

Cisco NCS 4000 Optical Transport Network (OTN) Line Cards

OTN provides robust transport services that leverage many of the benefits of SONET/SDH such as resiliency and performance monitoring, while adding enhanced multi-rate capabilities in support of packet traffic, plus the transparency required by DWDM networks. OTN is the ideal technology to bridge the gap between next generation IP and legacy time division multiplexing (TDM) networks by acting as a converged transport layer for newer packet-based and existing TDM services. The Cisco NCS 4000 offers a suite of OTN line cards supporting Ethernet, SONET/SDH, and OTN client interfaces with data rates from 1 to 100 gigabits per second.

24 Port Low-Rate OTN Line Card

The NCS 4000 24 port low-rate OTN line card supports up to (Figure 1):

- Twenty-four 1 Gigabit Ethernet interfaces through SFP pluggables
- Sixteen OC-48/STM-16/OTU-1 interfaces through SFP pluggables
- Four 10 Gigabit Ethernet /OC-192/OTU-2 interfaces through SFP+ pluggables

OTU-1 and OTU-2 ports support generic forward error correction (GFEC). The card supports ODU-2, ODU-1, ODU-0, and ODU-Flex switching functions by interconnecting with the centralized agnostic switch fabric.

Figure 1. NCS 4000 24 Port Low-Rate OTN Line Card

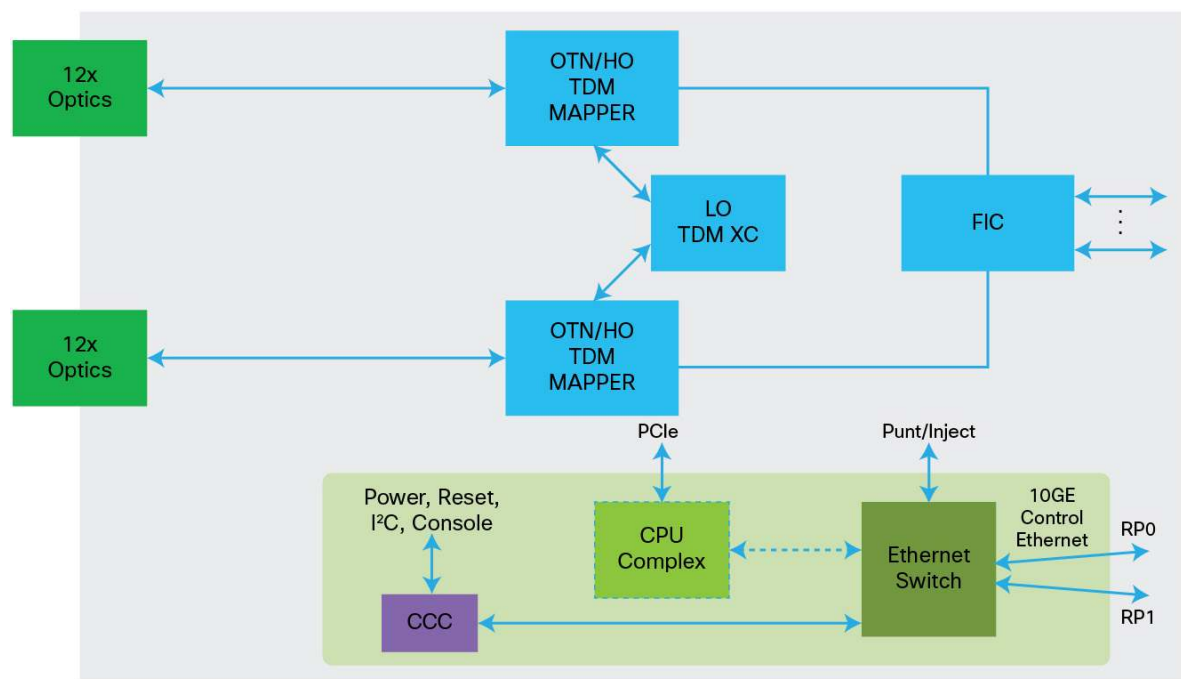


The NCS 4000 24 Port Low-Rate OTN line card can provide mapping into OTN containers as well as OTN multiplexing functions. Different mapping methods will be provided pending different rates (Table 1).

