

Cisco ASR 1000 Series Aggregation Services Router

General Information

Q. What is the Cisco® ASR 1000 Series Aggregation Services Router?

A. The Cisco ASR 1000 Series is a new class of mid-range routers offering convergence of network services on highly scalable routing platforms. The Cisco ASR 1000 Series delivers superior resiliency with intelligent services and modularity to meet the long-term needs of both enterprise and service provider applications.

The Cisco ASR 1000 Series is the first system to utilize the Cisco QuantumFlow Processor, which is a groundbreaking technology offering superior multiprocessing, advanced memory management, customized quality of service (QoS), and silicon-based service delivery and programmability for emerging requirements. The flexibility of this new processor allows network services such as packet encryption, packet inspection, application recognition, traffic differentiation, and subscriber management to be integrated on a single routing platform – the Cisco ASR 1000 Series router—without using external network appliances or services modules.

The Cisco ASR 1000 Series Routers scale from Fast Ethernet to 10 Gigabit Ethernet and from DS-0 to OC-192/STM-64 (OC-12/STM-4 at time of first availability) with rich QoS features, allowing network operators to guarantee bandwidth to mission-critical applications and improve the overall application user experiences.

Q. What routers are included in the Cisco ASR 1000 Series?

A. The Cisco ASR 1000 Series includes four models: the 2-rack-unit (2RU) Cisco ASR 1002-Fixed, the 2-rack-unit (2RU) Cisco ASR 1002, the Cisco ASR 1004 (4RU), and the Cisco ASR 1006 (6RU). See Table 1 for specifications.

Table 1. Cisco ASR 1000 Series Specifications

Model	Cisco ASR 1002-F	Cisco ASR 1002	Cisco ASR 1004	Cisco ASR 1006
Physical specifications	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"> • 33.65 lb (15.23 kg) (with dual AC power supply and SPA blank cover) • 36.85 lb (16.75 kg) (with dual AC power supply, blank cover and ESP2.5) • No SPAs included Note: The Cisco ASR 1002-F has the route processor, ESP 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"> • 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 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, ASR1000-ESP10 or ASR1000-ESP20, ASR1000-RP1, ASR1000-SIP10 (two), 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 RP and SIP blank covers, ASR1000-ESP10 or ASR1000-ESP20 (dual), ASR1000-RP1 (dual), ASR1000-SIP10 (three), no SPAs)
Shared port adapters	1 SPA slots	3 SPA slots	8 SPA slots	12 SPA slots
Cisco ASR 1000 Series ESP	Integrated in chassis	1 ESP slot	1 ESP slot	2 ESP slots
Route processor	Integrated in chassis	Integrated in chassis	1 route-processor slot	2 route-processor slots
Number of SIPs supported	Integrated in chassis	Integrated in chassis	2	3
Redundancy	Software: Yes	Software: Yes	Software: 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
Airflow	Front-to-back	Front-to-back	Front-to-back	Front-to-back

Note: The 2RU chassis (part number ASR1002) comes by default with 4-GB DRAM and 4-GB are required for the for software-redundancy implementation, which is also of high interest for the managed CPE application.

Q. What are the major components of the Cisco ASR 1000 Series?

A. The major components of the Cisco ASR 1000 Series are:

- Cisco ASR 1000 Series chassis
- Cisco ASR 1000 Series Route Processor (RP1)
- Cisco ASR 1000 Series Embedded Services Processor (ESP5, ESP10, ESP10-N and ESP20)
- Cisco ASR 1000 Series SPA Interface Processor (SIP10)
- Cisco shared port adapters (SPAs)
- Cisco IOS XE Software

Table 2 lists component details.

