

# Cisco Network Convergence System 4000 Multi-Chassis System

The Cisco® Network Convergence System 4000 (NCS 4000) is a converged optical service platform providing Dense Wavelength-Division Multiplexing (DWDM), Optical Transport Network (OTN), Multiprotocol Label Switching Transport Profile (MPLS-TP), Carrier Ethernet, and Label Switch Router (LSR) or IP multiservice capabilities. The Cisco Network Convergence System 4000 Multi-chassis System (Fig. 1) allows to scale total node capacity to tens of Terabit/s with no differentiation between OTN or Packet services.

Cisco NCS 4016 systems supports up to 6.4Tbps of OTN/MPLS switching functionalities and can be In-service upgraded to Multi-Chassis Configuration leveraging to a Centralized Fabric systems allowing to scale up to more than 100 Tbps of non-blocking OTN/MPLS switching with a configuration of 16+4 with 16 Line Card Chassis (LCC) and 4 Fabric Card Chassis Series (FCC).

Figure 1 shows Fabric Card Chassis of Cisco NCS 4000 Series.

**Figure 1.** The Cisco NCS 4000 Centralize fabric chassis



## NCS 4000 Multi-Chassis System

NCS 4000 Multi-chassis system consists of two major elements: a Line Card Chassis (LCC) and a Fabric Card Chassis (FCC). The LCC hosts Route Processor (RP) cards, the first and third stages of switch fabric cards, and line cards that provide the physical interface and process data packets. The FCC hosts the second stage of the switch fabric cards. The LCC and FCC are connected by a set of optical cables. Expanding your network capacity is a smooth process for the Cisco NCS 4000, supported by in-service hardware and software upgrades.

## NCS 4000 Multi-Chassis System Configurations

NCS 4000 Multi-chassis system can be offered with different configurations pending the required maximum switching capacity. It is possible to start from Single chassis configuration with one single NCS4016 (1+0 configuration) towards up to 16+4 configuration.

It has to be noted that the number of the initial installation of FCC will determine the final configuration that can be supported with a Non-traffic-Affecting Upgrade. If initial installation includes one single FCC the system can be upgraded up to 4+1 in a NTA fashion as the cabling configuration is predetermined on the FCC.

Supported configurations can be summarized in:

1+1, 2+1, 2+3 and 4+1 with single FCC

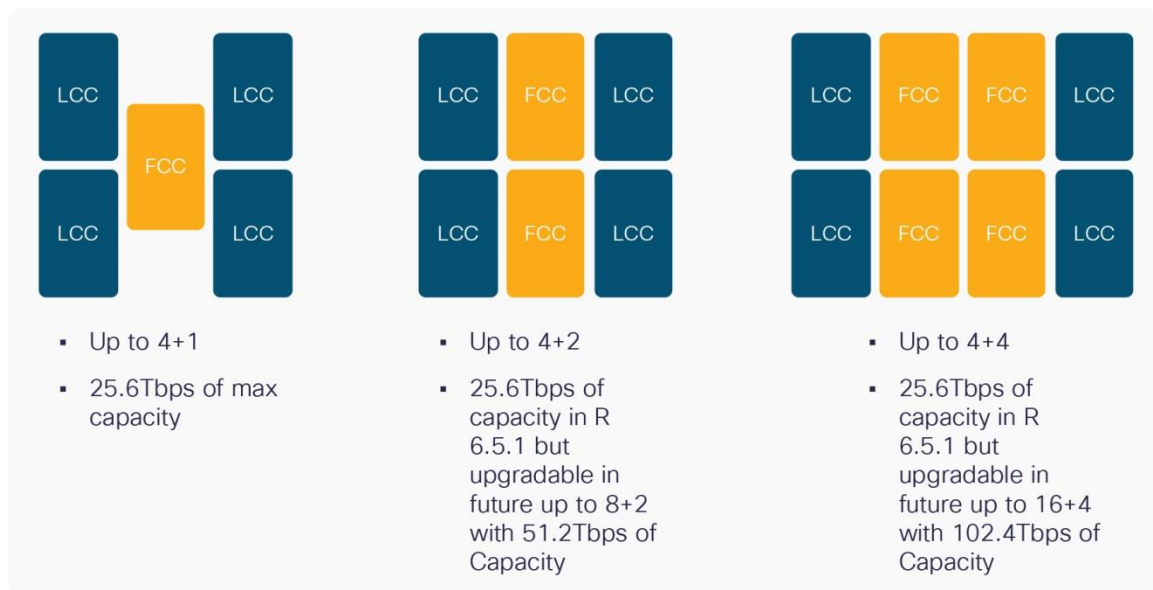
1+2, 2+2, 3+2, 4+2, 5+2, 6+2, 7+2 and 8+2 with 2 x FCCs

1+3, 2+3, 3+3, 4+3, 5+3, 6+3, 7+3 ..... up to 12+3 with 3 x FCCs

1+4, 2+4, 3+4, 4+4, 5+4, 6+4, 7+4 ..... up to 16+4 with 4 x FCCs

It is required to double-check SW release availability to manage the right configuration.

