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Cisco NCS 4200 Series Network Convergence System Interface Modules

Contents

Cisco® NCS 4200 Series Network Convergence System interface modules (Figure 1) are designed to support a wide range of services, speeds, temperature ranges, and rich capabilities. They provide cost-effective delivery of converged circuit emulation, optical transport network, and business Ethernet services.

Product overview

Legacy copper access networks, based on Plesiochronous Digital Hierarchy (PDH), and optical metro networks, based on Synchronous Optical Network (SONET) or Synchronous Digital Hierarchy (SDH) technologies, set the standards for reliability, capacity, and efficiency transporting Time-Division Multiplexing (TDM) traffic and carrying voice and data services. Service providers and carriers are nonetheless faced with many challenges and limitations imposed by these legacy networks and need alternatives for migrating their circuit-switched transport networks to future-proof packet-based networks.

The Cisco NCS 4200 Series Network Convergence Systems address the legacy network inefficiencies by delivering a cost-effective, modular solution based on a protocol-independent fabric architecture. The Cisco NCS 4200 Series, as part of the Cisco Evolved Programmable Network (EPN) architecture, is capable of delivering unbounded scale and unmatched Circuit Emulation (CEM) and Optical Transport Network (OTN) capabilities, in addition to Carrier Ethernet business services, over a redundant and protected packet-based network (Multiprotocol Label Switching [MPLS]/FlexLSP and Segment Routing).

Figure 1.
Selection of Cisco NCS 4200 Series Interface Modules

Features and benefits

Feature	Benefit
Support for TDM and SONET/SDH migration to modernized packet-based optical metro network	Provides cost-effective delivery of circuit emulation (CEM) and Carrier Ethernet (CE) capabilities over a redundant and protected packet-based network (MPLS/FlexLSP/SR).
Metro Carrier Ethernet aggregation	Enables the service flexibility and delivery of Layer 2, Layer 3, IP, and MPLS transport for advanced L2VPN, L3VPN, and multicast services.
Industry-leading, carrier-class Circuit Emulation (CEM) technology	Delivers any-to-any connectivity over a packet-based network (MPLS/Flex LSP) using TDM, PDH, SONET/SDH, and Carrier Ethernet (FE, GE, and 10GE) interfaces.
Next-generation access network with fully distributed and unique packet capabilities	Supports state-of-the-art Pseudowire Emulation Edge-to-Edge (PWE3), Hierarchical Quality of Service (H-QoS), and next-generation IP/MPLS. Cisco's MPLS FlexLSP guarantees resiliency (sub-50 ms switchover time), fault propagation, connectivity verification, statistical multiplexing, and scalability, with RSVP-TE extensions as the control plane for bidirectional tunnel (LSP) setup and programmability for SDN functionality support.
Operation efficiency with end-to-end network management	Supported by the Evolved Programmable Network Manager (EPN-M), which enables business agility and operational efficiencies through automated device operations, fast provisioning, and proactive assurance.
Comprehensive variety of interfaces and protocols	Ethernet interfaces are available in copper and fiber, with speeds ranging from 10 Mbps to 100 Gbps. Legacy interfaces are available in speeds ranging from nxDS0 to OC-192/STM-64 for Plesiochronous Digital Hierarchy (PDH), Synchronous Digital Hierarchy (SDH), and Synchronous Optical Network (SONET). Optical Transport Network (OTN) wrapping functionalities are also supported.

Ethernet interface modules

Cisco NCS 4200 Series Ethernet interface modules are designed to give customers a high degree of flexibility and value. All Ethernet interface modules share a common core that supports time stamping on the module for Y.1731 Operations, Administration, and Maintenance (OAM) delay measurement functions to achieve precise results for one-way and two-way delay measurement. The modules also provide time-stamping functions for the IEEE 1588-2008 protocol. These time stamps help ensure that NCS 4200 Series systems achieve outstanding results when deploying IEEE 1588-2008 protocols for frequency and phase synchronization. Not all customers will deploy IEEE 1588-2008 for synchronization. Therefore, the Ethernet interface modules also support input and output frequency synchronization using Synchronous Ethernet (SyncE).

All NCS 4200 Series Ethernet interface modules support Online Insertion and Removal (OIR), which contributes to a higher uptime for NCS 4200 Series systems.

Cisco NCS 4200 Series 2-Port 100GE QSFP28 Module

This 2-port 100 Gigabit Ethernet Cisco QSFP28 module delivers the highest performance per slot on Cisco NCS 4200 Series systems and provides physical connectivity using pluggable 100GE QSFP28 optic. (See Table 1.) Only one 100GE port can be used with currently available NCS4200 RSPs (RSP3-400) and two ports will be supported with future RSP4 generation.

Table 1. 100 Gigabit Ethernet Optics Supported in 1-Port 100GE QSFP28 Module

Optic Product Number	Supported as of Cisco IOS Software Release	Description
QSFP-100G-SR4-S	16.11.1	Cisco SR4 QSFP transceiver module for 100 Gigabit Ethernet optical links, Multi-Mode Fiber (OM4 MMF), MPO connectors, up to 100 m.
QSFP-100G-LR4-S	16.11.1	Cisco LR4 QSFP transceiver module for 100 Gigabit Ethernet optical links, Single-Mode Fiber (SMF), LC connectors, up to 10 km.
QSFP-100G-ER4L-S	16.11.1	Cisco ER4L QSFP transceiver module for 100 Gigabit Ethernet optical links, Single-Mode Fiber (SMF), LC connectors, up to 40 km.

Cisco NCS 4200 Series 1-Port 100GE CPAK Module

This 1-port 100 Gigabit Ethernet Cisco CPAK® module delivers the highest performance per slot on Cisco NCS 4200 Series systems and provides physical connectivity using a single pluggable 100GE CPAK optic.
(See Table 2.)

Table 2.   100 Gigabit Ethernet Optics Supported in 1-Port 100GE CPAK Module

Optic Product Number	Supported as of Cisco IOS Software Release	Description
CPAK-100G-LR4	3.18.0SP	Cisco CPAK transceiver module for 100 Gigabit Ethernet optical links, Single-Mode Fiber (SMF, G.652), SC connectors, low power (5.5W), up to 10km.
CPAK-100G-SR10	3.18.0SP	Cisco CPAK transceiver module for 100 Gigabit Ethernet optical links over 24-fiber ribbon cables terminated with MPO/MTP connectors, up to 100m and 150m on OM3 and OM4 multifiber cables respectively.
CPAK-100G-ER4L	16.6.1	Cisco CPAK transceiver module for 100 Gigabit Ethernet optical links, Single-Mode Fiber (SMF, G.652), SC connectors, up to 25km.
CPAK-100G-SR4	16.7.1	Cisco CPAK transceiver module for 100 Gigabit Ethernet optical links over 12-fiber ribbon cables terminated with MPO/MTP connectors, up to 70m and 100m on OM3 and OM4 multi-mode cables respectively.

Cisco NCS 4200 Series 2-Port 40GE QSFP Module

This 2-port 40 Gigabit Ethernet QSFP module provides physical connectivity using two pluggable 40 Gigabit Ethernet optics. (See Table 3.)

Table 3.   40 Gigabit Ethernet Optics Supported in 2-Port 40GE QSFP Module

Optic Product Number	Supported as of Cisco IOS Software Release	Description
QSFP-40G-LR4	3.18.0SP	Cisco QSFP transceiver module for 40-Gbps optical links, Single-Mode Fiber (SMF, G.652), SC connectors, up to 10km.
QSFP-40G-SR4	3.18.0SP	Cisco QSFP transceiver module for 40-Gigabit Ethernet optical links over laser-optimized OM3 and OM4 multimode fibers (up to 100m and 150m, respectively). It primarily enables high-bandwidth 40G optical links over 12-fiber parallel fiber terminated with MPO/MTP multifiber connectors.
QSFP-40G-ER4	16.6.1	Cisco QSFP transceiver module for 40-Gigabit Ethernet optical links, Single-Mode Fiber (SMF, G.652), LC connectors, up to 40km.

Cisco NCS 4200 Series 8-Port 10GE SFP+ Module

This interface module provides eight 10 Gigabit Ethernet ports with physical connectivity, using pluggable 10 Gigabit Ethernet Enhanced Small Form-Factor Pluggable (SFP+) on each port. The module is hardware ready to support 1 Gigabit Ethernet mode per group of four interfaces, and this capability will be provided in future software releases. The interface module supports both the LAN and WAN physical layer (PHY), which allows flexible and versatile deployment models.

Table 4 lists the pluggable optics that are supported in the Cisco NCS 4200 Series 8-Port 10GE SFP+ Module, on the Cisco IOS® Software releases for the NCS 4200 Series router.

Table 4. 10 Gigabit Ethernet Optics Supported in 8-Port 10GE SFP+ Module

Optic Product Number	Supported as of Cisco IOS Software Release	Description
SFP-10G-SR-S	3.18.0SP	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, S-class
SFP-10G-LR-S	3.18.0SP	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, S-class
SFP-10G-ER-S	3.18.0SP	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF, 1550 nm, S-class
SFP-10G-ZR-S	3.18.0SP	Cisco 10GBASE-ZR Ethernet SFP+ transceiver module for SMF, 1550 nm, S-class
SFP-10G-SR	3.18.0SP	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm
SFP-10G-LR	3.18.0SP	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm
SFP-10G-ER	3.18.0SP	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF, 1550 nm
SFP-10G-ZR	3.18.0SP	Cisco multirate 10GBASE-ZR, 10GBASE-ZW and OTU2e SFP+ transceiver module for SMF, 1550 nm
SFP-10G-SR-X	3.18.0SP	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, extended temperature range
SFP-10G-LR-X	3.18.0SP	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, extended temperature range
ONS-SC+-10G-SR	16.5.1	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, commercial temperature range
ONS-SC+-10G-LR	3.18.0SP	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, commercial temperature range
ONS-SC+-10G-ER	3.18.0SP	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF, 1550 nm, commercial temperature range
ONS-SC+-10G-ZR	16.5.1	Cisco 10GBASE-ZR Ethernet SFP+ transceiver module for SMF, 1550 nm, commercial temperature range

Optic Product Number	Supported as of Cisco IOS Software Release	Description
ONS-SI+-10G-LR	17.8.1	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, industrial temperature range
ONS-SI+-10G-ER	17.8.1	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF, 1550 nm, industrial temperature range
CWDM-SFP10G-xxxx	3.18.0SP	Cisco 10GBASE-CWDM single wavelength SFP+ module (ITU-T G.694.2 CWDM grid) – 8 individual wavelength pluggable modules
DWDM-SFP10G-xx.xx	3.18.0SP	Cisco multirate (LAN/WAN/OTU2E) 10GBASE-DWDM single wavelength SFP+ module (100-GHz ITU grid) – 40 individual wavelength pluggable modules
DWDM-SFP10G-C	3.18.0SP	Cisco 10G BASE-DWDM tunable SFP+ with 96 DWDM ITU-50GHz channels to which the device can be tuned, ranging from 1528-nm to 1566-nm
ONS-SC+-10G-C=	16.6.1	Cisco 10G BASE-DWDM full C-band tunable SFP+, ITU-50Ghz
ONS-SC+-10G-xx.x	3.18.0SP	Cisco multirate 10G BASE DWDM SFP+ with different wavelengths ranging from 1530-nm to 1561-nm, 100 GHz, LC
ONS-SC+-10GEPxx.x	3.18.0SP	Cisco multirate 10G BASE DWDM Edge Performance SFP+ with different wavelengths ranging from 1530-nm to 1561-nm, 100 GHz, LC
SFP-10G-BXD-I	3.18.0SP	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1320-nm to 1340-nm TX/1260-nm to 1280-nm RX wavelength, single LC/PC connector, 10 km reach
SFP-10G-BXU-I	3.18.0SP	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1260-nm to 1280-nm TX/1320-nm to 1340-nm RX wavelength, single LC/PC connector, 10 km reach
SFP-10G-BX40D-I	3.18.0SP	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1320-nm to 1340-nm TX/1260-nm to 1280-nm RX wavelength, single LC/PC connector, 40 km reach
SFP-10G-BX40U-I	3.18.0SP	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1260-nm to 1280-nm TX/1320-nm to 1340-nm RX wavelength, single LC/PC connector, 40 km reach
GLC-SX-MMD	16.6.7	1000BASE-SX SFP transceiver module, MMF, 850nm, DOM
GLC-SX-MM	16.6.7	GE SFP, LC connector SX transceiver
SFP-GE-T	16.6.7	1000BASE-T SFP (NEBS 3 ESD)
SFP-GE-S	16.6.7	1000BASE-SX SFP (DOM)
SFP-GE-Z	16.6.7	1000BASE-ZX Gigabit Ethernet SFP (DOM)
GLC-LH-LMM-T1	16.6.7	1000BASE-LX/LH SFP trn mod, M/SMF, 1310nm, DOM, smrt LMM, TI
GLC-GE-DR-LX	16.6.7	1000BASE-LX 100M Dual Rate SFP transceiver module, 1310nm

Cisco NCS 4200 1-port 10 Gigabit Ethernet (SFP+) / 1-port Gigabit Ethernet (SFP) / 2-port Gigabit Ethernet (CSFP) + 16-port Gigabit Ethernet (CSFP) / 8-port Gigabit Ethernet (SFP) Module

This interface module can operate in a number of different modes, using specific Bandwidth subscription or oversubscription configuration, dependent on Interface module slot and optics use. The default mode is delivering one port of 10 Gigabit Ethernet and eight ports of Gigabit Ethernet using regular SFP+ and SFP interfaces respectively on Cisco NCS 4200 Series systems. Optional mode two delivers one port of 10 Gigabit Ethernet and sixteen ports of Gigabit Ethernet using one regular SFP+ and eight bi-directional Compact SFP interfaces respectively on Cisco NCS 4200 Series systems. Optional mode three is delivering eighteen ports of 1 Gigabit Ethernet using nine bi-directional Compact SFP interfaces on Cisco NCS 4200 Series systems. The Interface Module mode selection is available through a Command Line Interface command. Interface Module Slot compatibility and subscription modes can be found in tables 11-13. This module is capable of supporting MACsec in a future software release.

