Cisco Network Convergence System 6000 Series 10-Port 100-Gbps Multiservice Line Cards with Cisco AnyPort Technology

The Cisco® Network Convergence System (NCS) 6000 Series Routers offer exceptional network agility, packet optical convergence, and petabit per second system scale. The Cisco NCS 6000 Series also facilitates the build-out of the next-generation core to support elastic capacity at a low TCO and to deliver high-bandwidth mobile, video, and cloud services.

Using the industry-leading Cisco IOS® XR operating system, running in a virtualized environment, the Cisco NCS 6000 Series advances the concept of distributed routing and virtualization. Using virtualized Cisco IOS XR, the Cisco NCS 6000 Series brings new levels of programmability and virtualization to increase application service offerings, accelerate provisioning, and make the network more cost effective.

The Cisco NCS 6000 Series is powered by the Cisco nPower family of Network Processor Units (NPU). Cisco nPower devices are state-of-the-art programmable forwarding ASICs (Application Specific Integrated Circuit), designed to deliver the industry's first zero-packet loss (ZPL) and zero-topology loss (ZTL) software upgrade capability.

The Cisco NCS 6000 Series is engineered for environmental efficiency by offering an adaptable power-consumption model for its ASICs, and the use of revolutionary CMOS photonics technology. With these technologies together, the Cisco NCS 6000 Series can offer the most power-efficient footprint in the service provider routing space.

Figure 1. 10-Port 100-Gbps Multiservice Line Card with CXP Optics

Figure 2. 10-Port 100-Gbps Multiservice Line Card with Cisco AnyPort Technology and CPAK Optics

Features and Benefits

The Cisco NCS 6000 Series 10-port 100-Gbps Multiservice Line Cards are industry-leading solutions that allow service providers to offer one terabit per second (Tbps) of throughput over 10 ports with 100-Gbps interfaces. Optimized for high-speed IP and Multi-Protocol Label Switching (MPLS) forwarding applications, they provide industry-leading forwarding scale and quality of service (QoS) at wire rate.

These line cards are available in two versions:

- 10-port 100-Gbps Multiservice Line Card with CXP optics (Figure 1.)
- 10-port 100-Gbps Multiservice Line Card with Cisco AnyPort technology and Cisco CPAK optics (Figure 2.)

The Cisco CPAK version uses the state-of-the-art Cisco nPower intelligent silicon design and the latest CMOS photonics-based Cisco CPAK 100-Gbps modular optics. With the combination of these technologies, the power consumption per gigabit is the lowest in the industry.

The use of Cisco CPAK-100G-SR10 modular optics enables the following short-reach interface options per CPAK:

- 1 port of 100 Gigabit Ethernet
- 10 ports of 10 Gigabit Ethernet

The Cisco NCS 6000 series introduces a new innovative Anyport technology that enables under software control and in conjunction with the attached CPAK optical module various high-speed Ethernet rates.

The Cisco CPAK optics allow for different optical capabilities at the same rates:

- Short reach using multimode fiber (MMF) connectivity with Cisco CPAK-100G-SR10 modules
- Long reach using single-mode fiber (SMF) connectivity with Cisco CPAK-100G-LR4 modules

Using the Cisco CPAK-100G-SR10 modules and a breakout MMF panel (NCS-PP-100X10-SR; Figure 3), the 10-port 100-Gbps Multiservice Line Card with AnyPort technology can support up to 100 x 10 Gigabit Ethernet short-reach MMF interfaces per card, 800 x 10 Gigabit Ethernet interfaces per chassis, and 12,800 x 10 Gigabit Ethernet interfaces per system.

The Cisco NCS 6000 Series 10-port 100-Gbps Multiservice Line Cards offer significant advantages to service providers:

- Industry-leading 1-Tbps throughput with full IPv4, IPv6, and MPLS forwarding capabilities, optimized for high-throughput Internet peering and core applications
- Advanced Cisco nPower Layer 3 forwarding NPU with industry-leading wire-rate lookup, forwarding, and QoS performance for IP and MPLS flows
- Built-in hardware acceleration for critical network control traffic
- Support across all Cisco NCS 6000 Series single-chassis and multi-chassis configurations for investment protection
- Support for the Cisco AnyPort technology allowing short-reach solutions to mix and match different types of interfaces and breakout capabilities
- Efficient environmental design by adapting the power consumption to active Cisco nPower resources only
- In Service Software Upgrade
- Independently programmable and upgradable NPUs with fault protection and isolation

- Enhanced onboard multicore CPU for accelerated and scalable software processing
- Integrated OTU-3 and OTU-4 framers for G.709 termination at 40- and 100-Gbps speeds
- Up to 2048 licensed enabled queues per 100 Gigabit Ethernet physical interface, with 20,480 licensed enabled queues per card
- Accurate hardware-assisted time-stamping support for OAM and service-level agreement (SLA) monitoring
- Industry-leading environmental efficiency with a low power and weight profile per Gbps

Figure 3. Cisco NCS-PP-100X10-SR MMF Break-Out Panel

Product Specifications

Table 1 provides a summary of the Cisco 10-port 100-Gbps line card specifications.

