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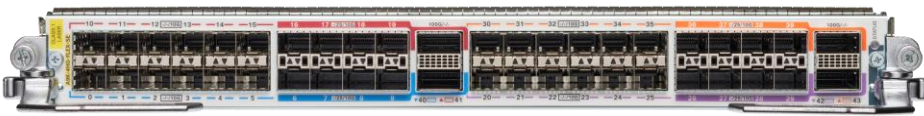
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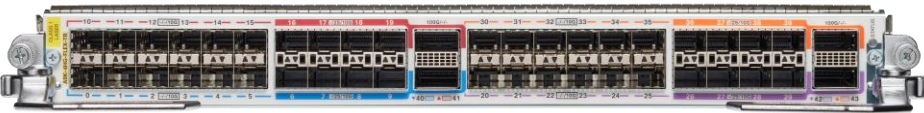
## Product overview

The Cisco® ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Multi-Rate Line Card delivers industry-leading high density, with line-rate 10, 25, 40, and 100 Gigabit Ethernet ports, to any slot of a Cisco ASR 9000 Series Aggregation Services Router. This Multi-Rate line card is 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. The physical interfaces support QSFP28, SFP28, QSFP+, SFP+ optics, giving customers the flexibility to mix and match interface types on the same line card.

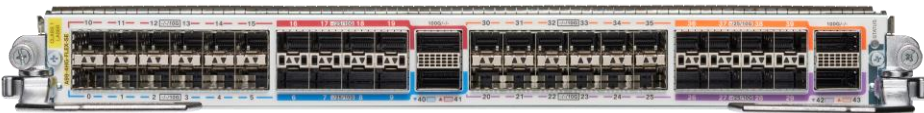
Multiple interface modes can be configured easily through the Command Line Interface (CLI) without resetting or restarting the line card. With these capabilities, the ASR 9000 Series line card (Figure 1) and routers provide the fundamental infrastructure for scalable Carrier Ethernet and IP/Multiprotocol Label Switching (IP/MPLS) networks, promoting profitable business, residential, and mobile services.



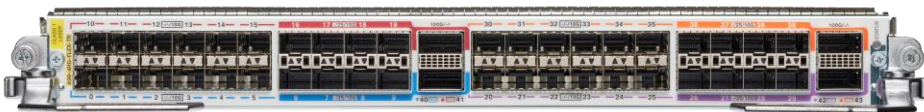
**Figure 1.**  
Cisco ASR 9000 400GE Combo Service Edge Line Card - 5<sup>th</sup> Generation



**Figure 2.**  
Cisco ASR 9000 400GE Combo Packet Transport Line Card - 5<sup>th</sup> Generation



**Figure 3.**  
Cisco ASR 9900 400GE Combo Service Edge Line Card - 5<sup>th</sup> Generation



**Figure 4.**  
Cisco ASR 9900 400GE Combo Packet Transport Line Card - 5<sup>th</sup> Generation

## Features and benefits

The ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Card is fully compatible with the Cisco ASR 9922 Router, ASR 9912 Router, ASR 9910 Router, ASR 9906 Router, ASR 9904 Router, ASR 9010 Router, and ASR 9006 Router. However, the chassis may require a hardware update for the fabric cards, RP/RSP cards, and cooling systems. This line card is designed to support full line rate, non-oversubscribed Ethernet traffic.

This power-optimized line card, at such high density and scale, allows customers to reduce Capital Expenditures (CapEx) and Operating Expenses (OpEx) while offering highly predictable, managed transport services for Core and Peering applications. It supports a 10 Gigabit Ethernet Satellite Network Virtualization (nV) System mode on the ASR 9000 Series Router.

Table 1 lists the features and benefits of the 400 Gigabit Ethernet Cisco ASR 9000 Series line card. Specific features and scale support are hardware and software dependent.

**Table 1.** Features and benefits of Cisco ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Cards

Feature	Benefit
<b>Interface support</b>	
<b>Cisco pluggable interfaces</b>	Provide the capacity to mix and match 10, 25, 40, and 100 Gigabit Ethernet interface types across a single line card (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 trace route
<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 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Card is available in the service-edge- and packet-transport-optimized variants.

- The service edge-optimized line card is designed for customer deployments requiring enhanced service scale.
- The packet transport-optimized line card is designed for customer deployments requiring basic service scale.