Table 5.   Ethernet Optics Supported in 1-port 10 Gigabit Ethernet SFP+/SFP/CSFP and 8-Port 1 Gigabit Ethernet SFP/CSFP Module

Optic Product Number	Supported as of Cisco IOS Software Release	Description
GLC-FE-100FX	16.7.1	100BASE-FX SFP for Fast Ethernet SFP Ports, 1310 nm wavelength, 2 km over MMF
GLC-FE-100LX	16.7.1	100BASE-LX SFP for Fast Ethernet SFP Ports, 1310 nm wavelength, 10 km over SMF
GLC-FE-100EX	16.7.1	100BASE-EX SFP for Fast Ethernet SFP Ports, 1310 nm wavelength, 40 km over SMF
GLC-FE-100ZX	16.7.1	100BASE-ZX SFP for Fast Ethernet SFP Ports, 1550 nm wavelength, 80 km over SMF
GLC-FE-100BX-U	16.7.1	100BASE-BX10-U SFP for Fast Ethernet SFP Ports. Single-strand SMF up to 10 km, transmits on a 1310-nm channel and receives on a 1550-nm signal
GLC-FE-100BX-D	16.7.1	100BASE-BX10-D SFP for Fast Ethernet SFP Ports. Single-strand SMF up to 10 km, transmits on a 1550-nm channel and receives on a 1310-nm signal
GLC-BX-D	16.7.1	1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength, single LC/PC connector
GLC-BX-U	16.7.1	1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength, single LC/PC connector
GLC-BX40-U-I	16.7.1	1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength, 40 km reach, single LC/PC connector
GLC-BX40-D-I	16.7.1	1000BASE-BX10 SFP module for single-strand SMF, 1550-nm TX/1310-nm RX wavelength, 40 km reach, single LC/PC connector
GLC-BX40-DA-I	16.7.1	1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength, 40 km reach, single LC/PC connector
GLC-BX80-U-I	16.7.1	1000BASE-BX10 SFP module for single-strand SMF, 1490-nm

Optic Product Number	Supported as of Cisco IOS Software Release	Description
		TX/1490-nm RX wavelength, 80 km reach, single LC/PC connector
GLC-BX80-D-I	16.7.1	1000BASE-BX10 SFP module for single-strand SMF, 1570-nm TX/1310-nm RX wavelength, 80 km reach, single LC/PC connector
GLC-TE	16.7.1	1000BASE-T SFP transceiver module for Category 5 copper wire, RJ-45 connector
SFP-GE-T	16.7.1	1000BASE-T SFP transceiver module for Category 5 copper wire, extended operating temperature range, RJ-45 connector
SFP-GE-S	16.7.1	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength
SFP-GE-L	16.7.1	1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1310-nm wavelength
SFP-GE-Z	16.7.1	1000BASE-ZX SFP transceiver module for SMF, 1550-nm wavelength
GLC-SX-MMD	16.7.1	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector
GLC-LH-SMD	16.7.1	1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector
GLC-EX-SMD	16.7.1	1000BASE-EX SFP transceiver module for SMF, 1310-nm wavelength, extended operating temperature range and Digital Optical Monitoring (DOM) support, dual LC/PC connector
GLC-ZX-SMD	16.7.1	1000BASE-ZX SFP transceiver module for SMF, 1550-nm wavelength, extended operating temperature range and Digital Optical Monitoring (DOM) support, dual LC/PC connector
ONS-SC-2GE-BX-D	16.7.1	1000BASE-BX10 2 Channel Gigabit Ethernet transceiver module for SMF, 1490 nm wavelength, dual LC/PC connector
SFP-10G-SR	16.7.1	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm
SFP-10G-LR	16.7.1	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm
SFP-10G-ER	16.7.1	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF and MMF, 1550 nm
SFP-10G-ZR	16.7.1	Cisco multi-rate 10GBASE-ZR, 10GBASE-ZW and OTU2e SFP+ transceiver module for SMF and MMF, 1550 nm
SFP-10G-SR-X	16.7.1	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, extended temperature range
SFP-10G-LR-X	16.7.1	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, extended temperature range

Optic Product Number	Supported as of Cisco IOS Software Release	Description
SFP-10G-BXD-I	16.7.1	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1320-nm to 1340-nm TX/1260-nm to 1280-nm RX wavelength, single LC/PC connector, 10 km reach
SFP-10G-BXU-I	16.7.1	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1260-nm to 1280-nm TX/1320-nm to 1340-nm RX wavelength, single LC/PC connector, 10 km reach
SFP-10G-BX40D-I	16.7.1	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1320-nm to 1340-nm TX/1260-nm to 1280-nm RX wavelength, single LC/PC connector, 40 km reach
SFP-10G-BX40U-I	16.7.1	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1260-nm to 1280-nm TX/1320-nm to 1340-nm RX wavelength, single LC/PC connector, 40 km reach
GLC-SX-MM-RGD	16.9.1	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector, rugged
GLC-GE-DR-LX	17.3.1	1000BASE-LX 100M Dual Rate SFP transceiver module, 1310nm
ONS-SE-ZE-EL=	17.3.1	SFP - 10/100/1000 Ethernet BaseT Multi-rate Copper RJ45
ONS-SI-GE-SX	17.3.1	SFP - 1000BASE-SX Gigabit Ethernet, 850nm, MM, I-TEMP
ONS-SI-GE-EX	17.3.1	SFP - 100Base EX - I-Temp
ONS-SI-GE-ZX	17.3.1	SFP - 1000BASE-ZX Gigabit Ethernet, 1550, SM, I-Temp
ONS-SE-Z1=	17.3.1	OC-3 SR-1, OC-12 SR-1, OC-48 IR-1 or GE LX
ONS-SI-100-LX10=	17.4.1	SFP - 100Mbps Long Reach - 1310nm - SM - LC, ITEMP.
ONS-SE-100-BX10D=	17.4.1	SFP -10/100 BX-D, EXT
ONS-SE-100-BX10U=	17.4.1	SFP -10/100 BX-U, EXT
ONS-SI-100-FX=	17.4.1	SFP - 100Mbps Short Reach - 1310nm - MM - LC, ITEMP
ONS-SC+-10G-SR	17.3.1	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, commercial temperature range
ONS-SC+-10G-LR	17.3.1	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, commercial temperature range
ONS-SC+-10G-ZR	17.3.1	Cisco 10GBASE-ZR Ethernet SFP+ transceiver module for SMF, 1550 nm, commercial temperature range
ONS-SC+-10G-ER	17.3.1	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF, 1550 nm, commercial temperature range
ONS-SI+-10G-SR	17.8.1	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, industrial temperature range
ONS-SI+-10G-ER	17.8.1	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF,

Optic Product Number	Supported as of Cisco IOS Software Release	Description
		1550 nm, industrial temperature range

Cisco NCS 4200 Series 8-Port 1GE SFP and 1-Port 10GE SFP+ Module

This interface module delivers eight ports of Gigabit Ethernet and Fast Ethernet and one port of 10 Gigabit Ethernet interface on Cisco NCS 4200 Series systems. The interface speed of the SFP interfaces can be selected per interface, depending on the optic used. For the 10 Gigabit Ethernet SFP+ port, the speed is not configurable. This module provides physical connectivity using eight SFP transceivers and one SPF+ transceiver.

Table 6 lists the pluggable optics supported in the Cisco NCS 4200 Series 8-Port 1GE SFP and 1-Port 10GE SFP+ Module, on the Cisco IOS Software releases for the NCS 4200 Series system.

Table 6. Ethernet Optics Supported in 8-Port 1GE SFP and 1-Port 10GE SFP+ Module

Optic Product Number	Supported as of Cisco IOS Software Release	Description
GLC-FE-100FX	3.18.0SP	100BASE-FX SFP for Fast Ethernet SFP Ports, 1310 nm wavelength, 2 km over MMF
GLC-FE-100LX	3.18.0SP	100BASE-LX SFP for Fast Ethernet SFP Ports, 1310 nm wavelength, 10 km over SMF
GLC-FE-100EX	3.18.0SP	100BASE-EX SFP for Fast Ethernet SFP Ports, 1310 nm wavelength, 40 km over SMF
GLC-FE-100ZX	3.18.0SP	100BASE-ZX SFP for Fast Ethernet SFP Ports, 1550 nm wavelength, 80 km over SMF
GLC-FE-100FX-RGD	3.18.0SP	100BASE-FX SFP module for Industrial Ethernet 100-MB ports, 1310 nm wavelength, 2 km over MMF
GLC-FE-100LX-RGD	3.18.0SP	100BASE-LX SFP module for Industrial Ethernet 100-MB ports, 1310 nm wavelength, 10 km over SMF
GLC-FE-100BX-U	3.18.0SP	100BASE-BX10-U SFP for Fast Ethernet SFP Ports. Single-strand SMF up to 10 km, transmits on a 1310-nm channel and receives on a 1550-nm signal
GLC-FE-100BX-D	3.18.0SP	100BASE-BX10-D SFP for Fast Ethernet SFP Ports. Single-strand SMF up to 10 km, transmits on a 1550-nm channel and receives on a 1310-nm signal
GLC-SX-MMD	3.18.0SP	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector
GLC-LH-SMD	3.18.0SP	1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector
GLC-EX-SMD	3.18.0SP	1000BASE-EX SFP transceiver module for SMF, 1310-nm wavelength, extended operating temperature range and Digital Optical Monitoring (DOM) support, dual LC/PC connector

Optic Product Number	Supported as of Cisco IOS Software Release	Description
GLC-ZX-SMD	3.18.0SP	1000BASE-ZX SFP transceiver module for SMF, 1550-nm wavelength, extended operating temperature range and Digital Optical Monitoring (DOM) support, dual LC/PC connector
GLC-SX-MM-RGD	3.18.0SP	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength, industrial Ethernet, dual LC/PC connector
GLC-LX-SM-RGD	3.18.0SP	1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength, industrial Ethernet, dual LC/PC connector
GLC-ZX-SM-RGD	3.18.0SP	1000BASE-ZX SFP transceiver module for SMF, 1550-nm wavelength, industrial Ethernet, dual LC/PC connector
GLC-TE	16.5.1	1000BASE-T SFP transceiver module for Category 5 copper wire, extended operating temperature range, RJ-45 connector
SFP-GE-T	3.18.0SP	1000BASE-T SFP transceiver module for Category 5 copper wire, extended operating temperature range, RJ-45 connector
SFP-GE-S	3.18.0SP	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength
SFP-GE-L	3.18.0SP	1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1310-nm wavelength
SFP-GE-Z	3.18.0SP	1000BASE-ZX SFP transceiver module for SMF, 1550-nm wavelength
GLC-BX-D	3.18.0SP	1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength, single LC/PC connector
GLC-BX-U	3.18.0SP	1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength, single LC/PC connector
GLC-BX40-U-I	3.18.0SP	1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength, 40 km reach, single LC/PC connector
GLC-BX40-D-I	3.18.0SP	1000BASE-BX10 SFP module for single-strand SMF, 1550-nm TX/1310-nm RX wavelength, 40 km reach, single LC/PC connector
GLC-BX40-DA-I	3.18.0SP	1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength, 40 km reach, single LC/PC connector
GLC-BX80-U-I	3.18.0SP	1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1490-nm RX wavelength, 80 km reach, single LC/PC connector
GLC-BX80-D-I	3.18.0SP	1000BASE-BX10 SFP module for single-strand SMF, 1570-nm TX/1310-nm RX wavelength, 80 km reach, single LC/PC connector
GLC-GE-DR-LX	16.5.1	Dual Rate 100BASE-LX / 1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector
ONS-SC-GE-LX	16.5.1	1000BASE-LX Gigabit Ethernet transceiver module for SMF, 1310 nm wavelength, commercial operating temperature range and DOM support, dual LC/PC connector