Table 1. Product Specifications

Feature	Description
Software compatibility	Virtualized Cisco IOS-XR Software Release 5.0.0 or later
Port density	• 10 ports of 100 Gigabit Ethernet per line card slot for both Cisco CPAK and CXP versions • Up to 20 ports of 40 Gigabit Ethernet short-reach optics using Cisco CPAK-100G-SR10 and MPO-24 to 2xMPO-12 break-out cables • Up to 100 ports of 10 Gigabit Ethernet short-reach optics using Cisco CPAK-100G-SR10 and the break-out panel NCS-PP-100X10-SR
Ethernet	• IEEE 802.3ba compliant • 100 Gigabit Ethernet physical later (PHY) monitoring • IEEE 802.x flow control
Optical transport network (OTN) framing	• Support for OTN framing (OTU-3 and OTU-4)
Features and protocols	IP features: • IPv4 unicast services • IPv6 unicast services • IPv4 and IPv6 equal-cost multipath (ECMP) routing • IPv4 and IPv6 load balancing Forwarding features: • Access control lists (ACLs and xACLs) • QoS and class of service (CoS) using modular QoS command line interface (CLI) • IP packet classification and marking • Queuing (both ingress and egress) • Policing (both ingress and egress) • Diagnostic and network management support IPv4 multicast features: • Protocol-independent multicast (PIM) forwarding • IP multicast priority propagation • Multicast reverse path forwarding (RPF) • Multicast nonstop forwarding (NSF)

Feature	Description
	• Multicast forwarding information base (MFIB) MPLS features: • MPLS forwarding • MPLS load balancing • Traffic engineering and point-to-multipoint (P2MP) traffic engineering • Policy-based traffic engineering selection (PBTS) • MPLS OAM • User-Network Interface (UNI) • Link Management Protocol (LMP) Security features: • Access control list • Unicast reverse path forwarding (uRPF) • Dynamic control plane protection (DCoPP) • Management plane protection • QoS-based policy propagation through Border Gateway Protocol (BGP) Error detection and fast convergence features: • Bidirectional Forwarding Detection (BFD) • Ethernet OA&M (802.1ag and 802.3ah) • IP and MPLS fast reroute (FRR) • BGP Prefix-Independent Convergence Accounting: • Cisco NetFlow • BGP policy accounting • MAC accounting
Performance	• Line-rate packet forwarding and service • Nonblocking fabric performance for all IPv4, IPv6, and MPLS packet sizes • Full bidirectional 1-Tbps throughput • Maximum number of line cards per chassis: 8
Reliability and availability	• Line card online insertion and removal (OIR) support without affecting system • In-service system upgrade of the switch fabric from single-chassis to multichassis • In-Service Software Upgrade • Coexistence of Multiservice and Label Switch Router (LSR) cards in the same system
Network management	• Cisco IOS XR Software CLI • Simple Network Management Protocol (SNMP) • Extensible Markup Language (XML) interface • Cisco Prime™ Network
Physical dimensions	• Occupies a full slot in a Cisco NCS 6000 Series chassis • Size (H x D x W): 21.5 in. x 15.58 in. x 2.125 in. • Weight: 25 lb
Environmental conditions	• Compliant with GR-63-CORE requirements • Storage temperature: -40 to 158℉ (-40 to 70℃) • Operating temperature: ◦ Normal: 41 to 104℉ (5 to 40℃) ◦ Short-term: 23 to 122℉ (-5 to 50℃) [1] • Relative humidity: ◦ Normal: 5 to 85%

The Cisco NCS 6000 Series 10-port 100-Gbps Multiservice Line Cards can be ordered in various optics configurations. All optics are fully compliant with IEEE standards 802.3ba PHY specifications (such as LR4 and SR10) and will interoperate with the far side according to IEEE specifications, regardless of the remote module type. Optics specifications are listed in Table 2.

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

Table 2. Additional Specifications

100 Gigabit Ethernet CPAK Optics for the 10-port 100-Gbps Multiservice Line Card with Cisco AnyPort technology and Cisco CPAK optics	**Maximum Distance**
Support for Cisco CPAK-100G-LR4 (100 Gigabit Ethernet long-reach over 4 wavelength-division multiplexing (WDM) lanes (LR4) using single-mode fiber)	6.2 mi (10 km) over standard SMF fiber
Support for Cisco CPAK 100G-SR10 for short reach solutions over ribbon-cable multimode fiber (MMF)	100m over OM3 ribbon cable or 150m over OM4 ribbon cable
Pluggable optics support for Cisco 100GBASE and 100G-OTU4 framing	
Support for future Cisco CPAK versions	

100 Gigabit Ethernet CXP Optics for 10-port 100-Gbps Multiservice Line Card with Cisco AnyPort technology and CXP optics	**Maximum Distance**
Support for Cisco CXP-100G-SR10	100m over OM3 ribbon cable or 150m over OM4 ribbon cable
Pluggable optics support for Cisco 100GBASE and 100G-OTU4 framing	

Ordering Information

To place an order, visit the Cisco Ordering homepage. Table 3 provides ordering information for the products listed in this datasheet.

Table 3. Ordering Information

Product Part Number	Product Name
NC6-10X100G-M-K	Cisco NCS 6000 10 Port 100 Gigabit Ethernet Multi-service Line Card CPAK Optics
NC6-10X100G-M-P	Cisco NCS 6000 10 Port 100 Gigabit Ethernet Multi-service Line Card CXP Optics
NCS-PP-100X10-SR	NCS 100x10GE Break-out Panel Short Reach
Optics for Cisco NCS 6000 Series 10-Port 100 Gigabit Ethernet Line Card Cisco CPAK Optics	
CPAK-100G-LR4	Cisco 100 Gigabit Ethernet LR4 (10 km) CPAK Optics
CPAK-100G-SR10	Cisco 100 Gigabit Ethernet SR10 CPAK Optics
Optics for Cisco NCS 6000 Series 10-Port 100 Gigabit Ethernet Line Card CXP Optics	
CXP-100G-SR10	Cisco 100 Gigabit Ethernet SR10 CXP Optics

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For More Information

For more information about the Cisco NCS 6000 Series Routers, contact your local Cisco representative or visit: http://www.cisco.com/go/ncs6000.

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