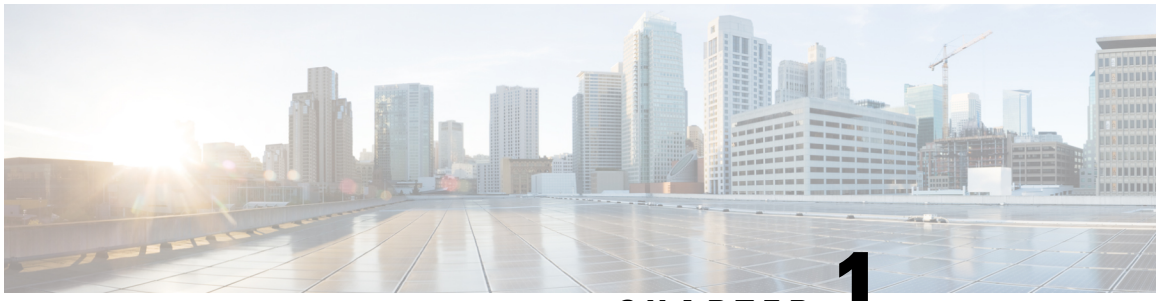
Release Notes for Cisco NCS 4206 and Cisco NCS 4216 Series, Cisco IOS XE Bengaluru 17.5.x

First Published: 2021-03-25

Last Modified: 2023-03-02

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

CONTENTS



CHAPTER 1

Introduction

Note Explore the Content Hub, the all new portal that offers an enhanced product documentation experience.

- Use faceted search to locate content that is most relevant to you.
- Create customized PDFs for ready reference.
- Benefit from context-based recommendations.

Get started with the Content Hub at content.cisco.com to craft a personalized documentation experience.

Do provide feedback about your experience with the Content Hub.

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.

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 it's 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 GigabitEthernet 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:
			`Router# configure t`
			`Router(config)# license feature service-offload enable`

	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:
			`Router# configure t`
			`Router(config)# license feature service-offload enable`

	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.
- 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.
- 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.
- 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.

- The frame drops may occur for packets with packet size of less than 100 bytes, when there is a line rate of traffic over all 1G or 10G interfaces available in the system. This restriction is applicable only on RSP2 module, and is not applicable for RSP3 module.
- While performing an auto upgrade of ROMMON, only primary partition is upgraded. Use the **upgrade rom-mon filename** command to upgrade the secondary partition of the ROMMON during the auto upgrade. However, the router can be reloaded during the next planned reload to complete the secondary rommon upgrade.
- One Ternary Content-Addressable Memory (TCAM) entry is utilized for Segment Routing Performance Measurement. This is required for the hardware timestamping to function.
- For Cisco IOS XE Gibraltar Release 16.9.5, Cisco IOS XE Gibraltar Release 16.12.3, and Cisco IOS XE Amsterdam 17.1.x, a minimum diskspace of 2 MB is required in the boot flash memory file system for a successful ROMMON auto upgrade process. For a diskspace lesser than 2 MB, ROMMON auto upgrade fails and the router reboots. This is applicable to Cisco NCS 4206 and Cisco NCS 4216 routers.
- 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.
- CEM circuit provisioning issues may occur during downgrade from Cisco IOS XE Amsterdam 17.3.1 to any lower versions or during upgrade to Cisco IOS XE Amsterdam 17.3.1 from any lower versions, if the CEM scale values are greater than 10500 APS/UPSR in protected CEM circuits. So, ensure that the CEM scale values are not greater than 10500, during ISSU to or from 17.3.1.

- Some router models are not fully compliant with all IETF guidelines as exemplified by running the pyang tool with the **lint** flag. The errors and warnings exhibited by running the pyang tool with the **lint** flag are currently non-critical as they do not impact the semantic of the models or prevent the models from being used as part of the toolchains. A script has been provided, "check-models.sh", that runs pyang with **lint** validation enabled, but ignoring certain errors. This allows the developer to determine what issues may be present.

  As part of model validation for the Cisco IOS XE Amsterdam 17.3.1 release, "LEAFREF_IDENTIFIER_NOT_FOUND" and "STRICT_XPATH_FUNCTIONS" error types are ignored.

