



Release Notes for Cisco NCS 4206 and Cisco NCS 4216 Series, Cisco IOS XE Amsterdam 17.1.x

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Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883



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CHAPTER 1

Introduction



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This document provides information about the IOS XE software release for the Cisco NCS 4206 and Cisco NCS 4216 beginning with Cisco IOS XE Release 3.18SP.

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Overview of Cisco NCS 4206 and NCS 4216

Cisco NCS 4206

The Cisco NCS 4206 is a fully-featured aggregation platform designed for the cost-effective delivery of converged mobile and business services. With shallow depth, low power consumption, and an extended temperature range, this compact 3-rack-unit (RU) chassis provides high service scale, full redundancy, and flexible hardware configuration.

The Cisco NCS 4206 expands the Cisco service provider product portfolio by providing a rich and scalable feature set of Layer 2 VPN (L2VPN) and Layer 3 VPN (L3VPN) services in a compact package. It also supports a variety of software features, including Carrier Ethernet features, Timing over Packet, and pseudowire.

For more information on the Cisco NCS 4206 Chassis, see the [Cisco NCS 4206 Hardware Installation Guide](#).

Cisco NCS 4216

The Cisco NCS 4216 is a seven-rack (7RU) unit chassis that belongs to the Cisco NCS 4200 family of chassis. This chassis complements Cisco's offerings for IP RAN solutions for the GSM, UMTS, LTE and CDMA. Given its form-factor, interface types and Gigabit Ethernet density the Cisco NCS 4216 can also be positioned as a Carrier Ethernet aggregation platform.

The Cisco NCS 4216 is a cost optimized, fully redundant, centralized forwarding, extended temperature, and flexible pre-aggregation chassis.

For more information about the Cisco NCS 4216 Chassis, see the [Cisco NCS 4216 Hardware Installation Guide](#).

Cisco NCS 4216 F2B

The Cisco NCS 4216 F2B is a 14-rack unit router that belongs to the Cisco NCS 4200 family of routers. This router complements Cisco's offerings for IP RAN solutions for the GSM, UMTS, LTE, and CDMA. Given its form-factor, interface types, and Gigabit Ethernet density the Cisco NCS 4216 F2B can also be positioned as a Carrier Ethernet aggregation platform.

The Cisco NCS 4216 F2B is a cost optimized, fully redundant, centralized forwarding, extended temperature, and flexible pre-aggregation router.

For more information about the Cisco NCS 4216 F2B Chassis, see the [Cisco NCS 4216 F2B Hardware Installation Guide](#).

NCS 4216 14RU

The Cisco NCS 4216 14RU is a 14-rack unit router that belongs to the Cisco NCS 4200 family of routers. This router complements Cisco's offerings for IP RAN solutions for the GSM, UMTS, LTE, and CDMA. Given its form-factor, interface types and Gigabit Ethernet density the Cisco NCS 4216 14RU can also be positioned as a Carrier Ethernet aggregation platform.

The Cisco NCS 4216 14RU is a cost optimized, fully redundant, centralized forwarding, extended temperature, and flexible pre-aggregation router.

For more information about the Cisco NCS 4216 14RU chassis, see the [Cisco NCS 4216 14RU Hardware Installation Guide](#).

Feature Navigator

You can use Cisco Feature Navigator to find information about feature, platform, and software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on cisco.com is not required.

Hardware Supported

The following sections list the hardware supported for Cisco NCS 4206 and Cisco NCS 4216 chassis.

Cisco NCS 4206 Supported Interface Modules

Supported Interface Modules



Note If the **license feature service-offload enable** command is configured, then the NCS4200-1T8LR-PS IM is not supported in the router for RSP3.



Note There are certain restrictions in using the interface modules on different slots in the chassis. Contact Cisco Sales/Support for the valid combinations.



Note FAN OIR is applicable every time the IM based fan speed profile is switched to NCS4200-1H-PK= and NCS4200-2Q-P interface modules. Even though the IMs remain in the Out-of-Service state, they are still considered as present in the chassis.

Table 1: NCS420X-RSP Supported Interface Modules and Part Numbers

RSP Module	Supported Interface Modules	Part Numbers	Slot
NCS420X-RSP	8-port 10 Gigabit Ethernet Interface Module (8X10GE)	NCS4200-8T-PS	All
	1-port 100 Gigabit Ethernet Interface Module (1X100GE)	NCS4200-1H-PK=	4 and 5
	2-port 40 Gigabit Ethernet QSFP Interface Module (2X40GE)	NCS4200-2Q-P	4 and 5
	8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module	NCS4200-1T16G-PS	0,3,4, and 5
	1-port OC-192 Interface module or 8-port Low Rate Interface Module	NCS4200-1T8S-10CS	2,3,4, and 5
	NCS 4200 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module	NCS4200-1T8S-20CS	2,3,4, and 5 ¹
	48-port T1/E1 CEM Interface Module	NCS4200-48T1E1-CE	All
	48-port T3/E3 CEM Interface Module	NCS4200-48T3E3-CE	All
	2-port 100 Gigabit Ethernet (QSFP) Interface Module (2X100GE) ²	NCS4200-2H-PQ	4,5
	1-port OC48 ³ / STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-Port T3/E3 CEM Interface Module	NCS4200-3GMS	2,3,4, and 5

¹ These slots are supported on 10G or 20G mode.

