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 class of midrange routers offering convergence of network services on highly scalable routing platforms. It 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 use 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 you to integrate network services such as packet encryption, packet inspection, application recognition, traffic differentiation, and subscriber management on a single routing platform, the Cisco ASR 1000 Series Router, without using external network appliances or service modules.

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

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

A. The Cisco ASR 1000 Series includes seven models: the 1-rack-unit (1RU) Cisco ASR 1001; the 2-rack-unit (2RU) Cisco ASR 1002-Fixed, ASR 1002, and ASR 1002-X; the 4RU Cisco ASR 1004; the 6RU Cisco ASR 1006; and the 13RU Cisco ASR 1013. Table 1 gives specifications.

Table 1. Cisco ASR 1000 Series Specifications

Model	Cisco ASR 1001	Cisco ASR 1002-F	Cisco ASR 1002	Cisco ASR 1002-X	Cisco ASR 1004	Cisco ASR 1006	Cisco ASR 1013
Physical specifications	Height: 1.71 in. (43.43 mm) Width: 17.3 in. (439.42 mm) Depth: 18.5 in. (470 mm) Weight: • 23.30 lb (kg) (with dual AC power supplies and integrated daughter card [IDC]) • 22.70 lb (kg) (with dual DC power and IDC) • No SPA included **Note:** The Cisco ASR 1001 Router has the route processor, ESP, and SIP	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 supplies and shared-port-adapter [SPA] blank cover) • 36.85 lb (16.75 kg) (with dual DC power supply, blank cover, and embedded services processor	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 supplies and SPA blank covers) • 36.85 lb (16.75 kg) (with dual DC power supply, blank covers, and ASR1000-ESP5) • No SPAs included	Height: 3.5 in. (88.9 mm) Width: 17.2 in. (437.4 mm) Depth: 22 in. (558.8 mm) Weight: • 38.25 lb (17.37 kg) (with dual AC power supplies and SPA blank covers) • 39.05 lb (17.73 kg) (with dual AC power supply and blank covers) • No SPAs included **Note:** The Cisco ASR 1002-X	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 supplies, SPA blank covers, ASR1000-ESP10 or ASR1000-ESP20, ASR1000-RP1, ASR1000-SIP10 (two), and no SPAs **Note:** The Cisco ASR 1004 also supports ASR1000-ESP40.	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 supplies, SPA and RP and SIP blank covers, ASR1000-ESP10 or ASR1000-ESP20 (two), ASR1000-RP1 (two), ASR1000-SIP10 (three), 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 supplies, SPA and route processor and SIP blank covers, two Cisco ASR 1000 Series ESP40s (ASR1000-ESP40), two Cisco ASR 1000 Series RP2s (ASR1000-RP2), six Cisco ASR 1000 Series SIP40s (ASR1000-SIP40), and no

Model	Cisco ASR 1001	Cisco ASR 1002-F	Cisco ASR 1002	Cisco ASR 1002-X	Cisco ASR 1004	Cisco ASR 1006	Cisco ASR 1013
	integrated.	2.5 [ESP2.5]) • No SPAs included **Note:** The Cisco ASR 1002-F has the route processor, ESP, and SIP integrated.	**Note:** The Cisco ASR 1002 has the route processor and SIP integrated.	has the route processor, ESP, and SIP integrated.			SPAs)
Shared port adapters (SPAs)	1 SPA slot	1 SPA slot	3 SPA slots	3 SPA slots	8 SPA slots	12 SPA slots	24 SPA slots
Cisco ASR 1000 Series ESP	Integrated in chassis	Integrated in chassis	1 ESP slot	Integrated in chassis	1 ESP slot	2 ESP slots	2 ESP slots
Route processor	Integrated in chassis	Integrated in chassis	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	Integrated in chassis	Integrated in chassis	2	3	6
Redundancy	Software: Yes	Software: Yes	Software: Yes	Software: Yes	Software: Yes	Hardware: Yes	Hardware: Yes
Built-in Gigabit Ethernet ports	Yes: 4 Gigabit Ethernet (SFP) ports	Yes: 4 Gigabit Ethernet (SFP) ports	Yes: 4 Gigabit Ethernet (SFP) ports	Yes: 6 Gigabit Ethernet (SFP) ports	0	0	0
Airflow	Front-to-back	Front-to-back	Front-to-back	Front-to-back	Front-to-back	Front-to-back	Front-to-back

Note: The 1RU, 2RU, and 2RU-F chassis (ASR1001, ASR1002, ASR1002-X, and ASR1002-F) come by default with 4-GB DRAM. In the ASR1002 and ASR1002-F, 4 GB is required for the software-redundancy implementation, which is also of high interest for the managed customer-premises-equipment (CPE) application. In the ASR 1001 and ASR 1002-X, 8 GB is required for the software redundancy implementation.