Feature licenses are also available to turn on advanced features on the line cards, as described in Table 4 “Ordering information for the ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Cards with the Traditional Business Model”.

## Product specifications

Table 2 provides product specifications for the ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Cards.

**Table 2.** Product specifications

Description	Specification
<b>Chassis compatibility</b>	<p>Compatible with the Cisco ASR 9922, ASR 9912, ASR 9910, ASR 9906, ASR 9904, ASR 9010 and ASR 9006 chassis.</p> <ul style="list-style-type: none"> <li>• <b>A99-4HG-FLEX-FC, A99-4HG-FLEX-SE, A99-4HG-FLEX-TR</b> PIDs - compatible with the ASR 9922, ASR 9912, ASR 9910, ASR 9906, ASR 9904 chassis</li> <li>• <b>A9K-4HG-FLEX-FC, A9K-4HG-FLEX-SE, A9K-4HG-FLEX-TR</b> PIDs - compatible with the ASR 9922, ASR 9912, ASR 9910, ASR 9906, ASR 9904, ASR 9010, ASR 9006 chassis</li> </ul>
<b>Port density</b>	4 QSFP28 ports capable of 40Gb and 100Gb Ethernet traffic support. 16 SFP28 ports capable of 10Gb and 25Gb Ethernet traffic support. 24 SFP+ ports capable of 10Gb Ethernet traffic support.
<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>• 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>• 25-Gbps line rate throughput per SFP28 port</li> <li>• 10-Gbps line rate throughput per SFP+ port</li> </ul>
<b>Options</b>	Each line card is available as either a service-edge-optimized or packet-transport-optimized line card
<b>Reliability and availability</b>	Line card Online Insertion and Removal (OIR) support without system impact
<b>Physical dimensions (includes ejector bracket/lever); (H x W x D); weight</b>	<p>ASR 9000 400GB 5<sup>th</sup> Generation Service Edge Line Card: 1.68 x 15.87 x 24.00 in.; 18.74 lb (42.67 x 403.10 x 609.60 mm; 8.50 kg)</p> <p>ASR 9000 400GB 5<sup>th</sup> Generation Packet Transport Line Card: 1.68 x 15.87 x 24.00 in.; 18.74 lb (42.67 x 403.10 x 609.60 mm; 8.50 kg)</p>
<b>Operating temperature</b>	<p>41 to 104°F (5 to 40°C)</p> <p><b>Note:</b> Limitations may apply when using high-power optics</p>
<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>	<p>5 to 95%</p> <p><b>Note:</b> Not to exceed 0.024 kg of water per kg of dry air</p>
<b>Operating altitude</b>	-60 to 4000 m (up to 2000 m conforms to IEC, EN, UL, and CSA 60950 requirements)

Description	Specification
<b>ETSI/EN standards</b>	<p>Cisco ASR 9000 Series Routers are designed to meet:</p> <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>• EN55032: Multimedia Equipment (Emissions)</li> <li>• EN55024: Information Technology Equipment (Immunity)</li> <li>• EN55035: Multimedia Equipment (Immunity)</li> <li>• EN50082-1/EN-61000-6-1: Generic Immunity Standard</li> </ul>
<b>EMC standards</b>	<p>Cisco ASR 9000 Series Routers are designed to meet:</p> <ul style="list-style-type: none"> <li>• FCC Class A</li> <li>• ICES 003 Class A</li> <li>• AS/NZS CISPR 32 Class A</li> <li>• CISPR 22/CISPR 32 Class A</li> <li>• EN55022/EN55032 Class A</li> <li>• VCCI Class A</li> <li>• CNS-13438 Class A</li> <li>• KN32 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> <li>• EN50121-3-2 Railway applications Part 3-2: Rolling stock - Apparatus</li> </ul>
<b>Immunity</b>	<p>Cisco ASR 9000 Series Routers are 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>• KN35</li> </ul>

Description	Specification
<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>
<b>Network Equipment Building System (NEBS)</b>	Designed to meet: <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>

## Ordering information

The ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Cards are available to order through two commercial models, the Flexible Consumption Model (FCM) and the 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 3 provides ordering information for the ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Card with the Flexible Consumption Model

**Table 3.** Ordering information for the ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Card with the Flexible Consumption Model