² IM supports only one port of 100G with RSP3 as QSFP28 on Port 0 in both slots 4 and 5.

³ If OC48 is enabled, then the remaining 3 ports are disabled.

Table 2: NCS420X-RSP-128 Supported Interface Modules and Part Numbers

RSP Module	Supported Interface Modules	Part Numbers	Slot
NCS420X-RSP	SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet Interface Module (1X10GE)	NCS4200-1T8LR-PS	All
	8-port T1/E1 CEM Interface Module	NCS4200-8E1T1-CE	All
	1-port OC48 ⁴ / STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-Port T3/E3 CEM Interface Module	NCS4200-3GMS	2,3,4, and 5

⁴ If OC48 is enabled, then the remaining 3 ports are disabled.

Cisco NCS 4216 Supported Interface Modules

For information on supported interface modules, see [Supported Interface Modules](#).

Swapping of Interface Modules

The following Ethernet interface modules support swapping on the Cisco NCS4216-RSP module:

Use the **hw-module subslot default** command before performing a swap of the modules to default the interfaces on the interface module.

- SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)
- 2-port 40 Gigabit Ethernet Interface Module (2X40GE)
- 8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module
- 8-port 10 Gigabit Ethernet Interface Module (8X10GE)
- 1-port 100 Gigabit Ethernet Interface Module (1X100GE)
- 2-port 100 Gigabit Ethernet (QSFP) Interface Module (2X100GE)

Use of **hw-module subslot default** command is not supported on the following interface modules.

- OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO)
- 48 T1/E1 TDM Interface Module (48XT1/E1)
- 48 T3/E3 TDM Interface Module (48XT3/E3)
- 1-port OC48 STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-Port T1/E1 + 4-Port T3/E3 CEM Interface Module
- NCS 4200 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module



Note If the **license feature service-offload enable** command is configured, then the NCS4200-1T8LR-PS IM is not supported in the router for RSP3.



Note There are certain restrictions in using the interface modules on different slots in the chassis. Contact Cisco Sales/Support for the valid combinations.

Table 3: NCS4216-RSP Supported Interface Modules and Part Numbers

RSP Module	Interface Modules	Part Number	Slot
NCS4216-RSP	SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)	NCS4200-1T8LR-PS	2,5,6,9,10,13,14,15
	1-port 100 Gigabit Ethernet Interface Module (1X100GE)	NCS4200-1H-PK	7,8
	2-port 100 Gigabit Ethernet (QSFP) Interface Module (2X100GE) ⁵	NCS4200-2H-PQ	7,8
	2-port 40 Gigabit Ethernet QSFP Interface Module (2X40GE)	NCS4200-2Q-P	3,4,7,8,11,12
	8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module	NCS4200-1T16G-PS	All slots
	1-port OC48 ⁶ / STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-Port T3/E3 CEM Interface Module	NCS4200-3GMS	All slots
	8-port 10 Gigabit Ethernet Interface Module (8X10GE)	NCS4200-8T-PS	3,4,7,8,11,12
	1-port OC-192 Interface Module with 8-port Low Rate CEM Interface Module (5G/ 10G HO / 10G LO)	NCS4200-1T8S-10CS	3,4,7,8,11,12 (10G mode) 0,1,2,5,6,9,10,13,14,15 (5G mode) Note To enable this IM on slot 0 or slot 1, do the following and reload the router: <pre>Router# configure t Router(config)# license feature service-offload enable</pre>
	NCS 4200 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module	NCS4200-1T8S-20CS	3,4,7,8,11,12 (20G mode) 0,1,2,5,6,9,10,13,14,15 (10G mode) Note To enable this IM on slot 0 or slot 1, do the following and reload the router: <pre>Router# configure t Router(config)# license feature service-offload enable</pre>
	48-port T1/E1 Interface module	NCS4200-48T1E1-CE	2,3,4,5,6,7,8,9,10,13,14,15

RSP Module	Interface Modules	Part Number	Slot
	48-port T3/E3 Interface module	NCS4200-48T3E3-CE	2,3,4,5,6,7,8,9,10,13,14,15

⁵ IM supports only one port of 100G with RSP3 as QSFP28 on Port 0 in both slots 7 and 8.

⁶ If OC48 is enabled, then the remaining 3 ports are disabled.

Cisco NCS 4216 F2B Supported Interface Modules

For information on supported interface modules, see [Supported Interface Modules](#).

Swapping of Interface Modules

The following interface modules support swapping on the Cisco NCS4216-RSP module:

- SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)
- 2-port 40 Gigabit Ethernet Interface Module (2X40GE)
- 8-port 10 Gigabit Ethernet Interface Module (8X10GE)
- 1-port 100 Gigabit Ethernet Interface Module (1X100GE)
- 2-port 100 Gigabit Ethernet Interface Module (2X100GE)
- 8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module
- 1-port OC-192 Interface Module with 8-port Low Rate CEM Interface Module (10G HO / 10G LO)
- 48-port T1/E1 TDM Interface Module (48XT1/E1)
- 48-port T3/E3 TDM Interface Module (48XT3/E3)
- 1-port OC 482/ STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-Port T3/E3 CEM Interface Module (NCS4200-3GMS)
- 1-Port 10 Gigabit MR and 8-Port LR 20 Gigabit CEM and iMSG Interface Module (NCS 4200-1T8S-20CS)

Use the **hw-module subslot default** command before performing a swap of the modules to default the interfaces on the interface module.