Q. What key new items are introduced with the Cisco ASR 1001 chassis compared to the other ASR 1000 Series Routers?

A. The Cisco ASR 1001 Series introduces the concept of the integrated daughter card (IDC), which is a non-field upgradable component on the ASR 1001 chassis to provide enhanced (I/O) capabilities. The first Cisco ASR 1001 release came in three different versions: the ASR 1001 base chassis (part number ASR1001); the ASR1001 chassis with an IDC providing two OC-3 Packet-over-SONET/SDH (POS) ports (ASR1001-2XOC3POS); and the ASR1001 with an IDC providing four T3 ports (ASR1001-4XT3). The second phase of the ASR 1001 launched a further three chassis: the ASR1001 chassis with built-in 160-GB hard drive (ASR1001-HDD); the ASR1001 chassis with an IDC providing four 1 Gigabit Ethernet Ports (ASR1001-4X1GE); and the ASR1001 chassis with an IDC providing eight Channelized T1/E1 ports (ASR1001-8XCHT1E1) In addition, the Cisco ASR 1001 is the first chassis of the Cisco ASR 1000 Series that implements the software activation that is the same software activation concept as seen on other Cisco offerings; for example, on the Cisco Integrated Services Routers Generation 2 (ISR G2) router series. At first customer shipment (FCS), two different types of licenses will be enforced through software activation. First, the feature sets will be offered through the IP Base (K9 and non-K9), Advanced IP Services (K9 and non-K9), and Advanced Enterprise Services (K9 and non-K9). Second, the upgrade from the default performance of 2.5 to 5 Gbps can be accomplished through a software-activated performance upgrade license (part number to be used at the time of ordering any of the three ASR 1001 chassis for the performance upgrade to 5 Gbps

is FLS-ASR1001-5G). Other functions such as firewall and encryption are planned to be software-activated on the ASR 1001 in the future.

Q. What are the key new items introduced with the Cisco ASR 1002-X chassis compared to the other ASR 1000 Series Routers?

A. The Cisco ASR 1002-X Series has 6 built-in Gigabit Ethernet ports. Further, the Cisco ASR 100-X implements the software activation that is the same software activation concept as seen on ASR 1001 and other Cisco offerings; for example, on the Cisco ISR G2 routers. The system performances can be set at 5 (default), 10, 20, and 36 Gbps through software activation.

Q. What are the major differences between the Cisco ASR 1013 and ASR 1006?

A. The Cisco ASR 1013 has expanded I/O capacity of up to 6 I/O slots (24 half-height SPAs), and a throughput support capabililty of 360 Gbps total. This model is designed to support either four 40-Gbps slots or two 100-Gbps slots in the future. The Cisco ASR 1013 has four power supplies (AC or DC) organized in two redundant pairs. Field-replaceable unit (FRU) placement is also different on the Cisco ASR 1013. From the bottom up, there are three SIP slots, a route-processor slot, an embedded-services-processor (ESP) slot, another ESP slot, a route-processor slot, and then another three SIP slots.

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

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

- Cisco ASR 1000 Series chassis
- Cisco ASR 1000 Series Route Processor (RP1 and RP2 modules - or a route processor - are integrated in ASR 1001, ASR 1002-F, and ASR 1002 chassis)
- Cisco ASR 1000 Series Embedded Services Processor (ESP5, ESP10, ESP10-N, ESP20, ESP40, ESP100, and ESP200)
  - **Note:** The ESP is integrated in the ASR 1001, ASR 1002-F, and ASR 1002-X chassis.

    The integrated ESP on the ASR 1001 offers 2.5 Gbps by default and is upgradable through a license to 5 Gbps. The integrated ESP on the ASR 1002-F chassis offers 2.5 Gbps throughput and is not further upgradable.

    The integrated ESP on the ASR 1002-X offers 5 Gbps by default, and is upgradable through a software license to 10, 20, or 36 Gbps.
- Cisco ASR 1000 Series SPA Interface Processor (SIP10 or SIP40)
  - **Note:** The SIP is integrated on the ASR 1001, ASR 1002-F, and ASR 1002-X chassis.
- Cisco 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)	• Runs the general-purpose CPU subsystem with the Cisco IOS XE Software 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 older protocols not handled by the ESP • Responsible for control plane: ◦ Executing routing protocol stacks ◦ Performing all protocol communications with other routers