Part number	Feature description
<b>A9K-4HG-FLEX-FC</b>	ASR 9000 400GB Flexible Consumption Line Card - 5 <sup>th</sup> Generation
<b>A99-4HG-FLEX-FC</b>	ASR 9000 400GB Flexible Consumption Line Card - 5 <sup>th</sup> Generation
<b>ESS-ED-100G-RTU1</b>	Edge Essentials Software RTU License per 100G
<b>ADV-ED-100G-RTU1</b>	Edge Advantage w/o Essentials Software RTU License per 100G
<b>ADN-ED-100G-RTU1</b>	Edge Advantage w/ Essentials Software RTU License per 100G
<b>ESS-ED-400G-RTU1</b>	Edge Essentials Software RTU License per 400G
<b>ADV-ED-400G-RTU1</b>	Edge Advantage w/o Essentials Software RTU License per 400G
<b>ADN-ED-400G-RTU1</b>	Edge Advantage w/ Essentials Software RTU License per 400G
<b>ESS-ED-100G-SIA5</b>	Edge Essentials SIA per 100G 60-120 months
<b>ESS-ED-100G-SIA3</b>	Edge Essentials SIA per 100G 36-59 months
<b>ESS-ED-400G-SIA5</b>	Edge Essentials SIA per 400G 60-120 months

Part number	Feature description
ESS-ED-400G-SIA3	Edge Essentials SIA per 400G 36-59 months
ADV-ED-100G-SIA5	Edge Advantage w/o Essentials SIA per 100G for 60-120 months
ADV-ED-100G-SIA3	Edge Advantage w/o Essentials SIA per 100G for 36-59 months
ADV-ED-400G-SIA5	Edge Advantage w/o Essentials SIA per 400G for 60-120 months
ADV-ED-400G-SIA3	Edge Advantage w/o Essentials SIA per 400G for 36-59 months
ADN-ED-100G-SIA5	Edge Advantage w/ Essentials SIA per 100G for 60-120 months
ADN-ED-100G-SIA3	Edge Advantage w/ Essentials SIA per 100G for 36-59 months
ADN-ED-400G-SIA5	Edge Advantage w/ Essentials SIA per 400G for 60-120 months
ADN-ED-400G-SIA3	Edge Advantage w/ Essentials SIA per 400G for 36-59 months

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

Table 4 provides ordering information for the ASR 9000 Series 5<sup>th</sup> Generation 400 Gigabit Ethernet Line Cards with the Traditional Business Model.

**Table 4.** Ordering information for the ASR 9000 Series 5<sup>th</sup> Generation 10-Port 400 Gigabit Ethernet Line Cards with the Traditional Business Model

Part number	Feature description
A9K-4HG-FLEX-SE	ASR 9000 400GE Combo Service Edge Line Card - 5 <sup>th</sup> Generation
A9K-4HG-FLEX-TR	ASR 9000 400GE Combo Packet Transport Line Card - 5 <sup>th</sup> Generation
A99-4HG-FLEX-SE	ASR 9900 400GE Combo Service Edge Line Card - 5 <sup>th</sup> Generation
A99-4HG-FLEX-TR	ASR 9900 400GE Combo Packet Transport Line Card - 5 <sup>th</sup> Generation
S-A9K-4HG-IVRF	ASR 9000 infrastructure VRF (up to 8) license for 400GB Line Card- 5 <sup>th</sup> Generation
S-A9K-4HG-AIP-SE	ASR 9000 full-scale VRF license for 400GB SE Line Card- 5 <sup>th</sup> Generation
S-A9K-4HG-AIP-TR	ASR 9000 full-scale VRF license for 400GE TR Line Card - 5 <sup>th</sup> Generation
S-A9K-4HG-CGN	ASR 9000 In-Line CGv6 Translation License for 400GB Line Card - 5 <sup>th</sup> Generation
S-A9K-MACSEC-10	ASR 9000 MACSec 10G Right to Use License
S-A9K-MACSEC-40	ASR 9000 MACSec 40G Right to Use License
S-A9K-MACSEC-100	ASR 9000 MACSec 100G Right to Use License



## 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 post implementation 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.

## Product 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>

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

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## Document history

Table 5. Document history

New or Revised Topic	Described In	Date
Updated the Ordering information section with new license SKU content for both Traditional and FCM models. Updated relevant features and technical specifications across document.	Ordering information	July 26,2021

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