Optic Product Number	Supported as of Cisco IOS Software Release	Description
ONS-SI-GE-LX	3.18.0SP	1000BASE-LX Gigabit Ethernet transceiver module for SMF, 1310 nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector
ONS-SC-GE-BXD	16.5.1	1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength, single LC/PC connector
ONS-SC-GE-BXU	16.5.1	1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength, single LC/PC connector
ONS-SE-ZE-EL	3.18.0SP	10/100/1000BASE-T SFP transceiver module for Category 5 copper wire, extended operating temperature range, RJ-45 connector
ONS-SE-Z1	16.5.1	1000BASE-LX Gigabit Ethernet / OC-48/STM-16 IR / OC-12/-2 / STM-1/-4 SR transceiver module, 1310 nm, SFP, extended temperature range
ONS-SI-GE-LX	16.5.1	1000BASE-LX Gigabit Ethernet transceiver module for SMF, 1310 nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector
ONS-SI-GE-ZX	16.5.1	1000BASE-ZX Gigabit Ethernet transceiver module, SMF, 1550 nm, SFP, industrial temperature range
DWDM-SFP-xxxx (36 wavelengths)	3.18.0SP	Cisco 1000BASE-DWDM Gigabit Ethernet SFP, with 36 different wavelengths ranging from 1561.42 nm to 1530.33nm or ITU channel 20 to 59
DWDM-SFP10G-C	3.18.0SP	Cisco 10G BASE-DWDM tunable SFP+ with 96 DWDM ITU-50GHz channels to which the device can be tuned, ranging from 1528-nm to 1566-nm
CWDM-SFP-xxxx (8 wavelengths)	3.18.0SP	Cisco CWDM Gigabit Ethernet SFP, with eight different wavelengths ranging from 1470 nm to 1610 nm
SFP-10G-SR-S	3.18.0SP	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, S-class
SFP-10G-LR-S	3.18.0SP	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, S-class
SFP-10G-ER-S	3.18.0SP	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF, 1550 nm, S-class
SFP-10G-ZR-S	3.18.0SP	Cisco 10GBASE-ZR Ethernet SFP+ transceiver module for SMF, 1550 nm, S-class
SFP-10G-SR	3.18.0SP	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm
SFP-10G-LR	3.18.0SP	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm
SFP-10G-ER	3.18.0SP	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF and MMF, 1550 nm

Optic Product Number	Supported as of Cisco IOS Software Release	Description
SFP-10G-ZR	3.18.0SP	Cisco multirate 10GBASE-ZR, 10GBASE-ZW and OTU2/OTU2e SFP+ transceiver module for SMF and MMF, 1550 nm
SFP-10G-SR-X	3.18.0SP	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, extended temperature range
SFP-10G-LR-X	3.18.0SP	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, extended temperature range
ONS-SC+-10G-SR	3.18.0SP	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, commercial temperature range
ONS-SC+-10G-LR	3.18.0SP	Cisco 10GBASE-LR Ethernet SFP+ transceiver module for SMF, 1310 nm, commercial temperature range
ONS-SC+-10G-ER	3.18.0SP	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF, 1550 nm, commercial temperature range
ONS-SC+-10G-ZR	3.18.0SP	Cisco 10GBASE-ZR Ethernet SFP+ transceiver module for SMF, 1550 nm, commercial temperature range
ONS-SI+-10G-SR	17.8.1	Cisco 10GBASE-SR Ethernet SFP+ transceiver module for MMF, 850 nm, industrial temperature range
ONS-SI+-10G-ER	17.8.1	Cisco 10GBASE-ER Ethernet SFP+ transceiver module for SMF, 1550 nm, industrial temperature range
DWDM-SFP10G-xx.xx	3.18.0SP	Cisco multirate (LAN/WAN/OTU2/OTU2E) 10GBASE-DWDM single wavelength SFP+ module (100-GHz ITU grid) – 40 individual wavelength pluggable modules
ONS-SC+-10G-xx.x	3.18.0SP	Cisco multirate 10G BASE DWDM SFP+ with different wavelengths ranging from 1530-nm to 1561-nm, 100 GHz, LC
ONS-SC+-10GEPxx.x	3.18.0SP	Cisco multirate 10G BASE DWDM Edge Performance SFP+ with different wavelengths ranging from 1530-nm to 1561-nm, 100 GHz, LC
ONS-SC+-10G-C=	16.6.1	Cisco 10G BASE-DWDM full C-band tunable SFP+, ITU-50Ghz
SFP-10G-BXD-I	3.18.0SP	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1320-nm to 1340-nm TX/1260-nm to 1280-nm RX wavelength, single LC/PC connector, 10 km reach
SFP-10G-BXU-I	3.18.0SP	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1260-nm to 1280-nm TX/1320-nm to 1340-nm RX wavelength, single LC/PC connector, 10 km reach
SFP-10G-BX40D-I	3.18.0SP	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1320-nm to 1340-nm TX/1260-nm to 1280-nm RX wavelength, single LC/PC connector, 40 km reach
SFP-10G-BX40U-I	3.18.0SP	10GBASE-BX single-strand SMF bidirectional SFP+ module, 1260-nm to 1280-nm TX/1320-nm to 1340-nm RX wavelength, single LC/PC connector, 40 km reach

TDM/PDH/SONET/SDH Interface modules

Migrating circuit-switched TDM, PDH, and SONET/SDH networks to Ethernet/IP/MPLS-capable switches and routers can be challenging, particularly when service providers need to replicate the functionalities and provisioning capabilities of the legacy infrastructure. Although the legacy TDM infrastructure is aging, expensive to operate, and an inefficient platform for data transport, service providers and carriers are still required to maintain their TDM connectivity. End customers are sometimes reluctant to move to native Ethernet/IP/MPLS handoffs and might switch to a different service provider if forced to transition early.

The NCS 4200 Series products provide a purpose-built solution that enables service providers to meet their legacy TDM requirements. With high-density TDM, SONET/SDH, OTN, and Carrier Ethernet (FE, GE, 10GE, 40GE, and 100GE) interfaces, the NCS 4200 Series delivers any-to-any connectivity over a packet-based network (MPLS/Flex LSP) more efficiently than any other packet transport mechanism and is not bounded by TDM transport inefficiencies. The NCS 4200 Series features include:

- Cisco's high-density Circuit Emulation technology, which provides boundless scale with high-density TDM circuit emulation over a protected Flex LSP core

- A complete central office modernization option for legacy TDM DCS migration and SONET/SDH ADM ring overlay/migration, as well as facilitating the transition to packet-based networks over time

- A carrier-class design that requires a much smaller central office footprint (some configurations provide more than 2 times the capacity of multiple DCS/ADM equipment) with significant power and cooling savings compared to legacy products
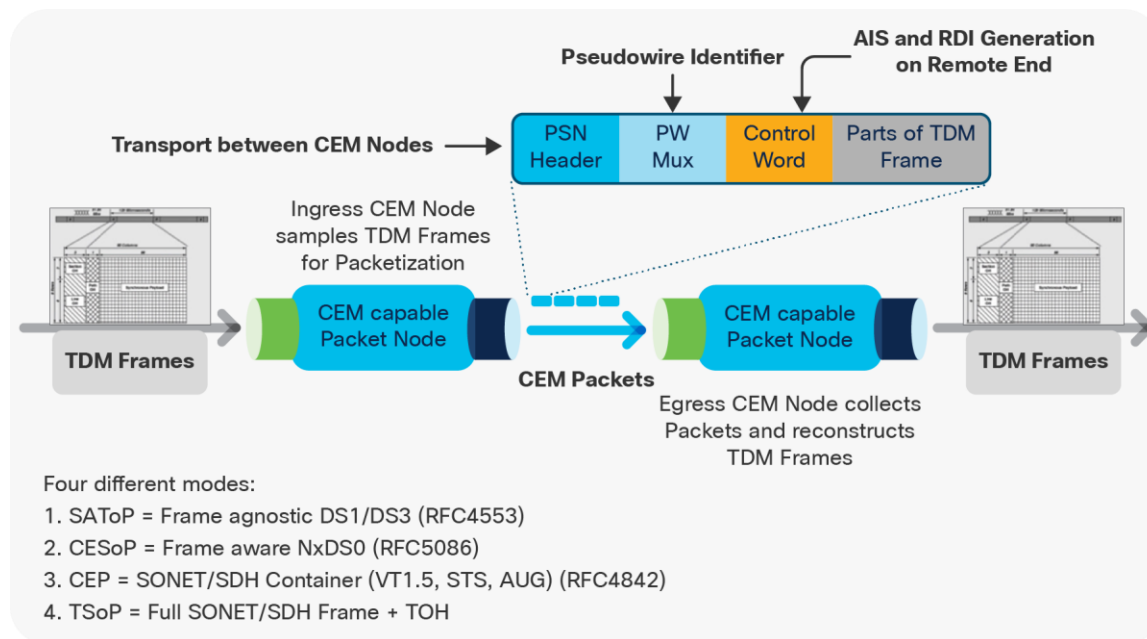

Figure 2.
Circuit Emulation (CEM) Standards

All NCS 4200 Series TDM/PDH/SONET/SDH interface modules support Online Insertion and Removal (OIR), which contributes to a higher uptime for NCS 4200 Series systems.

Cisco NCS 4200 Series 8-Port T1/E1 Module

This interface module delivers 8 ports of T1 or E1 connectivity on NCS 4200 Series systems. The module can be software configured as either T1 mode or E1 mode per interface module in an NCS 4200 Series platform. This interface module provides physical connectivity using eight individual onboard physical RJ-48C port connectors.
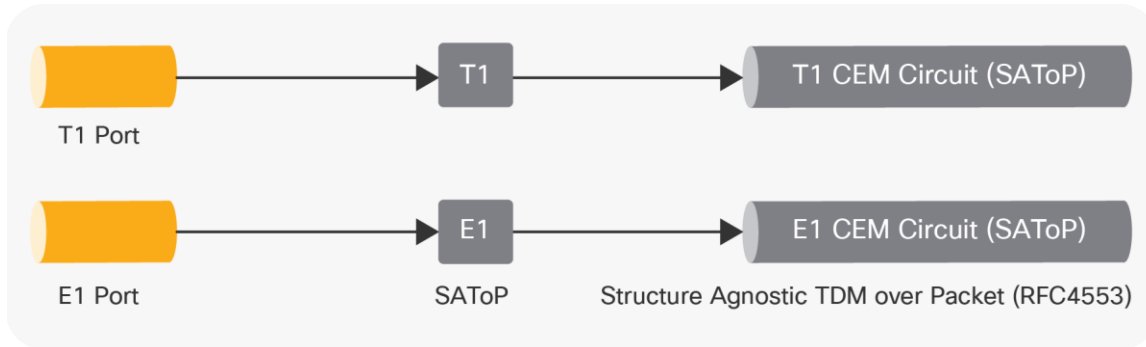

Figure 3.
Supported CEM Types for T1/E1

Cisco NCS 4200 Series 48-Port T1/E1 Module

This interface module delivers 48 ports of T1 or E1 connectivity on NCS 4200 Series systems. The module can be software configured as either T1 mode or E1 mode per interface module in an NCS 4200 Series platform. This interface module provides physical connectivity using a single high-density connector and requires a breakout cable and patch panel for individual port connections.

The module is software configurable for 48 T1 or 48 E1 ports. Mixing T1 and E1 ports on the same interface module is not supported. The module can be clocked from a line or from an internal clock source. The protocols supported on the module are software configurable per interface, which allows for flexible deployment and efficient use of the hardware.
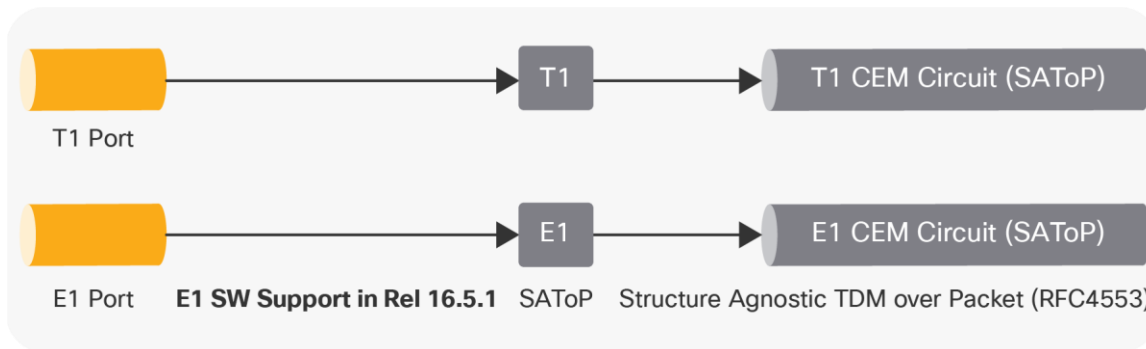

Figure 4.
Supported CEM Types for T1/E1

The module requires an external patch panel and a breakout cable to deliver a DIN, RJ48C or AMP64 port for the user application.