Table 2. Cisco ASR 1000 Series Components

Components	Description
Cisco ASR 1000 Series Route Processor (RP1)	<ul style="list-style-type: none"> • Runs the general-purpose CPU subsystem with the Cisco IOS XE operating system and chassis-specific code • Runs the router control plane (IOSD) including processing of network control packets, computation of routes, connection setup, and processing of select legacy protocols not handled by the ESP • Responsible for control plane: <ul style="list-style-type: none"> ◦ Executing routing protocol stacks ◦ Performing all protocol communications with other routers ◦ Building and distributing forwarding information to all line cards ◦ Uploading the OS software system images to all installed line cards upon powering up ◦ Providing out-of-band system console and auxiliary ports, two USB and an Ethernet port for router configuration and maintenance ◦ Monitoring and managing the power and temperature of system components such as line cards, power supplies, and fans ◦ H.248 signaling for the session border controller • Provides punt path processing for network packets that are not supported by the ESP, including older protocols such as AppleTalk and IPX. • Receives and transmits all network packets through the active ESP. • Offers non-volatile storage for the system used as the image and configuration repository along with the logger for system statistics, records, events, errors, dumps, etc. • Manages chassis including activation and initialization of the other cards, selection/switchover of active versus standby cards, image management and distribution, logging facilities, distribution of user configuration information, alarm control, etc.
Cisco ASR 1000 Series Embedded Services Processor (ESP)	<ul style="list-style-type: none"> • Based on highly programmable Cisco QuantumFlow Processor and all network traffic flows through the Cisco QuantumFlow Processor which is integrated on the ESP • Processes all data plane processing tasks • Performs the egress packet buffering, queuing, and egress packet scheduling functions for the system • Performs all traditional baseline router packet operations including MAC classification, Layer 2 and the various Layer 3 forwarding, QoS classification, security access control lists (ACLs), VPNs, policing, shaping, load balancing, NetFlow, etc. • Supports all value-add features such as firewall, intrusion prevention, NBAR, NAT, flexible pattern matching, numerous tunneling protocols, crypto, header and payload compression, etc. • ASR1000-ESP10-N supports all of the mentioned features except for IPSec services.
Cisco ASR 1000 Series SPA Interface Processor (SIP)	<ul style="list-style-type: none"> • Provides physical and electrical termination for up to 4 half-height SPAs (or 2 full-height or 2 half-height and 1 full-height) • Supports up to 10 Gbps • Note: Double-wide SPAs are not supported
Cisco ASR 1000 Series Shared Port Adaptor (SPA)	<ul style="list-style-type: none"> • Provides all of the network interfaces for the Cisco ASR 1000 Series excluding management ports for the modular chassis • Full-height and half-height SPAs are supported along with quarter-rate and full-rate • SPAs ranging from multiple T1s up to 10GE/OC-192 are or will be supported on the Cisco ASR 1000 Series • Existing SPAs that are supported on the Cisco 7600 Series Routers and Cisco Catalyst® 6000 Series Switches are supported on the Cisco ASR 1000 Series

Q. What are the typical applications of Cisco ASR 1000 Series in enterprise networks?**A.** Examples of enterprise applications include:

- Multiservice, scalable, and secure enterprise headend for branch and remote-user aggregation
- Enterprise private WAN router, WAN aggregation router, or Internet gateway router with high-density Gigabit Ethernet/WAN link aggregation and 10-Gigabit Ethernet uplink capability to help guarantee the performance of high-priority applications with optimized treatment of all WAN traffic
- High-speed firewall to switch multiple gigabits of traffic while at the same time performing firewall and other baseline features such as NetFlow, NAT, and IPv6.

Q. What are the typical applications of the Cisco ASR 1000 Series in service provider networks?**A.** Examples of service provider applications include:

- Broadband aggregation terminating up to 16,000 subscriber sessions while optionally supporting features such as Cisco Unified Border Element (SP Edition) (also known as session border control [SBC]) for VoIP and video TelePresence services, hardware-assisted firewall for security, and Gigabit Ethernet or 10-Gigabit Ethernet uplink capability.
- Interface with the service provider's voice and multimedia services directly at the edge. No overlay network, network appliances, or service blades are required in this solution for lower operational expenses, lower capital expenditures, and flexible deployment models. Supports protected signaling for both voice and video services and enables 32,000 voice calls concurrent with 10 Gbps of data traffic with accounting, firewall, and call-quality features enabled.

