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# Cisco ASR 9903 Compact High-Performance Router

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## Product overview

Part of the Cisco® ASR 9000 Series, the Cisco ASR 9903 Router (Figure 1) is a compact, high-performance router that delivers up to 3.6 Tbps of nonblocking, full-duplex capacity in a Three-Rack-Unit (3RU) form factor. Based on the same Cisco IOS® XR software image as the other routers in the Cisco ASR 9000 Series, the Cisco ASR 9903 Router delivers the features and services found on the ASR 9000 Series platforms, allowing customers to standardize on the same Cisco IOS XR operating system. Multiple port rates are supported by ASR 9903: 400 Gigabit Ethernet, 200 Gigabit Ethernet, 100 Gigabit Ethernet, 40 Gigabit Ethernet, and 10 Gigabit Ethernet, so it gives customers the flexibility to mix and match interface types on the same chassis and offers operators the readiness for mass-scale networking.

As a fully redundant, high-performance multi-purpose platform, the ASR 9903 router can be used in a wide range of customer's scenarios and use-cases: business PE, metro aggregation, cloud edge, Internet peering, Data Center Interconnect (DCI), and others. The compact size (depth is 600 mm), front-to-back airflow, support of PTP Telecom profiles, and different port rates make this platform very efficient and flexible for using at the mobile edge in 4G/5G networks. Enterprise customers can deploy the ASR 9903 as a border router at the edge of the enterprise network and as a peering router for communication with Internet service providers.

## Features and benefits

The ASR 9903 router offers power-optimized architecture with high density of multi-rate ports and super service scales. This allows customers to reduce Capital Expense (CapEx) and Operating Expense (OpEx) while providing highly predictable, flexibly managed service infrastructure.

The Cisco ASR 9903 Router is a compact router that supports two redundant Route Processors (RP), two integrated switch fabrics, 4 AC or DC power supply modules, and 4 fans in redundant configuration. The router consists of the fixed board, with 16 integrated QSFP28-based 100GE ports plus 20 integrated SFP+-based ports and an optional Port Expansion Card (PEC), which can be inserted into the dedicated slot on demand.

The ASR 9903 fixed board supports maximum 1.6T data bandwidth. The integrated physical ports on its faceplate can operate in three combinations: 16x100GE, 15x100GE + 10x10GE or 14x100GE + 20x10GE.

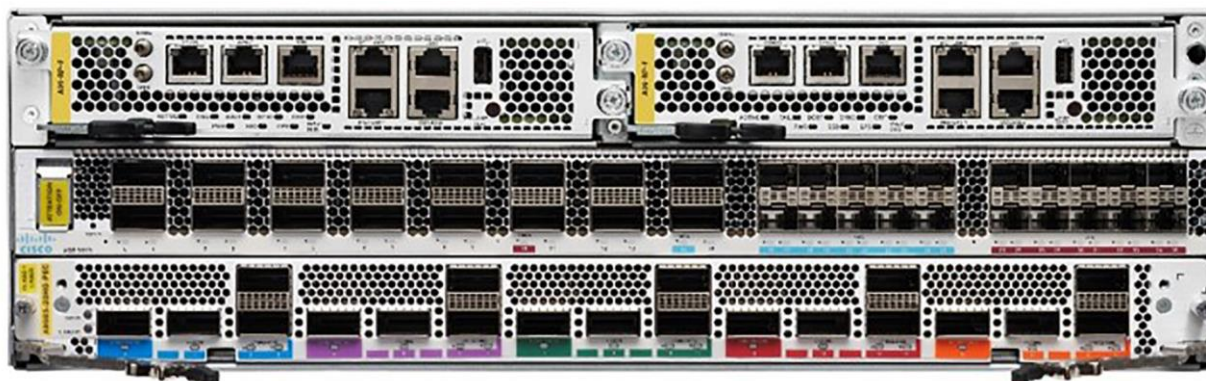
The Cisco ASR 9903 Route Processor (Figure 2) is available in a service edge-optimized version to meet customer requirements for large-scale, comprehensive service deployment and also features a powerful 64-bit Intel CPU and 32GB memory. A set of external interfaces on the front panel includes: console and auxiliary serial ports, two management Ethernet interfaces, a Class A USB port, GPS interface (10Mhz, 1PPS, ToD ports), and two BITS interfaces.

