Cisco ASR 1000 Series Route Processor

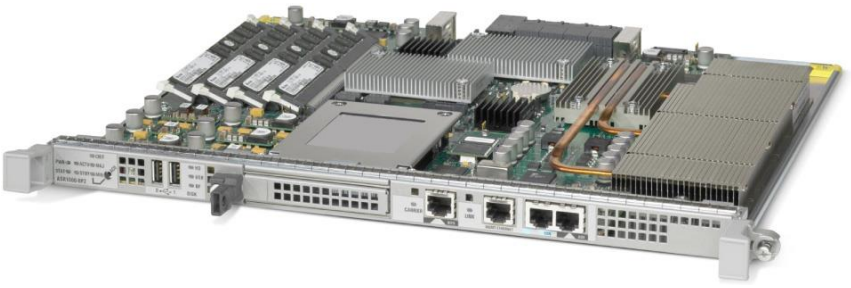
Product Overview

The Cisco® ASR 1000 Series Route Processors address the route-processing requirements of carrier-grade IP and Multiprotocol Label Switching (MPLS) packet infrastructures. Not only do they provide advanced routing capabilities, but they also monitor and manage the other components in the Cisco ASR 1000 Series Aggregation Services Router. The first-generation Cisco ASR 1000 Series Route Processor 1 (RP1; part number ASR1000-RP1) and the second-generation Cisco ASR 1000 Series Route Processor 2 (RP2; part number ASR1000-RP2) (Figure 1) offer the following embedded features:

- Integrate full range of industry-leading Cisco IOS® Software features and services
- Run with the modular Cisco IOS XE Software for the Cisco ASR 1000 Series
- Provide optional redundant-processor support and dual Cisco IOS Software support for single-route-processor solutions for the industry's most compact, fully redundant, high-availability solution, improving network resiliency, management, and costs
- Provide a hard disk drive (HDD) for code storage, boot, configuration, logs, and so on
- Provide USB port for 1-GB Compact Flash memory support
- Offer built-in embedded USB (eUSB) memory support (1 GB on ASR1000-RP1; 8 GB on the built-in RP1 on the Cisco ASR 1002 Router) (partitioned: 1 GB for bootflash; 7 GB for mass storage)
- Offer field-replaceable and hot-swappable capabilities to help ensure minimal service disruption
- Offer Stratum-3 clock circuitry, building integrated timing supply (BITS) input and output (BITS output available on ASR1000-RP2 only)
- Offer memory scalability up to 4-GB DRAM on the Cisco ASR 1000 Series Route Processor 1 and 16-GB DRAM on the Cisco ASR 1000 Series Route Processor 2

Features and Benefits

Figure 1. Cisco ASR 1000 Series RP2



Because of the advanced capabilities in the Cisco ASR 1000 Series Route Processors, many additional features are performed in line with routing, including:

- Building and distributing forwarding information to the Cisco ASR 1000 Series Embedded Services Processor (ESP)
- Implementing session border controller (SBC) setup and teardown and applying per-session policies for voice and video streams
- Offering a portal for stateful firewall policy configuration and distribution to the ESP forwarding engine
- Negotiating and maintaining IP Security (IPsec[1]) authentication, encryption methods, and encryption keys (Internet Key Exchange [IKE])

As the management processor for the Cisco ASR 1000 Series Router, the Cisco ASR 1000 Series Route Processors automatically perform the following system management functions:

- Load the operating system software system images to all installed line cards upon powering up or through operator commands
- Synchronize the dynamic state conditions for the redundant Cisco IOS XE Software, the route processor, and embedded services processor components
- Perform high-availability failover for redundant solutions
- Provide out-of-band system console and auxiliary ports, USB, and Ethernet ports for router configuration and maintenance
- Allow direct system access through the operating-system kernel if catastrophic Cisco IOS Software failure occurs
- Monitor and manage the power and temperature of system components such as line cards, power supplies, and fans

Table 1 gives features and benefits of the Cisco ASR 1000 Series RP1.

Table 1. Features and Benefits of Cisco ASR 1000 Series RP1

Feature	Benefit
Support for Cisco IOS XE Software	• Supports a breadth of IP network services, including quality of service (QoS), MPLS, Layer 2 virtual private network (L2VPN), Layer 3 virtual private network (L3VPN), and IPv6 • Uses the field-proven Cisco IOS Software for all IP network services
High availability	• Provides optional redundant-processor support and dual Cisco IOS Software support for single-route-processor solutions for a highly compact, fully redundant, high-availability solution, improving network resiliency, management, and costs
Stratum-3 clock circuitry and BITS input ports	• Facilitates support of clocking for synchronous services such as SONET and SDH
Memory scalability of up to 16 GB	• Allows pay-as-you-grow scalability so memory can increase as more users or features are added; the scalability offered through memory upgrades includes: ◦ Routing-table growth ◦ Additional MPLS VPN routing and forwarding instances ◦ Feature additions such as SBC and broadband aggregation (BBA)

[1] This product includes software developed by Cavium Networks.