See the *Cisco NCS 4216 Router Hardware Installation Guide* for information on Supported Interface Modules on the RSP.



Note If the **license feature service-offload enable** command is configured, then the NCS4200-1T8LR-PS IM is not supported in the router for RSP3.



Note There are certain restrictions in using the interface modules on different slots in the chassis. Contact Cisco Sales/Support for the valid combinations.

Table 4: Cisco NCS4216-RSP Supported Interface Modules and Part Numbers

RSP Module	Interface Modules	Part Number	Slot
NCS4216-RSP	SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)	NCS4200-1T8LR-PS	2,5,6,9,10,13,14,15
	1-port 100 Gigabit Ethernet Interface Module (1X100GE)	NCS4200-1H-PK	7,8
	2-port 100 Gigabit Ethernet (QSFP) Interface Module (2X100GE) ⁷	NCS4200-2H-PQ	7,8
	2-port 40 Gigabit Ethernet QSFP Interface Module (2X40GE)	NCS4200-2Q-P	3,4,7,8,11,12
	8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module	NCS4200-1T16G-PS	All slots
	8-port 10 Gigabit Ethernet Interface Module (8X10GE)	NCS4200-8T-PS	3,4,7,8,11,12
	1-port OC-192 Interface Module with 8-port Low Rate CEM Interface Module (5G/ 10G HO / 10G LO)	NCS4200-1T8S-10CS	3,4,7,8,11,12 (10G mode) 0,1,2,5,6,9,10,13,14,15 (5G mode)
	NCS 4200 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module	NCS4200-1T8S-20CS	3,4,7,8,11,12 (20G mode) 0,1,2,5,6,9,10,13,14,15 (10G mode)
	48XT1/E1 Interface module	NCS4200-48T1E1-CE	2,3,4,5,6,7,8,9,10,13,14,15
	48XT3/E3 Interface module	NCS4200-48T3E3-CE	2,3,4,5,6,7,8,9,10,13,14,15
	1-port OC48 ⁸ / STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-Port T3/E3 CEM Interface Module	NCS4200-3GMS	All slots

⁷ IM supports only one port of 100G with RSP3 as QSFP28 on Port 0 in both slots 7 and 8.

⁸ If OC48 is enabled, then the remaining 3 ports are disabled.

Restrictions and Limitations for Cisco NCS 4206 and Cisco NCS 4216



Note The error message "PLATFORM-1-NOSPACE: SD bootflash : no space alarm assert" may occur in the following scenarios:

- Any sector of SD Card gets corrupted
- Improper shut down of router
- power outage.

This issue is observed on platforms which use EXT2 file systems.

We recommend performing a reload of the router. As a result, above alarm will not be seen during the next reload due to FSCK(file systems check) execution.

However, If the error persists after a router reload, we recommend to format the bootflash or FSCK manually from IOS.

- In the Cisco IOS XE 16.12.1 release, IPSec is not supported on the Cisco RSP3 module.
- VT PMON is not supported.
- APS is supported across interface modules. But it is not supported on the same interface module.
- VT loopback is not supported if T1 is configured for the VT mode.
- DS1/DS3 SF/SD is not supported.
- Alternate 0's and 1's BERT pattern is not supported for DS1.
- All zeros BERT pattern on system side does not get in sync on DS3.
- DS3/OCx MDL does not interoperate with legacy Q.921 standards.
- APM is not supported with EPAR on CEP.
- FDL is not supported.
- STS24-c is not supported on 1-port OC-192 or 8-port low rate CEM interface module.
- Port restriction on 1-port OC-192 or 8-port low rate CEM interface module. If you have OC-48 configured on a port, you cannot use the neighboring port.
- Bellcore remote loopbacks are not supported for DS1/DS3. Only T1.403 remote loopbacks are supported.
- CEP MIB is not supported.
- HSPW is not supported on DS3/DS1/OCX card.
- The **ip cef accounting** command is not supported on the chassis.

- Crash may be observed on the chassis when EoMPLS, CEM, ATM and IMA Pseudowire Redundancy (PW-redundancy) configurations exist while switchover and fail back of the pseudowires are being triggered, and the **show platform hardware pp active pw eompls** command is executed.
- Configuration sync does not happen on the Standby RSP when the active RSP has Cisco Software Licensing configured, and the standby RSP has Smart Licensing configured on the chassis. If the active RSP has Smart Licensing configured, the state of the standby RSP is undetermined. The state could be pending or authorized as the sync between the RSP modules is not performed.
- Evaluation mode feature licenses may not be available to use after disabling, and enabling the smart licensing on the Cisco NCS 4206. A reload of the chassis is required.
- Ingress counters are not incremented for packets of the below format on the RSP3 module for the 10 Gigabit Ethernet interfaces, 100 Gigabit Ethernet interfaces, and 40 Gigabit Ethernet interfaces:

Packet format

MAC header---->Vlan header---->Length/Type

When these packets are received on the RSP3 module, the packets are not dropped, but the counters are not incremented.