Q. What are the QoS capabilities of the Cisco ASR 1000 Series?

A. The Cisco ASR 1000 Series provides a very granular and flexible QoS architecture to enable service providers and enterprise customers to manage their network performance with respect to bandwidth, delay, jitter, and packet loss, which are critical to optimizing application performance and meeting service-level agreements (SLAs). The Cisco ASR 1000 Series supports multilevel hierarchical queuing, which includes traffic classification; two-rate, three-color policing; Class-Based Weighted Fair Queuing (CBWFQ); two Low-Latency Queues; and traffic shaping as well as congestion-avoidance techniques such as Weighted Random Early Detection (WRED). The Cisco ASR 1000 Series provides queue and scheduling functionalities such as Low-Latency Queuing (LLQ), Bandwidth Limiting, and Traffic Shaping, etc. across up to 128,000 queues on dedicated hardware, up to 1000 service policies, and three levels of QoS hierarchy.

Hardware**Q. What is the main difference between the Cisco ASR 1000 Series ESP2.5, ESP5, ESP10 and ESP20 processors?**

A. All embedded services processors are based on the novel Quantum Flow Processor for performing all data-plane forwarding functions, such as MAC classification, Layer2/3 forwarding, QoS, ACL, VPN, and NetFlow. The Cisco ASR 1000 Series ESP2.5 supports 2.5-Gbps bandwidth, the ESP5 supports 5-Gbps bandwidth. The ESP10 and ESP10-N support 10-Gbps bandwidth, and the ESP20 supports 20-Gbps bandwidth. The Cisco ASR 1000 Series ESP10-N does not support IPSec services. The Cisco ASR 1000 Series ESP5 is only supported in the Cisco ASR 1002 and the ESP2.5 only on the Cisco ASR 1002-Fixed (integrated in chassis). See Table 4 for more comparison and specifications.

Table 3. Cisco ASR 1000 ESP5 and ESP10 Processors: Comparison and Specifications

	Cisco ASR 1000 ESP2.5	Cisco ASR 1000 ESP5	Cisco ASR 1000 ESP10	Cisco ASR 1000 ESP20
Bandwidth	2.5 Gbps	5 Gbps	10 Gbps	20 Gbps
Crypto engine bandwidth	Up to 1.0 Gbps	Up to 1.8 Gbps	Up to 4 Gbps Not supported on ESP10-N	Up to 7 Gbps
Chassis	Cisco ASR 1002-F (integrated)	Cisco ASR 1002	Cisco ASR 1002 Cisco ASR 1004 Cisco ASR 1006	Cisco ASR 1004 Cisco ASR 1006
Clock rate of PPE threads	900 MHz	900 MHz	900 MHz	1.2GHz
DRAM	1 GB DRAM default 1 GB DRAM maximum	1 GB DRAM default 1 GB DRAM maximum	2 GB DRAM default 2 GB DRAM maximum	4 GB DRAM default 4 GB DRAM maximum
Cisco QuantumFlow Processor memory	256 MB	256 MB	512 MB	1 GB
Packet buffer	64 MB	64 MB	128 MB	256 MB
Number of queues	64,000	64,000	128,000	128,000
Content-addressable memory (TCAM)	10 Mb	10 Mb	10 Mb	40 Mb

Q. What shared port adapters (SPAs) are supported on the Cisco ASR 1000 Series?

- A.** Table 4 lists the SPAs supported on the Cisco ASR 1000 Series. Additional SPAs will be added in future, time-based releases made available every four months.