Table 7 lists the cables and patch panels that are required with the Cisco NCS 4200 Series 48-Port T1/E1 Module on the Cisco IOS Software releases for NCS 4200 Series systems.

Table 7. Accessories Required with NCS 4200 Series 48-Port E1/T1 Module

Product ID	Supported as of Cisco IOS Software Release	Description
PANEL-48-1-DIN	3.18.0SP	48 x 75 ohm E1/DS1 termination, through DIN 1.0/2.3 connectors
PANEL-48-1-RJ48	3.18.0SP	48 x 120 ohm E1/110 ohm DS1 termination, through RJ 48C connectors
PANEL-48-1-AMP64	3.18.0SP	48 x 120 ohm E1/110 ohm DS1 termination, 4 x AMP 64-pin
PANEL-144-1-AMP64	17.2.1	144 x 120 ohm E1/110 ohm DS1 termination, 12 x AMP 64-pin
CABLE-16TDM-C	3.18.0SP	16 port cable for TDM CEM IM, no red, 72" / 6 ft / 1.8 m
CABLE-16TDM-L1	3.18.0SP	16 port cable for TDM CEM IM, no red, 56" / 4.7 ft / 1.4 m
CABLE-16TDM-L2	3.18.0SP	16 port cable for TDM CEM IM, no red, 63" / 5.3 ft / 1.6 m
CABLE-16TDM-L3	3.18.0SP	16 port cable for TDM CEM IM, no red, 85" / 7.1ft / 2.2 m
CABLE-16TDM-L4	3.18.0SP	16 port cable for TDM CEM IM, no red, 96" / 8 ft / 2.4 m
CABLE-16TDM-R1EL1	16.7.1	Kit with 3 16-port cables for TDM T1/E1 CEM IM, 1:1 red, Even Slot Numbers, 42" / 3.5 ft / 1.1 m
CABLE-16TDM-R1EL2	16.7.1	Kit with 3 16-port cables for TDM T1/E1 CEM IM, 1:1 red, Even Slot Numbers, 62" / 5.2 ft / 1.6 m
CABLE-16TDM-R1EL3	16.7.1	Kit with 3 16-port cables for TDM T1/E1 CEM IM, 1:1 red, Even Slot Numbers, 78" / 6.5 ft / 2 m
CABLE-16TDM-R1OL1	16.7.1	Kit with 3 16-port cables for TDM T1/E1 CEM IM, 1:1 red, Odd Slot Numbers, 42" / 3.5 ft / 1.1 m
CABLE-16TDM-R1OL2	16.7.1	Kit with 3 16-port cables for TDM T1/E1 CEM IM, 1:1 red, Odd Slot Numbers, 62" / 5.2 ft / 1.6 m
CABLE-16TDM-R1OL3	16.7.1	Kit with 3 16-port cables for TDM T1/E1 CEM IM, 1:1 red, Odd Slot Numbers, 78" / 6.5 ft / 2 m

Cisco NCS 4200 Series 48-Port T3/E3 Module

This interface module delivers 48 ports of T3 or E3 connectivity on NCS 4200 Series systems. The module can be software configured as either T3 mode or E3 mode per interface module in an NCS 4200 Series platform. This interface module provides physical connectivity using a single high-density connector and requires a breakout cable and patch panel for individual port connections.

The module is software configurable for 48 T3 or 48 E3 ports. Mixing T3 and E3 ports on the same interface module is not supported. The module can be clocked from a line or from an internal clock source. The protocols supported on the module are software configurable per interface, which allows for flexible deployment and efficient use of the hardware.
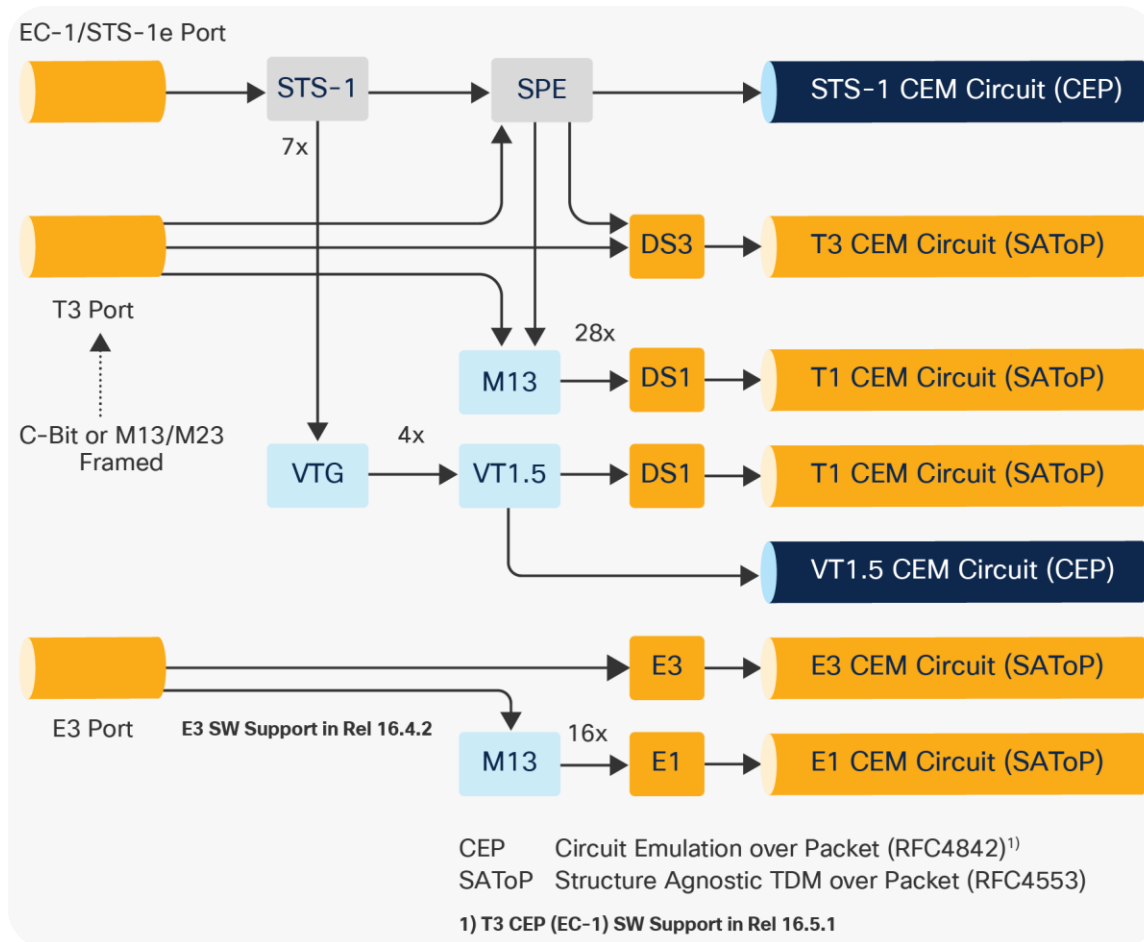

Figure 5.
Supported CEM Types for T3/E3

The module requires an external patch panel and a breakout cable to deliver a DIN or HDBNC port for the user application.

Table 8 lists the cables and patch panels that are required with the Cisco NCS 4200 Series 48-Port T3/E3 Module on the Cisco IOS Software releases for NCS 4200 Series systems.

Table 8.   Accessories Required with NCS 4200 Series 48-Port E3/T3 Module

Product ID	Supported as of Cisco IOS Software Release	Description
PANEL-48-3-DIN	3.18.0SP	48 x 75 ohm E3/DS3 termination, through DIN 1.0/2.3 connectors1
PANEL-48-3-HDBNC	3.18.0SP	48 x 75 ohm E1/110 ohm DS1 termination, HD BNC connectors1
CABLE-16TDM-C	3.18.0SP	16 port cable for TDM CEM IM, no red, 72" / 6 ft / 1.8 m
CABLE-16TDM-L1	3.18.0SP	16 port cable for TDM CEM IM, no red, 56" / 4.7 ft / 1.4 m
CABLE-16TDM-L2	3.18.0SP	16 port cable for TDM CEM IM, no red, 63" / 5.3 ft / 1.6 m
CABLE-16TDM-L3	3.18.0SP	16 port cable for TDM CEM IM, no red, 85" / 7.1ft / 2.2 m
CABLE-16TDM-L4	3.18.0SP	16 port cable for TDM CEM IM, no red, 96" / 8 ft / 2.4 m
CABLE-16TDM-R3EL1	16.7.1	Kit with 3 16-port cables for TDM T3/E3 CEM IM, 1:1 red, Even Slot Numbers, 42" / 3.5 ft / 1.1 m
CABLE-16TDM-R3EL2	16.7.1	Kit with 3 16-port cables for TDM T3/E3 CEM IM, 1:1 red, Even Slot Numbers, 62" / 5.2 ft / 1.6 m
CABLE-16TDM-R3EL3	16.7.1	Kit with 3 16-port cables for TDM T3/E3 CEM IM, 1:1 red, Even Slot Numbers, 78" / 6.5 ft / 2 m
CABLE-16TDM-R3OL1	16.7.1	Kit with 3 16-port cables for TDM T3/E3 CEM IM, 1:1 red, Odd Slot Numbers, 42" / 3.5 ft / 1.1 m
CABLE-16TDM-R3OL2	16.7.1	Kit with 3 16-port cables for TDM T3/E3 CEM IM, 1:1 red, Odd Slot Numbers, 62" / 5.2 ft / 1.6 m
CABLE-16TDM-R3OL3	16.7.1	Kit with 3 16-port cables for TDM T3/E3 CEM IM, 1:1 red, Odd Slot Numbers, 78" / 6.5 ft / 2 m

[1] T3/E3 DIN/HDBNC ports can support up to 450 ft cable length with 75 Ohm 734A coaxial cable.

Cisco NCS 4200 Series 12-Port T1/E1 + 4-port T3/E3 + 4-port OC3/STM-1 or 4-port OC12/STM-4 or 1-Port OC48/STM-16 Module

This interface module delivers up to 12 active ports of T1/E1 plus up to 4 active ports of T3/E3 connectivity, plus 4 active ports of OC3/STM-1, or 4 active ports of OC12/STM-1, or 1 active port of OC48/STM-16 connectivity on NCS 4200 Series Router.

This Interface Module supports:

- Clear Channel (SAToP) and Channelized T1/E1 (CESoP)

- Channelized OC-3/STM-1 to clear channel T1/E1 (SAToP), clear channel DS3/E3 (SAToP) and Channelized T1/E1 (CESoP)

- Channelized OC-12/STM-4 to clear channel T1/E1 (SAToP), clear channel DS3/E3 (SAToP) and Channelized T1/E1 (CESoP)

- Channelized OC48/STM-16 to clear channel T1/E1 (SAToP), clear channel DS3/E3 (SAToP) and Channelized T1/E1 (CESoP)

- Clear channel OC-3/STM-1 (CEP)

- Clear Channel OC12/STM-4 (CEP)

- Clear Channel OC48/STM-16 (CEP)

In addition to Circuit Emulation technologies, this interface module supports also IPv4 and IPv6 Interworking capabilities (HDLC, PPP, MLPPP) including Frame Relay (FR) and Multilink Frame Relay (MLFR).

This module is supported in interface module slots 2-5 on NCS 4206 Series routers with RSP2A-128 and can be clocked from a line or from an internal clock source. Starting with software release 16.9.1, the module is also supported on NCS 4206/4216/4216-F2B-SA Series routers with RSP3-400 and can be clocked from a line or from an internal clock source. Tables 12, 13, and 14 below list the supported slots.

The module delivers a true multiservice and multi-rate capability in a small form factor in combination with an incremental pricing model. The interface module can be software configured as either Synchronous Optical Networking (SONET) mode or Synchronous Digital Hierarchy (SDH) mode per module in the NCS 4200 Series configuration.

The interface module hardware has been designed for high availability, including Access Circuit Redundancy (ACR), 1+1 Automatic Protection Switching (APS) across two modules, and SDH Linear Multiplexer Section Protection (MSP) protocols. Support of these capabilities is software dependent and described in the Cisco IOS XE Software for Cisco NCS 4200 Series Routers data sheet.