- T1 SAToP, T3 SAToP, and CT3 are supported on an UPSR ring only with local connect mode. Cross connect of T1, T3, and CT3 circuits to UPSR are not supported.
- DCC is supported only on PPP encapsulation. It is not supported on CLNS encapsulation.
- If oversubscription is enabled on 8-port 10 Gigabit Ethernet interface module, PTP is not supported.
- Traffic is dropped when packets of size 64 to 100 bytes are sent on 1G and 10G ports.
 - For 64-byte packets, traffic drop is seen at 70% and beyond of the line rate.
 - For 90-byte packets, traffic drop is seen at 90% and beyond of the line rate.
 - For 95-byte packets, traffic drop is seen at 95% and beyond of the line rate.

Traffic is dropped when:

- Traffic is sent on a VRF interface.
- Traffic is sent across layer 2 and layer 3.

However, traffic is not dropped when the packet size is greater than 100 bytes, even if the packets are sent bi-directionally at the line rate.

- In the Cisco IOS XE 17.1.1 release, the EVPN EVI type is VLAN-based by default, and while configuring for the EVPN EVI type, it is recommended to configure the EVPN EVI type as VLAN-based, VLAN bundle and VLAN aware model.
- Effective with Cisco IOS XE Everest 16.6.1, the Port-channel (PoCH) scale is reduced to 24 from 48 for Cisco ASR 900 RSP3 module.



Note The PoCH scale for Cisco NCS 4216 routers is 48.

Determining the Software Version

You can use the following commands to verify your software version:

- Consolidated Package—**show version**
- Individual sub-packages—**show version installed** (lists all installed packages)

Upgrading to a New Software Release

Only Cisco IOS XE 3S consolidated packages can be downloaded from Cisco.com; users who want to run the chassis using individual subpackages must first download the image from Cisco.com and extract the individual subpackages from the consolidated package.

ROMMON Version

For software upgrade later than the Cisco IOS XE 16.9.x release, it is mandatory that you upgrade the ROMMON version to 15.6(49r)S.

Supported FPGA Versions for NCS 4206 and NCS 4216

Use the **show hw-module all fpd** command to display the IM FPGA version on the chassis.

Use the **show platform software agent iomd [slot/subslot] firmware cem-fpga** command to display the CEM FPGA version on the chassis.

The table below lists the FPGA version for the software releases.



Note During ISSU, TDM interface modules are reset for FPGA upgrade.

Table 5: Supported FPGA Versions for NCS 4206-RSP3 and NCS 4216

	Cisco IOS XE Release	48 X T1/E1 CEM Interface Module FPGA	48 X T3/E3 CEM Interface Module FPGA	OC-192 Interface Module + 8-port Low Rate Interface Module FPGA	NCS 4206-RSP3	NCS 4216-RSP3	8x10G FPGA	2x40G FPGA	1x100G FPGA
IM FPGA	3.18SP	1.22	1.22	1.12	—	—	0.17 (0x1100 H)	0.22 (0x1600 H)	0.19 (0x1300 H)
CEM FPGA		4.6	4.6	6.6	—	—	—	—	—

	Cisco IOS XE Release	48 X T1/E1 CEM Interface Module FPGA	48 X T3/E3 CEM Interface Module FPGA	OC-192 Interface Module + 8-port Low Rate Interface Module FPGA	NCS 4201/178S/20CS	NCS 4203/3GMS	8x10G FPGA	2x40G FPGA	1x100G FPGA
IM FPGA	3.18.1SP	1.22	1.22	1.12	—	—	0.17 (0x1100 H)	0.22 (0x1600 H)	0.19 (0x1300 H)
CEM FPGA		4.6	4.6	7.0	—	—	—	—	—
IM FPGA	16.5.1	1.22	1.22	1.15	—	—	0.21 (0x1500 H)	0.22 (0x1600 H)	0.20 (0x1400 H)
CEM FPGA		0x46310046	0x46310046	5G mode: 0x10070059 10G mode: 0x10050073	—	—	—	—	—
IM FPGA	16.6.1	1.22	1.22	1.15	—	—	0.21 (0x1500 H)	0.22 (0x1600 H)	0.20 (0x1400 H)
CEM FPGA		0x46310046	0x46310046	5G mode: 0x10070059 10G mode: 0x10050073	—	—	—	—	—
IM FPGA	16.7.1	1.22	1.22	1.15	—	2.0	0.21 (0x1500 H)	0.22 (0x1600 H)	0.20 (0x1400 H)
CEM FPGA		0x46410046	0x46410046	5G mode: 0x10780059 10G mode: 0x10120076	—	0x10230039	—	—	—
IM FPGA	16.8.1	1.22	1.22	1.15	—	2.0	0.22	0.22	0.20
CEM FPGA		0x46470046	0x46470046	5G mode: 0x10780059 10G mode: 0x10670075	—	0x10380039	—	—	—