Components	Description
	◦ 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 ports, 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 Internetwork Packet Exchange (IPX) • Receives and transmits all network packets through the active ESP • Offers nonvolatile storage for the system used as the image and configuration repository along with the logger for system statistics, records, events, errors, dumps, and so on • Manages chassis including activation and initialization of the other cards, selection and switchover of active as opposed to standby cards, image management and distribution, logging facilities, distribution of user configuration information, alarm control, and so on • Offers memory scalability of up to 4 GB **Note:** The ASR 1000-RP1 is integrated in the ASR 1002-F and ASR 1002 chassis. The ASR 1001 and ASR 1002-X also have their own route processor integrated; their performances are between RP1 and RP2, but closer to RP2.
Cisco ASR 1000 Series Route Processor (RP2)	• Runs the general-purpose CPU subsystem with the Cisco IOS XE Software 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 older protocols not handled by the ESP • Is responsible for the control plane: ◦ 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 ports, 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 (SBC) • 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 nonvolatile storage for the system used as the image and configuration repository along with the logger for system statistics, records, events, errors, dumps, and so on • Manages chassis including activation and initialization of the other cards, selection and switchover of active as opposed to standby cards, image management and distribution, logging facilities, distribution of user configuration information, alarm control, and so on • Offers memory scalability of up to 16 GB
Cisco ASR 1000 Series Embedded Services Processor (ESP)	• It is based on the highly programmable Cisco QuantumFlow Processor; all network traffic flows through the Cisco QuantumFlow Processor, which is integrated on the ESP. • It processes all data-plane processing tasks. • It performs the egress packet buffering, queuing, and egress packet scheduling functions for the system. • It 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, and so on. • It supports all value-added features, such as firewall, intrusion prevention, Network-Based Application Recognition (NBAR), Network Address Translation (NAT), Flexible Packet Matching (FPM), numerous tunneling protocols, cryptography, header and payload compression, and so on. • The integrated ESP on the ASR1001 and ASR1002-X supports all of the mentioned features. • The integrated ESP on the ASR 1002-F supports all of the mentioned features with the exception of broadband, which is not supported. • The ASR 1000-ESP10-N supports all of the mentioned features except for IPsec services. • The ASR 1000-ESP20 supports all of the mentioned features. • The ASR 1000-ESP40 supports all of the mentioned features. • The ASR 1000-ESP100 supports all of the mentioned features. • The ASR 1000-ESP200 supports all of the mentioned features.
Cisco ASR 1000 Series SPA Interface Processor	• The SIP provides physical and electrical termination for up to four half-height SPAs (or two full-height, or two half-height and one full-height). Double-wide SPAs are not supported. • The Cisco ASR 1000 SIP10 supports up to 10 Gbps.

Components	Description
(SIP)	• The Cisco ASR 1000 SIP40 supports up to 40 Gbps.
Cisco ASR 1000 Series Shared Port Adaptor (SPA)	• The SPA provides all of the network interfaces for the Cisco ASR 1000 Series, excluding management ports for the modular chassis. • It supports full-height and half-height SPAs 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. • It supports the Ethernet SPA, the Serial/PoS SPA, the Channelized SPA, and the ATM SPA.

Q. What are the typical applications of the Cisco ASR 1000 Series in enterprise networks?

A. Examples of enterprise applications include:

- Multiservice, scalable, and secure enterprise headend for branch-office and remote-user aggregation
- Enterprise private WAN router, WAN aggregation router, or Internet gateway router with high-density Gigabit Ethernet or 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.
- Data Center Interconnect (DCI) with supported functions such as Ethernet over Multiprotocol Label Switching (EoMPLS) or Ethernet over MPLS over generic routing encapsulation (EoMPLSoGRE) or Ethernet over MPLS over generic routing encapsulation over IP Security (EoMPLSoGREoIPsec).

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 32,000 subscriber sessions while optionally supporting features such as Cisco Unified Border Element (Service Provider Edition, also known as session border control [SBC]) for voice-over-IP (VoIP) and video telepresence services, hardware-assisted firewall for security, and Gigabit Ethernet or 10 Gigabit Ethernet uplink capability are some service provider applications.
- Another application includes interfaces 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 operating expenses (OpEx), lower capital expenditures (CapEx), and flexible deployment models. The solution supports protected signaling for both voice and video services and enables 32,000 voice calls concurrent with 200 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; traffic shaping; and congestion-avoidance techniques such as Weighted Random Early Detection (WRED). The Cisco ASR 1000 Series provides queue and scheduling functions such as Low-Latency Queuing (LLQ), bandwidth limiting, traffic shaping, and so on, across up to 128,000 queues on dedicated hardware; up to 4000 service policies; and three levels of QoS hierarchy with queuing on the grandchild level.

Hardware

Q. What is the main difference between the Cisco ASR 1000 Series ESP2.5, ESP5, ESP10 and ESP20, ESP40, ESP100, and ESP200 processors?

A. All ESPs are based on the Cisco QuantumFlow Processor for performing all data-plane forwarding functions, such as MAC classification, Layers 2 and 3 forwarding, QoS, ACL, VPN, and NetFlow. The Cisco ASR 1000 Series ESP2.5 supports 2.5-Gbps bandwidth (integrated in the ASR 1002-F chassis), and the ESP5 supports 5-Gbps bandwidth. The ESP10 and ESP10-N support 10-Gbps bandwidth, the ESP20 supports 20-Gbps bandwidth, the ESP40 supports 40-Gbps bandwidth, the ESP100 supports 100-Gbps bandwidth, and the ESP200 supports 200-Gbps bandwidth. The Cisco ASR 1000 Series ESP10-N does not support IPsec services. The Cisco ASR 1000 Series ESP5 is supported only in the Cisco ASR 1002 and the ESP2.5 only on the Cisco ASR 1002-Fixed (integrated in chassis). Refer to Table 3 for more comparisons and specifications. The integrated ESP in the ASR 1001 chassis supports from 2.5 to 5 Gbps (upgradable through a software license with software activation), whereas the integrated ESP in the ASR 1002-X chassis supports from 5 to 36 Gbps.