The Cisco A9903-20HG-PEC (Figure 3) offers 20 physical ports with maximum 2T data bandwidth capacity. 5 of the 20 physical ports are 400GE/200GE/100GE multi-rate QSFP-DD/QSFP28-based ports which can be individually migrated to 400GE through a license. The rest 15 ports are 100GE QSFP28-based ports.

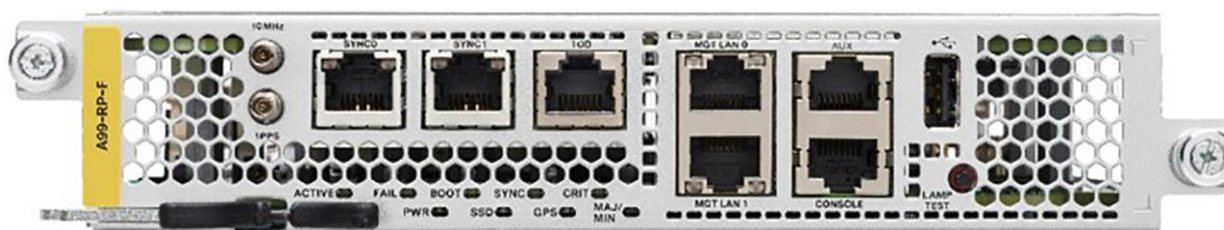
All transceivers that are applicable on the ASR 9903 can be used in any of the ASR 9000 Series of modular chassis.

The QSFP-DD optics have the same mechanical characteristics and cage size as the QSFP28 optics, and the same ports can act as 10 GE (via breakout options), 40 GE, 100 GE, 200 GE, or 400 GE, therefore allowing operators to migrate to 400 GE at their own pace as the need arises.

ASR 9903 chassis as well as the A9903-20HG-PEC are supported, starting with Cisco IOS XR Software Release 7.1.25.



**Figure 1.**  
Cisco ASR 9903 chassis



**Figure 2.**  
Cisco ASR 9903 Route Processor



**Figure 3.**  
Cisco ASR 9903 Series 2T Port Expansion Card

Table 1 lists the features and benefits of the ASR 9903 router. Specific features and scale support are hardware and software dependent.

**Table 1.** Features and benefits (XR 7.1.25 or later) of the Cisco ASR 9903 compact high-performance router

Feature	Benefit
<b>Interface support</b>	
<b>Cisco SFP+ and QSFP Pluggable interfaces</b>	Provides the capacity to mix and match 10, 40, 100, and 400 Gigabit Ethernet interface types across the ASR 9903 chassis. For a complete list of supported pluggable interfaces, see the <a href="#">Cisco Optics Compatibility Matrix</a> .
<b>Evolutionary monitoring</b>	
<b>Carrier-class Operations, Administration, and Maintenance (OAM)</b>	NetFlow, IEEE 802.1ag, IEEE 802.3ah, ITU Y.1731, IP Service-Level Agreement (IP SLA), Virtual Circuit Connectivity Verification (VCCV), ping, and traceroute

Feature	Benefit
<b>Timing capability</b>	
<b>Hardware-based IEEE 1588, GPS/BITS interfaces, and SyncE support</b>	Delivers timing services over the packet network. Support of PTP Telecom profiles (G.8265.1, G.8275.1, G.8275.2). SyncE on Ethernet ports across the ASR 9903 chassis, support of GPS, and BITS interfaces to provide redundant network synchronization.
<b>Carrier-grade redundancy</b>	
<b>Fully redundant configuration</b>	Support of redundant configuration: two RPs, two fabrics, 4 power supply modules, 4 Fan modules
<b>Carrier-class OS</b>	
<b>Cisco IOS XR Software (64-bit)</b>	Modular, patchable, scalable, highly available, carrier-core, and edge-proven operating system

The ASR 9903 compact high-performance router is available in the service edge variant.

Feature licenses are also available to turn on features on the ASR 9903, as described in the Table 6 “Feature license information for the ASR 9903 router with the Traditional Business Model”.

## Product specifications

Table 2 provides product specifications for the ASR 9903 compact high-performance router.