	Cisco IOS XE Release	48 X T1/E1 CEM Interface Module FPGA	48 X T3/E3 CEM Interface Module FPGA	OC-192 Interface Module + 8-port Low Rate Interface Module FPGA	NCS 4206-1T8S-2DCS	NCS 4206-3GMS	8x10G FPGA	2x40G FPGA	1x100G FPGA
IM FPGA	16.9.1	1.22	1.22	1.15	—	2.0	0.22	0.22	0.20
CEM FPGA		0x50090050	0x50060050	5G mode: 0x10070062 10G mode: 0x10480078	—	0x10520063	—	—	—
IM FPGA	16.10.1	1.22	1.22	1.15	—	2.0	0.22	0.22	0.20
CEM FPGA		0x50090050	0x50060050	5G mode: 0x10070062 10G mode: 0x10480078	—	0x10520063	—	—	—
IM FPGA	16.11.1	1.22	1.22	1.15	—	2.0	0.22	0.22	0.20
CEM FPGA		0x00000051	0x00000051	5G mode: 0x10180062 10G mode: 0x10510078	—	0x10820063	—	—	—
IM FPGA	16.12.1	1.22	1.22	1.15	0.80	2.0	0.22	0.22	0.20
CEM FPGA		0x00000051	0x00000051	5G mode: 0x10180062 10G mode: 0x10510078	10G mode: 0x10260046 20G mode: 0x10710047	0x10050071	—	—	—

	Cisco IOS XE Release	48 X T1/E1 CEM Interface Module FPGA	48 X T3/E3 CEM Interface Module FPGA	OC-192 Interface Module + 8-port Low Rate Interface Module FPGA	NCS 4201-178S-20CS	NCS 4203-3GMS	8x10G FPGA	2x40G FPGA	1x100G FPGA
IM FPGA	16.12.2	1.22	1.22	1.15	0.80	2.0	0.22	0.22	0.20
CEM FPGA		0x00000051	0x00000051	5G mode: 0x10180062 10G mode: 0x10510078	10G mode: 0x10260046 20G mode: 0x10710047	0x10050071	—	—	—
IM FPGA	17.1.1	1.22	1.22	1.15	0.80	2.0	0.22	0.22	0.20
CEM FPGA		0x52050052	0x52310052	5G mode: 0x10180062 10G mode: 0x10510078	10G mode: 0x10770047 20G mode: 0x10710047	0x10060071	—	—	—

Documentation Updates

Rearrangement in the Configuration Guides

- The following are the modifications in the CEM guides.
 - Introduction of the Alarm Configuring and Monitoring Guide:

This guide provides the following information:

 - Alarms supported for SONET and SDH, and their maintenance
 - Alarm profiling feature
 - Auto In-Service States for cards, ports, and transceivers
 - Rearrangement of Chapter and Topics in the Alarm Configuring and Monitoring Guide:
 - The Auto In-Service States Guide is now a chapter inside the Alarms Configuring and Monitoring Guide.
 - Alarms at SONET Layers topic in the following CEM guides, is added to the Alarms Configuring and Monitoring Guide:

- 1-Port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide
- The Alarm History and Alarm Profiling chapters are removed from the below CEM Technology guides, and added into the Alarm Configuring and Monitoring Guide:
 - 1-Port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide

Additional References

Deferrals

Cisco IOS software images are subject to deferral. We recommend that you view the deferral notices at the following location to determine whether your software release is affected:

http://www.cisco.com/en/US/products/products_security_advisories_listing.html.

Field Notices and Bulletins

- Field Notices—We recommend that you view the field notices for this release to determine whether your software or hardware platforms are affected. You can find field notices at http://www.cisco.com/en/US/support/tsd_products_field_notice_summary.html.
- Bulletins—You can find bulletins at http://www.cisco.com/en/US/products/sw/iosswrel/ps5012/prod_literature.html.

MIB Support

The below table summarizes the supported MIBs on the Cisco NCS 4206 and Cisco NCS 4216.

Supported MIBs		
BGP4-MIB (RFC 1657)	CISCO-IMAGE-LICENSE-MGMT-MIB	MPLS-LDP-STD-MIB (RFC 3815)
CISCO-BGP-POLICY-ACCOUNTING-MIB	CISCO-IMAGE-MIB	MPLS-LSR-STD-MIB (RFC 3813)
CISCO-BGP4-MIB	CISCO-IPMROUTE-MIB	MPLS-TP-MIB
CISCO-BULK-FILE-MIB	CISCO-LICENSE-MGMT-MIB	MSDP-MIB
CISCO-CBP-TARGET-MIB	CISCO-MVPN-MIB	NOTIFICATION-LOG-MIB (RFC 3014)
CISCO-CDP-MIB	CISCO-NETSYNC-MIB	OSPF-MIB (RFC 1850)
CISCO-CEF-MIB	CISCO-OSPF-MIB (draft-ietf-ospf-mib-update-05)	OSPF-TRAP-MIB (RFC 1850)
CISCO-CLASS-BASED-QOS-MIB	CISCO-OSPF-TRAP-MIB (draft-ietf-ospf-mib-update-05)	PIM-MIB (RFC 2934)
CISCO-CONFIG-COPY-MIB	CISCO-PIM-MIB	RFC1213-MIB