Table 3. Cisco ASR 1000 ESP Processors: Comparison and Specifications

	Cisco ASR 1001 Integrated ESP	Cisco ASR 1000 ESP2.5	Cisco ASR 1000 ESP5	Cisco ASR 1000 ESP10	Cisco ASR 1000 ESP20	Cisco ASR 1000 ESP40	Cisco ASR 1002-X Integrated ESP	Cisco ASR 1000 ESP100	Cisco ASR 1000 ESP200
Bandwidth	5 Gbps	2.5 Gbps	5 Gbps	10 Gbps	20 Gbps	40 Gbps	36 Gbps	100 Gbps	200 Gbps
Cryptography engine bandwidth	Up to 1.8 Gbps	Up to 1.0 Gbps	Up to 1.8 Gbps	Up to 4 Gbps Not supported on ESP10-N	Up to 7 Gbps	Up to 11 Gbps	Up to 4 Gbps	Up to 29 Gbps	Up to 78 Gbps
Chassis	Cisco ASR 1001 (integrated)	Cisco ASR 1002-F (integrated)	Cisco ASR 1002	Cisco ASR 1002 Cisco ASR 1004 Cisco ASR 1006	Cisco ASR 1004 Cisco ASR 1006	Cisco ASR 1004 Cisco ASR 1006 Cisco ASR 1013	Cisco ASR 1002-X (integrated)	Cisco ASR 1006 with ASR1013/06-PWR-AC or ASR1013/06-PWR-DC power supply Cisco ASR 1013	Cisco ASR 1013
Processor Clock rate of PPE threads	900 MHz	900 MHz	900 MHz	900 MHz	1.2GHz	1.2 GHz	1.2 GHz	1.5 GHz	1.5 GHz
DRAM	1-GB DRAM default 1-GB DRAM maximum	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	8-GB DRAM default 8-GB DRAM maximum	4-, 8-, or 16-GB DRAM	16-GB DRAM	32-GB DRAM
Cisco QuantumFlow Processor memory	256 MB	256 MB	256 MB	512 MB	1 GB	1 GB	1 GB	4 GB	8 GB
Packet buffer	64 MB	64 MB	64 MB	128 MB	256 MB	256 MB	512 MB	1 GB	2 GB
QoS number of queues	15,000	64,000	64,000	128,000	128,000	128,000	128,000	232,000	464,000
Content-addressable memory (TCAM)	5 Mb	5 Mb	10 Mb	10 Mb	40 Mb	40 Mb	40 Mb	80 Mb	Two 80 Mb

Q. What 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 the future. For a current complete list of ASR 1000 SPA support, please check (http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/install_upgrade/ASR1000/ASRintro.html). Time-based Cisco IOS XE Software releases are available every 4 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 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 8-Port Clear Channel T3/E3 Shared Port Adapter	SPA-8XT3/E3
Cisco 4-Port Serial Interface Shared Port Adapter	SPA-4XT-Serial
Cisco 1-port Channelized STM-1/OC-3c to DS-0 Shared Port Adapter	SPA-1XCHSTM1/OC3
Cisco 1-port Channelized OC-12/STM-4 SPA	SPA-1XCHOC12/DS0
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-10X1GE-V2
Cisco 1-Port 10 Gigabit Ethernet Shared Port Adapter, Version 2	SPA-1X10GE-L-V2
Cisco 1-Port 10GE LAN/WAN-PHY Shared Port Adapter	SPA-1X10GE-WL-V2
Cisco Synchronous Ethernet SPA	SPA-2X1GE-SYNCE
ATM SPAs	
Cisco 1-Port OC3c/STM1c ATM Shared Port Adapter	SPA-1XOC3-ATM-V2
Cisco 3-Port OC-3c/STM-1c ATM Shared Port Adapter	SPA-3XOC3-ATM-V2
Cisco 1-Port OC12c/STM4c ATM Shared Port Adapter	SPA-1XOC12-ATM-V2
Cisco 2-Port T3/E3 Circuit Emulation and ATM SPA	SPA-2CHT3-CE-ATM
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 4-Port OC-3c/STM-4 POS Shared Port Adapter, Version 2	SPA-4XOC3-POS-V2
Cisco 8-Port OC-3c/STM-1c POS Shared Port Adapter	SPA-8XOC3-POS
Cisco 1-Port OC-12c/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

Product Name	Part Number
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
Circuit Emulation SPAs	
Cisco 1 Port Channelized OC3/STM-1 ATM and Circuit Emulation SPA	SPA-1CHOC3-CE-ATM
Cisco 24-Port T1/E1/J1 Circuit Emulation and ATM SPA	SPA-24CHT1-CE-ATM
Cisco 2-Port T3/E3 Circuit Emulation and ATM SPA	SPA-2CHT3-CE-ATM
Service SPA	
Cisco SPA WebEx Node for ASR 1000	SPA-WMA-K9
Cisco ASR 1000 Series Digital Signal Processor SPA	SPA-DSP