This interface module provides physical connectivity using pluggable SFP/SFP+ optics. Table 8 lists the pluggable optics that are supported in the Cisco NCS 4200 Series 12-port T1/E1 + 4port DS3/E3 + 4-Port OC3/STM1 or 4-Port OC12/STM4 or 1-port OC48/STM-16 Interface Modules on the Cisco IOS XE Software releases for NCs 4200 Series routers.

Table 9. Optics Supported in the Cisco NCS 4200 12-port T1/E1 + 4port DS3/E3 + 4-Port OC3/STM1 or 4-Port OC12/STM4 Module or 1-port OC48/STM-16 Interface Module

Optic Product ID	Supported As of Cisco IOS XE Release	Description
ONS-SI-155-SR-MM	16.7.1	OC-3/STM-1, Short Reach (SR), 1310 nm, Multimode (MM), SFP, industrial temperature range
ONS-SI-155-I1	16.7.1	OC-3/STM-1 Intermediate Reach (IR), 1310 nm, SFP, industrial temperature range
ONS-SI-155-L1	16.7.1	OC-3/STM-1 Long Reach (LR), 1310 nm, SFP, industrial temperature range
ONS-SI-155-L2	16.7.1	OC-3/STM-1 LR, 1550 nm, SFP, industrial temperature range
ONS-SC-155-EL	16.7.1	STM-1 Electrical SFP, Commercial temperature range
ONS-SI-622-SR-MM	16.7.1	OC-12/STM-4, SR, 1310 nm, MM, SFP, industrial temperature range
ONS-SI-622-I1	16.7.1	OC-12/STM-4 IR, 1310 nm, SFP, industrial temperature range
ONS-SI-622-L1	16.7.1	OC-12/STM-4 LR, 1310 nm, SFP, industrial temperature range
ONS-SI-622-L2	16.7.1	OC-12/STM-4 LR, 1550 nm, SFP, industrial temperature range
ONS-SI-2G-I1	16.7.1	OC-48/STM-16 IR, 1310 nm, SFP, industrial temperature range
ONS-SI-2G-L1	16.7.1	OC-48/STM-16 LR, 1310 nm, SFP, industrial temperature range
ONS-SI-2G-L2	16.7.1	OC-48/STM-16 LR, 1550 nm, SFP, industrial temperature range
ONS-SI-2G-S1	16.7.1	OC-48/STM-16 SR, 1310 nm, SFP, industrial temperature range

The module requires an external patch panel and a breakout cable to deliver RJ48 (T1/E1) or HDBNC (T3/E3) ports for the user application.

Table 10 lists the cables and patch panels required with the Cisco NCS 4200 12-port T1/E1 + 4port DS3/E3 + 4-Port OC3/STM1 or 4-Port OC12/STM4 Module or 1-port OC48/STM-16 Interface Module on the Cisco IOS Software releases for NCS 4200 Series systems.

Table 10. Accessories Required with the Cisco NCS 4200 12-port T1/E1 + 4port DS3/E3 + 4-Port OC3/STM1 or 4-Port OC12/STM4 Module or 1-port OC48/STM-16 Interface Module

Product ID	Supported as of Cisco IOS Software Release	Description
PANEL-3G-COMBO-1	16.7.1	Single 12 x E1 + 4 x DS3 Patch panel for 3G CEM/IMSG interface module
PANEL-3G-COMBO-2	16.7.1	Double 12 x E1 + 4 x DS3 Patch panel for 3G CEM/IMSG interface module
PANEL-3G-COMBO-1S	16.7.1	Single 12 x E1 + 4 x DS3 Patch panel for 3G CEM/IMSG interface module (Requires straight-through cable)
PANEL-3G-COMBO-2S	16.7.1	Double 12 x E1 + 4 x DS3 Patch panel for 3G CEM/IMSG interface module (Requires straight-through cable)
P3G1-RCKMNT-19IN	16.7.1	EIA 19 Inch mounting brackets for single 3G CEM/IMSG IM patch panel
P3G1-RCKMNT-ETSI	16.7.1	ETSI 21 Inch mounting brackets for single 3G CEM/IMSG IM patch panel
P3G1-RCKMNT-23IN	16.7.1	EIA 23 Inch mounting brackets for single 3G CEM/IMSG IM patch panel
P3G2-RCKMNT-19IN	16.7.1	EIA 19 Inch mounting brackets for double 3G CEM/IMSG IM patch panel
P3G2-RCKMNT-ETSI	16.7.1	ETSI 21 Inch mounting brackets for double 3G CEM/IMSG IM patch panel
P3G2-RCKMNT-23IN	16.7.1	EIA 23 Inch mounting brackets for double 3G CEM/IMSG IM patch panel
CABLE-16TDM-C	16.7.1	16 port cable for TDM CEM IM, no red, 10 Feet
CABLE-16TDM-C-L1	16.7.1	16 port cable for TDM CEM IM, no red, 56" / 4.7 ft / 1.4 m
CABLE-16TDM-C-L2	16.7.1	16 port cable for TDM CEM IM, no red, 63" / 5.3 ft / 1.6 m
CABLE-16TDM-C-L3	16.7.1	16 port cable for TDM CEM IM, no red, 85" / 7.1ft / 2.2 m
CABLE-16TDM-C-L4	16.7.1	16 port cable for TDM CEM IM, no red, 96" / 8 ft / 2.4 m

Cisco NCS 4200 Series 1-Port OC192/STM-64 or 8-Port OC3/12/48/STM-1/-4/-16 Modules

These interface modules deliver one active port of OC192 or STM-64 connectivity or up to eight ports of OC3/12 or STM-1/-4 or up to 4 ports of OC48 or STM-16 connectivity on NCS 4200 Series systems.

These modules are supported in some interface module slots on NCS 4200 Series systems and can be clocked from a line or from an internal clock source.

These modules deliver true high-density, multiservice, and multirate capabilities in a small form factor. The interface module can be software configured as either Synchronous Optical Networking (SONET) mode or Synchronous Digital Hierarchy (SDH) mode per module in the NCS 4200 Series configuration.
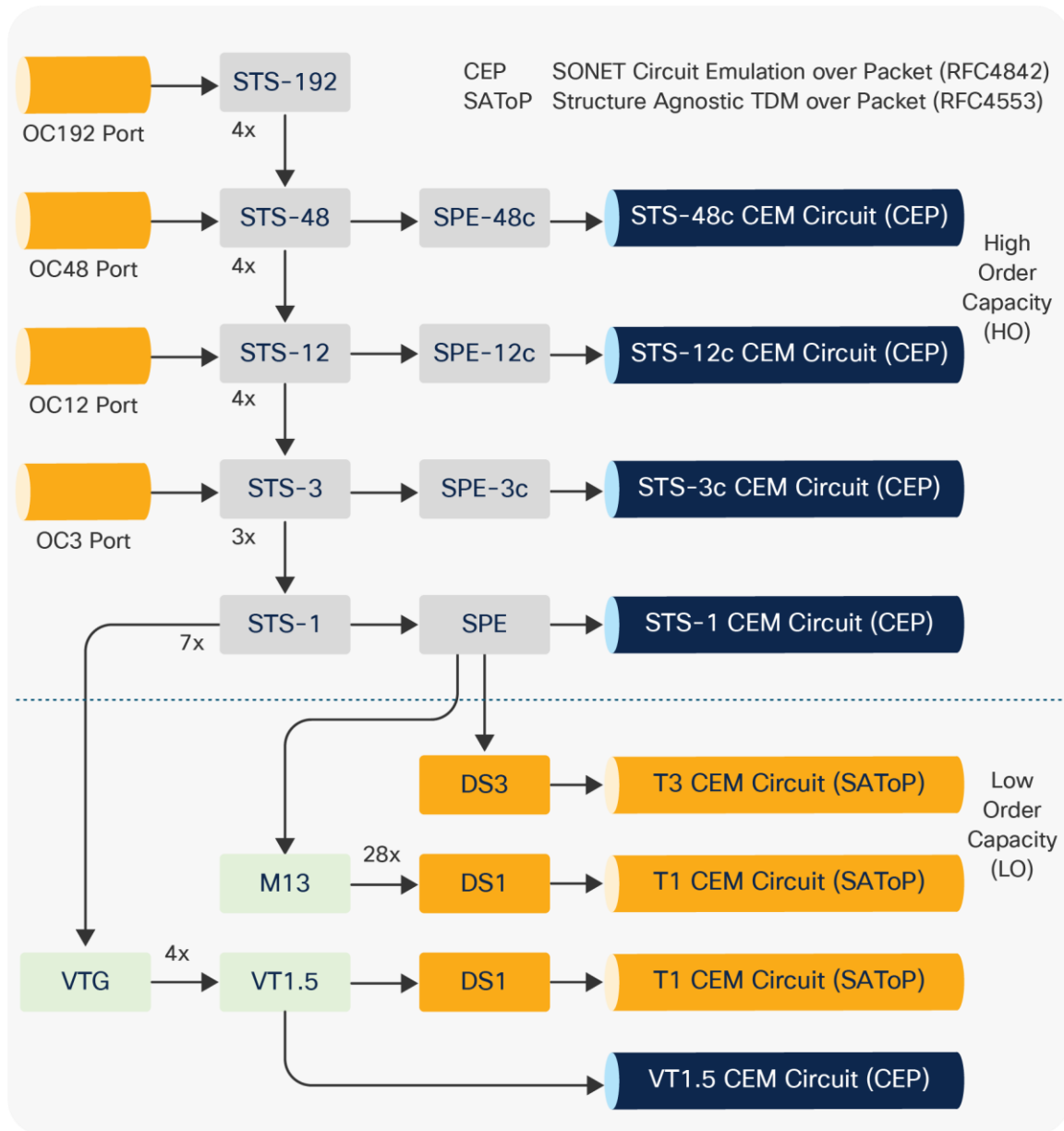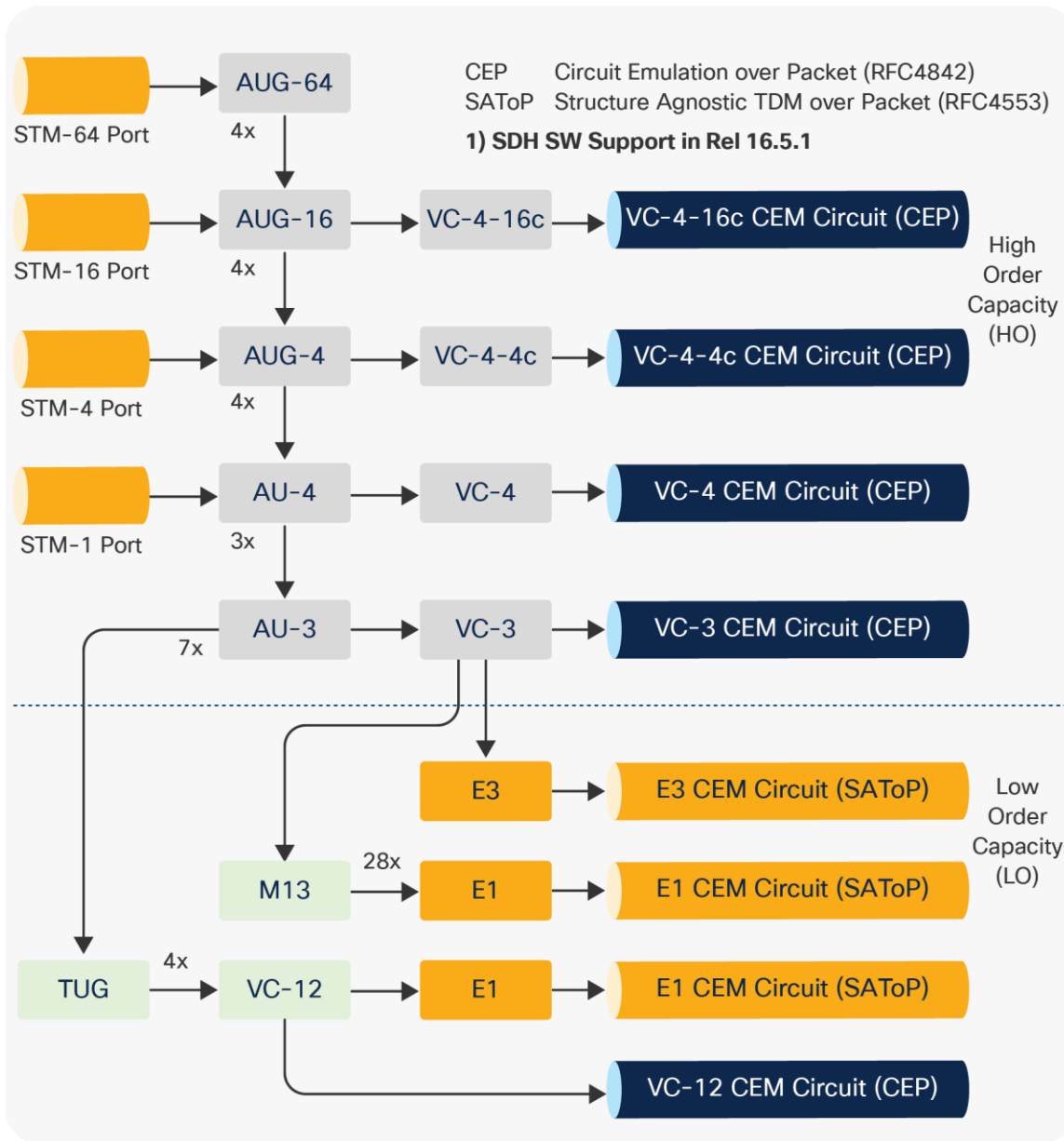
Figure 6.
Supported CEM Types for OCn/STM-n1

In addition to Circuit Emulation technologies, the new NCS4200-1T8S-20CS interface module supports also IPv4 and IPv6 Interworking capabilities (HDLC, PPP, MLPPP)including Frame Relay (FR) and Multlink Frame Relay (MLFR). The new NCS4200-1T8S-20CS module requires at least software release 16.12.1.

