USB memory (EUSB) support (partitioned: two 32-MB for nonvolatile RAM (NVRAM) and the rest for mass storage).</li> </ul>	<ul style="list-style-type: none"> <li>Cisco ASR 1000 Series Route Processor 1 (ASR1000-RP1) is integrated in the chassis of the Cisco ASR 1002.</li> <li>Cisco ASR 1002 comes with 4-GB DRAM (default and maximum).</li> <li>The router offers 8-GB Embedded USB memory (EUSB) support (partitioned: two 32-MB for nonvolatile RAM (NVRAM) and the rest for mass storage).</li> </ul>	<ul style="list-style-type: none"> <li>Cisco ASR 1000 Series Route Processor (ASR1000-RP1): 2-GB DRAM default; 4-GB DRAM maximum</li> <li>1-GB EUSB memory support (partitioned: two 32-MB for NVRAM and the rest for mass storage)</li> <li>For mass storage: Hard disk drive (40-GB) or solid-state drive (32-GB) support (will be offered later)</li> </ul>	Same as for Cisco ASR 1004
SIPs	Integrated in chassis: 10-Gbps Cisco ASR 1000 SIP Carrier Card (ASR1000-SIP10)	Integrated in chassis: 10-Gbps Cisco ASR 1000 SIP Carrier Card (ASR1000-SIP10)	10-Gbps Cisco ASR 1000 SIP Carrier Card (ASR1000-SIP10) Supported as a module on the Cisco ASR 1004 and ASR 1006	Same as for Cisco ASR 1004

Embedded hardware-based encryption	Yes: On 2.5-Gbps Cisco ASR 1000 Series ESP with up to 1.0 Gbps	Yes: On 5-Gbps Cisco ASR 1000 Series ESP (ASR1000-ESP5) with up to 1.8 Gbps and on 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10) with up to 4 Gbps  No support: On non crypto 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10-N)	Yes (ASR1000-ESP10 with up to 4 Gbps; ASR1000-ESP20 with up to 8 Gbps)  No support: On non crypto 10-Gbps Cisco ASR 1000 ESP (ASR1000-ESP10-N)	Same as for Cisco ASR 1004
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
Rack-mounting	Yes: 19-inch	Yes: 19-inch	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
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
<b>Power Requirements</b>				
Redundant power supply	Yes: Dual power supply by default; option of either AC or DC power supply  <b>Note:</b> A mix of one AC and one DC power supply is not supported. The spare AC and DC power supplies for ASR1002-F are the same as those for ASR1002 (ASR1002-PWR-AC= and ASR1002-PWR-DC=).	Yes: Dual power supply by default; option of either AC or DC power supply  <b>Note:</b> 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
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
Power consumption	<ul style="list-style-type: none"> <li>• Maximum (DC): 590W</li> <li>• Maximum (AC): 560W</li> <li>• Maximum (Out): 470W</li> </ul>	<ul style="list-style-type: none"> <li>• Maximum (DC): 590W</li> <li>• Maximum (AC): 560W</li> <li>• Maximum (Out): 470W</li> </ul>	<ul style="list-style-type: none"> <li>• Maximum (DC): 1020W</li> <li>• Maximum (AC): 960W</li> <li>• Maximum (Out): 765W</li> </ul>	<ul style="list-style-type: none"> <li>• Maximum (DC): 1700W</li> <li>• Maximum (AC): 1600W</li> <li>• Maximum (Out): 1275W</li> </ul>
Airflow	Front to back	Front to back	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
<b>Environmental Specifications</b>				
Operating temperature (nominal)	41 to 104°F (5 to 40°C)	41 to 104°F (5 to 40°C)	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Operating temperature (short-term)	23 to 131°F (-5 to 55°C)	23 to 131°F (-5 to 55°C)	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
Operating humidity (short-term)	5 to 90%	5 to 90%	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
Storage temperature	-38 to 150°F (-39 to 70°C)	-38 to 150°F (-39 to 70°C)	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