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. This data assumes 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 1001	Cisco ASR 1002-F Router	Cisco ASR 1002 Router	Cisco ASR 1002-X Router	Cisco ASR 1004 Router	Cisco ASR 1006 Router	Cisco ASR 1013 Router
Number of SPA slots (single-height)	1	1	3	3	8	12	24
10 Gigabit Ethernet	1	1	3	3	8	12	24
Gigabit Ethernet	12	12	28	30	64	96	192
Fast Ethernet	8	8	24	24	64	96	192
OC-192/STM-64 PoS	1	1	3	3	8	12	24
OC-48/STM-16 PoS	4	4	12	12	32	48	96
OC-12/STM-4 PoS	8	8	24	24	64	96	192
OC-3/STM-1 PoS	8	8	24	24	64	96	192
T3/E3	4	4	12	12	32	48	96
Channelized T3 at T1	112	112	336	336	896	1344	2688
Channelized T3 at DS-0	1023	1023	3069	3069	8184	12276	24552
OC-3/STM-1 ATM	3	3	9	9	24	36	72
OC-12/STM-4 ATM	1	1	3	3	8	12	24
CHT1/CHE1 @ DS-0	256/192	256/192	768/576	768/576	2048/1536	3072/2304	6144/4608
V.35/X.21/EIA-232	4	4	12	12	32	48	96
ChSTM1 @ T3/E3	3/3	3/3	9/9	9/9	24/24	36/36	72/72
ChSTM1 @ T1/E1	83/63	83/63	252/189	252/189	672/504	1008/756	2016/1512
ChSTM1 @ DS-0	1023	1023	3069	3069	8184	12276	24552

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 ESP. The overall control-plane performance of the Cisco ASR 1000 Series depends on both the route processor and the ESP. Table 6 lists the forwarding and encryption throughput performance numbers.

Table 6. Cisco ASR 1000 ESP5, ESP10, ESP20, ESP40, ESP100, and ESP200 Performance Comparison

	Cisco ASR 1001 ESP (integrated)	Cisco ASR 1000 ESP2.5 (integrated in ASR1002-F)	Cisco ASR 1000 ESP5	Cisco ASR 1000 ESP10	Cisco ASR 1000 ESP20	Cisco ASR 1000 ESP40	Cisco ASR 1002-X ESP (integrated)	Cisco ASR 1000 ESP100	Cisco ASR 1000 ESP200
Forwarding throughput	5 Gbps	2.5 Gbps	5 Gbps	10 Gbps	20 Gbps	40 Gbps	36 Gbps	100 Gbps	200 Gbps
Encryption throughput (IPsec Digital Encryption Standard 3/Advanced Encryption Standard (3DES/AES): 128-, 192-, and 256-bit keys)	Up to 1.8 Gbps	Up to 1 Gbps	Up to 1.8 Gbps	Up to 4 Gbps	Up to 8 Gbps	Up to 11 Gbps	Up to 4 Gbps	Up to 29 Gbps	Up to 78 Gbps
Firewall throughput	5 Gbps	2.5 Gbps	5 Gbps	10 Gbps	20 Gbps	40 Gbps	36 Gbps	100 Gbps	200 Gbps

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. The Cisco ASR 1000 Series ESP40 is supported on the Cisco ASR 1004, ASR 1006, and ASR 1013 chassis only. The Cisco ASR 1000 Series ESP100 is supported on the Cisco ASR 1006 with the ASR1013/06-PWR-AC or ASR1013/06-PWR-DC power supply, and on the ASR 1013 chassis only. The Cisco ASR 1000 Series ESP200 is supported on the ASR 1013 chassis only.

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

A. The Cisco ASR 1000 Series processes ACLs in the ESPs. The Cisco ASR 1000 Series supports up to 4,000 unique ACLs and up to 400,000 access control entries (ACEs) per system.

Power

Q. What system power-supply options are available 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 be used with either two AC or two 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 1001 Router	Cisco ASR 1002-F Router	Cisco ASR 1002 Router	Cisco ASR 1002-X Router	Cisco ASR 1004 Router	Cisco ASR 1006 Router	Cisco ASR 1013 Router
Maximum input DC	500W	590W	590W	590W	1020W	1700W	4000W
Maximum input AC	471W	560W	560W	560W	960W	1600W	3760W

Maximum output	400W	470W	470W	470W	765W	1275W	3200W

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 for Cisco IOS XE 2.1 through 2.6 and Cisco IOS Software Release 15S starting with Cisco IOS XE Software Release 3.1S.

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 route processor, ESP, and SIP have their own processors, which are responsible for managing the local resources, data structures, and so on. In addition, the route processor controls other components of the system such as power-entry modules, midplane ID, and so on, using dedicated signals. Certain SPAs contain processors that communicate using interprocess communication (IPC) and have loadable software. In addition, the Cisco QuantumFlow Processor on the ESP contains multiple, parallel processors running data- and control-plane software. The communication between the control processors does not expose the details of the internal design of the components 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 4 months a new Cisco IOS XE Software Release is made available with new features. Details of the new software release strategy are discussed in the product bulletin, which is available at http://www.cisco.com/go/asr1000.