Table 4. Shared Port Adapters for the Cisco ASR 1000 Series

Product Name	Part Number
Serial and Channelized SPAs	
Cisco 8-Port Channelized T1/E1 Shared Port Adapter	SPA-8XCHT1/E1
Cisco 4-Port Channelized T3 (DS-0) Shared Port Adapter	SPA-4XCT3/DS0
Cisco 2-Port Channelized T3 (DS-0) Shared Port Adapter	SPA-2XCT3/DS0
Cisco 1-Port Channelized STM-1/OC-3 Shared Port Adapter	SPA-1XCHSTM1/OC3
Cisco 2-Port Clear Channel T3/E3 Shared Port Adapter	SPA-2XT3/E3
Cisco 4-Port Clear Channel T3/E3 Shared Port Adapter	SPA-4XT3/E3
Cisco 4-Port Serial Interface Shared Port Adapter	SPA-4XT-Serial
Ethernet SPAs	
Cisco 4-Port 10BASE-T/100BASE Fast Ethernet Shared Port Adapter, V-2	SPA-4X1FE-TX-V2
Cisco 8-Port 10BASE-T/100BASE Fast Ethernet Shared Port Adapter, V-2	SPA-8X1FE-TX-V2
Cisco 2-Port Gigabit Ethernet Shared Port Adapter, Version 2	SPA-2X1GE-V2
Cisco 5-Port Gigabit Ethernet Shared Port Adapter, Version 2	SPA-5X1GE-V2
Cisco 8-Port Gigabit Ethernet Shared Port Adapter, Version 2	SPA-8X1GE-V2
Cisco 10-Port Gigabit Ethernet Shared Port Adapter, Version 2	SPA-10XGE-V2
Cisco 1-Port 10 Gigabit Ethernet Shared Port Adapter, Version 2	SPA-1X10GE-L-V2
ATM SPAs	
Cisco 1-Port OC3c/STM1c ATM Shared Port Adapter	SPA-1XOC3-ATM-V2
Cisco 3-Port OC-3c/STM-1c POS Shared Port Adapter	SPA-3XOC3-ATM-V2
Packet over SONET (POS) SPAs	
Cisco 2-Port OC-3c/STM-1c POS Shared Port Adapter	SPA-2XOC3-POS
Cisco 4-Port OC-3c/STM-1c POS Shared Port Adapter	SPA-4XOC3-POS
Cisco 8-Port OC-3c/STM-1c POS Shared Port Adapter	SPA-8XOC3-POS
Cisco 1-Port OC-1-2c/STM-4c POS Shared Port Adapter	SPA-1XOC12-POS

Cisco 2-Port OC-12c/STM-4 POS Shared Port Adapter	SPA-2XOC12-POS
Cisco 4-Port OC-12c/STM-4 POS Shared Port Adapter	SPA-4XOC12-POS
Cisco 8-Port OC-12c/STM-4 POS Shared Port Adapter	SPA-8XOC12-POS
Cisco 1-Port OC-48c/STM-16c POS/RPR Shared Port Adapter (POS mode only)	SPA-1XOC48POS/RPR
Cisco 2-Port OC-48c/STM-16c POS/RPR Shared Port Adapter (POS mode only)	SPA-2XOC48POS/RPR
Cisco 4-Port OC-48c/STM-16c POS/RPR Shared Port Adapter (POS mode only)	SPA-4XOC48POS/RPR
Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter with XFP Optics	SPA-OC192POS-XFP

Q. What is the maximum physical interface termination capacity of the Cisco ASR 1000 Series?

A. Table 5 lists the maximum physical interface termination capacity of the Cisco ASR 1000 Series. It is assumed that all SPA slots are filled with the respective interface type.

Table 5. Maximum Number of Physical Interfaces Terminated on the Cisco ASR 1000 Series

	Cisco ASR 1002-F Router	Cisco ASR 1002 Router	Cisco ASR 1004 Router	Cisco ASR 1006 Router
Number of SPA slots (single-height)	1	3	8	12
10 GE	1	3	8	12
GE	12	28	64	96
FE	8	24	64	96
OC-48/STM-16 POS	4	12	32	48
OC-12/STM-4 POS	1	3	8	12
OC-3/STM-1 POS	3	12	32	48
T3/E3	3	12	32	48
Channelized T3 at T1	112	336	896	1344
Channelized T3 at DS-0	1024	3072	4096	4096

Performance

Q. What is the expected performance of the Cisco ASR 1000 Series?

A. The overall forwarding performance of the Cisco ASR 1000 Series depends on the embedded services processor (ESP). The overall control plane performance of the Cisco ASR 1000 Series depends on both the route processor (RP) and ESP. Table 6 lists the forwarding and encryption throughput performance numbers.

Note: The Cisco ASR 1000 Series ESP5 is supported on the Cisco ASR 1002 chassis only, whereas the Cisco ASR 1000 Series ESP10 is supported on all three chassis. The Cisco ASR 1000 Series ESP20 is supported on the Cisco ASR 1004 and the ASR 1006 chassis only.