Supported MIBs		
CISCO-CONFIG-MAN-MIB	CISCO-PROCESS-MIB	RFC2982-MIB
CISCO-DATA-COLLECTION-MIB	CISCO-PRODUCTS-MIB	RMON-MIB (RFC 1757)
CISCO-EMBEDDED-EVENT-MGR-MIB	CISCO-PTP-MIB	RSVP-MIB
CISCO-ENHANCED-MEMPOOL-MIB	CISCO-RF-MIB	SNMP-COMMUNITY-MIB (RFC 2576)
CISCO-ENTITY-ALARM-MIB	CISCO-RTTMON-MIB	SNMP-FRAMEWORK-MIB (RFC 2571)
CISCO-ENTITY-EXT-MIB	CISCO-SONET-MIB	SNMP-MPD-MIB (RFC 2572)
CISCO-ENTITY-FRU-CONTROL-MIB	CISCO-SYSLOG-MIB	SNMP-NOTIFICATION-MIB (RFC 2573)
CISCO-ENTITY-SENSOR-MIB	DS1-MIB (RFC 2495)	SNMP-PROXY-MIB (RFC 2573)
CISCO-ENTITY-VENDORTYPE-OID-MIB	ENTITY-MIB (RFC 4133)	SNMP-TARGET-MIB (RFC 2573)
CISCO-FLASH-MIB	ENTITY-SENSOR-MIB (RFC 3433)	SNMP-USM-MIB (RFC 2574)
CISCO-FTP-CLIENT-MIB	ENTITY-STATE-MIB	SNMPv2-MIB (RFC 1907)
CISCO-IETF-ISIS-MIB	EVENT-MIB (RFC 2981)	SNMPv2-SMI
CISCO-IETF-PW-ATM-MIB	ETHERLIKE-MIB (RFC 3635)	SNMP-VIEW-BASED-ACM-MIB (RFC 2575)
CISCO-IETF-PW-ENET-MIB	IF-MIB (RFC 2863)	SONET-MIB
CISCO-IETF-PW-MIB	IGMP-STD-MIB (RFC 2933)	TCP-MIB (RFC 4022)
CISCO-IETF-PW-MPLS-MIB	IP-FORWARD-MIB	TUNNEL-MIB (RFC 4087)
CISCO-IETF-PW-TDM-MIB	IP-MIB (RFC 4293)	UDP-MIB (RFC 4113)
CISCO-IF-EXTENSION-MIB	IPROUTE-STD-MIB (RFC 2932)	CISCO-FRAME-RELAY-MIB
CISCO-IGMP-FILTER-MIB	MPLS-LDP-GENERIC-STD-MIB (RFC 3815)	

MIB Documentation

To locate and download MIBs for selected platforms, Cisco IOS and Cisco IOS XE releases, and feature sets, use Cisco MIB Locator found at the following location: <http://tools.cisco.com/ITDIT/MIBS/servlet/index>. To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to eco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at the following location: <http://tools.cisco.com/RPF/register/register.do>

Open Source License Notices

For a listing of the license notices for open source software used in Cisco IOS XE 3S Releases, see the documents accessible from the License Information page at the following location:

http://www.cisco.com/en/US/products/ps11174/products_licensing_information_listing.html

- To receive timely, relevant information from Cisco, sign up at [Cisco Profile Manager](#).
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- To obtain general networking, training, and certification titles, visit [Cisco Press](#).
- To find warranty information for a specific product or product family, access [Cisco Warranty Finder](#).

Cisco Bug Search Tool

[Cisco Bug Search Tool](#) (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.



CHAPTER 2

New Features

This chapter describes the new hardware and software features supported on the Cisco NCS 4200 Series in this release.

- [New Hardware Features for NCS 4206 and NCS 4216 in Cisco IOS XE Amsterdam 17.1.1a](#), on page 19
- [New Software Features for NCS 4206 and NCS 4216 in Cisco IOS XE Amsterdam 17.1.1a](#), on page 19
- [New Hardware Features for NCS 4206 and NCS 4216 in Cisco IOS XE Amsterdam 17.1.1](#), on page 22
- [New Software Features for NCS 4206 and NCS 4216 in Cisco IOS XE Amsterdam 17.1.1](#), on page 22

New Hardware Features for NCS 4206 and NCS 4216 in Cisco IOS XE Amsterdam 17.1.1a

There are no new hardware features for this release.

New Software Features for NCS 4206 and NCS 4216 in Cisco IOS XE Amsterdam 17.1.1a

- **Auto In-Service State for Transceiver**

The transceiver module is a logical entity that represents a Transceiver equipment. The module can be created using a CLI command or created automatically when the Transceiver (pluggable) is inserted into a port. The transceiver connected to port supports the Auto In-Service State (AINS) functionality. For example, if an alarm is raised during the AINS state, then the alarm is not reported, and the syslog is not generated. You need to enable AINS under the alarms profile and the profile should be attached to the corresponding port.

For more information, see [Auto In-Service States, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **BGP Tracking**

The selective address tracking for Border Gateway Protocol (BGP) next hop fallover with maximum-metric can be enabled using the **neighbor ip-address fall-over route-map** command.

For more information on the command, see [Cisco IOS IP Routing: BGP Command Reference](#).

- **Card Protection for STS-1 Electricals**

The router supports electrical card protection feature with 1:1 protection, or during events such as when interface module stops responding, software stops responding, or issues in other hardware components.

For more information, see [48-Port T3/E3 CEM Interface Module Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **DSCP Preservation of MLDP Traffic**

The Differentiated Services Code Point (DSCP) value does not change on both the uniform and pipe modes.