Q. What Cisco IOS XE Software images are you offering for the Cisco ASR 1000 Series?

A. The images are 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 about each image. The Cisco ASR RP1 and RP2 consolidated packages are supported on the RP1 and RP2 route processors, respectively. The Cisco ASR 1001 and ASR 1002-X chassis both have a route processor integrated and run ASR 1001 and ASR 1002-X RP specific consolidated packages, respectively. Further, with the introduction of the software activation for license enforcement on the Cisco ASR 1001 and ASR 1002-X chassis, the ASR 1001 and ASR 1002-X both support two “universal” consolidated packages,

the Cisco ASR 1001 or ASR 1002-X IOS XE UNIVERSAL and Cisco ASR 1001 or ASR 1002-X IOS XE - NO PAYLOAD ENCRYPTION UNIVERSAL consolidated packages. The respective functions as delivered in IP Base (K9 and no-K9), Advanced IP Services (K9 and non-K9), and Advanced Enterprise Services (K9 and non-K9) are enforced through software licenses. For more details about the software activation on the Cisco ASR 1001 and ASR 1002-X, please refer to the Cisco ASR 1000 Software Activation Product Bulletin, which covers the details of software activation on the Cisco ASR 1001 and ASR 1002-X chassis.

Table 8. Cisco IOS XE Software Consolidated Packages for the Cisco ASR 1000 Series

Description	Details
Cisco ASR 1000 Series RP1/2 IP Base without Cryptography	Includes only basic IP features: IPv4 and IPv6 basic services and standard routing protocols • No SSH • No crypto • No older protocols • No Systems Network Architecture (SNA) switching • No broadband or Cisco Intelligent Services Gateway (ISG) features • No Layer 3 or Layer 2 VPN features • No security features
Cisco ASR 1000 Series RP1/2 IP Base	Includes only basic IP features and SSH, but: • No crypto • No older protocols • No SNA switching • No broadband or ISG features • No Layer 3 or Layer 2 VPN features • No security features
Cisco ASR 1000 Series RP1/2 Advanced IP Services without Cryptography	Includes all features and Session Border Controller and Lawful Intercept, but: • No crypto • No older protocols • No SNA switching
Cisco ASR 1000 Series RP1/2 Advanced IP Services	Includes all features and Session Border Controller and Lawful Intercept, but: • No older protocols • No SNA switching
Cisco ASR 1000 Series RP1/2 Advanced Enterprise Services without Cryptography	Includes all features and older protocols, Session Border Controller, and Lawful Intercept, but: • No crypto • No SNA switching
Cisco ASR 1000 Series RP1/2 Advanced Enterprise Services	Includes all features and older protocols, Session Border Controller, and Lawful Intercept, but: • No SNA switching

The Cisco ASR 1000 Series allows you to upgrade or downgrade SIP and SPA software sub-packages without operationally affecting other SIP and SPA functions 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 Software consolidated package that supports the required features. Second, check whether this feature requires a software license. If it does, you must purchase the required license in addition to the Cisco IOS XE consolidated package. 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 FCS are listed in the “Ordering Information” section. Note that in the future more licenses will be introduced. With Cisco ASR 1001 and ASR 1002-X, system performances are now enforced through software activation. For more details about the software activation on the Cisco ASR 1001 and ASR 1002-X, please refer to the Cisco ASR 1000 Software Activation Product Bulletin, which covers the details of software activation on the Cisco ASR 1001 and ASR 1002-X chassis. For details about 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 functions 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: • RPAccess K9: This package includes restricted components (SSL and SSH). Consolidated packages with this sub-package are subject to export controls. • RPAccess non-K9: This package is 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 Software image has a different RPIOS.
ESPBase	Provides the ESP operating system and control process, 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 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

	Sub-package							
Cisco IOS XE Consolidated Package	RPBase	RPControl	RPIOS	RPAccess[1]	RPAccessK9	SIPBase	SIPSPA	ESPBase
ASR 1000 Advanced Enterprise[2]	Yes	Yes	Advanced Enterprise Services	-	Yes	Yes	Yes	Yes
ASR 1000 Advanced Enterprise[3] without Cryptography	Yes	Yes	Advanced Enterprise Services (without Cryptography)	Yes	-	Yes	Yes	Yes
ASR 1000 Advanced IP Services[4]	Yes	Yes	Advanced IP Services	-	Yes	Yes	Yes	Yes
ASR 1000 Advanced IP Services[5] without Cryptography	Yes	Yes	Advanced IP Services (without Cryptography)	Yes	-	Yes	Yes	Yes
ASR 1000 IP Base	Yes	Yes	IP Base	-	Yes	Yes	Yes	Yes
ASR 1000 IP Base without Cryptography	Yes	Yes	IP Base without Cryptography	Yes	-	Yes	Yes	Yes

[1] RP-Access is provided as either a cryptographic or a noncryptographic version depending on the type of consolidated package (IP BASE or IP BASE without Cryptography).