The interface module hardware has been designed for high availability, including Access Circuit Redundancy (ACR), 1+1 Automatic Protection Switching (APS) across two modules, and SDH Linear Multiplexer Section Protection (MSP) protocols. Support of these capabilities is software dependent and described in the Cisco IOS Software for Cisco NCS 4200 Series systems data sheet.

These interface modules provide physical connectivity using pluggable SFP/SFP+ optics. Table 11 lists the pluggable optics that are supported in the Cisco NCS 4200 Series 1-Port OC192/STM-64 or 8-Port OC3/12/48/STM-1/-4/-16 module on the Cisco IOS Software releases for NCS 4200 Series systems.

Table 11. Optics Supported in 1-Port OC192/STM-64 or 8-Port OC3/12/48/STM-1/-4/-16 Module

Optic Product ID	Supported as of Cisco IOS XE Software Release	Description
ONS-SI-155-SR-MM	16.12.1	OC-3/STM-1, Short Reach (SR), 1310 nm, Multimode (MM), SFP, industrial temperature range
ONS-SI-155-I1	16.12.1	OC-3/STM-1 Intermediate Reach (IR), 1310 nm, SFP, industrial temperature range
ONS-SI-155-L1	16.12.1	OC-3/STM-1 Long Reach (LR), 1310 nm, SFP, industrial temperature range
ONS-SI-155-L2	16.12.1	OC-3/STM-1 LR, 1550 nm, SFP, industrial temperature range
ONS-SC-155-EL	16.12.1	OC-3/STM-1, Electrical SFP, Standard Coaxial Connector 75 Ohm, commercial temperature range
ONS-SI-622-SR-MM	16.12.1	OC-12/STM-4, SR, 1310 nm, MM, SFP, industrial temperature range
ONS-SI-622-I1	16.12.1	OC-12/STM-4 IR, 1310 nm, SFP, industrial temperature range
ONS-SI-622-L1	16.12.1	OC-12/STM-4 LR, 1310 nm, SFP, industrial temperature range
ONS-SI-622-L2	16.12.1	OC-12/STM-4 LR, 1550 nm, SFP, industrial temperature range
ONS-SI-2G-I1	16.12.1	OC-48/STM-16 IR, 1310 nm, SFP, industrial temperature range
ONS-SI-2G-L1	16.12.1	OC-48/STM-16 LR, 1310 nm, SFP, industrial temperature range
ONS-SI-2G-L2	16.12.1	OC-48/STM-16 LR, 1550 nm, SFP, industrial temperature range
ONS-SI-2G-S1	16.12.1	OC-48/STM-16 SR, 1310 nm, SFP, industrial temperature range
ONS-SC+-10G-LR	16.12.1	OC-192/STM-64 LR1, 1310 nm, SFP+, commercial temperature range
ONS-SC+-10G-ER	16.12.1	OC-192/STM-64 IR2, 1550 nm, SFP+, commercial temperature range
ONS-SC+-10G-SR	16.12.1	OC-192/STM-64 SR, 850 nm, SFP+, commercial temperature range

Product specifications

Table 12 shows the Cisco NCS 4206/4202 Series platform and interface module compatibility matrix. Table 13 shows the Cisco NCS 4216 Series Interface Module Compatibility Matrix. Table 14 provides Cisco NCS 4216-F2B Series interface module specifications, and Table 15 lists the safety and compliance specifications.

Table 12. Cisco NCS 4206/4202 Series interface module compatibility matrix

Platform		Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5
Cisco NCS 4206 System with NCS420X-RSP-128	NCS4200-1T8LR-PS	16.7.1	16.7.1	16.7.1	16.7.1	16.7.1	16.7.1
	NCS4200-8E1T1-CE	16.7.1	16.7.1	16.7.1	16.7.1	16.7.1	16.7.1
	NCS4200-3GMS	–	–	16.7.1	16.7.1	16.7.1	16.7.1
Cisco NCS 4206 System with NCS420X-RSP	NCS4200-1T8LR-PS	3.18.0SP[3]	3.18.0SP[3]	3.18.0SP[3]	3.18.0SP[3]	3.18.0SP[3]	3.18.0SP[3]
	NCS4200-1T16G-PS	16.7.1[5, 6]	–	–	16.7.1[6]	16.7.1[6]	16.7.1[6]
	NCS4200-8T-PS	3.18.0SP[1]	3.18.0SP[2]	3.18.0SP[3]	3.18.0SP	3.18.0SP	3.18.0SP
	NCS4200-2Q-P	–	–	–	–	3.18.0SP	3.18.0SP
	NCS4200-1H-PK	–	–	–	–	3.18.0SP	3.18.0SP
	NCS4200-2H-PQ	–	–	–	–	16.10.1[9]	16.10.1[7]
	NCS4200-48T1E1-CE	3.18.0SP	3.18.0SP	3.18.0SP	3.18.0SP	3.18.0SP	3.18.0SP
	NCS4200-48T3E3-CE	3.18.0SP	3.18.0SP	3.18.0SP	3.18.0SP	3.18.0SP	3.18.0SP
	NCS4200-1T8S-20CS	–	–	16.12.1	16.12.1	16.12.1	16.12.1
	NCS4200-3GMS	–	–	16.9.1	16.9.1	16.9.1	16.9.1
Cisco NCS 4202 System	NCS4200-8E1T1-CE	3.18.0SP	–	–	–	–	–
	NCS4200-1T8LR-PS	3.18.0SP	–	–	–	–	–
	NCS4200-3GMS	16.7.1	–	–	–	–	–

[1] NCS4200-8T-PS could not be in slot 0 when NCS4200-1H-PK or NCS4200-2H-PQ is present in slot 4.

[2] NCS4200-8T-PS could not be in slot 1 when NCS4200-1H-PK or NCS4200-2H-PQ is present in slot 5.

[3] NCS4200-8T-PS in slot 2 is incompatible with the support for NCS4200-1T8LR-PS for the chassis.

[5] NCS4200-1T16G-PS could not be in slot 0 when NCS4200-1H-PK or NCS4200-2H-PQ is present in slot 4.

[6] NCS4200-1T16G-PS in slots 0, 3, 4 and 5 can be configured in 8 x Gigabit Ethernet (SFP) + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode (SFP), or in 16 x Gigabit Ethernet (C-SFP) + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode.

[7] NCS4200-2H-PQ supports only one 100GE port with RSP3 (NCS420X-RSP).

Table 13. Cisco NCS 4216 Series interface module compatibility matrix

	NCS4200-3GMS	NCS4200-1T8S-20CS	NCS4200-48T1E1-CE	NCS4200-48T3E3-CE	NCS4200-1T8LR-PS	NCS4200-1T16G-PS	NCS4200-2Q-P / NCS4200-8T-PS	NCS4200-1H-PK	NCS4200-2H-PQ
Slot 0	–	16.12.1[23]	3.18.0SP[9]	3.18.0SP[9]	–	16.7.1[12, 13, 24]	–	–	–
Slot 1	–	16.12.1[23, 27]	3.18.0SP[9]	3.18.0SP[9]	–	16.7.1[12, 13, 24]	–	–	–
Slot 2	–	16.12.1[23]	3.18.0SP	3.18.0SP	3.18.0SP[4, 19]	16.7.1[13, 17, 24]	–	–	–
Slot 3	16.9.1	16.12.1[23, 27, 28]	3.18.0SP	3.18.0SP	–	16.7.1[14, 24]	3.18.0SP[3, 7, 16, 21]	–	–
Slot 4	–	16.12.1[23, 29]	3.18.0SP	3.18.0SP	–	16.7.1[14, 24]	3.18.0SP[4, 8, 17]	–	–
Slot 5	16.9.1[21]	16.12.1[23, 27]	3.18.0SP	3.18.0SP	3.18.0SP[3, 18]	16.7.1[13, 16, 24]	–	–	–
Slot 6	–	16.12.1[23, 25]	3.18.0SP	3.18.0SP	3.18.0SP[4, 19]	16.7.1[13, 17, 24]	–	–	–
Slot 7	16.9.1	16.12.1[23, 27]	3.18.0SP	3.18.0SP	–	16.7.1[14, 24]	3.18.0SP[, 25]	3.18.0SP[1, 25]	16.10.1[22, 25]
Slot 8	–	16.12.1[23]	3.18.0SP	3.18.0SP	–	16.7.1[14, 24]	3.18.0SP[26]	3.18.0SP[2, 26]	16.10.1[22, 26]
Slot 9	16.9.1[20, 21]	16.12.1[23, 26, 27]	3.18.0SP	3.18.0SP	3.18.0SP[3, 18]	16.7.1[13, 16, 24]	–	–	–
Slot 10	–	16.12.1[23]	3.18.0SP	3.18.0SP	3.18.0SP[4, 19]	16.7.1[13, 17, 24]	–	–	–
Slot 11	16.9.1[21]	16.12.1[23, 27]	16.5.1[10]	16.5.1[10]	–	16.7.1[15, 16, 24]	3.18.0SP[1, 5]	–	–
Slot 12	–	16.12.1[23]	16.5.1[11]	16.5.1[11]	–	16.7.1[15, 17, 24]	3.18.0SP[2, 6]	–	–
Slot 13	16.9.1[21]	16.12.1[23, 27]	3.18.0SP	3.18.0SP	3.18.0SP[3, 18]	16.7.1[13, 16, 24]	–	–	–
Slot 14	–	16.12.1[23]	3.18.0SP	3.18.0SP	3.18.0SP[4, 19]	16.7.1[13, 17, 24]	–	–	–
Slot 15	16.9.1[21]	16.12.1[23, 27]	3.18.0SP	3.18.0SP	3.18.0SP[3, 18]	16.7.1[13, 16, 24]	–	–	–

[1] NCS4200-8T-PS cannot be in slot 11 when NCS4200-1H-PK is present in slot 7.

[2] NCS4200-8T-PS cannot be in slot 12 when NCS4200-1H-PK is present in slot 8.

[3] NCS4200-1T8LR-PS cannot be in slot 5, 9, 13, or 15 when NCS4200-8T-PS or NCS4200-2Q-P is present in slot 3.

[4] NCS4200-1T8LR-PS cannot be in slot 2, 6, 10, or 14 when NCS4200-8T-PS or NCS4200-2Q-P is present in slot 4.

[5] No IM could be used in slot 1, 5, 9, 13, or 15 when NCS4200-8T-PS or NCS4200-2Q-P is present in slot 11.

[6] No IM could be used in slot 0, 2, 6, 10, or 14 when NCS4200-8T-PS or NCS4200-2Q-P is present in slot 12.

[7] NCS4200-48T1E1-CE or NCS420048-T3E3-CE cannot be in slots 5, 9, 13 and 15 when NCS4200-8T-PS or NCS4200-2Q-P IM is present in slot 3.

[8] NCS4200-48T1E1-CE or NCS420048-T3E3-CE cannot be in slots 2, 6, 10, and 14 when NCS4200-8T-PS or NCS4200-2Q-P IM is present in slot 4.

[9] NCS4200-48T1E1-CE or NCS420048-T3E3-CE can be in slots 0 and 1 ONLY with release 3.18SP.

[10] NCS4200-1T8LR-PS cannot be in slots 5, 9, 13 and 15 when NCS4200-48T1E1-CE or NCS420048-T3E3-CE is present in slot 11.

[11] NCS4200-1T8LR-PS cannot be in slots 2, 6, 10, and 14 when NCS4200-48T1E1-CE or NCS420048-T3E3-CE is present in slot 12.

[12] NCS4200-1T16G-PS cannot be in slots 0 and 1 if NCS4200-1T8LR-PS is present in the system, and no Y.1564/SADT is used.

