

# Cisco ASR 9000 Series 24-Port and 48-Port Dual-Rate 10GE/1GE Line Card

## Product Overview

The Cisco® ASR 9000 Series 24-port and 48-port dual-rate 10 Gigabit and 1 Gigabit Ethernet line card deliver industry-leading high density and high 10 Gigabit/1 Gigabit Ethernet performance to any slot of a Cisco ASR 9000 Series Aggregation Services Router. These high-capacity line cards are designed to remove bandwidth bottlenecks in the network that are caused by a large increase in video-on-demand (VoD), IPTV, point-to-point video, Internet video, and cloud services traffic, all with an incredibly low power profile.

Fully populating an ASR 9922 chassis with the 48-port line card delivers 960 ports of 10 Gigabit Ethernet or 960 ports of 1 Gigabit Ethernet in a single chassis. Such configurations are ideal for networks in which density, performance, and low-latency operations are critical. The 24-port and the 48-port line cards are designed for throughput of 200G and 400G, respectively, but can operate in oversubscription mode up to 240G for the 24-port card and 480G for the 48-port card. There will be a graceful redistribution of packets across all ports in case of oversubscription. All the ports on the line card can be configured to be all in 10G or all in 1G mode. The line card also offers the flexibility to support certain mixed 1G and 10G configurations.

The physical interfaces on these line cards support both Small Form-Factor Pluggable (SFP) and Enhanced SFP (SFP+) optics for long- and short-haul applications, enabling migration and support for numerous deployment scenarios requiring different media types and flexible interface modes. With these capabilities, the ASR 9000 Series line cards (Figure 1 and Figure 2) and routers provide the fundamental infrastructure for scalable Carrier Ethernet and IP/Multiprotocol Label Switching (IP/MPLS) networks, promoting profitable business, residential, and mobile services.

**Figure 1.** Cisco ASR 9000 Series 24-Port Dual-Rate 10GE/1GE Line Card



**Figure 2.** Cisco ASR 9000 Series 48-Port Dual-Rate 10GE/1GE Line Card



## Features and Benefits

Both the ASR 9000 Series 24-port and 48-port dual-rate 10GE/1GE line cards are fully compatible with all ASR9000 modular chassis. Powered by the proven and the widely deployed Cisco IOS® XR Software OS, these line cards set a new standard for Layer 2 and Layer 3 10GE/1GE service density and scale to support large-scale aggregation, data center interconnect (DCI), and Satellite Network Virtualization (nV) System mode on the ASR 9000 Series Router. These versatile capabilities help operators qualify and stock one type of line card that can be deployed in any combination of Layer 2, Layer 3, DCI, or aggregation applications, thereby reducing capital expenditures (CapEx) and operating expenses (OpEx), as well as reducing the time required to develop and deploy new services.

Table 1 lists the features and benefits of the Cisco ASR 9000 Series line card. Specific feature and scale support is hardware and software dependent.

**Table 1.** Features and Benefits of Cisco ASR 9000 Series 24-Port and 48-Port Dual-Rate 10GE/1GE Line Cards

Feature	Benefit
<b>Interface Support</b>	
<b>Cisco SFP and SFP+ interfaces</b>	Provide the capacity to mix and match 10GE and 1GE Gigabit Ethernet interface types across a single line card. For a complete list of supported interfaces, see the <a href="#">Cisco ASR 9000 Transceiver Modules: Line-Card Support</a> data sheet.
<b>Scalable and Integrated Multiservice Support</b>	
<b>Layer 2 and Layer 3 services</b>	Combined IP, MPLS, Ethernet, Layer 2 VPN (L2VPN), and Layer 3 VPN (L3VPN) services. Only LAN mode is supported.
<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.
<b>Carrier-Class OS</b>	
<b>Cisco IOS XR Software</b>	Modular, patchable, scalable, highly available, carrier-core, and edge-proven operating system.

## Line-Card Types

The ASR 9000 Series 24-port and 48-port dual-rate 10GE/1GE line cards are available in service edge–optimized and packet transport–optimized variants:

- The service edge–optimized line cards are designed for customer deployments requiring enhanced quality of service (QoS).
- The packet transport–optimized line cards are designed for network deployments where basic QoS is required.
- Both optimized versions of the line card support only LAN mode.

Different line-card types can be used in the same system.

Feature licenses are also available to turn on advanced features on the line cards, as described in the “Software Licensing” section later in this document.

## Product Specifications

Table 2 provides product specifications for the ASR 9000 Series 24-port and 48-port dual-rate 10GE/1GE line cards.

**Table 2.** Product Specifications

Description	Specification
<b>Chassis compatibility</b>	Compatible with the Cisco ASR 9006, ASR 9010, ASR 9904, ASR9906, ASR 9910, ASR 9912, and ASR 9922 chassis
<b>Port density</b>	24 ports and 48 ports of 10 Gigabit/1 Gigabit Ethernet ports per line card
<b>Ethernet</b>	<ul style="list-style-type: none"> <li>• 10-Gbps IEEE 802.3ba compliant</li> <li>• 10 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>• 24-port dual-rate 10GE/1GE line card: 200-Gbps line-rate throughput, 240:200 oversubscription</li> <li>• 48-port dual-rate 10GE/1GE line card: 400-Gbps line-rate throughput, 480:400 oversubscription</li> </ul>
<b>Options</b>	Each line card is available as either a service edge–optimized (enhanced QoS) or packet transport–optimized (basic QoS) line card
<b>Reliability and availability</b>	Line-card online insertion and removal (OIR) support without system effects
<b>Physical dimensions (H x W x D); weight</b>	24-port 10 Gigabit Ethernet Line Card: 14.5 x 1.63 x 22.02 in.; 18.3 lb (est.) (368.3 mm x 41.4 mm x 559.3 mm; 12.7 kg) 48-port 10 Gigabit Ethernet Line Card: 14.5 x 1.63 x 22.02 in.; 20 lb (est.) (368.3 mm x 41.4 mm x 559.3 mm; 12.7 kg)
<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 4000m (up to 2000m conforms to IEC, EN, UL, and CSA 60950 requirements)
<b>ETSI standards</b>	Cisco ASR 9000 Series Routers are 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> </ul>

