

# Cisco N9800 Series Switches

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Cisco N9800 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 N9800 Series modular switches expand the Cisco N9000 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 N9800 Series chassis architecture can scale up to 230.4 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 800GE, 400GE, or 100GE ports now and higher speeds in the future.

The design of the Cisco N9800 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 N9800 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 N9800 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 N9800 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 N9800 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 N9800 Series Switches have two chassis models:

1. Cisco N9800 8-slot chassis, which supports 8 line cards and three power-supply trays
2. Cisco N9800 4-slot chassis, which supports 4 line-cards and two power-supply trays



Figure 1. Cisco N9800 8-slot chassis and 4-slot chassis

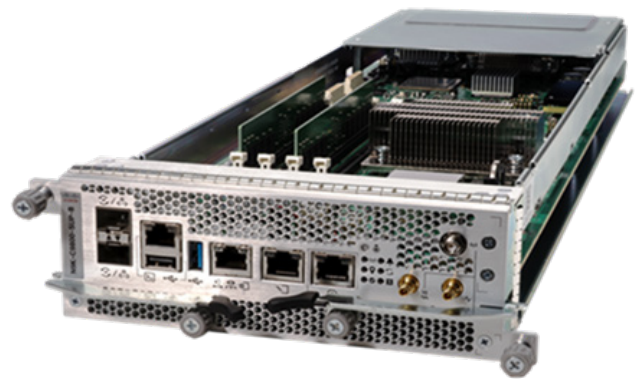


Figure 2. Cisco N9800 supervisor (2nd Generation)

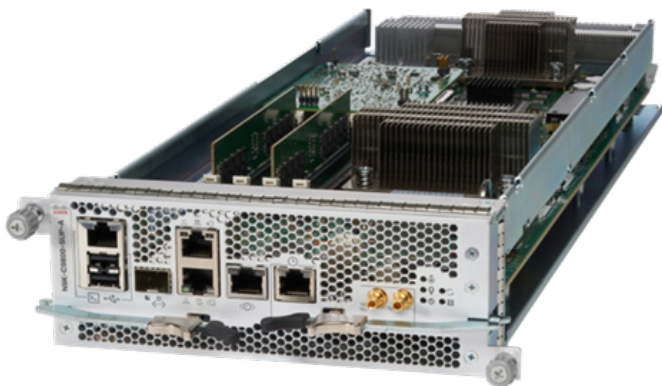


Figure 3. Cisco N9800 supervisor (1<sup>st</sup> Generation)

The Cisco N9800 Series Switches support a 36-port 800G OSFP ports line card. This line card provides up to 28.8 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 for this line card. This line card also supports line-rate MACsec encryption on all ports. Furthermore, each 800G port also supports 2x 400G, 4x 200G, and 8x 100G breakout options.



Figure 4. Cisco N9800 36-port QSFP-DD 800G line card with MACsec

The Cisco N9800 Series Switches support 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.

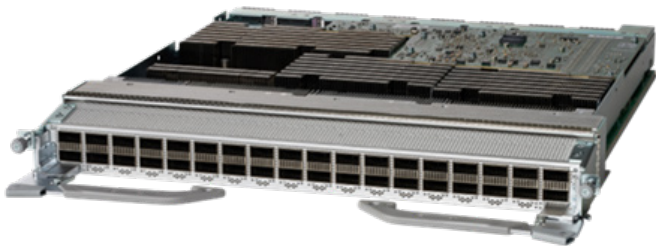


Figure 5. Cisco N9800 36-port QSFP-DD 400G line card with MACsec

The Cisco N9800 Series Switches support 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.

