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Cisco Nexus 9800 Series Switches

Contents

Cisco Nexus® 9800 Series Switches provide high-density 400G solutions in a chassis designed for future transition to high-density 800G and higher speeds.

Product overview

The Cisco Nexus 9800 Series modular switches expand the Cisco Nexus 9000 Series portfolio with a new chassis that supports very high-speed and port-density line cards.

Data centers continue to evolve to support next-generation applications and high performance compute workloads that drive massive growth in intra-data-center traffic. Furthermore, the rapid increase in Artificial Intelligence and Machine Learning (AI/ML) workloads have challenged data-center fabrics to support faster job completion times to minimize idle time for the compute nodes. To support this growth, data-center operators require scalable, high-capacity, high-speed, and highly efficient switches.

The Cisco Nexus 9800 Series chassis architecture can scale from 57 Tbps to 115 Tbps with a combination of various first-generation line cards and fabric modules. Each line card slot in the chassis can support line cards that offer 400GE or 100GE ports now and higher speeds in the future.

The design of the Cisco Nexus 9800 Series chassis is a significant improvement on the previous-generation modular chassis design, with better power distribution and connectors, fans, and a thermal design that allow the chassis to scale up to higher Ethernet speed line cards and fabric modules in the future. These design principles allow the doubling of total system capacity with next-generation line cards and fabric modules that support higher speed ports such as 800G at the same port density per slot as that of current-generation line cards.

The Cisco Nexus 9800 Series Switch line cards and fabric modules are built with power-efficient, high-performance, and high-capacity Cisco® ASICs that support dynamic flowlet load balancing, fully shared on-die packet buffering, and line-rate performance for small packets. The Cisco ASIC also has built-in ingress Virtual Output Queueing (VOQ) capabilities that provide the basis for faster job completion times, which is critical for AI/ML fabrics. The ASIC provides these capabilities without compromising on data-center spine/super-spine features, making the Cisco Nexus 9800 Series Switches an optimized platform to build fabrics that can support high-bandwidth applications and compute-intensive AI/ML workloads across data centers of varying sizes and scales.

The fabric capacity in a Cisco Nexus 9800 Series chassis is delivered by up to eight fabric modules with n+1 fabric module redundancy. Varying the number of fabric modules allows the chassis to provide fabric module redundancy and sufficient line-rate capacity for line cards with different port speeds and port densities.

Furthermore, the chassis architecture supports control-plane redundancy with dual supervisors, data-plane redundancy with up to eight fabric modules, fan-tray redundancy with four fan trays, and power-supply redundancy with up to 12 high-efficiency power supplies.

Moreover, the high capacity and port density of the Cisco Nexus 9800 Series Switches enable data-center fabrics to scale up even while keeping the required number of spines lower. This results in lower overall infrastructure costs and higher overall power efficiency across the data center.

The Cisco Nexus 9800 Series has two chassis models:

1. The Cisco Nexus 9800 8-slot chassis which supports eight line card slots and three power-supply trays.

2. The Cisco 9800 4-slot chassis, which supports four line-card slots and two power-supply trays.

Figure 1.
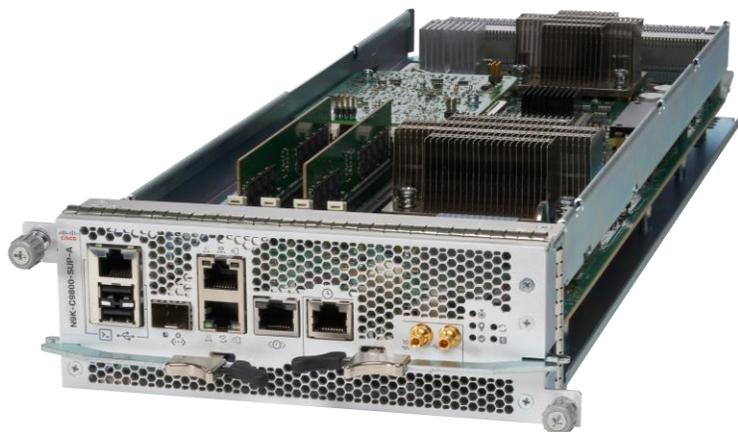Cisco Nexus 9800 8-slot chassis and 4-slot chassis

Figure 2.
Cisco Nexus 9800 supervisor (1st Generation)