Feature	Benefit
Hard-drive support	• Allows for greater storage area for code storage, boot, configurations, billing, logs, etc.
USB Compact Flash support	• (USB ports) Allows for easier manageability for code storage, boot, configurations, logs, etc.
Modularity	• Offers maximum investment protection and flexibility by allowing customers to upgrade to future Cisco ASR 1000 Series Route Processors **Note:** Cisco ASR 1002 and ASR 1002 Fixed Routers (part numbers ASR1002 and ASR1002-F, respectively) have an integrated RP1 built into the chassis that is not upgradable.

Product Architecture

High Availability

The Cisco ASR 1000 Series consists of seven different routers: the Cisco ASR 1001 Router, the Cisco ASR 1002 Fixed Router, the Cisco ASR 1002 Router, the Cisco ASR 1002-X Router, the Cisco ASR 1004 Router, the Cisco ASR 1006 Router, and the Cisco ASR 1013 Router, which use an innovative and powerful processor: the Cisco QuantumFlow Processor. The Cisco ASR 1013 Router (24-slot, 13 rack units [13RU]) and the Cisco ASR 1006 Router (12-slot, 6RU) are hardware-redundant (2 ESP and 2 route-processor slots) chassis; the Cisco ASR 1004 router is an 8-slot, 4RU chassis with one ESP and one route-processor slot; the Cisco ASR 1002-X is a 3-slot, 2RU chassis that has its own integrated route processor and ESP, a Cisco ASR Series Shared Port Adapter Interface Processor (SIP) Card, and 6 built-in Gigabit Ethernet ports; the Cisco ASR 1002 is also a 3-slot, 2RU chassis that has the route processor and Cisco ASR 1000 Series SIP Card and 4 Gigabit Ethernet ports built in and comes with 1 ESP slot; and the Cisco ASR 1002 Fixed is a 1-slot, 2RU chassis that has the route processor, a Cisco ASR 1000 Series SIP Card, and 4 Gigabit Ethernet ports built in, and a 2.5-Gbps ESP. The Cisco ASR 1001 is a 1RU chassis that uses its own integrated route processor (not RP1 or RP2).

The Cisco ASR 1006 and ASR 1013 Routers support fully redundant route processors that allow for full route-processor hardware redundancy, In-Service Software Upgrade (ISSU), Nonstop Forwarding (NSF), and route-processor service upgrades.

For single-route-processor Cisco ASR 1000 platforms - the Cisco ASR 1001, ASR 1002 Fixed, ASR 1002, ASR1002-X, and ASR 1004 - the route processor has a dual Cisco IOS Software option that allows these routers to use the Cisco industry-leading high-availability features, Cisco IOS Software redundancy, ISSU, and NSF. These features require the Cisco ASR 1000 Series RP1 to have 4 GB of DRAM memory. The Cisco ASR 1000 Series RP2 supports Cisco IOS Software redundancy, ISSU, and NSF with its default memory of 8-GB DRAM.

LAN Ports

Both the Cisco ASR 1000 Series RP1 and Cisco ASR 1000 Series RP2 have a single copper (RJ-45) 10/100/1000 management Ethernet port.

SDRAM

The Cisco ASR 1000 Series RP1 can support either 2 or 4 GB of synchronous dynamic RAM (SDRAM). Because the card holds 2 SDRAM slots, a route processor with 2 GB can hold two 1-GB dual in-line memory modules (DIMMs), whereas a route processor with 4 GB can hold two 2-GB DIMMs.

The Cisco ASR 1000 Series RP2 can support either 8 or 16 GB of SDRAM. Because the card holds 4 SDRAM slots, a route processor with 8 GB can hold four 2-GB DIMMs, whereas a route processor with 16 GB can hold four 4-GB DIMMs.

Hard Disk Drive

The Cisco ASR 1000 Series RP1 and RP2 have a HDD for code storage, system configurations, and log files. The RP1 provides a 40-GB HDD mounted on the board itself. The RP1 HDD is field-replaceable, but not hot-swappable. The Cisco ASR 1000 Series RP2 provides an 80-GB HDD that is front-mounted, field-replaceable, and hot-swappable.