[13] NCS4200-1T16G-PS in slots 0, 1, 2, 5, 6, 9, 10, 13, 14 and 15 can be configured in 8 x Gigabit Ethernet (SFP) full subscription mode, or 16 x Gigabit Ethernet (C-SFP) oversubscription mode, or 18 x Gigabit Ethernet (C-SFP) oversubscription mode.

[14] NCS4200-1T16G-PS in slots 3, 4, 7 and 8 can be configured in 8 x Gigabit Ethernet + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode (SFP), or 16 x Gigabit Ethernet (C-SFP) + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode, or 16 x Gigabit Ethernet (C-SFP) oversubscription mode, or 18 x Gigabit Ethernet (C-SFP) oversubscription mode.

[15] NCS4200-1T16G-PS in slots 11 and 12 can be configured in 8 x Gigabit Ethernet (SFP) + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode, or 16 x Gigabit Ethernet (C-SFP) + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode, or 16 x Gigabit Ethernet (C-SFP) oversubscription mode, or 18 x Gigabit Ethernet (C-SFP) oversubscription mode.

[16] NCS4200-1T16G-PS cannot be used in slots 5, 9, 13 and 15 if NCS4200-8T-PS or NCS4200-2Q-P is present in slot 3.

[17] NCS4200-1T16G-PS cannot be used in slots 2, 6, 10 and 14 if NCS4200-8T-PS or NCS4200-2Q-P is present in slot 4.

[18] NCS4200-1T8LR-PS cannot be used in slots 1, 5, 9, 13 and 15 if NCS4200-1T16G-PS is present in slot 11.

[19] NCS4200-1T8LR-PS cannot be used in slots 0, 2, 6, 10 and 14 if NCS4200-1T16G-PS is present in slot 12.

[20] If one NCS4200-1T8LR-PS is configured, then slot 9 becomes unavailable for NCS4200-3GMS.

[21] If NCS4200-8T-PS or NCS4200-2Q-P is configured in slot 3, then NCS4200-3GMS cannot be installed in slots 5, 9, 11, 13 and 15.

[22] NCS4200-2H-PQ supports only one 100GE port with RSP3 (NCS4216-RSP).

[23] If NCS4200-1T8S-20CS IM is present in a given downstream (even) slot then no IM can be installed in the adjacent upstream (odd) slot and it has to include IM Blank/IM Filler.

[24] NCS4200-1T16G-PS IM cannot be supported in adjacent slot to NCS4200-1T8S-20CS IM.

[25] NCS4200-1T8S-20CS cannot be installed in slot 6 if NCS4200-1H-PK, NCS4200-2H-PQ, or NCS4200-2Q-P IM is installed in slot 7.

[26] NCS4200-1T8S-20CS cannot be installed in slot 9 if NCS4200-1H-PK, NCS4200-2H-PQ, or NCS4200-2Q-P IM is installed in slot 8.

[27] If NCS4200-1T8S-20CS is selected for upstream (odd) slots, then only NCS4200-48T1E1-CE or NCS4200-1T8LR-PS IMs can be installed in the respective adjacent downstream (even) slots.

[28] If NCS4200-8T-PS or NCS4200-2Q-P card is installed on slot 3, NCS4200-1T8S-20CS cannot be selected on slots 5, 9, 13 and 15.

[29] If NCS4200-8T-PS or NCS4200-2Q-P card is installed on slot 4, NCS4200-1T8S-20CS cannot be selected on slots 2, 6, 10 and 14.

Table 14. Cisco NCS 4216 F2B Series interface module compatibility matrix

	NCS4200-3GMS	NCS4200-1T8S-20CS	NCS4200-48T1E1-CE	NCS4200-48T3E3-CE	NCS4200-1T8LR-PS	NCS4200-1T16G-PS	NCS4200-2Q-P NCS4200-8T-PS	NCS4200-1H-PK	NCS4200-2H-PQ
Slot 0	–	16.12.1	–	–	–	16.7.1[12, 13]	–	–	–
Slot 1	–	16.12.1	–	–	–	16.7.1[12, 13]	–	–	–
Slot 2	16.9.1[23]	16.12.1	16.5.1	16.5.1	16.5.1[4, 19]	16.7.1[13, 17]	–	–	–
Slot 3	16.9.1	16.12.1[27]	16.5.1	16.5.1	–	16.7.1[14]	16.5.1[3, 8, 16, 22]	–	–
Slot 4	16.9.1	16.12.1[28]	16.5.1	16.5.1	–	16.7.1[14]	16.5.1[4, 9, 17, 24]	–	–
Slot 5	16.9.1[22]	16.12.1	16.5.1	16.5.1	16.5.1[3, 18]	16.7.1[13, 16]	–	–	–
Slot 6	16.9.1[23]	16.12.1[25]	16.5.1	16.5.1	16.5.1[4, 19]	16.7.1[13, 17]	–	–	–

	NCS4200-3GMS	NCS4200-1T8S-20CS	NCS4200-48T1E1-CE	NCS4200-48T3E3-CE	NCS4200-1T8LR-PS	NCS4200-1T16G-PS	NCS4200-2Q-P NCS4200-8T-PS	NCS4200-1H-PK	NCS4200-2H-PQ
Slot 7	16.9.1	16.12.1	16.5.1	16.5.1	–	16.7.1[14]	16.5.1[25]	16.5.1[1, 25]	16.10.1[24, 25]
Slot 8	16.9.1	16.12.1	16.5.1	16.5.1	–	16.7.1[14]	16.5.1[26]	16.5.1[2, 26]	16.10.1[24, 26]
Slot 9	16.9.1[20,22]	16.12.1[26]	16.5.1	16.5.1	16.5.1[3, 18]	16.7.1[13, 16]	–	–	–
Slot 10	16.9.1[21, 23]	16.12.1	16.5.1	16.5.1	16.5.1[4, 19]	16.7.1[13, 17]	–	–	–
Slot 11	16.9.1[22]	16.12.1	16.5.1[10]	16.5.1[10]	–	16.7.1[15, 16]	16.5.1[1,5]	–	–
Slot 12	16.9.1[23]	16.12.1	16.5.1[11]	16.5.1[11]	–	16.7.1[15, 17]	16.5.1[2,6]	–	–
Slot 13	16.9.1[22]	16.12.1	16.5.1	16.5.1	16.5.1[3, 18]	16.7.1[13, 16]	–	–	–
Slot 14	16.9.1[23]	16.12.1	16.5.1	16.5.1	16.5.1[4, 19]	16.7.1[13, 17]	–	–	–
Slot 15	16.9.1[22]	16.12.1	16.5.1	16.5.1	16.5.1[3, 18]	16.7.1[13, 16]	–	–	–

[1] NCS4200-8T-PS cannot be in slot 11 when NCS4200-1H-PK is present in slot 7.

[2] NCS4200-8T-PS cannot be in slot 12 when NCS4200-1H-PK is present in slot 8.

[3] NCS4200-1T8LR-PS cannot be in slot 5, 9, 13, or 15 when NCS4200-8T-PS or NCS4200-2Q-P is present in slot 3.

[4] NCS4200-1T8LR-PS cannot be in slot 2, 6, 10, or 14 when NCS4200-8T-PS or NCS4200-2Q-P is present in slot 4.

[5] No IM could be used in slot 1, 5, 9, 13, or 15 when NCS4200-8T-PS or NCS4200-2Q-P is present in slot 11.

[6] No IM could be used in slot 0, 2, 6, 10, or 14 when NCS4200-8T-PS or NCS4200-2Q-P is present in slot 12.

[8] NCS4200-48T1E1-CE or NCS420048-T3E3-CE cannot be in slots 5, 9, 13 and 15 when NCS4200-8T-PS or NCS4200-2Q-P IM is present in slot 3.

[9] NCS4200-48T1E1-CE or NCS420048-T3E3-CE cannot be in slots 2, 6, 10, and 14 when NCS4200-8T-PS or NCS4200-2Q-P IM is present in slot 4.

[10] NCS4200-1T8LR-PS cannot be in slots 5, 9, 13 and 15 when NCS4200-48T1E1-CE or NCS420048-T3E3-CE is present in slot 11.

[11] NCS4200-1T8LR-PS cannot be in slots 2, 6, 10, and 14 when NCS4200-48T1E1-CE or NCS420048-T3E3-CE is present in slot 12.

[12] NCS4200-1T16G-PS cannot be in slots 0 and 1 if NCS4200-1T8LR-PS is present in the system, and no Y.1564/SADT is used.

[13] NCS4200-1T16G-PS in slots 0, 1, 2, 5, 6, 9, 10, 13, 14 and 15 can be configured in 8 x Gigabit Ethernet (SFP) full subscription mode, or 16 x Gigabit Ethernet (C-SFP) oversubscription mode, or 18 x Gigabit Ethernet (C-SFP) oversubscription mode.

[14] NCS4200-1T16G-PS in slots 3, 4, 7 and 8 can be configured in 8 x Gigabit Ethernet + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode (SFP), or 16 x Gigabit Ethernet (C-SFP) + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode, or 16 x Gigabit Ethernet (C-SFP) oversubscription mode, or 18 x Gigabit Ethernet (C-SFP) oversubscription mode.

[15] NCS4200-1T16G-PS in slots 11 and 12 can be configured in 8 x Gigabit Ethernet (SFP) + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode, or 16 x Gigabit Ethernet (C-SFP) + 1 x Ten Gigabit Ethernet (SFP+) full subscription mode, or 16 x Gigabit Ethernet (C-SFP) oversubscription mode, or 18 x Gigabit Ethernet (C-SFP) oversubscription mode.

[16] NCS4200-1T16G-PS cannot be used in slots 5, 9, 13 and 15 if NCS4200-8T-PS or NCS4200-2Q-P is present in slot 3.

[17] NCS4200-1T16G-PS cannot be used in slots 2, 6, 10 and 14 if NCS4200-8T-PS or NCS4200-2Q-P is present in slot 4.

[18] NCS4200-1T8LR-PS cannot be used in slots 1, 5, 9, 13 and 15 if NCS4200-1T16G-PS is present in slot 11.

[19] NCS4200-1T8LR-PS cannot be used in slots 0, 2, 6, 10 and 14 if NCS4200-1T16G-PS is present in slot 12.

[20] If one NCS4200-1T8LR-PS is configured, then slot 9 becomes unavailable for NCS4200-3GMS.

[21] If two or more NCS4200-1T8LR-PS IM is configured, then slot 10 becomes unavailable for NCS4200-3GMS.

[22] If NCS4200-8T-PS or NCS4200-2Q-P is configured in slot 3, then NCS4200-3GMS cannot be installed in slots 5, 9, 11, 13 and 15.

[23] If NCS4200-8T-PS or NCS4200-2Q-P is configured in slot 4, then NCS4200-3GMS cannot be installed in slots 2, 6, 10, 12 and 14.

[24] NCS4200-2H-PQ supports only one 100GE port with RSP3 (NCS4216-RSP).

[25] NCS4200-1T8S-20CS cannot be installed in slot 6 if NCS4200-1H-PK, NCS4200-2H-PQ, or NCS4200-2Q-P IM is installed in slot 7.

[26] NCS4200-1T8S-20CS cannot be installed in slot 9 if NCS4200-1H-PK, NCS4200-2H-PQ, or NCS4200-2Q-P IM is installed in slot 8.

[27] If NCS4200-8T-PS or NCS4200-2Q-P card is installed on slot 3, NCS4200-1T8S-20CS cannot be selected on slots 5, 9, 13 and 15.

[28] If NCS4200-8T-PS or NCS4200-2Q-P card is installed on slot 4, NCS4200-1T8S-20CS cannot be selected on slots 2, 6, 10 and 14.