Table 1. Line-card specifications

Feature	N9800 36-port 800G Line Card N9K-X9836E-SP2R-O	N9800 36-port 400G Line Card N9K-X9836DM-A	N9800 34-port 100G + 14-port 400G Line Card N9K-X98900CD-A
<b>800G ports</b>	36 OSFP		
<b>400G ports</b>		36 QSFP-DD	14 QSFP-DD
<b>100G ports</b>		0	34 QSFP28
<b>Bandwidth</b>	28.8 Tbps	14.4 Tbps	9 Tbps
<b>Performance</b>		9.374 Bpps	5.858 Bpps
<b>Packet buffer</b>	288 MB + 32 GB	324 MB + 24 GB	216 MB + 16 GB
<b>MACsec</b>	Yes (all ports)	Yes (all ports)	Yes (16 QSFP28 ports - top row)

Table 2 shows the interoperability between the line cards, fabric module, and the supervisor:

Table 2. Line-card, fabric-module, and supervisor interoperability

Cisco N9800 line card and fabric module	Cisco N9800 8-slot fabric module N9K-C9808-FM-A	Cisco N9800 8-slot fabric module N9K-C9808-FM-B	Cisco N9800 4-slot fabric module N9K-C9804-FM-A	Cisco N9800 supervisor N9K-C9800-SUP-A	Cisco N9800 supervisor N9K-C9800-SUP-B
<b>N9K-X9836E-SP2R-O</b>	No	Yes	No	No	Yes
<b>N9K-X9836DM-A</b>	Yes	Yes	Yes	Yes	Yes
<b>N9K-X98900CD-A</b>	Yes	Yes	Yes	Yes	Yes

Table 3 shows the minimum number of fabric modules required for line-rate operation.

Table 3. Minimum number of fabric modules required for line-rate operation

Cisco N9800 line card	Cisco N9800 8-slot fabric module N9K-C9808-FM-A	Cisco N9800 8-slot fabric module N9K-C9808-FM-B	Cisco N9800 4-slot fabric module N9K-C9804-FM-A
<b>N9K-X9836E-SP2R-O</b>	N/A	7	N/A
<b>N9K-X9836DM-A</b>	7	7	7
<b>N9K-X98900CD-A (400G mode)</b>	7	7	7
<b>N9K-X98900CD-A (100G mode)</b>	4	4	4

The Cisco N9800 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 N9800 Series Switches support line cards and fabric modules that provide up to 36 ports of 800G per slot. The advanced chassis design lays the foundation to support higher-capacity ASICs and higher-power optics in the future.

### System redundancy

Cisco N9800 Series Switches can scale up to 230.4 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 N9800 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 N9800 Series Switches the most reliable switches for data-center spine or super-spine use cases.

### Buffering

Cisco N9800 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 N9800 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 N9800 Series systems to achieve an effective buffer size much larger than the alternatives.

## Power efficiency

Cisco N9800 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

Cisco N9800 Series Switches provide the following scalability options:

- IPv4 unicast routes up to 1M
- IPv6 unicast routes up to 500K
- IPv4 host routes up to 96K
- IPv6 host routes up to 96K

## Product specifications

Table 4. Cisco N9800 Series chassis specifications

Description	Cisco N9808 switch	Cisco N9804 switch
<b>Number of line-card slots</b>	8	4
<b>Number of fabric-module slots</b>	8	8
<b>Number of supervisor slots</b>	2	2
<b>Number of fan trays</b>	4	4
<b>Number of power-supply trays</b>	3	2
<b>Number of power supplies</b>	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)
<b>Weight</b>	Unloaded: 162 lbs (73 kg) Fully loaded: 766 lbs (347 kg)	Unloaded: 124 lbs (56.36 kg) Fully loaded: 402 lbs (183 kg)
<b>Dimensions</b>	(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)
<b>Height</b>	16 RU	10 RU

## Licensing

Cisco N9800 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
<b>General</b>	Information on product-material-content laws and regulations	<a href="#">Materials</a>
	Information on electronic waste laws and regulations, including our products, batteries, and packaging	<a href="#">WEEE Compliance</a>
	Information on product takeback and reuse program	<a href="#">Cisco Takeback and Reuse Program</a>
	Sustainability inquiries	Contact: <a href="mailto:csr_inquiries@cisco.com">csr_inquiries@cisco.com</a>
<b>Material</b>	Product packaging weight and materials	Contact: <a href="mailto:environment@cisco.com">environment@cisco.com</a>