Table 6. Cisco ASR 1000 ESP5, ESP10 and ESP20 Performance Comparison

	Cisco ASR 1000 ESP5	Cisco ASR 1000 ESP10	Cisco ASR 1000 ESP20
Forwarding throughput	5 Gbps	10 Gbps	20 Gbps
Encryption throughput (IPsec 3DES/AES – 128-, 192-, and 256-bit keys)	Up to 1.8 Gbps	Up to 4 Gbps	Up to 8 Gbps
Firewall throughput	5 Gbps	10 Gbps	20 Gbps

Q. What is the ACL processing capability of the Cisco ASR 1000 Series?

A. The Cisco ASR 1000 Series processes ACLs in the ESPs. Cisco ASR 1000 Series supports up to 4000 unique ACLs and up to 50,000 access control entries (ACEs) per system.

Power

Q. What are the available system power-supply options for the Cisco ASR 1000 Series?

A. The Cisco ASR 1000 Series supports by default two power entry modules (PEMs) with either AC receptacle or DC terminal block for redundancy. The two redundant PEMs load share the power between them. If an external power supply fails or one PEM fails or is removed, the other PEM provides the entire power requirements for the chassis.

Q. Can one AC and one DC power supply be used together on the Cisco ASR 1000 Series?

A. No. The Cisco ASR 1000 Series supports dual power supplies by default. However, the router can either be used with two dual AC or two dual DC power supplies. The combination of one AC and one DC power supply is not supported.

Q. What are the power ratings for the Cisco ASR 1000 Series?

A. Table 7 lists the power ratings.

Table 7. Power Ratings

	Cisco ASR 1002-F Router	Cisco ASR 1002 Router	Cisco ASR 1004 Router	Cisco ASR 1006 Router
Maximum input DC	590W	590W	1020W	1700W
Maximum input AC	560W	560W	960W	1600W
Maximum output	470W	470W	765W	1275W

Cisco IOS XE Software

Q. What is Cisco IOS XE Software?

A. Cisco IOS XE Software is part of the Cisco IOS Software Family. Cisco IOS XE Software is a modular software built on a Linux kernel and based on Cisco IOS Software Release 12.2SR.

Q. What is the Cisco IOS XE architecture?

A. The Cisco IOS XE operating system design is based on a distributed control plane. A separate control processor is included on each major component of the Cisco ASR 1000 Series. For example the RP, the ESP, and the SIP have their own processors which are responsible for managing the local resources, data structures, etc. on that component. In addition, the RP controls other components of the system such as power entry modules, midplane ID, etc. using dedicated signals. Certain SPAs contain processors that communicate using IPC and that have loadable software. In addition, the Cisco QuantumFlow Processor on the ESP contains multiple, parallel processors running data plane and control plane software. The communication between the control processors does not expose the details of the components' internal design in order to allow easier evolution of the components.

Q. Is Cisco IOS XE Software the next-generation replacement of Cisco IOS Software?

A. No. Cisco IOS XE Software is an addition to the Cisco IOS Software Family and is designed to enable the Cisco ASR 1000 Series to meet the scalability, availability, and service flexibility requirements for the next-generation network edge encompassing enterprise, broadband aggregation, high-end managed CPE, and service provider edge applications.

Q. Can different Cisco IOS Software releases operate in the same network with the Cisco IOS XE Software releases?

A. Yes, Cisco took special care to preserve the interoperability.

Q. Does Cisco IOS XE Software use the same command-line interface (CLI) as Cisco IOS Software?

A. Cisco IOS XE Software uses the Cisco IOS Software CLI. It has additional commands to accommodate the Cisco IOS XE operating system infrastructure and capabilities of the Cisco ASR 1000 Series.

Q. What is the frequency of Cisco IOS XE Software releases?

- A.** Cisco introduced a new software release strategy with the introduction of the Cisco IOS XE operating system. This strategy accelerates the availability of software and hardware features by introducing a time-based release scheme. Every four months a new Cisco IOS XE release will be made available with new features. Details of the new software release strategy are discussed in the product bulletin which can be found at <http://www.cisco.com/go/asr1000>.

Q. What Cisco IOS XE Software images are being offered for the Cisco ASR 1000 Series?

- A.** The images are being referred to as consolidated packages. For the Cisco IOS XE software, the consolidated packages have been simplified into four options that run on the route processor. Refer to Table 8 for the details on each image.