For more information, see [QoS: Classification Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **EVPN Single-Homing**

The EVPN Single-Homing feature utilizes the functionality defined in RFC 7432 (BGP MPLS-based Ethernet VPN), to achieve single-homing between a Provider Edge (PE) and a Customer Edge (CE) device.

For more information, see the [MPLS Layer 2 VPNs Configuration Guide, Cisco IOS XE 17 \(NCS 4200 Series\)](#).

- **EVPN-VPWS Single Homing over Segment Routing**

EVPN-VPWS single homing is a BGP control plane solution for point-to-point services. It has the ability to forward traffic from one network to another using Ethernet Segment without MAC lookup.

EVPN-VPWS single homing works on both IP and SR core. IP core is used to support BGP while the SR core is used to switch packets between the endpoints.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **Facility Protocol Status Support**

The routers report the protocol status using syslog or trap alarm notifications. Few syslogs and traps are not cleared when the router gets disconnected or reloaded. As a result, the alarms are not notified.

To avoid this, a new command, show facility protocol status, is introduced that displays the output of the following routing protocols status at any interval of time: IS-IS, OSPF, BGP, LDP, PTP, HSRP, BFD, TE tunnels, Bundles, pseudowires, EVPN pseudowires, CFM, SYncE, and sensor threshold violations.

For more information, see the [Cisco NCS 4200 Series Software Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **IPSLAs TWAMP Responder**

The IETF Two-Way Active Measurement Protocol (TWAMP) defines a standard for measuring round-trip network performance between any two devices that support the TWAMP protocols. The TWAMP control protocol is used to set up performance measurement sessions. It is also used to send and receive performance measurement probes.

For more information on TWAMP Responder, see the [IP SLAs Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **IPv4 Interworking Support for MLPPP Interfaces**

The Multilink Point-to-Point (MLPPP) interworking supports IPv4 Layer 2 VPN Interworking with T1 or E1 bundles on the Cisco RSP3 module. The MLPPP interworking enables service providers (offering relatively low-speed links) to use MLP and spread traffic across them in their MPLS networks. The MPLS Multilink PPP feature reduces the number of Interior Gateway Protocol (IGP) adjacencies and facilitates load sharing of traffic.

For more information, see [1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **IPv6 Interworking Support for MLPPP Interfaces**

The Multilink Point-to-Point (MLPPP) interworking supports IPv6 Layer 2 VPN Interworking with T1 or E1 bundles on the Cisco RSP3 module. The MLPPP interworking enables service providers (offering relatively low-speed links) to use MLP and spread traffic across them in their MPLS networks. The MPLS Multilink PPP feature reduces the number of Interior Gateway Protocol (IGP) adjacencies and facilitates load sharing of traffic.

For more information, see [1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **IPv6 Interworking Pseudowire Support on HDLC or PPP Serial Interfaces**

The IPv6 interworking is supported for Layer 2 VPN interworking mode. The IPv6 interworking is supported only for HDLC or PPP to Ethernet. Layer 3 termination is supported with serial interfaces with HDLC or PPP encapsulation.

For more information, see [1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **IPv6 Support for Interworking Multiservice Gateway Access Circuit Redundancy**

The IPv6 interworking is supported with ACR for Layer 2 VPN.

For more information, see [1 port OC-48/STM-16 or 4 port OC-12/OC-3 / STM-1/STM-4 + 12 port T1/E1 + 4 port T3/E3 CEM Interface Module Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **L3VPN Support on mLACP**

Layer 3 VPN on multichassis LACP (mLACP) is supported in the Cisco RSP3 Module using the **port-channel mc-lag** command.

For more information on the mLACP support, see [Ethernet Channel Configuration Guide Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **Lawful Intercept**

The Lawful Intercept (LI) feature provides electronic surveillance as authorized by a judicial or administrative order for service provider routers. The Lawful Intercept is based on RFC3924 and Simple Network Management Protocol Version 3 (SNMPv3) provisioning architecture.

For more information on Lawful Intercept, see the [System Security Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **PTP Multiprofile**

The Precision Time Protocol (PTP) is a protocol used to synchronize clocks throughout a network. The PTP Multiprofile support is configured on a PTP boundary clock by translating one PTP profile at PTP slave port to other PTP profile at PTP master port. To translate PTP properties from one profile to other,

a special type of **inter-op** clock-port is introduced. This special clock-port is configured with the required profile and domain information.

For more information on PTP Multiprofile, see the [Timing and Synchronization Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **Oversubscription Support for NCS4200-1T16G-PS**

Egress packet classification is performed based on priority-based flow-control (PFC) to ensure that there are no drop in packets.

For more information on oversubscription, see [Cisco NCS 4200 Router Series Configuration Guide, Cisco IOS XE 17](#).

- **Segment Routing Low Latency Network Slice**

This feature allows the advertisement and reception of the extended TE link delay metrics without any additional configuration required in IS-IS, OSPF or BGP-IS. When the link delay values are configured, they are flooded in the PCE topology and when the path computation is requested, these values are used for path calculation.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **Segment Routing Performance Measurement Link Delay Metrics**

Network performance metrics such as packet loss, delay, delay variation, and bandwidth utilization is a critical measure for traffic engineering (TE) in service provider networks. These metrics provide network operators with information about characteristics of their networks for performance evaluation and helps to ensure compliance with service level agreements. The service-level agreements (SLAs) of service providers depend on the ability to measure and monitor these network performance metrics.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

New Hardware Features for NCS 4206 and NCS 4216 in Cisco IOS XE Amsterdam 17.1.1

There are no new hardware features for this release.

