

Cisco Network Convergence System 5500 Series: 400GE Line Cards

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The new generation of Cisco NCS 5500 line cards increases forwarding capacity of NCS 5500 by 2.7 times to a maximum of 153.6 Tbps per system.

Product Overview

Based on the Cisco® Global Cloud Index, digitalization is projected to grow global data center and public/private cloud network traffic more than 25 percent annually, resulting in a threefold increase by 2019. To help network providers meet these challenges, the Cisco Network Convergence System 5500 Series is built with features such as extremely high port densities, deep packet buffering, and forwarding hardware optimized for these types of deployments.

The Cisco NCS 5500 Series modular chassis provides a wide variety of line cards to address customer needs to use flexible interfaces and port densities, along with full bandwidth utilization of the forwarding ASIC. The next generation of line cards to be introduced during the second half of calendar year 2019 will provide the capability for dense 400G interface ports with QSFP-DD optics on line cards, thus providing operators with readiness for mass-scale networking.

The next generation consists of two line cards: the base version and the scale (SE) version, which can support enhanced configuration needs with expanded Forwarding Information Base (FIB), Quality of Service (QoS), Access Control Lists (ACL), and so on. These line cards are capable of advanced packet forwarding, segment routing, programmable network management, and telemetry, along with the robust and mature features already present in 64-bit Cisco IOS® XR Software. Note that the new version of these line cards require the second-generation fabric cards and fan trays for [NCS 5500 modular chassis](#) to be installed on the system.

The Cisco NC55-24D line card (Figure 1) provides 24 ports of 400 GE, providing a total bandwidth of 9.6 Tbps. This line card uses QSFP28 / QSFP+ / QSFP-DD transceivers and is to be used in any of the NCS 5500 series of modular chassis.



Figure 1.
Cisco NCS 5500 Series 24-port 400 GE Base Line Card

The second line card provides an enhanced scale version which improves the FIB scale capabilities by eight times when compared with the base version of the line card. The Cisco NC55-18D12TH-SE (Figure 2) provides 18 ports of 400 GE or 30 ports of 200 GE/100 GE, and provides up to 7.6 Tbps bandwidth per line card. If the first 18 ports are used in 400 GE mode, the remaining 12 ports will be disabled. Alternately, the line card can be used as all 30 ports in 200 GE or 100 GE mode or as a mix of 100 GE or 200 GE or 400 GE, up to a total of 7.2 Tbps.



Figure 2.
Cisco NCS 5500 Series 18-port 400 GE Scale Line Card

As the QSFP-DD optics have the same mechanical characteristics and cage size as other QSFP optics, the same ports can act as 10 GE, 40 GE, 100 GE, 200 GE, or 400 GE, therefore allowing operators to migrate to 400 GE at their own pace as the need arises. The 400 GE ports will also support 100 GE via breakout of 4x100.

Software Requirements

The previously listed NCS 5500 Series line cards will be supported on the Cisco IOS XR Software Release 7.0.1 or later.

Features and Benefits

Table 1 lists the features and benefits of the NCS 5500 Series line cards. Table 2 shows the features and benefits of the new second-generation fabric cards and fan trays. Table 3 outlines the software feature support for the line cards, Table 4 lists the environmental features, and Table 5 details the regulatory standards compliance.

Table 1. Features and Benefits of Cisco NCS 5500 Series 400G Line Cards (Cisco IOS XR Software 7.0.1 or later)

| Feature | Specification |
|--|--|
| Integrated interface | 400 GE, 200 GE, 100 GE, 40 GE support. 4x100G breakout supported. |
| Industry-leading, carrier-class Cisco IOS® XR Software | Visibility and telemetry Machine-to-machine interface Application hosting Flexible platform and packaging Modularity Automation |
| Management ports | Provides easy access to system console |
| External USB port | Helps simplify image and file management |
| Embedded USB (eUSB) storage | Flash memory devices for storing software image, configuration, logging, and recovery |
| Power consumption | Ultra-low power per Gigabit Ethernet |
| Redundancy | Redundant fan tray Redundant AC or DC power supply |

Table 2. Features and Benefits of the NCS 5500 Second-Generation Fabric Cards and Fan Trays

| Feature | Specification | |
|------------------|---|--|
| Product ID (PID) | NC55-24D | NC55-18D12TH-SE |
| Specifications | <ul style="list-style-type: none"> 24 ports 400 Gigabit Ethernet 2 forwarding ASICs | <ul style="list-style-type: none"> 18 ports 400 Gigabit Ethernet or 30 ports 200/100 Gigabit Ethernet |