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 4200-1T8S-20CS	NCS4200-3GMS	8x10G FPGA	2x40G FPGA	1x100G FPGA
IM FPGA	17.5.1	1.22	1.22	1.15	0.93	2.0	0.23	0.22	0.20
CEM FPGA		0x52050052	0x52420052	5G mode: 0x10210063 10G mode: 0x10530078	10G mode: 0x10090051 20G mode: 0x10090051	0x10020076	—	—	—

Documentation Updates

The following are the modifications to the CEM guides.

- **CEM Generic Guide**

  This guide covers CEM features, configurations, verifications, and examples that are common to the following CEM interface modules:

  - 48-Port T1 or E1 CEM interface module
  - 48-Port T3 or E3 CEM interface module
  - 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
  - 1-port OC-192 or 8-port Low rate CEM interface module
  - NCS4200 Combo 8-port SFP GE and 1-port 10 GE 20G interface module

  The CEM features are:

  - Circuit Emulation
    - CEM Classes
    - CEM Parameters
  - CEM Pseudowire
  - Clock Recovery
  - BERT and BERT Patterns for:
    - T1
    - T3

- OCX
- STS

- CEM over MPLS QoS
- RSP-based Non-Intrusive Monitor Ports
- Support for Static MPLS Labels on Cisco RSP3 Module

For more information, see the CEM Generic Configuration Guide, Cisco IOS XE 17 (Cisco NCS 4200 Series).

- **48-Port T1/E1 CEM Interface Module Configuration Guide**

  This guide covers the following information:

  - Introduction to the 48-Port T1/E1 CEM Interface Module—Provides basic information on interface module.
  - Supported Features and Configurations—Provides information on restrictions, configurations, and verification examples of supported features on interface module.
  - Monitoring the T1 or E1 Interface Module—Provides information on how features to monitor the interface module.
  - Troubleshooting the T1 or E1 Interface Module—Provides information on troubleshooting the interface module.
  - Additional References—Provides additional information about the interface module.

  For more information, see the 48-Port T1 or E1 CEM Interface Module Configuration Guide, Cisco IOS XE 17 (Cisco NCS 4200 Series).

- **48-Port T3/E3 CEM Interface Module Configuration Guide**

  This guide covers the following information:

  - Introduction to the 48-Port T3/E3 CEM Interface Module—Provides basic information on interface module.
  - Supported Features and Configurations—Provides information on restrictions, configurations, and verification examples of supported features on interface module.
  - Monitoring the T1 or E1 Interface Module—Provides information on how features to monitor the interface module.
  - Troubleshooting the T1 or E1 Interface Module—Provides information on troubleshooting the interface module.
  - Providing Redundancy Support At the Interface Module—Provides information on providing redundancy support at the interface module.
  - Additional References—Provides conceptual information of STS-1 frame, STS-1 overhead, asynchronous mapping for T3 or E3 CEP, and alarms for T3 or E3 CEP.

  For more information, see the 48-Port T3 or E3 CEM Interface Module Configuration Guide, Cisco IOS XE 17 (Cisco NCS 4200 Series).

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
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)

Supported MIBs		
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	IPMROUTE-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 cco-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

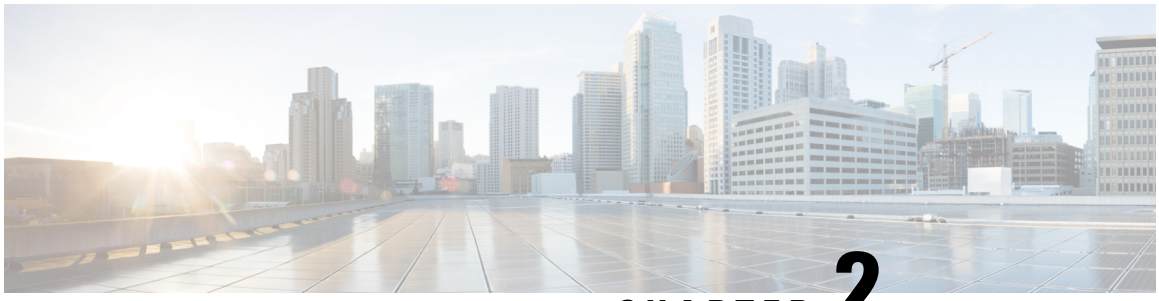
.