Table 8. Cisco IOS XE Software consolidated packages for the Cisco ASR 1000 Series

Description	Details
Cisco ASR1000 Series RP1 IP BASE W/O CRYPTO	Includes only basic IP features: <ul style="list-style-type: none"> • No SSH • No crypto • No legacy protocols • No SNA switching
Cisco ASR1000 Series RP1 IP BASE	Includes only basic IP features and SSH: <ul style="list-style-type: none"> • No crypto • No legacy protocols • No SNA switching
Cisco ASR1000 Series RP1 ADVANCED IP SERVICES	Includes all features and Session Border Controller and Lawful Intercept but: <ul style="list-style-type: none"> • No legacy protocols • No SNA switching
Cisco ASR1000 Series RP1 ADVANCED ENTERPRISE SERVICES	Includes all features and legacy protocols, Session Border Controller and Lawful Intercept but: <ul style="list-style-type: none"> • No SNA switching

The Cisco ASR 1000 Series allows you to upgrade or downgrade SIP and SPA software sub-packages without operationally impacting other SIP and SPA functionality within the same chassis.

Q. How can I deploy the value-added features on the Cisco ASR 1000 Series routers?

- A.** First, select a Cisco IOS XE consolidated package that supports the required features. Second, check whether this feature requires a software license. If yes, in addition to the Cisco IOS XE consolidated package, the required license needs to be purchased. The consolidated package and license are linked to the chassis, so if you upgrade from one route processor to another or from one ESP to another, you do not need to purchase a new consolidated package or feature license. The part numbers for the licenses and consolidated packages that are available at first customer shipment (FCS) are listed in the Ordering Information section. Note: In the future, more licenses will be introduced. For details on ordering, refer to the Ordering Guide product bulletin posted on <http://www.cisco.com/go/asr1000>.

Q. What kind of software modularity is offered with Cisco IOS XE Software?

- A.** Each consolidated package for the Cisco ASR 1000 Series consists of seven different sub-packages. The sub-packages are designed to maximize the In-Service Software Upgrade (ISSU) capability. Table 9 describes the functionality of each of the seven sub-packages.

Table 9. Cisco IOS XE Software sub-packages for the Cisco ASR 1000 Series

Software Sub-Package	Function
RPBase	Provides the operating system software for the route processor.
RPControl	Controls the control plane processes that interface between Cisco IOS XE Software and the rest of the platform.

RPAccess – K9 and non-K9	Software required for router access. <ul style="list-style-type: none"> • RPAccess K9: Includes restricted components (SSL and SSH). Consolidated packages with this sub-package are subject to export controls. • RPAccess non-K9: Included only in consolidated packages that do not have cryptographic support or SSH support.
RPIOS	Provides the Cisco IOS Software kernel, which is where Cisco IOS features are stored and run. Each Cisco IOS image has a different RPIOS.
ESPBase	Provides the ESP operating system and control processes, and the ESP software.
SIPSPA	Provides the SPA driver and associated field-programmable device (FPD) images.
SIPBase	Controls the SIP carrier card operating system and control processes.

For every Cisco IOS XE Software release, all seven sub-packages are integrated and available in each of the four consolidated packages. Each consolidated package is available for download from Cisco.com.

Q. What sub-packages are included in the various consolidated packages of a Cisco IOS XE Software release?

A. Table 10 lists the sub-packages included in each consolidated package.

Table 10. Modules Included in Cisco IOS XE Consolidated Packages

Cisco IOS XE Consolidated Package	Sub-Package							
	RPBase	RPControl	RPIOS	RPAccess ¹	RPAccessK9	SIPBase	SIPSPA	ESPBase
ASR 1000 ADVANCED ENTERPRISE²	Yes	Yes	Advanced Enterprise Services	–	Yes	Yes	Yes	Yes
ASR 1000 ADVANCED ENTERPRISE³ W/O Cryptography	Yes	Yes	Advanced Enterprise Services (W/O Cryptography)	Yes	–	Yes	Yes	Yes
ASR 1000 ADVANCED IP SERVICES⁴	Yes	Yes	Advanced IP Services	–	Yes	Yes	Yes	Yes
ASR 1000 ADVANCED IP SERVICES⁵ W/O Cryptography	Yes	Yes	Advanced IP Services (W/O Cryptography)	Yes	–	Yes	Yes	Yes
ASR 1000 IP BASE	Yes	Yes	IP Base	–	Yes	Yes	Yes	Yes
ASR 1000 IP BASE W/O CRYPTO	Yes	Yes	IP Base W/O CRYPTO	Yes	–	Yes	Yes	Yes

Redundancy Support

Q. What are the redundancy and resiliency features of the Cisco ASR 1000 Series?

A. The Cisco ASR 1000 Series offers the following features:

¹ RP-Access is provided as either a cryptographic or non-cryptographic version depending on the type of consolidated package (IP BASE or IP BASE W/O CRYPTO).