[2] Cisco 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] Cisco ASR 1000 Advanced Enterprise Services without Cryptography includes the RPIOS sub-package “Advanced Enterprise Services without Cryptography” with all features including Lawful Intercept and Cisco Unified Border Element (SP Edition).

[4] Cisco 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 older protocols.

[5] Cisco ASR 1000 Advanced IP Services without Cryptography includes the RPIOS sub-package “Advanced IP Services without Cryptography” and supports all features that are in the Cisco ASR 1000 Advanced Enterprise Services consolidated package, with the exception of older protocols.

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:

- The Cisco ASR 1006 and ASR 1013 support 1 + 1 active and standby redundancy in dual RP and dual ESP configurations. Switchover of the route processor does not result in switchover of the ESP, and switchover of the ESP does not result in switchover of the route processor.
- The Cisco ASR 1001, ASR 1002-F, ASR 1002, ASR 1002-X, and ASR 1004 support dual Cisco IOS Software redundancy with a single route-processor configuration. This feature is not supported on the Cisco ASR 1006 or Cisco ASR 1013.
- Cisco ASR 1000 Series Routers support Nonstop Forwarding (NSF), Stateful Switchover (SSO), ISSU, and online Insertion and removal (OIR).

Q. What other high-availability features does the Cisco ASR 1000 Series support?

A. The Cisco ASR 1001, ASR 1002-Fixed, ASR 1002, ASR 1002-X, and ASR 1004 support dual Cisco IOS Software redundancy, sub-package software upgrade and downgrade, and NSF. For the ASR 1002-F, ASR 1002, and ASR 1004, 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). For the ASR 1001 and ASR 1002-X, Cisco IOS Software redundancy requires 8 GB of DRAM and the Cisco IOS Software redundancy license. **Note**: The Cisco ASR 1002-F and ASR 1002 come by default with 4 GB of DRAM. The Cisco ASR1001 and ASR 1002-X come by default with 4 GB of DRAM, upgradable to 8 or 16 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
ASR1001	Cisco ASR1001 System, Crypto, 4 built-in GE, Dual P/S
ASR1001=	Cisco ASR1001 System, Crypto, 4 built-in GE, Dual P/S, spare
ASR1001-2XOC3POS	Cisco ASR1001 System, Crypto, 4 built-in GE, OC3 IDC, Dual P/S
ASR1001-2OC3POS=	Cisco ASR1001 System, Crypto, 4 built-in GE, OC3 IDC, Dual P/S, spare
ASR1001-4XT3	Cisco ASR1001 System, Crypto, 4 built-in GE, T3 IDC, Dual P/S
ASR1001-4XT3=	Cisco ASR1001 System, Crypto, 4 built-in GE, T3 IDC, Dual P/S, spare
ASR1001-HDD	Cisco ASR1001 System, 4 built-in GE, HDD, Dual P/S
ASR1001-HDD=	Cisco ASR1001 System, 4 built-in GE, HDD, Dual P/S, spare
ASR1001-4X1GE	Cisco ASR1001 System, 4 built-in GE, 4X1GE IDC, Dual P/S

