Cisco 8800 Series Q200-Based Line Cards

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Overview of the Cisco 8000 Series

Today's networks provide essential infrastructure for autonomous cars, telemedicine, industrial robots, immersive experiences for virtual and augmented reality, connected devices, and hybrid work environments, as well as the recent artificial intelligence and machine learning data models. As a result of digital transformation, users and devices are demanding more bandwidth.

High-performance networking systems have historically been divided into routing or switching classes, with distinct hardware and software. But as the necessity for reliable networks proliferates, it is imperative that traditional networks undergo an architectural shift to address the need for exponential growth in bandwidth, ubiquitous connectivity, better quality of service, low latency coupled with high reliability, availability, and serviceability of the infrastructure. The Cisco® 8000 Series Router portfolio completes this journey.

Cisco Silicon One™ was the first routing silicon architecture to break through the 10-Tbps benchmark for network bandwidth. This is accomplished without sacrificing route capacity, packet-per-second forwarding performance, or feature flexibility. The Cisco Silicon One architecture achieves high performance and full routing capabilities without external memory. This is enabled by the clean-sheet internal architecture that includes on-chip high-bandwidth memory.

Powered by Silicon One ASIC innovation, the Cisco 8000 Series portfolio delivers provider-class routing functionality at unmatched density, performance, and power. This enables the Cisco 8000 Series to be deployed into an unprecedented range of routing roles—all supported with a single ASIC architecture and operating system—thus streamlining qualification, deployment, and operations.

The Cisco 8000 Series combines the revolutionary Cisco Silicon One, Cisco IOS® XR software, and a set of clean-sheet chassis to deliver a breakthrough in high-performance routers. In particular, the Cisco 8000 modular systems portfolio, ranging from 4 slots to 18 slots, provides the benefits of deployment size flexibility and can be tailored to multiple use cases, from metro to high-speed core and aggregation, while providing high system density up to 1296x 400 Gigabit Ethernet (400G) ports and 5184x 100G ports on the 18-slot chassis. The performance of the Cisco 8000 Series modular systems goes hand in hand with the evolution of the line cards.

This data sheet introduces three line cards based on the Silicon One Q200 ASIC. The Silicon One Q200 ASIC offers 12.8-Tbps performance in 7-nm technology and delivers high-scale routing and deep buffering that typically require off-chip memory. These line cards deliver an industry-leading 400G platform with 14.4 Tbps per slot. They support 400G, 100G, 40G, and 10G ports at line rate in any slot of a Cisco 8000 Series modular router.

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Key benefits of Cisco 8800 Series modular systems powered by Cisco Silicon One Q200

Architectural innovation

Advanced Q200 technology allows a dense 400G optimized system supporting 36x 400G ports per slot. The largest Cisco 8800 Series system supports 648 native 400G ports or 2592x 100G ports with breakout cables.

Business agility

A pay-as-you-grow Flexible Consumption Model helps customers protect their investment by right-sizing the network, adding capacity over time to better align to business outcomes.

Operational simplicity

With the latest enhancements in Cisco Crosswork® Network Automation, along with advanced visualization dashboards, services monitoring with actionable insights, and closed-loop network optimization, customers can offer a consistent quality of experience for their services.

Features and benefits

Table 1. Features and benefits of Cisco 8800 Series Q200-based line cards

Feature	Details
Industry-leading, carrier-class Cisco IOS XR Software	Modular, patchable, scalable, highly available, carrier-class proven operating system.
Cisco pluggable interface	Compatible with a diverse range of optical modules, helping ensure optimal performance and flexibility: QSFP+, QSFP28, QSFP28-DD, QSFP56-DD.
Integrated interfaces	Flexible port rate configuration: 400G, 200G, 100G, 40G, 10G Breakout support: 4x100G. Routed optical networking architecture ready, supporting all types of 400G Digital Coherent Optics (DCO).
Network simplicity	Enhanced automation capability for onboarding. SRv6-capable Ethernet VPN (EVPN) and segment routing.