USB Port

One USB port is provided on the Cisco ASR 1000 Series RP1, and 2 ports are provided on the Cisco ASR 1000 Series RP2. Both route processors support 1-GB USB Compact Flash memory for the storage and portability of operating system software, system configurations, and log files.

Console and Auxiliary Ports

The Cisco ASR 1000 Series RP1 and RP2 have built-in console and auxiliary ports.

Product Specifications

Tables 2 and 3 provide specifications of the Cisco ASR 1000 Series RP1 and RP2, respectively, and Tables 4 and 5 provide specifications of the Cisco ASR 1001 and ASR 1002-X Integrated Route Processors, respectively.

Table 2. Cisco ASR 1000 Series RP1 Product Specifications

Item	Details
Chassis support	Cisco ASR 1004 and ASR 1006 chassis (**Note:** The Cisco ASR 1002 chassis comes with the Cisco ASR 1000 Series RP1 built into the chassis.)
Software compatibility	Cisco IOS XE Operating System, which is based on Cisco IOS Software Release 12.2SR (Please consult your Cisco account representative for additional details.)
Software protocols	Refer to Cisco IOS Software 12.2SR protocol support
Connectivity	• Console port (RJ-45 connector) • Auxiliary port (RJ-45 connector) • 10/100/1000 Ethernet port (RJ-45 connector) • Two RJ-48 connectors for BITS input clocks
Memory options	• Two 1-GB Double Data Rate 2 (DDR2) mini-DIMMs • Two 2-GB DDR2 mini-DIMMs • Upgradable memory from 2-GB to 4-GB DRAM
Storage options	• 40-GB HDD (RP1 only) • 1-GB USB Compact Flash memory
Performance	• Scalability up to 1,000,000 IPv4 routes or 500,000 IPv6 routes • BGP RR Scalability up to 5,000,000 IPv4 routes or 3,000,000 IPv6 routes
Reliability and availability	• 1 + 1 redundancy in dual-route-processor configuration • Support for online insertion and removal (OIR) • Support for NSF and Stateful Switchover (SSO) • Support for ISSU
MIBs	• RFC 2737 compliant
Network management	• Telnet and Secure Shell (SSH) Protocol (command-line interface [CLI]) • Console port (through the CLI) • Simple Network Management Protocol (SNMP) • RFC 2665
LEDs	• PWR - Power Green - All power rails are within specifications • STAT - Status Green - Cisco IOS Software has booted Yellow - BootROM has successfully loaded Red - System failure or during boot process

Item	Details
	• ACTV- Active Green - Active route processor • STBY - Standby Yellow - Standby route processor • CRIT - Critical Red - Critical alarm or during boot process • MAJ - Major Red - Major alarm • MIN - Minor Amber - Minor alarm • LINK - Management Ethernet link status Solid green - Link with no activity FLASH green - Link with activity Off - No link • DISK0 - Internal Compact Flash FLASH Green - Activity indicator Off - No activity • DISK1 - External Compact Flash FLASH green - Activity indicator Off - No activity • DISK2 - Internal HDD FLASH green - Activity indicator Off - No activity • CARRIER - BITS interface Off - Out of service Green - In frame and in service Amber - Fault or loop condition
Physical dimensions (H x W x D)	0.92 x 16.7 x 14.19 in. (0.02 x 0.428 x 0.36m)
Weight	5.0 lb (2.3 kg)
Approvals and compliance	**Safety** • UL60950-1 and CAN/CSA-C22.2 No. 60950-1-03 Information technology equipment • AS/NZS 60950-1 • IEC/EN 60950-1 Information technology equipment • 73/23/EEC **Electromagnetic Emissions Certification** • AS/NZ 3548: 1995 (including AMD I + II) Class B • EN55022: 1998 Class B • CISPR 22: 1997 • EN55022: 1994 (including AMD I + II) • 47 CFR Part 15: 2000 (FCC) Class B • VCCI V-3/01.4 Class 2 • CNS-13438: 1997 Class B • GR1089: 1997 (including Rev. 1: 1999) **Immunity** • EN300386: 2000-TNE EMC requirements; product family standard; high priority of service; central office and noncentral office locations • EN50082-1: 1992/1997 • EN50082-2: 1995-Generic Immunity Standard, Heavy **Industrial** • CISPR24: 1997 • EN55024: 1998-Generic ITE immunity standard • EN61000-4-2: 1995 + AMD I + II ESD, Level 4/8 kV contact, 15 kV air • IEC-1000-4-3: 1995 + AMD 1-Radiated Immunity, 10 V/m • IEC-1000-4-4: 1995-Electrical Fast Transients, Level 4/4 kV/B • IEC-1000-4-5: 1995 + AMD 1-DC Surge-Class 3; AC Surge-Class 4 • EN61000-4-6: 1996 + AMD 1-RF conducted immunity, 10 Vrms • EN61000-4-11: 1995-Voltage Dips and Sags • ETS300 132-2: 1996 + corregendum, December 1996 • GR1089:1997 (including Rev1: 1999) **Network Equipment Building Standards**