- To receive timely, relevant information from Cisco, sign up at Cisco Profile Manager.
- To get the business impact you're looking for with the technologies that matter, visit Cisco Services.
- To submit a service request, visit Cisco Support.
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit Cisco Marketplace.
- 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

What's New for Cisco IOS XE Bengaluru 17.5.x

This chapter describes the new hardware and software features supported in Cisco IOS XE Bengaluru 17.5.x.

What's New in Hardware for Cisco IOS XE Bengaluru 17.5.1

Feature	Description
High Density DS1 Panel for CEM	A new higher density, 144-port patch panel (PANEL-144-1-AMP64) is now available and can be used for DS1 termination of the 48-port T1/E1 Interface Module (48XT1/E1) (NCS4200-48T1E1-CE) on the Cisco NCS 4206, 4216, and 4216-F2B routers. For more information on NCS4200-48T1E1-CE support, see the Cisco NCS 4206 Hardware Installation Guide, Cisco NCS 4216 Hardware Installation Guide, and Cisco NCS 4216 F2B Hardware Installation Guide.

What's New in Software for Cisco IOS XE Bengaluru 17.5.1

Feature	Description
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	

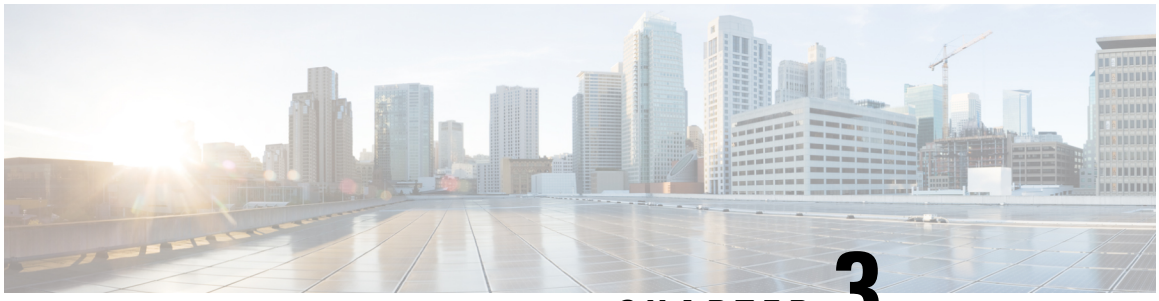
Feature	Description
GR-820-CORE specific Performance Monitoring	The **show controller tabular** command enables you to view the performance monitoring details in tabular form as per GR-820-Core standards. This feature is supported on the following CEM interface modules: • 1-port OC-48/ STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-Port T1/E1 + 4-Port T3/E3 CEM Interface Module • 48-port T3/E3 CEM Interface Module (ASR 900 48-port DS3/E3 Interface Module • 48-port T1/E1 CEM Interface Module (ASR 900 48 port T1/E1 Interface Module • 1-Port OC-192 or 8-Port Low Rate CEM Interface Module
MLPPP IP Termination on all Serial Physical and Logical Interfaces	This release supports Layer 3 termination using IPv6 addressing on MLPPP interfaces for the 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. In releases earlier, with IPv4 addressing, you can scale up to 512 MLPPP bundles. Now with IPv6 addressing, the MLPPP bundles can be scaled up to 1024.
Unframed Framing Support on E1 and Channel STM links	In this release, a new framing mode unframed is supported for the 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. With the unframed mode, you can create serial interface under the following modes: • SDH VC12 • Electrical E1
CEM Generic	
RSP-based Non-Intrusive Monitor Ports	This feature allows you to transmit data to multiple connections from a single source using the RSP-based non-intrusive monitor port or Terminal Access Point (TAP) port. It establishes a one-way cross-connect listen connection that listens to either the source or destination of an existing cross-connect or a local connect connection. This feature is only supported on Cisco RSP3 module. This feature is supported on NCS 4206/4216 routers. This feature is supported on the following CEM interface modules: • 1-port OC481/ STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-Port T1/E1 + 4-Port T3/E3 CEM Interface Module • 48-port T3/E3 CEM Interface Module (ASR 900 48-port DS3/E3 Interface Module) • 48-port T1/E1 CEM Interface Module (ASR 900 48 port T1/E1 Interface Module) • NCS 4200 1-Port 10 Gigabit MR + 8-Port 20 Gigabit LR CEM, iMSG Interface Module