New Software Features for NCS 4206 and NCS 4216 in Cisco IOS XE Amsterdam 17.1.1

- **EVPN Single-Homing**

The EVPN Single-Homing feature utilizes the functionality defined in RFC 7432 (BGP MPLS-based Ethernet VPN), to achieve single-homing between a Provider Edge (PE) and a Customer Edge (CE) device.

For more information, see the [MPLS Layer 2 VPNs Configuration Guide, Cisco IOS XE 17 \(NCS 4200 Series\)](#).

- **EVPN-VPWS Single Homing over Segment Routing**

EVPN-VPWS single homing is a BGP control plane solution for point-to-point services. It has the ability to forward traffic from one network to another using Ethernet Segment without MAC lookup.

EVPN-VPWS single homing works on both IP and SR core. IP core is used to support BGP while the SR core is used to switch packets between the endpoints.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **Programmability Features**

The following Programmability features are supported from this release:

- gRPC Network Management Interface (gNMI)—Model-driven configuration and retrieval of operational data using the gNMI capabilities, GET and SET RPCs.
- Model Driven Telemetry - gNMI Dial-In—Support for telemetry subscriptions and updates over a gRPC Network Management Interface (gNMI).
- TLS for gRPC Dial-Out—Support for TLS for gRPC dial-out.

For more information, see the [Programmability Guide, Cisco IOS XE Amsterdam 17.1.x](#).

- **SADT Overhead Accounting**

FPGA measures parameters such as throughput, frame loss, jitter, and delay for SADT.

FPGA has the capability to generate and measure only 1 Gbps traffic rate and hence maximum throughput cannot be achieved.

To overcome this limitation, use the **platform y1564 shadow-session-enable** command to replicate the packets 10 times in FPGA.

For more information, see [IP SLAs Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **Segment Routing Low Latency Network Slice**

This feature allows the advertisement and reception of the extended TE link delay metrics without any additional configuration required in IS-IS, OSPF or BGP-IS. When the link delay values are configured, they are flooded in the PCE topology and when the path computation is requested, these values are used for path calculation.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **Segment Routing Performance Measurement Link Delay Metrics**

Network performance metrics such as packet loss, delay, delay variation, and bandwidth utilization is a critical measure for traffic engineering (TE) in service provider networks. These metrics provide network operators with information about characteristics of their networks for performance evaluation and helps to ensure compliance with service level agreements. The service-level agreements (SLAs) of service providers depend on the ability to measure and monitor these network performance metrics.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **SR-TE Policy for MPLS TE**

The routers with Cisco RSP2 module support the newer segment routed Traffic Engineering (SR-TE) policy and you can enable the policy using the **segment-routing traffic-eng** command.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **SR-TE ODN Color Extended Community for Layer 3 VPN**

The routers with Cisco RSP2 module support the color extended community with the following feature support:

- An egress router adds the color extended community to the BGP updates that require a Traffic-Engineered path.
- An SR-TE policy is created on the ingress router for the color-endpoint pair.

For more information, see the [Segment Routing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).

- **Virtual Container over Packet Smart Small Form-factor Pluggable for DS1**

The VCoP smart SFP is now supported on DS1.

For more information on VCoP Smart SFP, see the [Time Division Multiplexing Configuration Guide, Cisco IOS XE 17 \(Cisco NCS 4200 Series\)](#).



CHAPTER 3

Caveats

This chapter describes open and resolved severity 1 and 2 caveats and select severity 3 caveats:

- The “Open Caveats” sections list open caveats that apply to the current release and may apply to previous releases. A caveat that is open for a prior release and is still unresolved applies to all future releases until it is resolved.
- The “Resolved Caveats” sections list caveats resolved in a specific release, but open in previous releases.

The bug IDs are sorted alphanumerically.



Note The Caveats section includes the bug ID and a short description of the bug. For details on the symptoms, conditions, and workaround for a specific caveat you must use the Bug Search Tool.

- [Cisco Bug Search Tool, on page 25](#)
- [Open Caveats – Cisco IOS XE Amsterdam 17.1.1, on page 25](#)
- [Resolved Caveats – Cisco IOS XE Amsterdam 17.1.1, on page 26](#)

Cisco Bug Search Tool

[Cisco Bug Search Tool](#) (BST), the online successor to Bug Toolkit, is designed to improve effectiveness in network risk management and device troubleshooting. You can search for bugs based on product, release, and keyword, and aggregates key data such as bug details, product, and version. For more details on the tool, see the help page located at <http://www.cisco.com/web/applicat/cbsshelphelp.html>

Open Caveats – Cisco IOS XE Amsterdam 17.1.1

Caveat ID Number	Description
CSCvr59626	RSP2_HA: Standby RP goes for a crash upon continuous rep interface flap
CSCvw34109	PTP failure due to LSMPI buffer exhaustion

Resolved Caveats – Cisco IOS XE Amsterdam 17.1.1

Caveat ID Number	Description
CSCvr59626	RSP2_HA: Standby RP goes for a crash upon continuous rep interface flap