Item	Details
	The module meets the following Networking Equipment Building Standards (NEBS): • GR-1089-CORE • GR-63-CORE **European Telecommunication Standards Institute (ETSI)** • ETSI 300 386-1 - Levels for equipment with a "high priority of service" that is installed in "locations other than telecommunication centers" • ETSI 300 386-2:1997 - Levels for equipment with a "high priority of service" that is installed in "locations other than telecommunication centers" • ETSI 300 132-2: December 1994 - Power supply interfaces at the input to telecommunications equipment Sections 4.8 and 4.9
Environmental	• Storage temperature: -38 to 150°F (-40 to 70°C) • Operating temperature, nominal: 41 to 104°F (5 to 40°C) • Operating temperature, short-term: 23 to 131°F (-5 to 55°C) • Storage relative humidity: 5 to 95% relative humidity (RH) • Operating humidity, nominal: 5 to 85% RH • Operating humidity, short-term: 5 to 90% RH • Operating altitude: -60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)

Table 3. Cisco ASR 1000 Series RP2 Product Specifications

Item	Details
Chassis support	Cisco ASR 1004 and ASR 1006 chassis (**Note:** The Cisco ASR 1002 and ASR 1002 Fixed chassis come with the Cisco ASR 1000 Series RP1 built into the chassis.)
Software compatibility	Cisco IOS XE Software, which is based on Cisco IOS Software Release 12.2SR (Please consult your Cisco account representative for additional details.)
Software protocols	Refer to Cisco IOS Software 12.2SR protocol support
Connectivity	• Console port (RJ-45 connector) • Auxiliary port (RJ-45 connector) • 10/100/1000 Ethernet port (RJ-45 connector) • RJ-48 connector for BITS input clock and output source
Memory options	• Four 2-GB DDR2 mini-DIMMs • Four 4 GB DDR2 mini-DIMMs • Upgradable memory from 8-GB to 16-GB DRAM
Storage options	• 80-GB HDD (hot-swappable) • 1-GB USB Compact Flash memory
Performance	**With 8-GB memory:** • Up to 1,000,000 IPv4 routes or 1,000,000 IPv6 routes • BGP RR Scalability up to 8,000,000 IPv4 routes or 6,000,000 IPv6 routes **With 16-GB memory:** • Up to 4,000,000 IPv4 routes or 4,000,000 IPv6 routes • BGP RR Scalability up to 24,000,000 IPv4 routes or 17,000,000 IPv6 routes
Reliability and availability	• 1 + 1 redundancy in dual-route-processor configuration • Support for OIR • Support for NSF and SSO • Support for ISSU
MIBs	• RFC 2737 compliant
Network management	• Telnet and SSH (CLI) • Console port (through the CLI) • SNMP • RFC 2665
LEDs	• PWR - Power Green - All power rails are within specifications • STAT - Status Green - Cisco IOS Software has booted