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Line card types

88-LC0-34H14FH

The Cisco 88-LC0-34H14FH (Figure 1) is a transport-optimized combo line card and provides 34 ports of QSFP-28 and 14 ports of QSFP56-DD (high-density 400G), aggregating to a total bandwidth of 9 Tbps. For additional flexibility, this card supports MACsec on 16 of the 100G ports.



Figure 1.
The 88-LC0-34H14FH, 34x QSFP-28 ports plus 14x QSFP56-DD ports Q200-based transport-optimized line card

88-LC0-36FH

The Cisco 88-LC0-36FH Q200-based transport-optimized line card (Figure 2) provides 36 ports of QSFP56-DD, aggregating to a total bandwidth of 14.4 Tbps.

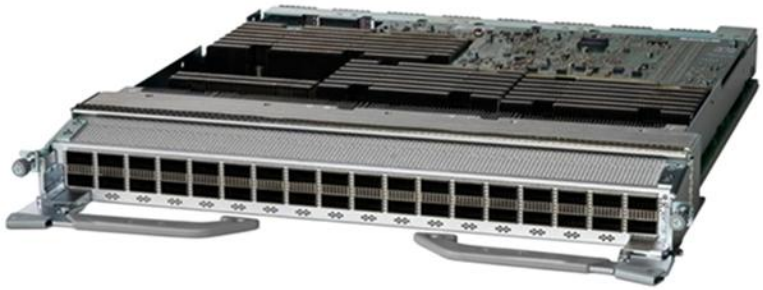


Figure 2.
The 88-LC0-36FH, 36x QSFP56-DD ports Q200-based line card

88-LC0-36FH-M

Like the 88-LC0-36FH, the Cisco 88-LC0-36FH-M is a Q200-based transport-optimized line card (Figure 3) that provides 36 ports of QSFP56-DD aggregating to a total bandwidth of 14.4 Tbps. In addition, all 36x 400G ports support MACsec capability.

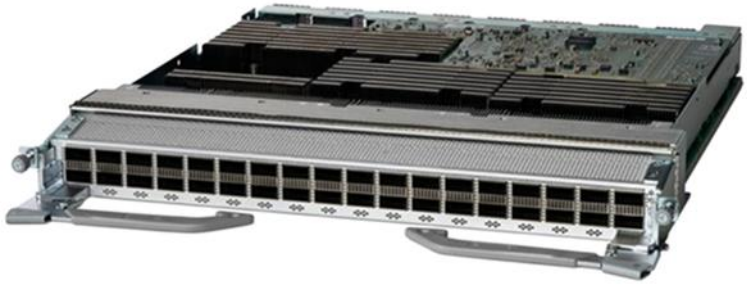


Figure 3.
The 88-LC0-36FH-M, 36x QSFP56-DD ports MACsec line card

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Product specifications

88-LC0-34H14FH

Table 2. Key specifications for the 88-LC0-34H14FH line card

Feature	Specification
Product ID (PID)	88-LC0-34H14FH
Specifications	• 34 ports of QSFP28-DD plus 14 ports of QSFP56-DD • 9 Tbps capacity • 4-core Intel® CPU, 32-GB DRAM, 128-GB SSD • Supports Class B timing • Supports DCO optics on all ports • Breakout support 4x100G • MACsec support on 16 ports
Physical specifications	• Height: 5.334 cm (2.10 in.) • Width: 45.974 cm (18.10 in.) • Length: 45.242 cm (17.812 in.) • Weight: 11.1 kg (24.471 lb)

88-LC0-36FH

Table 3. Key specifications for the 88-LC0-36FH line card

Features	Specification
Product ID (PID)	88-LC0-36FH
Specifications	• 36 ports of QSFP56-DD • 14.4 Tbps capacity • 4-core Intel CPU, 32-GB DRAM, 128-GB SSD • Supports Class B timing • Supports DCO optics on all ports • Requires 8 fabric cards for N + 1 redundancy
Physical specifications	• Height: 5.334 cm (2.10 in.) • Width: 45.974 cm (18.10 in.) • Length: 45.242 cm (17.812 in.) • Weight: 12.3 kg (27 lb)