The Cisco Nexus 9800 Series supports a 36-port 400G QSFP-DD line card. The QSFP-DD ports are also backward compatible with QSFP28 and QSFP+ modules. This line card provides up to 14.4 Tbps capacity with at least seven fabric modules. If the chassis is configured with eight fabric modules, the chassis would provide 7+1 fabric module redundancy to this line card. This line card also supports line rate MACsec encryption on all ports. Furthermore, each 400G port also supports 2x 100G, 4x 100, 4x 25, and 4x 10G breakout options.
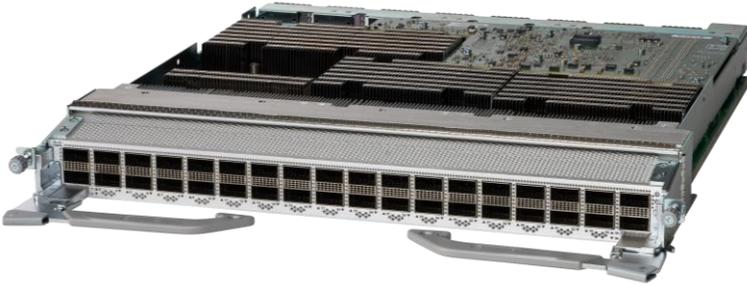
Figure 3.
Cisco Nexus 9800 36-port QSFP-DD 400G line card with MACsec

The Cisco Nexus 9800 Series supports a 14-port 400G QSFP-DD + 34-port QSFP28 100G line card. The QSFP-DD ports are also backward compatible with QSFP28 and QSFP+ modules. This line card provides up to 9 Tbps capacity with at least seven fabric modules. If the chassis is configured with eight fabric modules, the chassis would provide 7+1 fabric-module redundancy to this line card. This line card also supports line-rate MACsec encryption on 16 QSFP28 100G ports. Furthermore, each 400G port also supports 2x 100G, 4x 100, 4x 25, and 4x 10G breakout options. This card also offers the flexibility to be operated in 100G only mode with just 4 fabric modules, enabling better power efficiency.

Figure 4.
Cisco Nexus 9800 14-port QSFP-DD 400G + 34-port QSFP28 100G line card

The following table provides the line card specifications:

Feature	Nexus 9800 36-port 400G Line Card N9K-X9836DM-A	Nexus 9800 34-port 100G + 14-port 400G Line Card N9K-X98900CD-A
400G Ports	36 QSFP-DD	14 QSFP-DD
100G Ports	0	34 QSFP28
Bandwidth	14.4Tbps	9Tbps
Performance	9.374 Bpps	5.858 Bpps
Packet Buffer	324MB + 24GB	216MB + 16GB
MACsec	Yes (all ports)	Yes (16 QSFP28 ports - top row)

The following table shows the interoperability between the line cards, fabric module, and the supervisor:

Nexus 9800 Line Cards and Fabric Modules	Nexus 9800 8-slot Fabric Module N9K-C9808-FM-A	Nexus 9800 4-slot Fabric Module N9K-C9804-FM-A	Nexus 9800 Supervisor N9K-C9800-SUP-A
N9K-X9836DM-A	Yes	Yes	Yes
N9K-X98900CD-A	Yes	Yes	Yes
N9K-C9808-FM-A	Yes	No	Yes
N9K-C9804-FM-A	No	Yes	Yes

The following table shows the minimum number of fabric modules required for line-rate operation:

Nexus 9800 Line Cards	Nexus 9800 8-slot Fabric Module N9K-C9808-FM-A	Nexus 9800 4-slot Fabric Module N9K-C9804-FM-A
N9K-X9836DM-A	7	7
N9K-X98900CD-A (400G mode)	7	7
N9K-X98900CD-A (100G mode)	4	4

The Cisco Nexus 9800 Series Switches support dual-input, high-power, and high-efficiency power supplies for AC, DC, and high-voltage AC/DC power inputs.

Prominent feature

High-speed/high-density connectivity

Cisco Nexus 9800 Series Switches support line cards and fabric modules that provide 36 400G ports or 48 100G ports per slot. The advanced chassis design lays the foundation to support higher-capacity ASICs and higher-power optics in the future. This enables the chassis to support port speeds higher than 400G in the future.

System redundancy

Cisco Nexus 9800 Series Switches can scale up to 115.2 Tbps capacity with current-generation line cards. At this scale and capacity, system redundancy is a critical factor to protect the switch and the fabric in the event of even extremely rare failures. Cisco Nexus 9800 Series Switches provide n+1 redundancy for not only the supervisor, power supply, and fan trays but also the fabric modules, which makes the Cisco Nexus 9800 Series Switches the most reliable switches for data-center spine or super-spine use cases.