Item	Details
	Yellow - BootROM has successfully loaded Red - System failure or during boot process • ACTV- Active Green - Active route processor • STBY - Standby Yellow - Standby route processor • CRIT - Critical Alarm Red - Critical alarm or during boot process • MAJ - Major Alarm Red - Major alarm • MIN - Minor Alarm Amber - Minor alarm • HD - Internal HDD FLASH Green - Activity indicator Off - No activity • USB - External Compact Flash FLASH green - Activity indicator • BF - Boot Flash (Internal) FLASH green - Activity indicator Off - No activity • CARRIER BITS I/F Mode Off - Out of service or not configured Green - Normal or Bridging Amber - Fast • DTI Mode Off - Warm-up, free-run, or holdover Green - In service or working properly Amber - Fault or loop condition • LINK - Management Ethernet link status Solid green - Link with no activity FLASH green - Link with activity Off - No link • DISK2 - Internal HDD FLASH green - Activity indicator Off - No activity • CARRIER - BITS interface Off - Out of service Green - In frame and in service Amber - Fault or loop condition
Physical dimensions (H x W x D)	0.92 x 16.7 x 14.19 in. (0.02 x 0.428 x 0.36m)
Weight	5.0 lb (2.3 kg)
Approvals and compliance	**Safety** • UL60950-1 and CAN/CSA-C22.2 No. 60950-1-03 Information technology equipment • AS/NZS 60950-1 • IEC/EN 60950-1 Information technology equipment • 73/23/EEC **Electromagnetic Emissions Certification** • CFR 47 Part 15: (FCC) Class A • ICES 003 Class A • AS/NZ CISPR 22: Class A • CISPR 22 (EN55022) Class A • VCCI Class A • KN22 • IEC/EN 61000-3-2 (or 3-12 as applicable): AC Power Line Harmonics • IEC/EN 61000-3-3 (or 3-11 as applicable): AC Voltage Fluctuations and Flicker **Immunity** • IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8-kV Contact, 15-kV Air) • IEC/EN-61000-4-3: Radiated Immunity (10 V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2-kV Power, 1-kV Signal) • IEC/EN-61000-4-5: Surge AC Port (4-kV CM, 2-kV DM) • IEC/EN-61000-4-5: Surge Signal Ports (1-kV indoor, 2-kV outdoor) • IEC/EN-61000-4-5: Surge DC Port 1-kV

Item	Details
	• IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30 A/m) • IEC/EN-61000-4-11: Voltage Dips, Short Interruptions, and Voltage Variations **Network Equipment Building Standards** The module meets the following NEBS: • GR-1089-CORE • GR-63-CORE **ETSI and EN Standards** • EN300 386: Telecommunications Network Equipment (EMC), OTC • EN55022: Information Technology Equipment (Emissions) • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: 1995-Generic Immunity Standard
Environmental	• Storage temperature: -38 to 150°F (-40 to 70°C) • Operating temperature, nominal: 41 to 104°F (5 to 40°C) • Operating temperature, short-term: 23 to 131°F (-5 to 55°C) • Storage relative humidity: 5 to 95% RH • Operating humidity, nominal: 5 to 85% RH • Operating humidity, short-term: 5 to 90% RH • Operating altitude: -60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)

Table 4. Cisco ASR 1001 Integrated Route Processor Product Specifications

Item	Details
Chassis support	Cisco ASR 1001 chassis
Software compatibility	Cisco IOS XE Software Release 3.2.0S and later versions
Software protocols	Refer to Cisco IOS XE 3.2.0S and later versions for protocol support
Connectivity	Not applicable - route processor is integrated inside the chassis
Memory options	• Cisco ASR 1001 ships with 4-GB memory by default. It can be upgraded to 8- or 16-GB memory. • Cisco ASR 1001 has 4 DRAM memory slots, which can take either 2- or 4-GB DRAM each. • When shipped with 4-GB DRAM (M-ASR1K-1001-4GB), 2 slots are filled with 2 GB each. • When shipped with 8-GB DRAM (M-ASR1K-1001-8GB), 4 slots are filled with 2 GB each. • When shipped with 16-GB DRAM (M-ASR1K-1001-16GB), 4 slots are filled with 4 GB each.
Storage options	• 8-GB eUSB is partitioned as two 32-MB of memory for nonvolatile RAM (NVRAM) and the rest for mass storage. • The Cisco ASR 1001-HDD model includes 160-GB HDD for storage.
Performance	**With 4-GB memory:** • Up to 500,000 IPv4 or 500,000 IPv6 routes **With 8-GB or more memory:** • Up to 1,000,000 IPv4 or 1,000,000 IPv6 routes • BGP RR Scalability up to 7,000,000 IPv4 or 6,000,000 IPv6 routes - 8GB Memory • BGP RR Scalability up to 13,000,000 IPv4 or 11,000,000 IPv6 routes - 16GB Memory
Reliability and availability	• No route-processor hardware redundancy • Software redundancy available (requires software redundancy license and 8-GB memory)
MIBs	• RFC 2737 compliant
Network management	• Telnet and SSH Protocol (CLI) • Console port (through the CLI) • SNMP • RFC 2665
LEDs	• PWR - Power Green - All power rails are within specifications • STAT - Status Green - Cisco IOS Software has booted Yellow - BootROM has successfully loaded Red - System failure or during boot process