| Feature | Specification | |
|--------------------------------|--|---|
| | <ul style="list-style-type: none"> FIB scale up to 2M IPv4 or to 1M IPv6 routes (unidimensional figures that are to increase with future Cisco IOS XR releases) On-chip tables for 750K MAC and labels On-chip Ternary Content-Addressable Memory (TCAM) for network Access Control Lists (ACL) and Quality of Service (QoS) Supports SyncE and IEEE1588 PTP in combination with route processor NC55-RP-E | <ul style="list-style-type: none"> 2 forwarding ASICs FIB scale up to 4M IPv4 or to 2M IPv6 routes (unidimensional figures that are to increase with future Cisco IOS XR releases) On-chip tables for 750K MAC and labels On-chip Ternary Content-Addressable Memory (TCAM) for network ACLs and QoS Supports SyncE and IEEE1588 PTP in combination with route processor NC55-RP-E |
| Power consumption | Typical: 1250 watts Maximum: 1400 watts | Typical: 1300 watts Maximum: 1500 watts |
| Physical specifications | Height: 1.69 in (4.27 cm) Width: 16.89 in (42.9 cm) Depth: 17.89 in (43.32 cm) Weight: 18.25 lbs (8.57 kg) without optics | Height: 1.69 in (4.27 cm) Width: 16.89 in (42.9 cm) Depth: 17.89 in (43.32 cm) Weight: 18.9 lbs (8.57 kg) without optics |

Table 3. Software Feature Support on NCS 5500 Modular Chassis in Cisco IOS XR Software 6.3.1 Release or Beyond

Note: The list of supported features is not exhaustive, and some features are supported in later software releases.

| Description | Specification |
|----------------|---|
| Layer 2 | <ul style="list-style-type: none"> Layer 2 switch ports IEEE 802.1Q VLAN encapsulation/Q-in-Q encapsulation IEEE 802.1ad Cisco bundle Ethernet technology (up to 32 ports per Ethernet bundle) Link Aggregation Control Protocol (LACP): IEEE 802.3ad Jumbo frames on all ports (up to 9216 bytes) Layer 2 ingress ACL Layer 2 AC-AC cross-connect Integrated Routing and Bridging (IRB) Ethernet Flow Point (EFP) and VLAN trunks Virtual Router Redundancy Protocol (VRRP) |
| Layer 3 | <ul style="list-style-type: none"> IPv4 and IPv6 unicast Layer 3 interfaces: physical and sub-interfaces Routing protocols: static, Open Shortest Path First (OSPFv2), OSPFv3, Intermediate System to Intermediate System (ISIS), ISISv6, and Border Gateway Protocol (BGP) 64-way equal-cost multipath (ECMP) Layer 3 ingress and egress IPv4 ACL and IPv6 ACL Bidirectional Forwarding Detection (BFD) Cisco bundle Ethernet technology (up to 32 ports per Ethernet bundle) Link Aggregation Control Protocol (LACP): IEEE 802.3ad Jumbo frame support (up to 9216 bytes) Virtual Router Redundancy Protocol (VRRP) Layer 3 Virtual Private Network (L3VPN) |
| MPLS | <ul style="list-style-type: none"> Label switching LDP |

| Description | Specification |
|---------------------------------|--|
| | <ul style="list-style-type: none"> • MPLS traffic engineering • Ethernet over MPLS (EoMPLS) |
| Segment routing | <ul style="list-style-type: none"> • Segment routing–based transport • ISIS extensions to segment routing • OSPF extensions to segment routing • BGP egress peering engineering • Segment Routing Traffic Engineering (SR-TE) • Segment routing Topology Independent Loop-Free Alternatives (TI-LFA) |
| Quality of Service (QoS) | <ul style="list-style-type: none"> • QoS • Ingress classification based on class of service (Layer 2), IP differentiated services code point (Layer 3), IP ACL (Layer 3 / Layer 4), IP precedence (type of service) (Layer 3) • DSCP marking • 8 numbers of queues for user traffic • Support for priority queuing |
| Automation | <ul style="list-style-type: none"> • Zero-Touch Provisioning (ZTP), iPXE • Configuration management • Network Configuration Protocol (NETCONG/YANG model) |
| Security | <ul style="list-style-type: none"> • Provides comprehensive network security features, including ACLs; control-plane protection; management plane protection; routing authentications; Authentication, Authorization, and Accounting (AAA) and Terminal Access Controller Access-Control System Plus (TACACS+); Secure Shell (SSH) Protocol; SNMPv3; and RPL support • Layer 2 ingress ACLs • Layer 3 ingress ACLs • BGP flow spec |
| Management | <ul style="list-style-type: none"> • MIB, XML, JSON, GPB, and SNMP • MPLS OAM (label-switched path [LSP] ping, LSP traceroute) • Ethernet OAM |

Review the [Cisco NCS 5500 Series supported transceivers module matrix](#) for more details.

Table 4. Environmental Properties

| Property | Cisco NCS 5500 Series |
|-------------------------------------|--|
| Operating temperature | 32 to 104°F (0 to 40°C) |
| Non-operating (storage) temperature | -40 to 158°F (-40 to 70°C) |
| Operating humidity | 5% to 95% (noncondensing) Note: Not to exceed 0.024kg water or dry air |
| Storage (relative) humidity | 5% to 95% at 40°C per NEBS GR-63-Core Note: Not to exceed 0.024kg water or dry air |
| Altitude | 0 to 10,000 ft (0 to 3000m) |
| Power inputs | Worldwide ranging AC (90–265V; 50–60 Hz) Worldwide ranging DC (-40V to -72V) |
| Air flow | Front to back |

Table 5 describes regulatory standards compliance information.

