Cisco NCS 1014 Advanced Multihaul Optical Platform - An Overview

This chapter provides an overview for Cisco NCS 1014 Advanced Multihaul Optical Platform.

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Document objective

The Cisco NCS 1014 Configuration Guide describes how to configure various card modes for the line cards that are supported in the Cisco NCS 1014 chassis.

Cisco NCS 1014 chassis and line cards

The Cisco NCS 1014 chassis is an advanced multihaul optical platform that supports transponders and line system cards.

- It is a 2RU chassis,
- delivers a universal transponder solution, and
- provides excellent performance for metro, long-haul, and submarine applications.

Cisco NCS 1014 modules and supported line cards

The NCS 1014 chassis includes these modules:

- Removable controller
- Removable backup solid state drive (SSD)
- Two replaceable power supply units (PSU)
- Three replaceable fan modules
- Four line cards

The NCS 1014 chassis supports these line cards and modules:

Table 1: NCS 1014 supported line cards and modules

From release	PID	Description
7.11.1	NCS1K14-2.4T-K9	2.4T DWDM transponder card
	NCS1K14-CCMD-16-C/L	16-port colorless multiplexer and demultiplexer optical line card.
	NCS1K4-1.2T-K9	1.2T DWDM transponder card
24.1.1	NCS1K14-2.4T-X-K9	2.4T-X DWDM transponder and muxponder card
	NCS1K4-QXP-K9	3.2T QXP transponder card

1.2T line cards

A 1.2T DWDM line card is a transponder that

- enables high-capacity optical transport for Cisco NCS 1014 chassis,
- secures client-side data with AES256-based Layer-1 encryption, and
- delivers flexible client and trunk configurations for 100GE and OTU4 traffic.

Key features

The NCS1K4-1.2T-K9 line card is a single-slot unit.

- It provides 12 client ports for 100GE and OTU4 traffic and two trunks, which can be configured anywhere from 100G to 600G in 50G steps.
- It supports C-band traffic.

2.4T line cards

A 2.4T line card is a coherent optics transponder and muxponder that

- fits a single slot on the Cisco NCS 1014 chassis,
- supports C-band traffic at trunk ports, and
- delivers 400GE, 100GE, and OTU4 client traffic over two trunk ports operating at speeds from 400G to 1.2T each.

CCMD-16 line cards

The CCMD-16 optical line card is a type of optical line card designed for multiplexing and demultiplexing functions in an optical network.

- It features two line ports to transmit and receive using the same LC connectors,

- includes 16 ports for add/drop functionality with LC connector-based interfaces, and
- is available in two variants: NCS1K14-CCMD-16-C (C-band) and NCS1K14-CCMD-16-L (L-band).

CCMD-16 optical line card variants and specifications

The CCMD-16 optical line card is available in two main variants, each supporting different wavelength bands:

- **NCS1K14-CCMD-16-C:** This is a C-band, 16-port Colorless Direct attach optical line card with EDFA. It can host up to 16 channels and supports any signal distribution between 191250 and 196200 GHz, for example, a 64-channel grid with 75-GHz spacing.
- **NCS1K14-CCMD-16-L:** This is an L-band, 16-port Colorless Direct attach optical line card with EDFA. It can host up to 16 channels and supports any signal distribution between 186025 and 191000 GHz, for example, a 64-channel grid with 75-GHz spacing.

2.4TX line cards

The 2.4TX line card (NCS1K14-2.4T-X-K9) is a coherent optics Transponder and Muxponder for the Cisco NCS 1014 chassis.

- It is a single-slot card that supports C-band traffic at trunk ports,
- delivers 400GE and 100GE client traffic over two trunk ports operating at speeds ranging from 400G to 1.2T each, and
- operates in two configurable card modes: Muxponder mode and Muxponder Slice mode.

Table 2: Feature History

Feature Name	Release Information	Feature Description
NCS1K14-2.4T-X-K9 Line Card	Cisco IOS XR Release 24.1.1	The new NCS1K14-2.4T-X-K9 line card is a single-slot Transponder and Muxponder card that delivers up to 1.2T C-band traffic at each trunk port. It has six QDD client ports that support 400GE and 4x100GE traffic on each port. This card provides two trunk ports that support 1.2T traffic on each port. The mxponder-slice and muxponder keywords in the **hw-module** command enable this card to operate in the following modes. • **Muxponder slice mode:** The card virtually splits into two slices in this mode. It is possible to configure both trunks to carry different data rates. The supported trunk rates are 400G, 500G, 600G, 800G, 1000G, and 1200G. • **Muxponder mode:** The card acts as one unit in this mode, configuring both trunks to the same data rate. The supported trunk rates are 600G and 1000G. Additionally, the capacity of a specific shared client port is consumed by two trunk ports.

2.4TX line card features and specifications

The card's operation modes are enabled using the `mxponder-slice` and `muxponder` keywords in the `hw-module` command:

- **Muxponder slice mode:** The card virtually splits into two slices, allowing both trunks to carry different data rates. Supported trunk rates are 400G, 500G, 600G, 800G, 1000G, and 1200G.
- **Muxponder mode:**The card acts as one unit, configuring both trunks to the same data rate. Supported trunk rates are 600G and 1000G. Additionally, the capacity of a specific shared client port is consumed by two trunk ports.

Note In Release 24.1.1, the 2.4TX line card supports only 400G, 500G, 600G, 800G, 1000G, and 1200G trunk payloads.