Table 1. Low-Rate OTN Line Card Mapping

Rate	Mapping
OC-48/STM-16	CBRI CBRB ODU1 AMP/BMP
Gigabit Ethernet	CBRI CBRB ODU0 GMP TTT CPB
10 Gigabit Ethernet	G.Sup43 7.1/G.709 17.2.4: CBR10.3G → OPU2e G.709 17.4: GFP-F → OPU2 G.Sup43 7.3/G.709 17.4.1: GFP-F → Extended OPU
OC-192/STM-64	OC192/STM-64: CBRI CBRB ODU2 AMP/BMP

Figure 2. NCS 4000 24 Port Low-Rate OTN Line Card Architecture



20x10G OTN Line Card

The NCS 4000 20x10G OTN line card supports any combination of the following interfaces, up to:

- Twenty 10 Gigabit Ethernet interfaces through SFP+ pluggables
- Twenty OC-192/STM-64 interfaces through SFP+ pluggables
- Twenty OTU-2 interfaces through SFP+ pluggables

OTU-1 and OTU-2 ports support generic forward error correction (GFEC). The card supports up to 2-level ODU-4, ODU-3, ODU-2, ODU-1, ODU-0, and ODU-Flex switching functions by interconnecting with the centralized agnostic switch fabric.

The line card also supports direct interconnection to other slots within the Cisco NCS 4016 chassis to interconnect switched OTN traffic directly to the NCS 4000 2 x 100G CP-DQPSK - Full C band Tunable DWDM Line Card.

Figure 3. NCS 4000 20x10G OTN Line Card

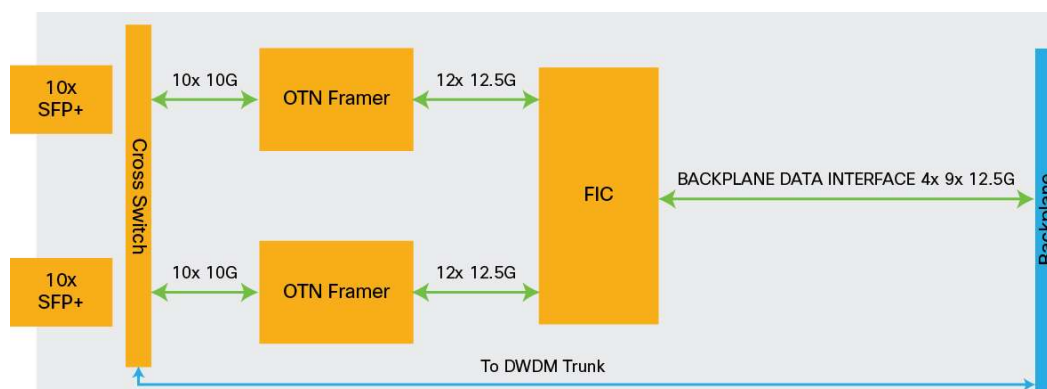


The NCS 4000 **20x10G OTN Line Card** line card can provide mapping into OTN containers as well as OTN multiplexing functions (Figure 8). Different mapping methods will be provided pending different rates (Table 2).

Table 2. NCS 4000 20x10G OTN Line Card Mapping

Rate	Mapping
10 Gigabit Ethernet	G.Sup43 7.1 / G.709 17.2.4: CBR 10.3G → OPU2e G.709 17.4: generic framing procedure-framed (GFP-F) → OPU2 G.Sup43 7.3/G.709 17.4.1: GFP-F → Extended OPU
OC-192/STM-64	OC-192/STM-64: CBRI CBRB ODU2 AMP/BMP