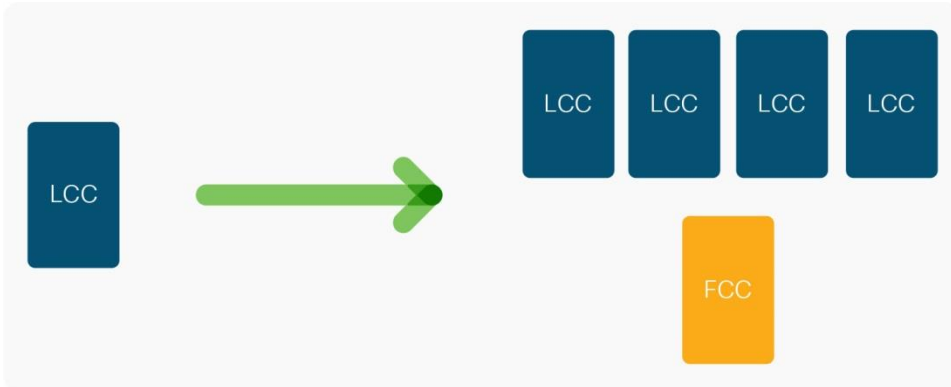
**Figure 2.** Examples of Cisco NCS 4000 Multi-chassis Configuration



## NCS 4000 Single-Chassis to Multi-Chassis Migration

It is a typical use case to have unplanned demand hitting a node. NCS 4000 platform allows a smooth and not traffic affecting upgrade from a single NCS 4016 chassis system to a NCS 4000 Multi-chassis System as depicted in Figure 3.

**Figure 3.** Single Chassis to Multi-Chassis Migration



Procedures implies insertion of CXP Pluggable on the NCS 4016 fabrics and MPO cable connection between CXP on NCS 4016 and the CXP of the Centralized Fabric of FCC system.

## NCS 4000 FCC system

The core of the NCS 4000 Multi-Chassis system is the Fabric Card Chassis (FCC). It is a 40" Rack that can host 8 Centralize Fabrics (Fig. 4) and 2 RP-MC Line Card.

**Figure 4.** Fabric Card Chassis



RP-MC (Fig.5) has the role to manage the FCC system and provide management plane connectivity between the different LCC. Two of them are hosted in each FCC providing the highest level of redundancy.

**Figure 5.** RP-MC Line Card



Centralized Fabric Card (Fig.6) acts as S2 fabric in a typical three stage CLOS fabric system. It hosts up to 24 CXP2 pluggable used to interconnect the Centralized Fabric card with the 4 Fabrics in the NCS 4016 system.

**Figure 6.** Centralized Fabric Card



## Product specification

Table 1 lists specifications for the Cisco NCS 4000 Series FCC System. For more information about the Cisco NCS 4000 Series, visit: <https://www.cisco.com/c/en/us/products/optical-networking/network-convergence-system-4000-series/index.html>.

**Table 1.** Cisco NCS FCC Product specifications

Feature	Description
<b>Software compatibility</b>	Cisco IOS XR Software Release 6.5.1 or later 6.5.1 supported configuration up to 4+4
<b>Components</b>	Each Cisco NCS 4000 Series fabric card chassis includes: <ul style="list-style-type: none"> <li>• FCC Rack</li> <li>• 8 FCC fabric card slots</li> <li>• 2 fan trays</li> <li>• Air inlet filter</li> <li>• 2 power Entry Modules supporting 4x PSU DC each</li> </ul>
<b>LCC Connectivity</b>	<ul style="list-style-type: none"> <li>• 24 CXP2 ports/FCC fabric card</li> <li>• NCS 4016 chassis shall be equipped with ECU2</li> </ul>
<b>Management</b>	RP-MC (Route processor MultiChassis)
<b>System capacity</b>	25.6 Tbps per FCC Up to 102.4Tbps total switching capacity in max multi-chassis configuration