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88-LC0-36FH-M

Table 4. Key specifications for the 88-LC0-36FH-M line card

Feature	Specification
Product ID	88-LC0-36FH-M
Specifications	• 36 ports of QSFP56-DD • 14.4 Tbps capacity • 4-core Intel CPU, 32-GB DRAM, 128-GB SSD • Supports MACsec on all 36 ports • Supports Class B timing • Supports DCO optics on all ports • Requires 8 fabric cards for N + 1 redundancy
Physical specifications	• Height: 5.334 cm (2.10 in.) • Width: 45.974 cm (18.10 in.) • Length: 45.242 cm (17.812 in.) • Weight: 14.2 kg (31.3 lb)

Compatibility

The Q200 line cards are supported by both the Cisco 8800 Route Processor (8800-RP) and the Cisco 8800 Route Processor 2 (8800-RP2) and all three generations of fabric cards: 88xx-FC, 88xx-FC0, and 88xx-FC1.

The Q200 line cards can coexist with all Q100 line cards and the 88-LC1-36EH P100 line card in the same chassis.

Environmental properties

Table 5. Environmental properties for the 88-LC0-34H14FH, 88-LC0-36FH, and 88-LC0-36FH-M line cards

Property	
Operating temperature	0° to 40°C (32° to 104°F)
Nonoperating(storage) temperature	-40° to 70°C (-40° to 158°F)
Operating humidity	5% to 95% +- 2%
Storage (relative) humidity	5% to 95% +- 2%
Altitude	0 to 3000m

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Regulatory and safety compliance

Table 6. Regulatory and safety compliance

Regulatory compliance	Regulatory compliance statement: Products comply with CE markings according to directives 2014/30/EU and 2014/35/EU
Safety	Safety (confirm with Safety Engr) AS/NZS 62368-1, 3rd edition CAN/CSA C22.2 No. 62368-1, 3rd edition EN 62368-1, 3rd edition GB 4943-2022 (IEC 62368-1, 3rd edition) EC 62368-1, 3rd edition with all country deviations UL 62368-1, 3rd edition UL 60950-1, 2nd edition (NRTL only)
EMC standards	EMC (Confirm with EMC design engr) Emissions: CISPR32 EN 55032 EN 61000-3-3 EN IEC 61000-3-2 EN 300 386 V2.1.23 47 CFR FCC Part 15 ICES-003 Issue 7 KS C 9832 KS C 9610-3-2 KS C 9610-3-3 VCCI-CISPR 32 CNS 15936 QCVN 118/BTTTT TEC 11016:2016_TEC/SD/DD/EMC-221/05/OCT-16
EMC immunity	CISPR35 EN 55035 EN IEC 61000-6-1 EN IEC 61000-6-2 EN 300 386 V2.1.23 KS C 9835 TCVN 7317 TEC 11016:2016_TEC/SD/DD/EMC-221/05/OCT-16

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Regulatory compliance	Regulatory compliance statement: Products comply with CE markings according to directives 2014/30/EU and 2014/35/EU
Restriction of Hazardous Substances	The product is RoHS 6 compliant with exceptions for leaded Ball Grid Array (BGA) balls and lead press fit connectors.

Hardware ordering information

Table 7. Hardware ordering information

Hardware PIDs	Product description
88-LC0-34H14FH	Cisco 8800 48x 100G or 34x 100G + 14x 400G QSFP28-DD line card
88-LC0-36FH	Cisco 8800 36x 400G QSFP56-DD line card
88-LC0-36FH-M	Cisco 8800 36x 400G QSFP56-DD line card–MACsec