**Table 2.** Product specifications

Description	Specification
<b>Physical dimensions (includes ejector bracket/lever); (H x W x D); weight</b>	ASR 9903 chassis (including 2 RPs, 4 PSUs, 4 FANs): 5.18 x 17.475 x 30 in.; 75.85 lb (131.57 mm x 443.86 mm x 762 mm; 34.4 kg) Note: Excluding ejector, the depth is 23.62 in/600 mm
<b>Redundancy</b>	Route processor redundancy Switch fabric redundancy Power supply redundancy: Fan redundancy Software redundancy
<b>Port density</b>	ASR 9903 chassis with integrated ports: <ul style="list-style-type: none"> <li>• 16 QSFP28 ports capable of 10Gb, 40Gb, and 100Gb Ethernet</li> <li>• 20 SFP+ ports capable of 10Gb Ethernet</li> </ul>
<b>RP CPU memory</b>	SDRAM DDR4 – 32GB default
<b>Rack mounting</b>	19-in.
<b>Airflow</b>	Front to back

Description	Specification
<b>Power</b>	<ul style="list-style-type: none"> <li>• 1.6 kW DC power module (up to 4 modules), redundancy: 2+2</li> <li>• 1.6 kW AC power module (up to 4 modules), redundancy: <ul style="list-style-type: none"> <li>◦ AC high line (200–240V): 2+2</li> <li>◦ AC low line (90–130V): 3+1</li> </ul> </li> </ul> <p><b>Note:</b> Mixing of AC and DC modules is not supported.</p>
<b>Ethernet</b>	<ul style="list-style-type: none"> <li>• 10 Gbps IEEE 802.3ae compliant</li> <li>• 40/100-Gbps IEEE 802.3ba compliant</li> <li>• 100 Gigabit Ethernet PHY monitoring</li> <li>• IEEE 802.x flow control</li> <li>• Full-duplex operation</li> <li>• Per-port byte and packet counters for policy drops; oversubscription drops; Cyclic Redundancy Check (CRC) error drops; packet sizes; and unicast, multicast, and broadcast packets</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>• 10-Gbps line-rate throughput per SFP+ port</li> <li>• 100-Gbps line-rate throughput per QSFP28 port</li> </ul>
<b>Operating temperature</b>	41 to 104°F (5 to 40°C)
<b>Operating humidity (nominal) (relative humidity)</b>	10 to 85%
<b>Storage temperature</b>	–40 to 158°F (–40 to 70°C)
<b>Storage (relative humidity)</b>	5 to 95% <b>Note:</b> Not to exceed 0.024 kg of water per kg of dry air
<b>Operating altitude</b>	–60 to 1800 m
<b>ETSI/EN standards</b>	The Cisco ASR 9903 Router is designed to meet: <ul style="list-style-type: none"> <li>• EN300 386: Telecommunications Network Equipment (EMC)</li> <li>• ETSI 300 019 Storage Class 1.1</li> <li>• ETSI 300 019 Transportation Class 2.3</li> <li>• ETSI 300 019 Stationary Use Class 3.1</li> <li>• EN55022: Information Technology Equipment (Emissions)</li> <li>• EN55024: Information Technology Equipment (Immunity)</li> <li>• EN50082-1/EN-61000-6-1: Generic Immunity Standard</li> </ul>
<b>EMC standards</b>	The Cisco ASR 9903 Router is designed to meet: <ul style="list-style-type: none"> <li>• FCC Class A</li> <li>• ICES 003 Class A</li> <li>• AS/NZS 3548 Class A</li> <li>• CISPR 22 (EN55022) Class A</li> <li>• VCCI Class A</li> <li>• BSMI Class A</li> <li>• IEC/EN 61000-3-2: Power Line Harmonics</li> <li>• IEC/EN 61000-3-3: Voltage Fluctuations and Flicker</li> <li>• EN50121-4 Railway Applications Part 4: Emission and immunity of the signaling and telecommunications apparatus</li> </ul>