Feature	Description
<b>Reliability and availability</b>	System redundancy: <ul style="list-style-type: none"> <li>• Power redundancy 1:1 or 1:N</li> <li>• Fan tray redundancy 1:1</li> <li>• Shelf Controller redundancy 1:1</li> </ul>
<b>Network management</b>	Enhanced CLI XML interface Simple Network Management Protocol (SNMP) and MIB support Cisco EPNM TL1 Cisco Transport Controller as Craft Tool
<b>Physical dimensions</b>	Chassis height: <ul style="list-style-type: none"> <li>• 70.7 inches (1796 mm)</li> </ul> Chassis width: <ul style="list-style-type: none"> <li>• 17.54 in. (445.5 mm) chassis side to side</li> <li>• 19.5 in. (495.4 mm) with door assembled</li> </ul> Chassis depth: (inclusive of external cosmetic doors) <ul style="list-style-type: none"> <li>• 17.77 inches (451.4 mm) with door</li> </ul> Weight (chassis only): 103 kg
<b>Rack Mounting</b>	<ul style="list-style-type: none"> <li>• ANSI 19" or 23"</li> <li>• ETSI 600x600</li> </ul>
<b>Power</b>	<ul style="list-style-type: none"> <li>• 1.75-kW DC power modules</li> <li>• Worldwide ranging DC (-40 to -72V; 50A maximum)</li> </ul>
<b>Environmental conditions</b>	<ul style="list-style-type: none"> <li>• Storage temperature: -40 to 158°F (-40 to 70°C)</li> <li>• Operating temperature: <ul style="list-style-type: none"> <li>• Normal: 41 to 104°F (5 to 40°C)</li> <li>• Short term: 23 to 122°F (-5 to 50°C)**</li> </ul> </li> <li>• Relative humidity: 5 to 85%</li> </ul>

\*\* Short term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year. (This number refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)

**Table 2.** Physical characteristic for the Cisco NCS 4000 Multi-chassis System

Parameter	Description
<b>Power consumption</b>	NCS4KF-CRAFT: Min: 6W; Max 10W NCS4KF-FTA: Min: 670W; Max 780W NCS4KF-RPMC: Min: 370W; Max 450W NCS4KF-FC2-C: Min: 560W; Max 630W
<b>MTBF</b>	NCS4KF-SA-DC: 5,071,610 hrs NCS4KF-CRAFT: 3,841,650 hrs NCS4KF-FTA: 327,810 hrs NCS4KF-RPMC:190,003 NCS4KF-FC2-C: 267,008 hrs
<b>Physical dimensions</b>	NCS4KF-RPMC: 2,84 x 22,38 x 13,8 (H x W x D) inches NCS4KF-FC2-C: 3,58 x 22,38 x 13 (H x W x D) inches NCS4KF-CRAFT: 1,68 x 17,28 x 12,17 (H x W x D) inches NCS4KF-FTA: 1,68 x 17,28 x 12,17 (H x W x D) inches
<b>Weight</b>	NCS4KF-SA-DC: 92,28 Pounds NCS4KF-RPMC: 5,89 Pounds NCS4KF-FC2-C: 8,5 Pounds NCS4KF-CRAFT: 11,8 Pounds NCS4KF-FTA: 11,8 Pounds

## Approvals and compliance

Table 3 lists compliance and agency approvals for the Cisco NCS 4000 System.

**Table 3.** Compliance and Agency Approvals for Cisco NCS 4016

Feature	Description
<b>Safety standards</b>	<ul style="list-style-type: none"> <li>• UL/CSA/IEC/EN 60950-1</li> <li>• IEC/EN 60825 Laser Safety</li> <li>• FDA: Code of Federal Regulations Laser Safety</li> </ul>
<b>Electromagnetic Interference (EMI)</b>	<ul style="list-style-type: none"> <li>• FCC Class A</li> <li>• ICES 003 Class A</li> <li>• CISPR 22 (EN55022) Class A</li> <li>• VCCI Class A</li> <li>• IEC/EN 61000-3-2: Power Line Harmonics</li> <li>• IEC/EN 61000-3-3: Voltage Fluctuations and Flicker</li> </ul>
<b>Immunity (basic standards)</b>	<ul style="list-style-type: none"> <li>• IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8-kV contact, 15-kV air)</li> <li>• IEC/EN-61000-4-3: Radiated Immunity (10V/m)</li> <li>• IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2-kV power, 1-kV signal)</li> <li>• IEC/EN-61000-4-5: Surge AC Port (4-kV CM, 2-kV DM)</li> <li>• IEC/EN-61000-4-5: Signal Ports (1 kV)</li> <li>• IEC/EN-61000-4-5: Surge DC Port (1 kV)</li> <li>• IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10 Vrms)</li> <li>• IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m)</li> <li>• IEC/EN-61000-4-11: Voltage Dips, Short Interruptions, and Voltage Variations</li> </ul>
<b>ETSI and EN</b>	<ul style="list-style-type: none"> <li>• EN300 386: Telecommunications Network Equipment (EMC)</li> <li>• EN55022: Information Technology Equipment (Emissions)</li> <li>• EN55024: Information Technology Equipment (Immunity)</li> <li>• EN50082-1/EN-61000-6-1: Generic Immunity Standard</li> </ul>
<b>Network Equipment Building Standards (NEBS)</b>	<p>This product is designed to meet the following requirements (qualification in progress):</p> <ul style="list-style-type: none"> <li>• SR-3580: NEBS Criteria Levels (Level 3)</li> <li>• GR-1089-CORE: NEBS EMC and Safety</li> <li>• GR-63-CORE: NEBS Physical Protection</li> </ul>

## Ordering information

To place an order, visit the [Cisco Ordering Home Page](#) and refer to Table 4 and Table 5. To download software, visit the [Cisco Platform Suite](#).