Figure 4. 20x10G OTN Line Card Architecture



NCS 4000 2 x100G OTN Line Card

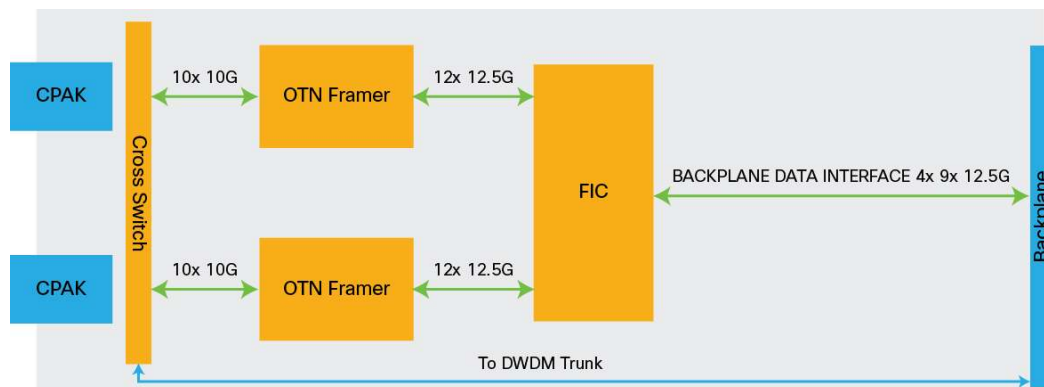
The NCS 4000 2 x 100G OTN Line Card supports any combination of 100 Gigabit Ethernet and OTU-4 interfaces using Cisco CPAK pluggable transceivers (Figure 9). The Cisco CPAK pluggable transceiver utilizes complementary metal-oxide semiconductor (CMOS) photonics technology to dramatically reduce the size and power consumption of 100 Gbps interfaces while maintaining IEEE and ITU protocol compliance. Two CPAK receptacles are hosted on the faceplate.

Figure 5. NCS 4000 2x100G OTN Line Card



The card supports up to two-level ODU-4, ODU-3, ODU-2, ODU-1, ODU-0, and ODU-Flex nested switching functions by interconnecting with the centralized agnostic switch fabric; 100 Gigabit Ethernet signals are mapped using generic mapping procedure (GMP) over ODU-4 according to ITU-T G.709 v3 (Section 17.7.5).

Figure 6. 2x100G OTN Line Card Architecture



Pluggable Interfaces

Cisco NCS 4016 Line Cards use pluggable transceivers to provide a pay-as-you-grow model and flexibility to support different reaches. Table 3 summarizes supported pluggables.

Table 3. Cisco NCS 4000 Pluggable Interfaces

Pluggable	Rate and Reach	Product ID	24x Low Rate OTN	20x 10 GE OTN	2x 100 GE OTN
SFP+	10 GE SR/SW	ONS-SC+-10G-SR=	X	X	
	10 GE LR/LW OC-192 SR STM-64 I-64.1 OTU-2 P1I1 2D1	ONS-SC+-10G-LR=	X	X	
	10 GE ER/EW OC-192 IR-2 STM-64 S-64.2 OTU-2 P1S1-2D2	ONS-SC+-10G-ER=	X	X	
	10 GE ZR OC192 LR-2 STM-64 L-64.2 OTU-2 P1L1-2D2	ONS-SC+-10G-ZR=	X	X	
	C-band tunable	ONS-SC+-10G-C=	X	X	

Pluggable	Rate and Reach	Product ID	24x Low Rate OTN	20x 10 GE OTN	2x 100 GE OTN
CPAK	100 GE SR10	CPAK-100G-SR10			X
	100 GE LR4 OTU-4 4I1-9D1F	CPAK-100G-LR4			X

Physical Specifications

Table 4 lists the power consumption, weight, and dimensions of NCS 4000 OTN Line Cards.

Table 4. Cisco NCS 4000 Physical Specifications

Unit	Maximum Power (W)	Typical Power (W)	Weight	Dimensions (H x W x D)
20 Port 10G OTN Line Card	386	328	5.5 lbs (2.5 kg)	10 x 12.5 x 1.55 in. (254 x 317.5 x 39.37 mm)
24 Port Low Rate OTN Line Card	280	200	5.5 lbs (2.5 kg)	10 x 12.5 x 1.55 in. (254 x 317.5 x 39.37 mm)
2 Port 100G OTN Line Card	375	262	5.5 lbs (2.5 kg)	10 x 12.5 x 1.55 in. (254 x 317.5 x 39.37 mm)

Warranty Information

Find warranty information on Cisco.com at the [Product Warranties](#) page.

Ordering Information

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

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For More Information

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