² ASR 1000 Advanced Enterprise Services includes the RPIOS sub-package “Advanced Enterprise Services” with all features including Lawful Intercept and Cisco Unified Border Element (SP Edition).

³ ASR 1000 Advanced Enterprise Services w/o Cryptography includes the RPIOS sub-package “Advanced Enterprise Services w/o Cryptography” with all features including Lawful Intercept and Cisco Unified Border Element (SP Edition).

⁴ ASR 1000 Advanced IP Services includes the RPIOS sub-package “Advanced IP Services” and supports all features that are in the Cisco ASR 1000 Advanced Enterprise Services consolidated package with the exception of legacy protocols.

⁵ ASR 1000 Advanced IP Services w/o Cryptography includes the RPIOS sub-package “Advanced IP Services w/o Cryptography” and supports all features that are in the Cisco ASR 1000 Advanced Enterprise Services consolidated package with the exception of legacy protocols.

- The Cisco ASR 1006 supports 1+1 active and standby redundancy in dual RP and dual ESP configuration. Switchover of the RP does not result in switchover of the ESP, and switchover of the ESP does not result in switchover of the RP.
- The Cisco ASR 1002 and Cisco ASR 1004 support dual Cisco IOS Software redundancy with a single RP configuration. This is not supported on the Cisco ASR 1006.
- Cisco ASR 1000 Series routers support Nonstop Forwarding (NSF), Stateful Switchover (SSO), In-Service Software Upgrade (ISSU), and Online Insertion and Removal (OIR).

Q. What high-availability features are supported by the Cisco ASR 1000 Series?

- A.** The Cisco ASR 1002-Fixed, ASR 1002 and Cisco 1004 support dual Cisco IOS Software redundancy, In-Service Software Upgrade (ISSU), and Non-Stop Forwarding (NSF). Cisco IOS Software redundancy requires 4 GB of DRAM on the Route Processor 1 (ASR1000-RP1) and a High Availability license (Cisco IOS Software redundancy license). Note: The Cisco ASR 1002 comes by default with 4 GB of DRAM.

Ordering Information

Q. How do I order the Cisco ASR 1000 Series routers?

- A.** Go to the [Cisco Ordering Tool](#).

Q. What are the part numbers for the hardware components?

- A.** Table 11 lists the hardware part numbers.