Table 5. Regulatory Standards Compliance: Safety and EMC

| Specification | Description |
|---|---|
| Regulatory compliance | Products should comply with CE markings according to directives 2004/108/EC and 2006/95/EC |
| Network Equipment Building Standards (NEBS) | Designed to meet GR-63-CORE and GR-1089-CORE |
| Safety | <ul style="list-style-type: none"> • UL 60950-1 Second Edition • CAN/CSA-C22.2 No. 60950-1 Second Edition • EN 60950-1 Second Edition • IEC 60950-1 Second Edition • AS/NZS 60950-1 • GB4943 |
| EMC standards | <ul style="list-style-type: none"> • 47CFR Part 15 (CFR 47) Class A • AS/NZS CISPR22 Class A • CISPR22 Class A • EN55022 Class A • ICES003 Class A • VCCI Class A • EN61000-3-2 • EN61000-3-3 • KN22 Class A • CNS13438 Class A |

| Specification | Description |
|--|---|
| EMC immunity | <ul style="list-style-type: none"> • EN55024 • CISPR24 • EN300386 • KN 61000-4 series |
| Restriction of Hazardous Substances (RoHS) | The product is RoHS-6 compliant with exceptions for leaded-ball grid-array (BGA) balls and lead press-fit connectors. |

Get additional information related to [NCS 5500 regulatory compliance and safety standards](#).

System Requirements

| | |
|--------------|--|
| Fabric Cards | Requires NCS5500 2 nd generation Fabric cards |
| Fan Trays | Requires NCS5500 2 nd generation Fan trays |

Ordering Information

Table 6. Ordering Information for NCS 5500 Series Line Cards

| Part number | Sub-component | Product description |
|------------------|---------------------|--|
| Hardware | | |
| NC55-24D-BA | | NCS 5500 Series 24 ports of 400 GE base line card bundle |
| | NC55-24D | NCS 5000 Series 24X400 GE base line card |
| | NC55-24D-RTU | NCS 5500 24X400 GE Right to Use License |
| NC55-24D-BA= | | NCS 5500 Series 24 ports of 400 GE base line card spare bundle |
| | NC55-24D | NCS 5000 Series 24X400 GE base line card |
| | NC55-24D-RTU | NCS 5500 24X400 GE Right to Use License |
| NC55-18D12TH-SB | | NCS 5500 Series 18 ports of 400 GE or 30 ports of 200 GE / 100 GE scale line card bundle |
| | NC55-18D12TH-SE | NCS 5500 Series 18 ports of 400 GE or 30 ports of 200 GE / 100 GE scale line card |
| | NC55-18D12TH-SE-RTU | NCS 5500 Series 18 ports of 400 GE or 30 ports of 200 GE / 100 GE Right to Use License |
| NC55-18D12TH-SB= | | NCS 5500 Series 18 ports of 400 GE or 30 ports of 200 GE / 100 GE scale line card spare bundle |
| | NC55-18D12TH-SE | NCS 5500 Series 18 ports of 400 GE or 30 ports of 200 GE / 100 GE scale line card |
| | NC55-18D12TH-SE-RTU | NCS 5500 Series 18 ports of 400 GE or 30 ports of 200 GE / 100 GE Right to Use License |

| Part number | Sub-component | Product description |
|-------------------|---------------|---|
| Software | | |
| XR-NC55-P-07.00 | | Cisco IOS XR Software 7.0.1 Release software image |
| XR-NC55-PK9-07.00 | | Cisco IOS XR Software 7.0.1 Release software crypto image |

Warranty Information

The Cisco NCS 5500 Series has a 1-year limited hardware warranty. The warranty includes hardware replacement with a 10-day turnaround from receipt of a Return Materials Authorization (RMA).

Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco NCS 5500 Series. 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 data center network.

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

Cisco SMARTnet[®] Service helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. With this service, you can take advantage of the Cisco Smart Call Home service, which offers proactive diagnostics and real-time alerts on your Cisco NCS 5500 Series. Spanning the entire network lifecycle, Cisco Services offerings help increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise.

Cisco Capital

Flexible payment solutions to help you achieve your objectives

Cisco Capital makes it easier to get the right technology to achieve your objectives, enable business transformation and help you stay competitive. We can help you reduce the total cost of ownership, conserve capital, and accelerate growth. In more than 100 countries, our flexible payment solutions can help you acquire hardware, software, services and complementary third-party equipment in easy, predictable payments. [Learn more.](#)

For More Information

For more information about the Cisco NCS 5500 Series, visit [Cisco Network Convergence System 5500 Series](#).

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