The 2.4TX card supports various pluggable form factors and data rates for its client and trunk ports, as detailed in this table:

Table 3: Interfaces and data rates

Interfaces	Form factor	Ports	Data rates
Client	QSFP-DD56	1, 2, 3, 4, 5, 6	400G
	QSFP-DD112	2, 5	400, 800G
Trunk	Coherent Interface Module 8 (CIM8)	0, 7	up to 1.2T in each port

Note In Release 24.1.1, ports 2 and 5 support only up to 400G data rates.

The 2.4TX card has two trunk ports and six client ports, as shown in the this figure:

Figure 1: 2.4TX Line card front view

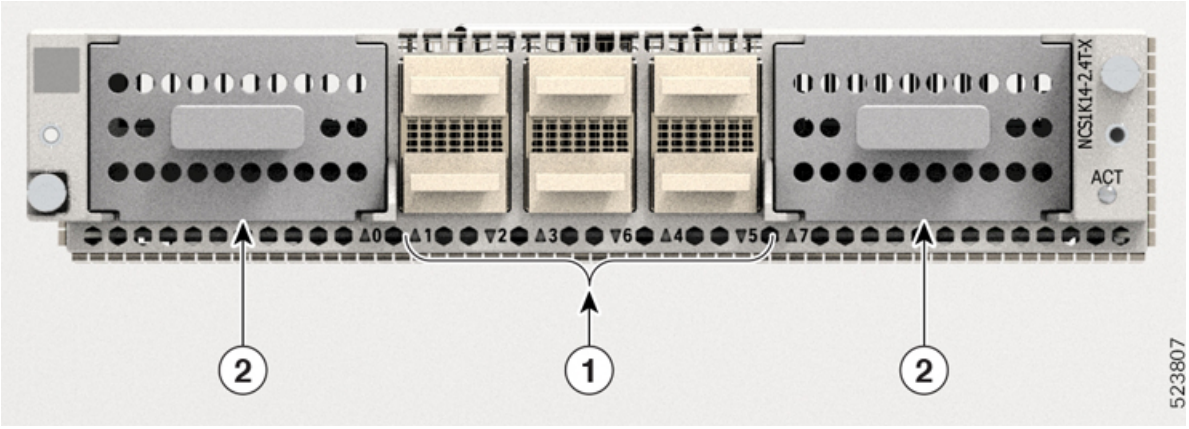

Table 4: 2.4TX line card interfaces

Callout	Interface
1	Client port
2	Trunk port

This figure illustrates the mapping between the client and trunk ports:

Figure 2: 2.4TX card client and trunk mapping

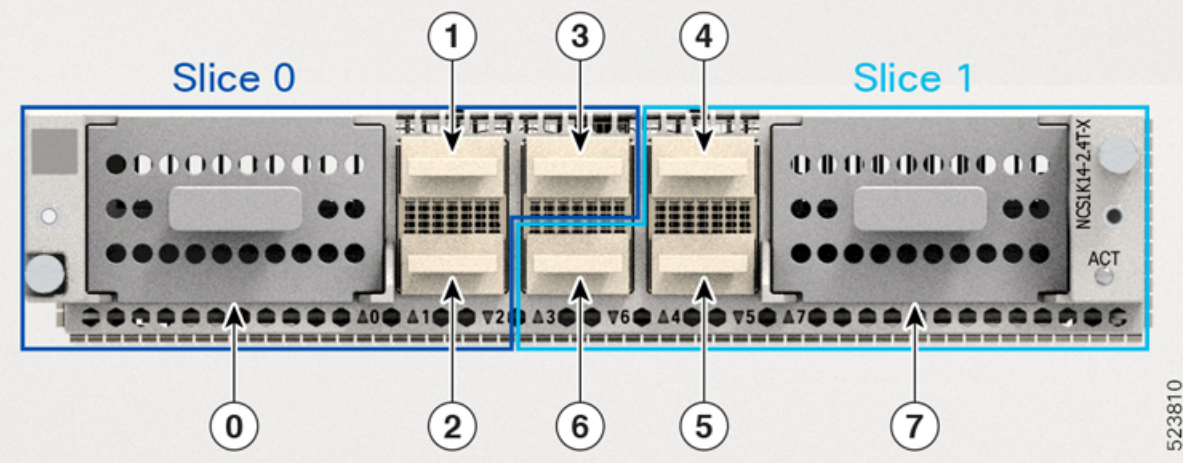

Table 5: Client-to-trunk port mapping

Trunk port	Client ports
0	1, 2, 3
7	4, 5, 6

Note This client-to-trunk port mapping is only applicable for the mxponder-slice mode.

For more information about the 2.4TX card, refer to the datasheet.

QXP-K9 line cards

A QXP-K9 line card is a high-density QSFP-DD transponder card that

- provides eight client ports (QSFP-DD) and eight trunk ports (QSFP-DD ZR+),
- supports up to 3.2T traffic through its eight QSFP-DD trunk ports, and
- operates each trunk port at speeds up to 400G in 50G increments.

QXP-K9 line card port capabilities

- **Client ports:** Eight QSFP-DD client ports. Each client port supports 400GE, 4x100GE, and 100GE without FEC client rates.
- **Trunk ports:** Eight QSFP-DD ZR+ trunk ports. Each trunk port operates at speeds up to 400G, configurable in 50G increments, contributing to the card's 3.2T total traffic capacity.