Part Number	Description
ASR1001-4X1GE=	Cisco ASR1001 System, 4 built-in GE, 4X1GE IDC, Dual P/S, spare
ASR1001-8XCHT1E1	Cisco ASR1001 System, 4 built-in GE, CHT1 IDC, Dual P/S
ASR1001-8XCHT1E1=	Cisco ASR1001 System, 4 built-in GE, CHT1 IDC, Dual P/S, spare
ASR1002-F	Cisco ASR 1002-F Chassis, 4 built-in GE, dual power supply, 4 GB DRAM
ASR1002-F=	Cisco ASR 1002-F Chassis, 4 built-in GE, dual power supply, 4 GB DRAM, spare
ASR1002	Cisco ASR 1002 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, spare
ASR1002-X	Cisco ASR1002-X System, Crypto, 6 built-in GE, Dual P/S
ASR1002-X=	Cisco ASR1002-X System, Crypto, 6 built-in GE, Dual P/S, spare
ASR1004	Cisco ASR 1004 Chassis, dual power supply
ASR1004=	Cisco ASR 1004 Chassis, dual power supply, spare
ASR1006	Cisco ASR 1006 Chassis, dual power supply
ASR1006=	Cisco ASR 1006 Chassis, dual power supply, spare
ASR1013	Cisco ASR 1013 Chassis, redundant power supply
ASR1013=	Cisco ASR 1013 Chassis, redundant power supply, spare
Cisco ASR 1000 Embedded Services Processor	
ASR1000-ESP5	Cisco ASR 1000 Embedded Services Processor, 5 G, cryptography, Cisco ASR 1002 only
ASR1000-ESP5=	Cisco ASR 1000 Embedded Services Processor, 5 G, cryptography, Cisco ASR 1002 only, spare
ASR1000-ESP10	Cisco ASR 1000 Embedded Services Processor, 10 G
ASR1000-ESP10=	Cisco ASR 1000 Embedded Services Processor, 10 G, spare
ASR1000-ESP10-N	Cisco ASR 1000 Embedded Services Processor, 10 G, non-cryptography
ASR1000-ESP10-N=	Cisco ASR 1000 Embedded Services Processor, 10 G, non-cryptography, spare
ASR1000-ESP20	Cisco ASR 1000 Embedded Services Processor, 20 G
ASR1000-ESP20=	Cisco ASR 1000 Embedded Services Processor, 20 G, spare
ASR1000-ESP40	Cisco ASR 1000 Embedded Services Processor, 40 G
ASR1000-ESP40=	Cisco ASR 1000 Embedded Services Processor, 40 G, spare
ASR1000-ESP100	Cisco ASR 1000 Embedded Services Processor, 100 G
ASR1000-ESP100=	Cisco ASR 1000 Embedded Services Processor, 100 G, spare
ASR1000-ESP200	Cisco ASR 1000 Embedded Services Processor, 200 G
ASR1000-ESP200=	Cisco ASR 1000 Embedded Services Processor, 200 G, spare
Cisco ASR 1000 Route Processor	
ASR1000-RP1	Cisco ASR 1000 Route Processor 1, 2 GB DRAM
ASR1000-RP1=	Cisco ASR 1000 Route Processor 1, 2 GB DRAM, spare
ASR1000-RP2	Cisco ASR 1000 Route Processor 2, 8 GB DRAM
ASR1000-RP2=	Cisco ASR 1000 Route Processor 2, 8 GB DRAM, spare
Cisco ASR 1000 SPA Interface Processor	
ASR1000-SIP10	Cisco ASR 1000 SPA Interface Processor 10
ASR1000-SIP10=	Cisco ASR 1000 SPA Interface Processor 10, spare
ASR1000-SIP40	Cisco ASR 1000 SPA Interface Processor 40
ASR1000-SIP40=	Cisco ASR 1000 SPA Interface Processor 40, spare
Cisco ASR 1000 USB Memory Options	
MEMUSB-1024FT	1 GB USB Flash Token for Cisco ASR 1000 Series
MEMUSB-1024FT=	1 GB USB Flash Token for Cisco ASR 1000 Series, 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 Software XE Release consolidated packages (Table 12) or the consolidated packages can be ordered as spares (Table 13). For the list of the Cisco IOS XE universal consolidated packages and respective feature licenses for Cisco ASR 1001, please refer to the Cisco ASR 1000 Series Data Sheet and the Cisco ASR 1000 Software Activation Product Bulletin, which covers the details of software activation on the Cisco ASR 1001 chassis.

Table 12. Cisco IOS Software XE Release Consolidated Packages: Part Numbers

Part Number	Description
SASR1R1-IPB	Cisco ASR 1000 Series RP1 IP Base without Cryptography
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
SASR1R2-IPB	Cisco ASR 1000 Series RP2 IP Base without Cryptography
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 Cryptography
SASR1R2-AESK9	Cisco ASR 1000 Series RP2 Advanced Enterprise Services
SASR1R2-AES	Cisco ASR 1000 Series RP2 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 ASR 1000 RP1 IP Base without cryptography, spare
CDASR1000-IPBK9=	Cisco ASR 1000 RP1 IP Base, spare
CDASR1000-AISK9=	Cisco ASR 1000 RP1 Advanced IP Services, spare
CDASR1000-AESK9=	Cisco ASR 1000 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-FWNAT-RED	Firewall/NAT Stateful Inter-Chassis Redundancy License
FLASR1-FPI-RTU	Flexible Packet Inspection RTU Feature License for Cisco ASR 1000 Series
FLASR1-IOSRED-RTU	Software Redundancy RTU Feature License for the Cisco ASR 1002 and 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

Security Licenses	Description
FLASR1-BB-32K	Broadband 32,000 Sessions Feature License for Cisco ASR 1000 Series
FLASR1-BB-48K	Broadband up to 48,000 Sessions Feature License for Cisco ASR 1000 Series
FLASR1-BB-64K	Broadband up to 64,000 Sessions Feature License for Cisco ASR 1000 Series
Cisco Unified Border Element (SP Edition) Licenses	
FLASR1-CUBES-250P	CUBE(SP) 250 Calls Perpetual License for ASR 1000 Series
FLASR1-CUBES-2KP	CUBE(SP) 2K Calls Perpetual License for ASR 1000 Series
FLASR1-CUBES-4KP	CUBE(SP) 4K Calls Perpetual License for ASR 1000 Series
FLASR1-CUBES-16KP	CUBE(SP) 16K Calls Perpetual License for ASR 1000 Series
FLASR1-CUBES-32KP	CUBE(SP) 32K Calls Perpetual License for ASR 1000 Series
FLASR1-CUBES-TPEX	CUBE(SP) Perpetual License 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 local Cisco account representative.

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San Jose, CA

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Cisco Systems (USA) Pte. Ltd.
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