Software ordering information

Table 8. Software ordering information

Software PIDs	Product description
ESS-CA-100G-SIA-3	Core/Aggr Essential SIA 3 yr term/100G for Cisco 8000 series
ESS-CA-100G-SIA-5	Core/Aggr Essential SIA 5 yr term/100G for Cisco 8000 series
ADN-CA-100G-SIA-3	Core/Aggr Advantage SIA 3 yr term/100G for Cisco 8000 series
ADN-CA-100G-SIA-5	Core/Aggr Advantage SIA 5 yr term/100G for Cisco 8000 series
ESS-CA-400G-SIA-3	Core/Aggr Essential SIA 3 yr term/400G for Cisco 8000 series
ESS-CA-400G-SIA-5	Core/Aggr Essential SIA 5 yr term/400G for Cisco 8000 series
ADN-CA-400G-SIA-3	Core/Aggr Advantage SIA 3 yr term/400G for Cisco 8000 series
ADN-CA-400G-SIA-5	Core/Aggr Advantage SIA 5 yr term/400G for Cisco 8000 series
ESS-CA-100G-RTU-2	Core & Agg Essential Right-to-Use 100G for Cisco 8000 series
ADN-CA-100G-RTU-2	Core & Agg Advantage Right-to-Use 100G for Cisco 8000 series
ESS-CA-400G-RTU-2	Core & Agg Essential Right-to-Use 400G for Cisco 8000 series
ADN-CA-400G-RTU-2	Core & Agg Advantage Right-to-Use 400G for Cisco 8000 series

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Warranty information

Cisco hardware is backed by a limited warranty. For details, please visit the Cisco Warranty Finder.

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.

Table 9. References to key environmental sustainability topics

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

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.

Product sustainability

Information about Cisco's Environmental, Social, and Governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability reporting.

Table 10. References to product sustainability topics

Sustainability Topic		Reference
General	Information on product takeback and reuse program	Cisco Takeback and Reuse Program
	Sustainability inquiries	Contact: csr_inquiries@cisco.com
Material	Product packaging weight and materials	Contact: environment@cisco.com

Service and support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco 8000 Series Q200-based line cards. These innovative Cisco Services offerings are delivered through a unique combination of people, processes, tools, and partners, and they are focused on helping you increase operating efficiency and improve your network.

Cisco Advanced Services uses an architecture-led approach to help you align your network infrastructure with your business goals and achieve long-term value.

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Cisco Software Support offers the Cisco Smart Net Total Care® Service, which helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning technical support coverage and maintenance releases for the Essentials and Advantage Software Suites. This support helps to keep your systems and your business running smoothly. Software Support is a required purchase with the Software Innovation Access (SIA) feature upgrade licenses.

Cisco SP Base provides device-level support and helps reduce downtime with fast, expert technical support and flexible hardware coverage provided by the Cisco Technical Assistance Center (TAC). With this service, you can take advantage of the Cisco Smart Call Home service, which offers proactive diagnostics and real-time alerts on your hardware.

Spanning the entire network lifecycle, Cisco Services offerings help increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise.

For information on services for the Cisco 8800 Series Q200-based line cards, contact your Cisco sales representative. For an overview of all offers, visit Cisco Services for Service Providers.

Cisco Licensing

Cisco Licensing is a flexible and secure licensing model that provides you with an easier, faster, and more consistent way to purchase, activate, manage, renew, and upgrade software products across the Cisco portfolio and across your organization. And it's secure—you control what users can access. With Cisco Licensing you get:

- **Easy activation**. Cisco Licensing establishes a pool of software licenses that can be used across the entire organization—no more PAKs (product activation keys).
- **Unified management**. Cisco License Central (CLC) provides a complete view into all your Cisco products and services in an easy-to-use portal, so you always know what you have and what you are using.
- **License flexibility**. Your software is not node-locked to your hardware, so you can easily use and transfer licenses as needed.

To use Smart Licensing, you must first set up a Smart Account on Cisco License Central.

For a more detailed overview on Cisco Licensing, visit the Licensing Hub.

The IOS XR Flexible Consumption Model (FCM) requires Cisco Licensing registration and license usage reporting. A customer network under the IOS XR FCM is considered compliant if the FCM-enabled devices in the customer's network are registered to Cisco Licensing and are reporting the usage.

Cisco Licensing greatly simplifies the operational overhead associated with license and device experience management for customers.

A successful registration and reporting to Cisco Licensing is essential to take advantage of all the benefits of SIA in FCM. All customers that are upgrading to IOS XR 7.4.x from 7.3.x will lose the right to software innovation and upgrades if the FCM device installation base does not register to an account on Cisco Software Central and report usage.

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