## Ordering information

Table 5. Ordering information

Product ID	Description
<b>N9K-C9808</b>	Cisco N9800 8-slot chassis
<b>N9K-C9800-SUP-A</b>	Cisco N9800 supervisor (1 <sup>st</sup> Generation)
<b>N9K-C9800-SUP-B</b>	Cisco N9800 supervisor (2 <sup>nd</sup> Generation)
<b>N9K-C9808-FM-A</b>	Cisco N9800 8-slot chassis fabric module (1 <sup>st</sup> Generation)
<b>N9K-C9808-FM-B</b>	Cisco N9800 8-slot chassis fabric module (2 <sup>nd</sup> Generation)

Product ID	Description
<b>N9K-C9808-FAN-A</b>	Cisco N9800 8-slot chassis fan tray (1 <sup>st</sup> Generation)
<b>N9K-C9808-FAN-B</b>	Cisco N9800 8-slot chassis fan tray (2 <sup>nd</sup> Generation)
<b>N9K-C9804</b>	Cisco N9800 4-slot chassis
<b>N9K-C9804-FM-A</b>	Cisco N9800 4-slot chassis fabric module (1 <sup>st</sup> Generation)
<b>N9K-C9804-FAN-A</b>	Cisco N9800 4-slot chassis fan tray (1 <sup>st</sup> Generation)
<b>N9K-X9836E-SP2R-O</b>	Cisco N9800 36-port 800G line card with MACsec
<b>N9K-X9836DM-A</b>	Cisco N9800 36-port 400G line card with MACsec
<b>N9K-X98900CD-A</b>	Cisco N9800 14-port 400G + 34-port 100G line card
<b>N9800-HV-TRAY</b>	Cisco N9800 power-supply tray for AC and HV power supplies
<b>NXK-HV6.3KW20A-A</b>	Cisco N9800 6300W 20A AC and HV power supply
<b>NXK-HV6.3KW30A-A</b>	Cisco N9800 6300W 30A AC and HV power supply
<b>N9800-DC-TRAY</b>	Cisco N9800 power tray for 48V 60A DC power supply
<b>NXK-DC-4.4KW-A</b>	Cisco N9800 DC power supply
<b>NXK-HV-BLANK</b>	Cisco N9800 AC/HV power supply slot cover
<b>N9K-C9800-IN-KIT</b>	Cisco N9800 installation kit
<b>N9800-ADJ-RAIL</b>	Cisco N9800 adjustable-rail kit
<b>N9K-C9808-CM-KIT</b>	Cisco N9800 8-slot chassis cable management kit
<b>N9K-C9808-DF-KIT</b>	Cisco N9800 8-slot chassis door kit
<b>N9K-C9808-RMB</b>	Cisco N9804 rear-mounting brackets
<b>N9K-C9808-PK-KIT</b>	Cisco N9808 packaging kit
<b>N9K-C9804-CM-KIT</b>	Cisco N9800 4-slot chassis cable management kit

Product ID	Description
<b>N9K-C9804-DF-KIT</b>	Cisco N9800 4-slot chassis door kit
<b>N9K-C9804-RMB</b>	Cisco N9800 4-slot chassis rear-mounting brackets
<b>N9K-C9804-PK-KIT</b>	Cisco N9804 packaging kit
<b>N9K-C9808-FM-CV</b>	Cisco N9800 8-slot chassis fabric module slot cover
<b>N9K-C9804-FM-CV</b>	Cisco N9804 fabric module slot cover
<b>N9K-C9800-SUP-CV</b>	Cisco N9800 supervisor slot cover
<b>N9K-X9800-LC-CV</b>	Cisco N9800 line card slot cover

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## Document history

New or revised topic	Described in	Date
<b>Added accessories and DC power supply Product IDs</b>	Ordering Information	March 12, 2024
<b>Added supervisor (2<sup>nd</sup> Generation)</b>	Where applicable	October, 2025
<b>Added new 800G line card, supported fabric module, fan tray and additional technical updates</b>	Where applicable	April, 2026