Description	Specification
	<ul style="list-style-type: none"> <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>	Cisco ASR 9000 Series Routers are 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> </ul>
<b>Immunity</b>	Cisco ASR 9000 Series Routers are designed to meet: <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> </ul>
<b>Safety</b>	Cisco ASR 9000 Series Routers are designed to meet: <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>

## Pluggable Interfaces

The ASR 9000 Series 24-port and 48-port dual-rate 10GE/1GE line cards support the Cisco SFP and SFP+ pluggable interfaces, some of which are listed in Table 3. To see the complete list of supported optics, see the [Cisco ASR 9000 Transceiver Modules: Line-Card Support](#) data sheet. Check with the BU about the minimum XR required to support these optics.

**Table 3.** Cisco SFP and SFP+ Interfaces Supported by the Cisco ASR 9000 Series 24-Port and 48-Port Dual-Rate 10GE/1GE Line Cards. Check with BU for complete list of optics and the minimum XR release to support these optics

Part Number	10GE SFP+ and 1G SFP Optics	Maximum Distance
<b>SFP-10G-LR</b>	10 Gigabit Ethernet long-reach, 1310 nm single-mode fiber	10 km
<b>SFP-10G-SR</b>	10 Gigabit Ethernet short-reach, 850 nm multimode fiber	400m
<b>SFP-10G-ER</b>	10 Gigabit Ethernet extended-reach, 1550 nm single-mode fiber	40 km
<b>SFP-10G-ZR</b>	10 Gigabit Ethernet extended long reach, 1550 nm single-mode fiber	80 km
<b>GLC-SX-MMD</b>	1 Gigabit Ethernet short-reach, 850 nm multimode fiber	1000m
<b>GLC-LH-SMD</b>	1 Gigabit Ethernet long-reach, 1310 nm single-mode fiber	10 km
<b>GLC-EX-SMD</b>	1 Gigabit Ethernet extended-reach, 1550 nm single-mode fiber	40 km
<b>GLC-ZX-SMD</b>	1 Gigabit Ethernet extended long reach, 1550 nm single-mode fiber	80 km
<b>GLC-BX-D</b>	1000BASE-BX SFP, 1490NM, SMF	10 km
<b>GLC-BX-U</b>	1000BASE-BX SFP, 1310NM, SMF	10 km

## Software Licensing

### Line-Card Feature Licenses

Both optimization versions of the ASR 9000 Series 24-port and 48-port dual-rate 10GE/1GE Ethernet line cards support optional per-line-card feature licenses to turn on advanced features. Layer 3 VPN licenses provide access to VPN routing and forwarding (VRF) instances on a per-line-card basis. They include the infrastructure VRF license to support up to eight VRF instances and advanced IP licenses to support up to full-scale VRF instances. Table 4 lists the line-card feature licenses.

**Table 4.** Feature Licenses for Cisco ASR 9000 Series 4-Port and 8-Port 100 Gigabit Ethernet Line Cards

License Part Number	Feature Description
<b>A9K-48P10G-AIP-SE</b>	Adv. IP license for full-scale VRFs for 48-port 10G/1G SE LC
<b>A9K-48P10G-AIP-TR</b>	Adv. IP license for full-scale VRFs for 48-port 10G/1G TR LC
<b>A9K-48P10G-IVRF</b>	Infra. VRF lic. for up to 8 VRF instances per 48-port 10G/1G
<b>A9K-24P10G-AIP-SE</b>	Adv. IP license for full-scale VRFs for 24-port 10G/1G SE LC
<b>A9K-24P10G-AIP-TR</b>	Adv. IP license for full-scale VRFs for 24-port 10G/1G TR LC
<b>A9K-24P10G-IVRF</b>	Infra. VRF lic. for up to 8 VRF instances per 24-port 10G/1G LC

Table 5 provides ordering information for the Cisco ASR 9000 Series 24-port and 48-port dual-rate 10GE/1GE line cards.

**Table 5.** Product Ordering Information

Product ID	Product Description	Minimum XR Release Support
<b>A9K-48X10GE-1G-SE</b>	ASR9000 48-port dual-rate 10G/1G service edge–optimized line card	XR 6.2.1
<b>A9K-48X10GE-1G-TR</b>	ASR9000 48-port dual-rate 10G/1G packet transport–optimized line card	XR 6.2.1
<b>A9K-24X10GE-1G-SE</b>	ASR9000 24-port dual-rate 10G/1G service edge–optimized line card	XR 6.2.1
<b>A9K-24X10GE-1G-TR</b>	ASR9000 24-port dual-rate 10G/1G packet transport–optimized line card	XR 6.2.1

## 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 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.

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## For More Information

For more information about Cisco Services, contact your local Cisco account representative or visit <http://www.cisco.com/go/spservices>.

## Cisco Capital

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