Item	Details
	• ACTV- Active Green - Active route processor • STBY - Standby Yellow - Standby route processor • CRIT - Critical Alarm Red - Critical alarm or during boot process • MAJ - Major Alarm Red - Major alarm • MIN - Minor Alarm Amber - Minor alarm • HD - Internal HDD FLASH Green - Activity indicator Off - No activity • USB - External Compact Flash FLASH green - Activity indicator • BF - Boot Flash (Internal) FLASH green - Activity indicator Off - No activity • CARRIER BITS I/F Mode Off- Out of service or not configured Green - Normal or Bridging Amber - Fast • DTI Mode Off- Warm-up, free-run, or holdover Green - In service or working properly Amber - Fault or loop condition • LINK - Management Ethernet link status Solid green - Link with no activity FLASH green - Link with activity Off - No link • DISK2 - Internal HDD FLASH green - Activity indicator Off - No activity • CARRIER - BITS interface Off - Out of service Green - In frame and in service Amber - Fault or loop condition
Approvals and compliance	**Safety** • UL60950-1 and CAN/CSA-C22.2 No. 60950-1-03 Information technology equipment • AS/NZS 60950-1 • IEC/EN 60950-1 Information technology equipment • 73/23/EEC **Electromagnetic Emissions Certification** • CFR 47 Part 15: (FCC) Class A • ICES 003 Class A • AS/NZ CISPR 22: Class A • CISPR 22 (EN55022) Class A • VCCI Class A • KN22 • IEC/EN 61000-3-2 (or 3-12 as applicable): AC Power Line Harmonics • IEC/EN 61000-3-3 (or 3-11 as applicable): AC Voltage Fluctuations and Flicker **Immunity** • IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8-kV Contact, 15-kV Air) • IEC/EN-61000-4-3: Radiated Immunity (10 V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2-kV Power, 1-kV Signal) • IEC/EN-61000-4-5: Surge AC Port (4-kV CM, 2-kV DM) • IEC/EN-61000-4-5: Surge Signal Ports (1-kV indoor, 2-kV outdoor) • IEC/EN-61000-4-5: Surge DC Port 1-kV • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30 A/m) • IEC/EN-61000-4-11: Voltage Dips, Short Interruptions, and Voltage Variations **Network Equipment Building Standards**

Item	Details
	The module meets the following NEBS: • GR-1089-CORE • GR-63-CORE **ETSI and EN Standards** • EN300 386: Telecommunications Network Equipment (EMC), OTC • EN55022: Information Technology Equipment (Emissions) • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: 1995-Generic Immunity Standard
Environmental	• Storage temperature: -38 to 150°F (-40 to 70°C) • Operating temperature, nominal: 41 to 104°F (5 to 40°C) • Operating temperature, short-term: 23 to 131°F (-5 to 55°C) • Storage relative humidity: 5 to 95% RH • Operating humidity, nominal: 5 to 85% RH • Operating humidity, short-term: 5 to 90% RH • Operating altitude: -60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)

Table 5. Cisco ASR 1002-X Integrated Route Processor Product Specifications

Item	Details
Chassis support	Cisco ASR 1002-X chassis
Software compatibility	Cisco IOS XE Software Release 3.7.0S and later versions
Software protocols	Refer to Cisco IOS XE 3.7.0S and later versions for protocol support.
Connectivity	Not applicable - route processor is integrated inside the chassis
Memory options	• Cisco ASR 1002-X ships with 4-GB memory by default. It can be upgraded to 8- or 16-GB memory. • Cisco ASR 1002-X has 4 DRAM memory slots, which can take either 2- or 4-GB DRAM each. • When shipped with 4-GB DRAM (M-ASR1002X-4GB), 2 slots are filled with 2 GB each. • When shipped with 8-GB DRAM (M-ASR1002X-8GB), 4 slots are filled with 2 GB each. • When shipped with 16-GB DRAM (M-ASR1002X-16GB), 4 slots are filled with 4 GB each.
Storage options	• 8-GB eUSB memory is partitioned as two 32-MB of memory for NVRAM and the rest for mass storage. • The Cisco ASR 1002-X has an optional 160-GB HDD for storage.
Performance	**With 4-GB memory:** • Up to 500,000 IPv4 or 500,000 IPv6 routes **With 8-GB or more memory:** • Up to 1,000,000 IPv4 or 1,000,000 IPv6 routes – 8GB Memory • Up to 3,500,000 IPv4 or 3,000,000 IPv6 routes – 16GB Memory • BGP RR Scalability up to 7,000,000 IPv4 or 6,000,000 IPv6 routes – 8GB Memory • BGP RR Scalability up to 13,000,000 IPv4 or 11,000,000 IPv6 routes – 16GB Memory
Reliability and availability	• No route-processor hardware redundancy • Software redundancy available (requires software redundancy license and 8-GB memory)
MIBs	• RFC 2737 compliant
Network management	• Telnet and SSH Protocol (CLI) • Console port (through the CLI) • SNMP • RFC 2665
LEDs	• PWR - Power Green - All power rails are within specifications • STAT - Status Green - Cisco IOS Software has booted Yellow - BootROM has successfully loaded Red - System failure or during boot process • CRIT - Critical Alarm Red - Critical alarm or during boot process • MAJ - Major Alarm Red - Major alarm • MIN - Minor Alarm