Feature	Description
Support for Static MPLS Labels on Cisco RSP3 Module	This feature allows you to provision an Any Transport over Multiprotocol (AToM) label switching static pseudowire without the use of a directed control connection. In environments that do not or cannot use directed control protocols, this feature provides a means for provisioning the pseudowire parameters statically at the Cisco IOS Command-Line Interface (CLI). This feature is supported on Cisco RSP3 module. This feature is supported on NCS 4206/4216 routers.
Carrier Ethernet	
CFM Sessions Hardware Offload	This feature enables for effective CPU utilization by offloading the one second CCM interval sessions on the hardware.
Layer 2	
MAC Security	The MACsec and Macsec Key Agreement protocol (MKA) features are introduced on the main interface with pre-shared key support for the MKA. This feature is supported on the Cisco RSP3 module.
IP SLAs	
TWAMP Light	This feature enables you to configure a TWAMP Light session using the **ip sla responder twamp-light test-session** command.
Quality of Service	
Increase QoS Service-Policy Scale	Starting with Cisco IOS XE Bengaluru 17.5.1 release, you can further increase the TCAM scale limit per NPU from 2048 entries to 3072 entries for ingress QoS policy maps. This feature is supported on the Cisco RSP3 module.
QoS: Policing and Shaping	
IP Address Range-Based Filtering Support for CoPP ACL	This feature supports Ingress on In-band Management Loopback interface and Ingress on Data plane interface to block traffic using MPLS. CoPP ACL also enables you to configure the 830 and 5432 ports on the Cisco router. This is only applicable to NCS 4206 and NCS 4216 routers. Both, Source IP and Destination IP based filtering are supported on NCS 4206 and NCS 4216; however, only Source IP based filtering is supported on the NCS 4201 and NCS 4202 routers.
MPLS Layer 2 VPNs	
On-Change Notifications for L2VPN Pseudowire	This feature allows you to subscribe on-change Network Configuration Protocol (NETCONF) notifications for L2VPN pseudowire. You can generate an alert from a device when the pseudowire status changes.

Feature	Description
EVPN Integrated Routing and Bridging (L2 and L3 Anycast Gateway) and Data Center Interconnect or Border Leaf (Single Homing)	This feature allows the devices to forward both layer 2 or bridged and layer 3 or routed traffic providing optimum unicast and multicast forwarding for both intra-subnets and inter-subnets within and across data centers. Data Center Interconnects (DCI) products are targeted at the Edge or Border Leaf (BL) of data center environments, joining data centers to each other in a point-to-point or point-to-multipoint fashion, or at times extending the connectivity to internet gateways or peering points.
Segment Routing	
ECMP over SR-TE Policy	This feature allows you to configure ECMP over SR-TE policies. In case of multiple paths, this feature enables mitigation of local congestion through load balancing. This feature is supported on Cisco RSP3 module.
SR-PM Delay Deduction (Loopback Mode)	This feature improves the SR-PM detection time as the PM probes are not punted on the remote nodes. Also, it does not a require a third-party support for interoperability.
SR-TE PM: Liveness of SR Policy Endpoint	This feature enables Performance Measurement (PM) liveness detection and delay measurement for an SR policy on all the segment lists of every candidate path that are present in the forwarding table using PM probes. Thus, you can easily monitor the traffic path and efficiently detect any drop of traffic due to cable or hardware or configuration failures. This feature provides the following benefits: • End-to-end liveness is verified before activating the candidate path in the forwarding table. • End-to-end liveness failure can trigger re-optimization to another path by deactivating the current path.
Segment Routing Flexible Algorithm with OSPF	This feature allows you to configure Segment Routing Flexible Algorithm with OSPF. Flexible Algorithm with OSPF supports metric minimization and avoidance, multi-plane, delay metric with rounding, and ODN with auto-steering.
Segment Routing Policy Counters	This feature enables statistic counters to be displayed when traffic passes over the SR-TE tunnel. You can use the command **show segment-routing traffic-eng policy name** *policy name* to view the counters.
Programmability	
gRPC Telemetry Support	Prior to Cisco IOS XE Bengaluru 17.5.1, gRPC protocol was supported on default VRF only. Effective Cisco IOS XE Bengaluru 17.5.1, gRPC protocol is supported on all types (default and non-default) of VRF. This will help you to get the data from all VRF and non-VRF network.