**Table 4.** Orderable HW item list

PID	Description
<b>NCS4KF-STRT-KIT</b>	NCS 4000 Centralized Fabric Sys Starter Kit - DC Power
<b>NCS4KF-SA-DC</b>	NCS 4000 Centralized Fabric chassis - DC Power
<b>NCS4KF-SA-DC=</b>	NCS 4000 Centralized Fabric chassis - DC Power
<b>NCS4KF-DOOR</b>	NCS 4000 Centralized Fabric Chassis Door
<b>NCS4KF-DOOR=</b>	NCS 4000 Centralized Fabric Chassis Door
<b>NCS4KF-FTA</b>	NCS 4000 Centralized Fabric Chassis Fan tray Assembly
<b>NCS4KF-FTA=</b>	NCS 4000 Centralized Fabric Chassis Fan tray Assembly
<b>NCS4KF-INST-KIT</b>	NCS 4000 systems Installation Kit
<b>NCS4KF-INST-KIT=</b>	NCS 4000 system NCS 4000 systems Installation Kits Installation Kit
<b>NCS4KF-CRAFT</b>	NCS 4000 Centralized Fabric Chassis Craft Panel
<b>NCS4KF-CRAFT=</b>	NCS 4000 Centralized Fabric Chassis Craft Panel
<b>NCS4KF-FC2-C=</b>	NCS 4000 Centralized Agnostic Xross connect 24 CXP2 - 400G

PID	Description
<b>NCS4KF-RPMC=</b>	NCS 4000 RP w/ Ethernet Switch for Multi-Chassis Connect
<b>ONS-CXP2-MPO-10=</b>	Multi-mode patchcord - MPO to MPO - For CXP2 - 10m
<b>ONS-CXP2-MPO-20=</b>	Multi-mode patchcord - MPO to MPO - For CXP2 - 20m
<b>ONS-CXP2-MPO-30=</b>	Multi-mode patchcord - MPO to MPO - For CXP2 - 30m
<b>ONS-CXP2-MPO-40=</b>	Multi-mode patchcord - MPO to MPO - For CXP2 - 40m
<b>ONS-CXP2-MPO-50=</b>	Multi-mode patchcord - MPO to MPO - For CXP2 - 50m
<b>ONS-CXP2-MPO-70=</b>	Multi-mode patchcord - MPO to MPO - For CXP2 - 70m
<b>ONS-CXP2-MPO-100=</b>	Multi-mode patchcord - MPO to MPO - For CXP2 - 100m
<b>ONS-SYNC-CBL-15=</b>	NCS 4000 Multichassis synchronization cable - 15 meters
<b>ONS-SYNC-CBL-25=</b>	NCS 4000 Multichassis synchronization cable - 25 meters
<b>ONS-SYNC-CBL-50=</b>	NCS 4000 Multichassis synchronization cable - 50 meters
<b>ONS-SYNC-CBL-75=</b>	NCS 4000 Multichassis synchronization cable - 75 meters
<b>ONS-SYNC-CBL-25=</b>	NCS 4000 Multichassis synchronization cable - 25 meters
<b>ONS-SYNC-CBL-100=</b>	NCS 4000 Multichassis synchronization cable - 100 meters
<b>ONS-CXP2-SR25</b>	CXP2 Transceiver module - 12x25G - Fabric Interconnect
<b>ONS-CXP2-SR25=</b>	CXP2 Transceiver module - 12x25G - Fabric Interconnect
<b>NCS4K-ECU2=</b>	NCS 4000 External Connection Unit - Version 2
<b>NCS4K-ECU2</b>	NCS 4000 External Connection Unit - Version 2

**Table 5.** Orderable SW item list

PID	Description
<b>XR-NCS4K-651K9</b>	Delivery of XR 6.5.1 for NCS4K; grants RTU license
<b>XR-NCS4K-651K9=</b>	USB Key delivery of XR 6.5.1 for NCS4K; grants RTU license
<b>NCS4K-RTU-651K9</b>	RTU of XR 6.5.1 for NCS4K
<b>E-NCS4K-651K9=</b>	E-delivery of XR 6.5.1 for NCS4K; grants RTU license

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### For more information

For more information about the Cisco Network Convergence System 4000, visit <https://www.cisco.com/go/ncs4000> or contact your local Cisco account representative.




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