Table 15. Cisco NCS 4200 Series interface module specifications

Features	Description
Port density	• 8-port Gigabit Ethernet SFP and 1-port 10 Gigabit Ethernet SFP+ • 8/16-port Gigabit Ethernet SFP/C-SFP and 1-port 10 Gigabit Ethernet SFP+ / 2-port Gigabit Ethernet C-SFP • 8-port 10 Gigabit Ethernet, SFP/SFP+ • 2-port 40 Gigabit Ethernet, QSFP • 1-port 100 Gigabit Ethernet, CPAK • 1-port 100 Gigabit Ethernet, QSFP28 • 8-port T1/E1 TDM • 48-port T1/E1 TDM • 48-port T3/E3 TDM • 12-port T1/E1 + 4-port DS3/E3 + 4-port OC3/STM-1 or 4-port OC12/STM-4 or 1-port OC48/STM-16 • 8-port OC3/12/48/STM-1/-4/-16 SFP or 1-Port OC192/STM-64 SFP+
Power draw	• 8-port Gigabit Ethernet SFP and 1-port 10 Gigabit Ethernet SFP+: 15W typical, 29W maximum • 8/16-port Gigabit Ethernet SFP/C-SFP and 1-port 10 Gigabit Ethernet SFP+ / 2-port Gigabit Ethernet C-SFP: 42W typical, 54W maximum • 8-port 10 Gigabit Ethernet SFP/SFP+: 53W typical, 57W maximum • 2-port 40 Gigabit Ethernet QSFP: 45W typical, 53W maximum • 1-port 100 Gigabit Ethernet CPAK: 55W typical, 62W maximum • 1-port 100 Gigabit Ethernet QSFP28: 75W typical, 78W maximum • 8-port T1/E1 TDM: 14W typical, 18W maximum • 48-port T1/E1 TDM: 30W typical, 35W maximum • 48-port T3/E3 TDM: 44W typical, 52W maximum • 12-port T1/E1 + 4-port DS3/E3 + 4-port OC3/STM-1 or 4-port OC12/STM-4 or 1-port OC48/STM-16: 54W maximum • 8-port OC3/12/48/STM-1/-4/-16 SFP or 1-Port OC192/STM-64 SFP+ (NCS4200-1T8S-20CS): 77W typical, 96W maximum

Features	Description
Module shipment weight	• 8-port Gigabit Ethernet SFP and 1-port 10 Gigabit Ethernet SFP+: 3.4 lbs • 8/16-port Gigabit Ethernet SFP/C-SFP and 1-port 10 Gigabit Ethernet SFP+ / 2-port Gigabit Ethernet C-SFP: 3.5 lbs • 8-port 1/10 Gigabit Ethernet SFP/SFP+: 3.8 lbs • 2-port 40 Gigabit Ethernet QSFP: 2.55 lbs • 1-port 100 Gigabit Ethernet CPAK: 2.23 lbs • 1-port 100 Gigabit Ethernet QSFP28: 2.55 lbs • 8-port T1/E1 TDM: 2.1 lbs • 48-port T1/E1 TDM: 2.1 lbs • 48-port T3/E3 TDM: 2.1 lbs • 12-port T1/E1 or 4-port DS3/E3 + 4-port OC3/STM-1 or 4-port OC12/STM-4 or 1-port OC48/STM-16: 3 lbs8-port OC3/12/48/STM-1/-4/-16 SFP or 1-Port OC192/STM-64 SFP+ (NCS4200-1T8S-20CS): 1.7 lbs
Module shipment package size (LxWxH)	15.44 x 9.44 x 4.31 inches
Environmental specifications[1]	–40 to 65°C (–40 to 149°F) operating temperature (using Industrial temperature XFP, SFP, and SFP+ optics) 0 to 40°C (32 to 104°F) operating temperature (CPAK and QSFP optics)
Relative humidity	5 to 95%, noncondensing
Storage environment	Temperature: –40 to 70°C (–40 to 158°F) altitude: 4570 m (15,000 ft)
MTBF at 40°C (104°F) operating temperature	• 8-port Gigabit Ethernet SFP and 1-port 10 Gigabit Ethernet SFP+: 2,257,780 hours • 8/16-port Gigabit Ethernet SFP/C-SFP and 1-port 10 Gigabit Ethernet SFP+ / 2-port Gigabit Ethernet C-SFP: 1,256,050 hours • 8-port 10 Gigabit Ethernet, SFP/SFP+: 1,897,650 hours • 2-port 40 Gigabit Ethernet, QSFP: 1,926,830 hours • 1-port 100 Gigabit Ethernet, CPAK: 1,715,860 hours • 1-port 100 Gigabit Ethernet QSFP28: 1,926,830 hours • 8-port T1/E1 TDM: 1,897,030 hours • 48-port T1/E1 TDM: 1,440,130 hours • 48-port T3/E3 TDM: 1,320,980 hours • 12-port T1/E1 + 4-port DS3/E3 + 4-port OC3/STM-1 or 4-port OC12/STM-4 or 1-port OC48/STM-16: 989,480 hours • 8-port OC3/12/48/STM-1/-4/-16 SFP or 1-Port OC192/STM-64 SFP+ (NCS4200-1T8S-20CS): 924,860 hours
Reliability and availability	OIR field-replaceable SFP optics modules Support for both 1+1 SONET Automatic Protection Switching (APS) and SDH Linear Multiplexer Section Protection (MSP) protocols Single interface module software reset Rolling software upgrade, interface module by interface module

[1] Optics, power supplies, fan tray, and chassis type used may limit the temperature range.

Table 16.   Safety and compliance

Type	Standards
Safety	• UL 60950-1, 2nd edition • CAN/CSA C22.2 No. 60950-1-07 2nd edition • IEC 60950-1, 2nd edition • EN 60950-1, 2nd edition • AS/NZS 60950.1:2003
Electromagnetic	• FCC CFR47 Part 15, Class A
Emissions compliance	• EN55022, class A • CISPR22, class A • ICES-003, class A • EN 300 386, class A • VCCI, class A • KN22, class A • EN61000-3-2 to EN61000-3-3
Immunity compliance	• EN 300 386 • EN 61000-6-1 • EN 50082-1 • CISPR24 • EN 55024 • KN 24 • EN 50121-4 • EN/KN 61000-4-2 to EN/KN 61000-4-6 • EN/KN 61000-4-8 • EN/KN 61000-4-11
Network Equipment-Building Systems (NEBS)[1]	• GR-63-CORE Issue 4 • GR-1089-CORE Issue 6 • SR-3580 NEBS Level 3
ETSI	• ETS/EN 300 119 Part 4 • ETS/EN 300 019 - Storage: Class 1.2, Transportation: Class 2.3, In-Use/Operational: Class 3.2

Type	Standards	
Telecom	T1: • ITU-T G.703 • ITU-T G.824 • TIA-968-B • IC CS-03 • HKTA 2028 • ID0002 • DSPR Technical Conditions • ANSI T1.403 E1: • ITU-T G.703/G.704 • ITU-T G.823 • AS/ACIF S016 • ETSI TBR12/13 • RRA 2009-38 (RRL 2005-96) • IDA TS DLCN	SONET/SDH subrate: • GR-253-CORE • ANSI T1.105 • ITU G.957 • ITU G.783 • ITU G.707 OTN: • ITU G.709 Ethernet: • DSPR Technical Conditions • RRA 2009-38 (RRL 2005-96) • IEEE 802.3-2005 • IEEE 802.3z • IEEE 802.3ab • IEEE 802.3ae
Network synchronization	• GR-1244-CORE • GR-253-CORE • ANSI T1.101 • ITU-T G.813 • ITU-T G.703 clause 5 • ITU-T G.703 clause 9 • ITU-T G.823 • ITU-T G.824 • ITU-T G.8261/Y.1361 • ITU-T G.781 • ITU-T G.8262 • ITU-T G.8264 • ITU-T G.8265.1 • ITU-T G.8275.1 • ITU-T G.8275.2 • IEEE1588-2008	

[1] Notable exceptions: All cabling is provided through the front panel.

Ordering information

Tables 17 lists the primary system components for the Cisco NCS 4200 Series interface modules.

Table 17.   Cisco NCS 4200 Series interface modules

Part Number	Description
NCS4200-1T8LR-PS	NCS 4200 Combo 8 port SFP GE and 1 port 10GE SFP+ IM
NCS4200-1T8LR-PS=	NCS 4200 Combo 8 port SFP GE and 1 port 10GE SFP+ IM, spare
NCS4200-1T16G-PS	NCS 4200 Combo 8/16 port GE SFP/C-SFP and 1 port 10GE SFP+ / 2 port 1GE C-SFP Interface Module
NCS4200-1T16G-PS=	NCS 4200 Combo 8/16 port GE SFP/C-SFP and 1 port 10GE SFP+ / 2 port 1GE C-SFP Interface Module, Spare
NCS4200-8T-PS	NCS 4200 8-Port 10GE SFP+ Interface Module
NCS4200-8T-PS=	NCS 4200 8-Port 10GE SFP+ Interface Module, spare
NCS4200-2Q-P	NCS 4200 2-Port 40GE QSFP Interface Module
NCS4200-2Q-P=	NCS 4200 2-Port 40GE QSFP Interface Module, spare
NCS4200-1H-PK	NCS 4200 1-Port 100GE CPAK Interface Module
NCS4200-1H-PK=	NCS 4200 1-Port 100GE CPAK Interface Module, spare
NCS4200-2H-PK	NCS 4200 2-Port 100GE QSFP28 Interface Module (Only one 100GE port supported with RSP3-400)
NCS4200-2H-PK=	NCS 4200 2-Port 100GE QSFP28 Interface Module, spare (Only one 100GE port supported with RSP3-400)
NCS4200-8E1T1-CE	NCS 4200 8-Port T1/E1 Interface Module
NCS4200-8E1T1-CE=	NCS 4200 8-Port T1/E1 Interface Module, Spare
NCS4200-48T1E1-CE	NCS 4200 48-Port T1/E1 Interface Module
NCS4200-48T1E1-CE=	NCS 4200 48-Port T1/E1 Interface Module, Spare
NCS4200-48T3E3-CE	NCS 4200 48-Port T3/E3 Interface Module
NCS4200-48T3E3-CE=	NCS 4200 48-Port T3/E3 Interface Module, Spare

Part Number	Description
NCS4200-3GMS	ASR 900 12 port T1/E1 + 4 port DS3/E3 + 4 port OC3/STM-1 or 4 port OC12/STM-4 or 1 port OC48/STM16 CEM/iMSG Interface Module
NCS4200-3GMS=	ASR 900 12 port T1/E1 + 4 port DS3/E3 + 4 port OC3/STM-1 or 4 port OC12/STM-4 or 1 port OC48/STM16 CEM/iMSG Interface Module, Spare
NCS4200-1T8S-20CS	NCS 4200 8-port OC3/12/48/STM-1/-4/-16 SFP or 1-Port OC192/STM-64 SFP+ CEM/iMSG Interface Module
NCS4200-1T8S-20CS=	NCS 4200 8-port OC3/12/48/STM-1/-4/-16 SFP or 1-Port OC192/STM-64 SFP+ CEM/iMSG Interface Module, Spare

Warranty information

Warranty information is available on Cisco.com at the [Product Warranties](#) page.

Service and Support

Cisco offers a wide range of services programs to help accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, promoting high levels of customer satisfaction. Cisco Services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, refer to Cisco Technical Support Services or Cisco Advanced Services.

Cisco is committed to reducing your total cost of ownership. Cisco offers a portfolio of technical support services to help ensure that Cisco products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 18 are available as part of the Cisco Carrier Ethernet Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 18. Service and Support

Advanced Services	Features	Benefits
Cisco Total Implementation Solutions (TIS), available directly from Cisco **Cisco Packaged TIS, available through resellers**	• Project management • Site survey, configuration, and deployment • Installation, text, and cutover • Training • Major moves, adds, and changes • Design review and product staging	• Supplement existing staff • Help ensure functions meet needs • Mitigate risk
Cisco SP Base Support and Service Provider-Based Onsite Support, available directly from Cisco **Cisco Packaged Service Provider-Based Support, available through resellers**	• 24-hour access to software updates • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance replacement of hardware parts	• Facilitate proactive or expedited problem resolution • Lower total cost of ownership by taking advantage of Cisco expertise and knowledge • Reduce network downtime

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 2018 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	Materials
Information on electronic waste laws and regulations, including products, batteries and packaging	WEEE Compliance

Reference links to **product-specific environmental sustainability information** that is mentioned in relevant sections of this data sheet are provided in the following table:

Sustainability Topic	Reference
General	
Product Compliance	Table 16 – Safety and Compliance
Power	
Power Supply	Table 15 – Cisco NCS 4200 Series Interface Module Specifications
Material	
Unit Weight	Table 15 – Cisco NCS 4200 Series Interface Module Specifications
Dimensions and Mean Time between Failures Metrics	Table 15 – Cisco NCS 4200 Series Interface Module Specifications

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 19.   Document history

New or Revised Topic	Described In	Date
Cisco NCS 4200 Series 8-Port 10GE SFP+ Module-added new optics that are supported	Optics supported	Aug. 16, 2021
Cisco NCS 4200 1-port 10 Gigabit Ethernet (SFP+) / 1-port Gigabit Ethernet (SFP) /2-port Gigabit Ethernet (CSFP) + 16-port Gigabit Ethernet (CSFP) / 8-port Gigabit Ethernet (SFP) Module-added new optics that are supported	Optics supported	Aug. 16, 2021
Cisco NCS 4200 Series 1-Port OC192/STM-64 or 8-Port OC3/12/48/ STM-1/-4/-16 Modules-updated software release for optics that are supported	Supported from release	Aug. 16, 2021
Product specifications-removed NCS4200-1T8S-10CS	Removed EoL line card	Aug. 16, 2021