Feature	Description
Complete YANG Model for L2VPN XConnect	L2VPNs can provide pseudowire resiliency through their routing protocols. When the connectivity between the end-to-end PE routers fails, an alternative path to the directed LDP session and the user data takes over. XConnect is a feature that enables you to assign remote IP Addresses, VLAN ID and encapsulation, and Pseudowire class names
Complete YANG Model for Pseudowire Interface Configuration	Pseudowires (PWs) manage encapsulation, timing, order, and other operations in order to make it transparent to users; the PW tunnel appears as an unshared link or circuit of the emulated service. Effective from the Cisco IOS XE 17.5.1 release, you can configure the Pseudowire Interface using YANG models.

YANG Data Models—For the list of Cisco IOS XE YANG models available with this release, navigate to https://github.com/YangModels/yang/tree/master/vendor/cisco/xe/1751. Revision statements embedded in the YANG files indicate if there has been a model revision. The README.md file in the same GitHub location highlights changes that have been made in the release.



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.

Resolved Caveats – Cisco IOS XE Bengaluru 17.5.1

Caveat ID Number	Description
CSCvh63374	TCAM related commands do not return values on RSP3
CSCvv06958	CPE SIT: IP Sec tunnel is not reachable after RSP3 SSO
CSCvv23077	Config failure is seeen on standby RPS3 from 16_9_4 to 17_3_1 images upgrade
CSCvv33300	Alarm-profile : APS configured for Au-4 mode T3, E3 after SSO alarms are removed
CSCvv51145	Crash seen on "show plat hard pp active feature multicast database ipv4 table label <> eos <>"
CSCvv76949	[SVSP-497]-Op state and Ad state showing NA for all slot with Bandwidth command
CSCvv83093	OBFL updation with valid time after NTP Sync in RTC failure case (Rework of CSCvq07399)

Caveat ID Number	Description
CSCvv94214	"no Loopback remote iboc csu/fac1/fac2" not brings remote end out of loop
CSCvv95745	Crash of standby supervisor because of QoS Overhead Accounting
CSCvw00749	sensor_state_change TDL message create validation missing
CSCvw04366	UEA: Display GNSS Chassis SN instead of PCB SN in show CLI
CSCvw09881	LOTR IM : RX-S1S0 bytes are not updated in "show controller sonet"
CSCvw46012	Traffic not passing via BDI after physical interface flaps
CSCvw57114	[RSP3 / PoCh-Mcast]: IGMP queries are dropped entering a Poch
CSCvw81102	RSP3: copy recent standby logs and corefiles to Active
CSCvx07262	[RSP3-DHCP-Relay]: DHCP relay unicast is dropped in transparent case with HSRP/VRRP/GLBP on EVC-BD
CSCvw30819	RSP3-400S: OTN-Alarms behavior change using Alarm-Profile
CSCvw59531	Auto negotiation failing when CU SFP connected to 100m port

Open Caveats – Cisco IOS XE Bengaluru 17.5.1

Caveat ID Number	Description
CSCvx34215	APS 1+1 Uni - Traffic hit due to sonet controllers down after inactive IMOIR then SSO
CSCvx45132	ASR90x-RSP3: Latency for priority traffic is high during congestion in egress over 1G link.
CSCvx46454	FMFP-3-OBJ_DWNLD_TO_DP_FAILED Log Message on ASR-903 RSP3 (A900-RSP3C-400-S)
CSCvx52992	More than 50 msec traffic loss on core ECMP link failure
CSCvx42526	A900-IMA2Z IM is impacted during SSO

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/cbsshelp/help.html