Item	Details
	Amber - Minor alarm • LINK - Management Ethernet link status Solid green - Link with no activity FLASH green - Link with activity Off - No link • BOOT FLASH Green - Activity indicator Off - No activity • BITS Off- Out of service or not configured Green - In frame and In service Amber - Fault condition • HDD FLASH green - Activity indicator • GPS Off- Port not connected Green - In service or working properly Amber - Fault condition
Approvals and compliance	**Safety** • UL60950-1 and CAN/CSA-C22.2 No. 60950-1-03 Information technology equipment • AS/NZS 60950-1 • IEC/EN 60950-1 Information technology equipment • 73/23/EEC **Electromagnetic Emissions Certification** • CFR 47 Part 15: (FCC) Class A • ICES 003 Class A • AS/NZ CISPR 22: Class A • CISPR 22 (EN55022) Class A • VCCI Class A • KN22 • IEC/EN 61000-3-2 (or 3-12 as applicable): AC Power Line Harmonics • IEC/EN 61000-3-3 (or 3-11 as applicable): AC Voltage Fluctuations and Flicker **Immunity** • IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8-kV Contact, 15-kV Air) • IEC/EN-61000-4-3: Radiated Immunity (10 V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2-kV Power, 1-kV Signal) • IEC/EN-61000-4-5: Surge AC Port (4-kV CM, 2-kV DM) • IEC/EN-61000-4-5: Surge Signal Ports (1-kV indoor, 2-kV outdoor) • IEC/EN-61000-4-5: Surge DC Port 1-kV • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30 A/m) • IEC/EN-61000-4-11: Voltage Dips, Short Interruptions, and Voltage Variations **Network Equipment Building Standards** The module meets the following NEBS: • GR-1089-CORE • GR-63-CORE **ETSI and EN Standards** • EN300 386: Telecommunications Network Equipment (EMC), OTC • EN55022: Information Technology Equipment (Emissions) • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: 1995-Generic Immunity Standard
Environmental	• Storage temperature: -38 to 150°F (-40 to 70°C) • Operating temperature, nominal: 41 to 104°F (5 to 40°C) • Operating temperature, short-term: 23 to 131°F (-5 to 55°C) • Storage relative humidity: 5 to 95% relative humidity (RH) • Operating humidity, nominal: 5 to 85% RH • Operating humidity, short-term: 5 to 90% RH • Operating altitude: -60 to 4000m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)

*Route-reflector numbers were tested with the BGP selective download feature for IPv4 and IPv6 for dedicated RR application. This feature prevents IPv4 and IPv6 BGP routes from being installed in the Routing Information Base (RIB) and Forwarding Information Base (FIB). It reduces memory usage per IPv4 and IPv6 prefix and CPU usage.

System Requirements

Table 6 gives specifications of the Cisco ASR 1000 Series RP1 and RP2. For ordering information, refer to Table 7.

Table 6. System Requirements

Item	Details
Hardware	• Cisco ASR 1004 or Cisco ASR 1006 Series Router chassis with at least one instance of Cisco ASR 1000 Series Route Processor, one instance of Cisco ASR 1000 Embedded Services Processor, and one instance of Cisco ASR 1000 Series Shared Port Adapter Interface Processor
Memory	Cisco ASR 1000 Series RP1 • 2 GB (default for Cisco ASR 1000 Series RP1) • 4 GB (maximum for Cisco ASR 1000 Series RP1) **Note:** Memory is field-upgradable from 2 to 4 GB. Cisco ASR 1000 Series RP2 • 8 GB (default for Cisco ASR 1000 Series RP2) • 16 GB (maximum for Cisco ASR 1000 Series RP2) **Note:** Memory is field-upgradable from 8 to 16 GB.
Minimum software release	Cisco ASR 1000 Series RP1 • Cisco IOS XE Software Release 2.1.0 Cisco ASR 1000 Series RP2 • Cisco IOS XE Software Release 2.3.0