Buffering

Cisco Nexus 9800 Series Switches support a fully shared buffer-memory architecture that allows the switch to absorb bursts up to the available shared memory size. This shared buffer-memory architecture also improves power efficiency by minimizing the number of read/write operations to process packets. In addition to this, the Cisco Nexus 9800 Series also supports hybrid HBM, which dynamically handles even larger flows that could cause temporary congestion. The combination of a hybrid HBM with a fully shared buffer allows Cisco Nexus 9800 Series systems to achieve an effective buffer size much larger than the alternatives.

Power efficiency

Cisco Nexus 9800 Series Switches enhance power efficiency by minimizing the number of power conversions within the chassis. A single system busbar distributes power to all cards and modules within the chassis. The dual input high-capacity hot-swappable power supplies provide enhanced power redundancy and added power efficiency.

Scalability

IPv4 unicast routes up to 1M.

IPv6 unicast routes up to 250K.

IPv4 host routes up to 256K.

IPv6 host routes up to 62K.

Licensing

Cisco Nexus 9800 Series Switches require Cisco Data Center Networking (DCN) Premier, Advantage, or Essentials licenses for appropriate features. Certain features such as MACsec require add-on licenses such as a DCN security license.

Product sustainability

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

Sustainability topic		Reference
General	Information on product-material-content laws and regulations	[Materials](#)
	Information on electronic waste laws and regulations, including our products, batteries, and packaging	[WEEE Compliance](#)
	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

Product specifications

Table 1. Cisco Nexus 9800 Series chassis specifications

Description	Cisco Nexus 9808 Switch	Cisco Nexus 9804 Switch
Number of line-card slots	8	4
Number of fabric-module slots	8	8
Number of supervisor slots	2	2
Number of fan trays	4	4
Number of power-supply trays	3	2
Number of power supplies	AC and high-voltage power supplies: 9 (3 per tray) DC power supplies: 12 (4 per tray)	AC and high-voltage power supplies: 9 (3 per tray) DC power supplies: 12 (4 per tray)
Weight	Unloaded: 162 lbs (73 kg) Fully loaded: 658 lbs (299 kg)	Unloaded, 124 lbs (56.36 kg) Fully loaded, 402 lbs (183 kg)
Dimensions	(H) 28 x (W) 17.45 x (D) 33.73 in. (71.12 x 44.32 x 85.7 cm)	(H) 17.5 x (W) 17.45 x (D) 33 in. (44.45 x 44.32 x 83.82 cm)
Height	16 RU	10 RU

Ordering information

Table 2. Ordering information

Product ID	Description
N9K-C9808	Cisco Nexus 9800 8-slot chassis
N9K-C9800-SUP-A	Cisco Nexus 9800 supervisor (1st Generation)
N9K-C9808-FM-A	Cisco Nexus 9800 8-slot chassis fabric module (1st Generation)
N9K-C9808-FAN-A	Cisco Nexus 9800 8-slot chassis fan tray (1st Generation)
N9K-C9804	Cisco Nexus 9800 4-slot chassis
N9K-C9804-FM-A	Cisco Nexus 9800 4-slot chassis fabric module (1st Generation)
N9K-C9804-FAN-A	Cisco Nexus 9800 4-slot chassis fan tray (1st Generation)
N9K-X9836DM-A	Cisco Nexus 9800 36-port 400G line card with MACsec
N9K-X98900CD-A	Cisco Nexus 9800 14-port 400G + 34-port 100G line card

Product ID	Description
N9800-HV-TRAY	Cisco Nexus 9800 power-supply tray for AC and HV power supplies
NXK-HV6.3KW20A-A	Cisco Nexus 9800 6300W 20A AC and HV power supply
NXK-HV6.3KW30A-A	Cisco Nexus 9800 6300W 30A AC and HV power supply
N9K-C9800-IN-KIT	Cisco Nexus 9800 installation kit
N9K-C9800-AR-KIT	Cisco Nexus 9800 adjustable-rail kit
N9K-C9800-CM-KIT	Cisco Nexus 9800 cable-management kit
N9K-C9800-DF-KIT	Cisco Nexus 9800 door and filter kit
N9K-C9800-RMB	Cisco Nexus 9800 rear-mounting brackets

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