Table 11. Cisco ASR 1000 Series Hardware -- Part Numbers

Part Number	Description
ASR1002-F	Cisco ASR 1002-F Chassis, 4 built-in GE, dual power supply, 4 GB DRAM
ASR1002	Cisco ASR 1002 Chassis, 4 built-in GE, dual power supply, 4 GB DRAM
ASR1004	Cisco ASR 1004 Chassis, dual power supply
ASR1006	Cisco ASR 1006 Chassis, dual power supply
Cisco ASR 1000 Embedded Services Processor	
ASR1000-ESP5	Cisco ASR 1000 Embedded Services Processor, 5 Gbps, Cisco ASR 1002 only
ASR1000-ESP10	Cisco ASR 1000 Embedded Services Processor, 10 Gbps
ASR1000-ESP10-N	Cisco ASR 1000 Embedded Services Processor, 10 Gbps Non Crypto
ASR1000-ESP20	Cisco ASR 1000 Embedded Services Processor, 20 Gbps
Cisco ASR 1000 Route Processor	
ASR1000-RP1	Cisco ASR 1000 Route Processor 1, 2 GB DRAM
Cisco ASR 1000 SPA Interface Processor	
ASR1000-SIP10	Cisco ASR 1000 SPA Interface Processor 10
Cisco ASR 1000 RP Memory: RP1	
M-ASR1K-RP1-2GB	Cisco ASR 1000 RP1 2 GB DRAM
M-ASR1K-RP1-2GB=	Cisco ASR 1000 RP1 2 GB DRAM, spare
M-ASR1K-RP1-4GB	Cisco ASR 1000 RP1 4 GB DRAM
M-ASR1K-RP1-4GB=	Cisco ASR 1000 RP1 4 GB DRAM, spare
M-ASR1K-HDD-40GB	Cisco ASR 1000 RP1 40 GB HDD
M-ASR1K-HDD-40GB=	Cisco ASR 1000 RP1 40 GB HDD, spare
M-ASR1K-SSD-32GB	Cisco ASR1000 RP1 32GB SSD
M-ASR1K-SSD-32GB=	Cisco ASR1000 RP1 32GB SSD, spare
Cisco ASR 1000 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
Cisco ASR 1000 Accessories	
ASR1002-ACS=	Cisco ASR1002 Accessory Kit, spare
ASR1004-ACS=	Cisco ASR1004 Accessory Kit, spare
ASR1006-ACS=	Cisco ASR1006 Accessory Kit, spare
SPA-BLANK=	Blank Cover for regular SPA
ASR1000-SIP-BLANK=	Blank Cover Cisco ASR 1000 SIP, spare
ASR1000-ESP-BLANK=	Blank Cover for Cisco ASR 1000 ESP, spare
ASR1000-RP-BLANK=	Blank Cover for Cisco ASR 1000 RP, spare
ASR1002-PWR-BLANK=	Blank Cover ASR1002 Power Supply,spare
ASR1004-PWR-BLANK=	Blank Cover ASR1004 Power Supply,spare

Q. How do I order Cisco IOS XE Software ?

- A.** The Cisco ASR 1000 Series can either be configured at the time of order with the desired Cisco IOS XE Software consolidated packages (see Table 12) or the consolidated packages can be ordered as spares (see Table 13).

Table 12. Cisco IOS XE Consolidated Packages—Part Numbers

Part Number	Description
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 Without cryptography
SASR1R1-AESK9	Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE SERVICES
SASR1R1-AES	Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE SERVICES Without Cryptography

Table 13. Cisco IOS XE Software Spares—Part Numbers

Part Number	Description
ASR 1000-SW-SPARECD	Cisco ASR 1000 Series Software Spare CD
CDASR1000-IPB=	Cisco ASR1000 RP1 IP Base W/O CRYPTO,spare
CDASR1000-IPBK9=	Cisco ASR1000 RP1 IP Base,spare
CDASR1000-AISK9=	Cisco ASR1000 RP1 Advanced IP Services,spare
CDASR1000-AESK9=	Cisco ASR1000 RP1 Advanced Enterprise Services,spare

Q. What Cisco IOS Software XE feature licenses are available and how do I order them?

- A.** Table 14 lists the licenses that are available at FCS. In the future, more licenses will be introduced.

Table 14. Cisco ASR 1000 Series Licenses

Security Licenses	Description
FLASR1-IPSEC-RTU	Encryption Right-To-Use (RTU) Feature License for Cisco ASR 1000 Series
FLASR1-FW-RTU	Firewall RTU Feature License for Cisco ASR 1000 Series
FLASR1-FPI-RTU	Flexible Packet Inspection RTU Feature License for Cisco ASR 1000 Series
FLASR1-IOSRED-RTU	Software Redundancy RTU Feature License for Cisco ASR 1002, ASR 1004
Broadband Licenses	
FLASR1-BB-RTU	Broadband RTU Feature License for Cisco ASR 1000 Series
FLASR1-BB-4K	Broadband 4000 Sessions Feature License for Cisco ASR 1000 Series

FLASR1-BB-16K	Broadband 16,000 Sessions Feature License for Cisco ASR 1000 Series
FLASR1-BB-32K	Broadband 32,000 Sessions Feature License for Cisco ASR 1000 Series
Cisco Unified Border Element (SP Edition) Licenses	
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

Q. How do I verify the Cisco ASR 1000 Series configurations?

A. Go to the dynamic configuration tool ([DCT](#)) and enter the respective part number(s).

Q. Where can I get pricing information?

A. Check the current [Cisco Product Price List](#) (requires a Cisco.com username and password) or contact your Cisco account representative.



Americas Headquarters
Cisco Systems, Inc.
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