Description	Specification
<b>Immunity</b>	<p>The Cisco ASR 9903 Router is designed to meet:</p> <ul style="list-style-type: none"> <li>• IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8kV Contact, 15kV Air)</li> <li>• IEC/EN-61000-4-3: Radiated Immunity (10V/m)</li> <li>• IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2kV Power, 1kV Signal)</li> <li>• IEC/EN-61000-4-5: Surge AC Port (4kV CM, 2kV DM)</li> <li>• IEC/EN-61000-4-5: Signal Ports (1kV)</li> <li>• IEC/EN-61000-4-5: Surge DC Port (1kV)</li> <li>• IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10Vrms)</li> <li>• IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m)</li> <li>• IEC/EN-61000-4-11: Voltage DIPS, Short Interruptions, and Voltage Variations</li> <li>• EN 50121-4: Railway EMC</li> </ul>
<b>Safety</b>	<p>The Cisco ASR 9903 Router is designed to meet:</p> <ul style="list-style-type: none"> <li>• UL/CSA/IEC/EN 60950-1</li> <li>• IEC/EN 60825 Laser Safety</li> <li>• ACA TS001</li> <li>• AS/NZS 60950</li> <li>• FDA: Code of Federal Regulations Laser Safety</li> </ul>
<b>Network Equipment Building Systems (NEBS)</b>	<p>The Cisco ASR 9903 Router is designed to meet:</p> <ul style="list-style-type: none"> <li>• SR-3580: NEBS Criteria Levels (Level 3)</li> <li>• GR-1089-CORE: NEBS EMC and Safety</li> <li>• GR-63-CORE: NEBS Physical Protection</li> </ul>

Table 3 provides product specifications for the 2T Port Expansion Card.

**Table 3.** Product specifications

Description	Specification
<b>Port density</b>	<b>2 Terabit Port Expansion Card:</b> 15 QSFP28 ports capable of 10Gb, 40Gb, and 100Gb Ethernet traffic support. 5 QSFP-DD ports capable of 10Gb, 40Gb, 100Gb, 200Gb, and 400Gb Ethernet traffic support.
<b>Ethernet</b>	<ul style="list-style-type: none"> <li>• 40/100-Gbps IEEE 802.3ba compliant</li> <li>• 100 Gigabit Ethernet PHY monitoring</li> <li>• 400-Gbps IEEE 802.3bs compliant</li> <li>• IEEE 802.x flow control</li> <li>• Full-duplex operation</li> <li>• Per-port byte and packet counters for policy drops; oversubscription drops; Cyclic Redundancy Check (CRC) error drops; packet sizes; and unicast, multicast, and broadcast packets</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>• 100-Gbps line-rate throughput per QSFP28 port</li> <li>• 400-Gbps line-rate throughput per QSFP-DD port</li> </ul>
<b>Physical dimensions (H x W x D); weight</b>	2T Port Expansion Card: 1.47 x 16.31 x 15.09 in.; 5.85 lb (est.) (37.34 mm x 414.27 mm x 383.28 mm; 2.65 kg)
<b>Operating temperature</b>	41 to 104°F (5 to 40°C)



Description	Specification
Operating humidity (nominal) (relative humidity)	10 to 85%
Storage temperature	-40 to 158°F (-40 to 70°C)
Storage (relative humidity)	5 to 95% <b>Note:</b> Not to exceed 0.024 kg of water per kg of dry air
Operating altitude	-60 to 1800m

## Ordering information

The ASR 9903 Compact High-Performance router is available to order through the Software Flexible Consumption Model (FCM) and Traditional Business Model.

The Flexible Consumption Model offers a built-in “pay-as-you-grow” structure that lowers initial start-up costs with the ability to add more capacity overtime as needed. Software subscription provides feature upgrades and helps defer the payment of software value for the initial purchase.

Table 4 provides ordering information for the ASR 9903 router with the Flexible Consumption Model.

**Table 4.** Ordering information for the ASR 9903 router with the Flexible Consumption Model

Part number	Feature description
<b>ASR-9903-FC</b>	ASR 9903 1.6T Flexible Consumption Chassis
<b>A99-RP-F-FC</b>	ASR 9900 Fixed Chassis Route Processor - Flexible Consumption Model
<b>A9903-20HG-PEC-FC</b>	ASR 9903 2T Flexible Consumption Port Expansion Card
<b>PWR-1.6KW-AC</b>	ASR 9900 Fixed Chassis AC Power Supply
<b>PWR-1.6KW-DC</b>	ASR 9900 Fixed Chassis DC Power Supply
<b>ASR-9903-FAN</b>	ASR 9903 Fan Tray
<b>ASR-9903-4P-KIT</b>	ASR 9903 4-Post Mounting Kit for 19-Inch Rack
<b>ASR-9903-CAB-MGMT</b>	ASR 9903 Cable Management
<b>ASR-9903-FILTER</b>	ASR 9903 Air Filter
<b>ESS-ED-100G-RTU1</b>	Essentials Software RTU License (per 100G) for Edge
<b>ADV-ED-100G-RTU1</b>	Advanced Software RTU License (per 100G) for Edge
<b>S-A9K-LI-LIC-FC</b>	ASR 9K Smart License Lawful Intercept - Flexible Consumption Model

For more information, please refer to the [Cisco IOS XR Software Flexible Consumption Model Data Sheet](#).