Table 7. Ordering Information

Part Number	Product Name
Cisco ASR 1000 Series Route Processor 1	
ASR1000-RP1	Cisco ASR1000 Route Processor 1, 2GB DRAM
ASR1000-RP1=	Cisco ASR1000 Route Processor 1, 2GB DRAM Spare
Cisco ASR 1000 Series Route Processor 2	
ASR1000-RP2	Cisco ASR1000 Route Processor 2, 8GB DRAM
ASR1000-RP2=	Cisco ASR1000 Route Processor 2, 8GB DRAM, Spare
Cisco ASR 1000 RP1 Memory	
M-ASR1K-RP1-2GB	Cisco ASR1000 RP1 2GB DRAM
M-ASR1K-RP1-2GB=	Cisco ASR1000 RP1 2GB DRAM, spare
M-ASR1K-RP1-4GB	Cisco ASR1000 RP1 4GB DRAM
M-ASR1K-RP1-4GB=	Cisco ASR1000 RP1 4GB DRAM, spare
M-ASR1K-HDD-40GB	Cisco ASR1000 RP1 40GB HDD
M-ASR1K-HDD-40GB=	Cisco ASR1000 RP1 40GB HDD, spare
Cisco ASR 1000 RP2 Memory	
M-ASR1K-RP2-8GB	Cisco ASR1000 RP2 8GB DRAM
M-ASR1K-RP2-8GB=	Cisco ASR1000 RP2 8GB DRAM, Spare
M-ASR1K-RP2-16GB	Cisco ASR1000 RP2 16GB DRAM
M-ASR1K-RP2-16GB=	Cisco ASR1000 RP2 16GB DRAM, Spare
M-ASR1K-HDD-80GB=	Cisco ASR1000 RP2 80GB HDD, spare
M-ASR1K-EUSB-2GB=	Cisco ASR1000 RP2 2GB EUSB+ FLASH, SPARE

Part Number	Product Name
Cisco ASR 1000 Series USB Flash 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
Compatible Hardware	
ASR1004 or ASR1006, or ASR1013	Cisco ASR 1000 Series Router chassis (4RU or 6RU, or 13RU)
ASR1000-ESP10	Cisco ASR-1000 Embedded Services Processor 10Gbps
ASR1000-ESP10-N	Cisco ASR-1000 Embedded Services Processor 10Gbps Non Crypto
ASR1000-ESP20	Cisco ASR-1000 Embedded Services Processor 20Gbps
ASR1000-ESP40	Cisco ASR 1000 Embedded Services Processor, 40Gbps
ASR1000-ESP100	Cisco ASR 1000 Embedded Services Processor, 100Gbps
ASR1000-ESP200	Cisco ASR 1000 Embedded Services Processor, 200Gbps
ASR1000-SIP10	Cisco ASR1000 SPA Interface Processor 10
ASR1000-SIP40	Cisco ASR1000 SPA Interface Processor 40
ASR1000-6TGE	Cisco ASR 1000 Fixed Ethernet Line Card 6x10GE
ASR1000-2T+20X1GE	Cisco ASR 1000 Fixed Ethernet Line Card 2x10GE + 20x1GE
Compatible Software	
SASR1R1-AES	Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE W/O CRYPTO
SASR1R1-AESK9	Cisco ASR 1000 Series RP1 ADVANCED ENTERPRISE SERVICES
SASR1R1-AIS	Cisco ASR 1000 Series RP1 ADVANCED IP SERVICES W/O CRYPTO
SASR1R1-AISK9	Cisco ASR 1000 Series RP1 ADVANCED IP SERVICES
SASR1R1-IPB	Cisco ASR 1000 Series RP1 IP BASE W/O CRYPTO
SASR1R1-IPBK9	Cisco ASR 1000 Series RP1 IP BASE
SASR1R2-AES	Cisco ASR 1000 Series RP2 ADVANCED ENTERPRISE W/O CRYPTO
SASR1R2-AESK9	Cisco ASR 1000 Series RP2 ADVANCED ENTERPRISE SERVICES
SASR1R2-AIS	Cisco ASR 1000 Series RP2 ADVANCED IP SERVICES W/O CRYPTO
SASR1R2-AISK9	Cisco ASR 1000 Series RP2 ADVANCED IP SERVICES
SASR1R2-IPB	Cisco ASR 1000 Series RP2 IP BASE W/O CRYPTO
SASR1R2-IPBK9	Cisco ASR 1000 Series RP2 IP BASE

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