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
<b>Regulatory Compliance</b>				
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
EMC standards	<ul style="list-style-type: none"> <li>• FCC 47 CFR Part 15 Class A</li> <li>• VCCI Class A</li> <li>• AS/NSZ Class A</li> <li>• ICES-003 Class A</li> <li>• EN55022/CISPR 22 Information Technology Equipment (Emissions)</li> <li>• EN55024/CISPR 24 Information Technology Equipment (Immunity)</li> <li>• EN300 386 Telecommunications Network Equipment (EMC)</li> <li>• EN50082-1/EN61000-6-1 Generic Immunity Standard</li> </ul>	<ul style="list-style-type: none"> <li>• FCC 47 CFR Part 15 Class A</li> <li>• VCCI Class A</li> <li>• AS/NSZ Class A</li> <li>• ICES-003 Class A</li> <li>• EN55022/CISPR 22 Information Technology Equipment (Emissions)</li> <li>• EN55024/CISPR 24 Information Technology Equipment (Immunity)</li> <li>• EN300 386 Telecommunications Network Equipment (EMC)</li> <li>• EN50082-1/EN61000-6-1 Generic Immunity Standard</li> </ul>	Same as for Cisco ASR 1002	Same as for Cisco ASR 1002
CE marking	<ul style="list-style-type: none"> <li>• UL60950-1</li> <li>• CSA C22.2 No. 60950-1-03</li> <li>• EN 60950-1</li> <li>• IEC 60950-1</li> <li>• AS/NZS 60950.1</li> </ul>	<ul style="list-style-type: none"> <li>• UL60950-1</li> <li>• CSA C22.2 No. 60950-1-03</li> <li>• EN 60950-1</li> <li>• IEC 60950-1</li> <li>• AS/NZS 60950.1</li> </ul>	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
<b>Serial and Channelized SPA</b>		
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
<b>Ethernet SPA</b>		
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
<b>Packet over SONET/SDH (PoS)</b>		
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 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

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
<b>Cisco ASR 1000 Series Chassis</b>	
ASR1002-F	Cisco ASR1002 System, Fixed ESP, Crypto, 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
<b>Cisco ASR 1000 Series Embedded Services Processor</b>	
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, Crypto
ASR1000-ESP10=	Cisco ASR1000 Embedded Services Processor, 10G, Crypto, Spare
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, Crypto
ASR1000-ESP20=	Cisco ASR1000 Embedded Services Processor, 20G, Crypto, Spare
<b>Cisco ASR 1000 Series Route Processor</b>	

Product Number	Product Description
ASR1000-RP1	Cisco ASR1000 Route Processor 1, 2GB DRAM
ASR1000-RP1=	Cisco ASR1000 Route Processor 1, 2GB DRAM, spare
<b>Cisco ASR 1000 Series SPA Interface Processor</b>	
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10
ASR1000-SIP10=	Cisco ASR1000 SPA Interface Processor 10, spare
<b>Cisco ASR 1000 Series USB Memory Options</b>	
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
<b>Cisco ASR 1000 Series Consolidated Packages</b>	
SASR1R1-IPB	Cisco ASR 1000 Series RP1 IP BASE W/O 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 W/O CRYPTO
SASR1R1-AESK9	Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE SERVICES
SASR1R1-AES	Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE SERVICES W/O CRYPTO
<b>Cisco ASR 1000 Series Licenses</b>	
<b>Cisco ASR 1000 Series Licenses-Security</b>	
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-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
<b>Cisco ASR 1000 Series Licenses-Broadband</b>	
FLASR1-BB-RTU	Broadband Right-To-Use Feature Lic for ASR1000 Series
FLASR1-BB-4K	Broadband 4K Sessions Feature Lic for ASR1000 Series
FLASR1-BB-8K	Broadband 8K 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
<b>Cisco ASR 1000 Series Licenses-Cisco Unified Border Element</b>	
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) 16K Calls 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
<b>Cisco ASR 1000 Series Software Spare</b>	
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 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 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 expedite solution adoption. Award-winning technical support increases operational efficiency. Optimization improves performance, resiliency, stability, and predictability and prepares your network and teams for change. For more information: <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.



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