Table 5 provides hardware ordering information for the ASR 9903 router with the Traditional Business Model.

**Table 5.** Hardware ordering information for the ASR 9903 router with the Traditional Business Model

Part number	Feature description
<b>ASR-9903</b>	ASR 9903 Chassis
<b>A99-RP-F</b>	ASR 9900 Fixed Chassis Route Processor
<b>A9903-20HG-PEC</b>	ASR 9903 2T Multirate Port Expansion Card
<b>PWR-1.6KW-AC</b>	ASR 9900 Fixed Chassis AC Power Supply
<b>PWR-1.6KW-DC</b>	ASR 9900 Fixed Chassis DC Power Supply
<b>ASR-9903-FAN</b>	ASR 9903 Fan Tray
<b>ASR-9903-4P-KIT</b>	ASR 9903 4-Post Mounting Kit for 19-Inch Rack
<b>ASR-9903-CAB-MGMT</b>	ASR 9903 Cable Management
<b>ASR-9903-FILTER</b>	ASR 9903 Air Filter

The ASR 9903 compact high-performance router supports optional feature licenses to enable features. Table 6 lists the feature licenses.

**Table 6.** Feature license information for the ASR 9903 router with the Traditional Business Model

Part number	Feature description
<b>S-A9903-IVRF</b>	ASR 9903 License to Activate up to 8 VRFs for Fixed Ports
<b>S-A9903-AIP</b>	ASR 9903 Full-Scale VRF License for Fixed Ports
<b>S-A9903-CGN</b>	ASR 9903 License Inline CGv6 Transformation for Fixed Ports
<b>S-A9903-20HG-IVRF</b>	ASR 9903 License to Activate up to 8 VRFs for 2T PEC
<b>S-A9903-20HG-AIP</b>	ASR 9903 Full-Scale VRF License for 2T PEC
<b>S-A9903-20HG-CGN</b>	ASR 9903 License Inline CGv6 Transformation for 2T PEC
<b>S-A9K-400G-F-ENBL</b>	ASR 9903 Enablement License for 400G Port on 2T PEC
<b>S-A9K-LI-LIC</b>	ASR 9K Smart License Lawful Intercept
<b>S-A9K-TUNNEL-ENT</b>	ASR 9K Smart License RTU License for Tunnel Protocols
<b>S-A9K-MOBILE-LIC</b>	ASR 9K Smart License Advanced Mobile for System
<b>S-A9K-NVSAT1-LIC</b>	NV Host License for 1 nV Client
<b>S-A9K-NVSAT5-LIC</b>	NV Host License for up to 5 nV Clients
<b>S-A9K-NVSAT20-LIC</b>	NV Host License for up to 20 nV Clients



# Downloading the software

Visit the [Cisco Software Center](#) to download Cisco IOS Software.

## Cisco Services for the Cisco ASR 9000 Series

Through a lifecycle services approach, Cisco delivers comprehensive support to service providers to help them successfully deploy, operate, and optimize their Cisco IP Next-Generation Networks. Cisco Services for the Cisco ASR 9000 Series Aggregation Services Routers provide services and proven methodologies that help ensure service deployment with substantial Return On Investment (ROI), operational excellence, optimal performance, and high availability. These services are delivered using leading practices, tools, processes, and lab environments developed specifically for ASR 9000 Series deployments and postimplementation support. The Cisco Services team addresses your specific requirements, mitigates risk to existing revenue-generating services, and helps accelerate time to market for new network services.

## Cisco environmental sustainability

Information about Cisco’s environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the “Environment Sustainability” section of Cisco’s [Corporate Social Responsibility](#) (CSR) Report.

Reference links to **information about key environmental sustainability topics** (mentioned in the “Environment Sustainability” section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	<a href="#">Materials</a>
Information on electronic waste laws and regulations, including products, batteries, and packaging	<a href="#">WEEE compliance</a>

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