Cisco CRS 100 Gigabit Ethernet Interface Modules

Product Overview

The Cisco® Carrier Routing System (CRS) provides outstanding economical scale, IP and optical network convergence, and a proven architecture. The Cisco CRS-X is powered by advanced portable address translation (PAT) advanced application-specific integrated circuits (ASICs), a chipset architecture based on multidimensional engineering, and Cisco IOS® XR Software, a unique self-healing, distributed operating system.

Networks are facing new challenges with the Internet of Everything. Trillions of things have become Internet ready and can start talking to each other, as well as to applications and people. The effects of machine-driven events change network dynamics and impose entirely new service requirements. Managing bandwidth is no longer enough. Networks must become more elastic and programmable, capable of adapting and evolving. As part of an evolving and programmable network, the Cisco CRS delivers highly reliable operations and scales easily from single-chassis form factors to a massive multichassis system. Its design offers industry-leading efficiency in power consumption, cooling, and rack-space resources, while providing intelligent service-rich bandwidth capacity. The Cisco CRS supports up to 400-Gbps line rates, and its hardware is backward and forward compatible, helping to protect existing and future investments.

The Cisco CRS has two different 100 Gigabit Ethernet line cards, the Cisco CRS-3 1-Port 100 Gigabit Ethernet Interface Module (Figure 1) and the Cisco CRS-X 4-Port 100GE LAN/OTN Interface Module (Figure 2).

Figure 1. Cisco CRS-3 1-Port 100 Gigabit Ethernet Interface Module

Figure 2. Cisco CRS-X 4-Port 100GE LAN/OTN Interface Module

Features and Benefits

The Cisco CRS-X 4-Port 100GE LAN/OTN Interface Module offers the following advanced features and benefits:

- 400-Gbps line-rate throughput per slot, increasing the Cisco CRS capacity to 12.8 Tbps in a single chassis
- Advanced forwarding ASICs to support 100-Gbps single-flow traffic processing with optimized power consumption
- Superior investment protection that maintains the existing Cisco CRS architecture, making it compatible with existing Cisco CRS-1 and Cisco CRS-3 line cards and physical layer interface modules (PLIMs)
- Space, cost, and power savings with 100-Gbps Cisco CPAK™ optics
- Flexibility through Cisco AnyPort Technology, which introduces 100-Gbps to 40-Gbps and 40-Gbps to 10-Gbps breakout options
- Energy monitor functionality that allows real-time power monitoring of each individual component, including PLIMs and line cards, fabric, performance route processor (PRP) through command line interface (CLI), beginning with IOS XR Release 5.1.1

The Cisco CRS-X 4-Port 100GE LAN/OTN Interface Module connects into an existing transport network and provides four ports, at 100 Gbps of data per port for 400 Gigabit Ethernet LAN physical layer (LAN-PHY) or optical transport network (OTN) Transport Unit Level 3 (OTU-4) transport. The interface module requires a 400-Gbps-capable modular services card, forwarding processor card or label switch processor card for operation. It is supported across Cisco CRS 8-slot, 16-slot, and multichassis systems, using either a Cisco CRS enhanced chassis or legacy chassis. The Interface module can operate in either a 400-Gbps or 200-Gbps mode. The 400-Gbps mode in a Cisco CRS enhanced chassis-based system allows the interface module to deliver full 400-Gbps line-rate throughput. However in a 200-Gbps mode, two of the four ports are in a shut-down state to conserve on power and thermals.

Product Specifications

Table 1 provides specifications for the Cisco CRS100 Gigabit Ethernet Interface Modules.

Table 1. Product Specifications

Feature	Description	
	Cisco CRS-X 4-port 100GE LAN/OTN Interface Module	**Cisco CRS-3 1-Port 100 Gigabit Ethernet Interface Module**
Chassis compatibility	Compatible with all Cisco CRS 8-slot, 16-slot, and multichassis systems with Cisco CRS-X fabric *Requires 400-Gbps modular services card, forwarding processor card. or label switch processor card for operation	Compatible with all current Cisco CRS-3 line-card chassis Compatible with all current Cisco CRS-1 line-card chassis with 140-Gbps fabric cards *Requires Cisco 140-Gbps modular services card or 140-Gbps forwarding processor card for operation
Software compatibility	Cisco IOS XR Software Release 5.1.1. or later	Cisco IOS XR Software Release 4.0.0 or later
Port density	Four ports of 100 Gigabit Ethernet per PLIM slot	One port of 100 Gigabit Ethernet per PLIM slot
Ethernet	• IEEE 802.3ba compliant • 100 Gigabit Ethernet PHY Monitoring • OTU-4 (Single 100-Gbps container) • Encapsulations: ARPA, IEEE 802.2/SAP, and IEEE 802.3/SNAP • IEEE 802.x flow control • 802.1q VLAN support, jumbo frames • IEEE 802.1p tagging • Source and destination MAC accounting and VLAN accounting	• IEEE 802.3ba compliant • 100 Gigabit Ethernet PHY Monitoring • Encapsulations: ARPA, IEEE 802.2/SAP, and IEEE 802.3/SNAP • IEEE 802.x flow control • 802.1q VLAN support, jumbo frames • IEEE 802.1p tagging • Source and destination MAC accounting and VLAN accounting • Full-duplex operation

Feature	Description	
	Cisco CRS-X 4-port 100GE LAN/OTN Interface Module	Cisco CRS-3 1-Port 100 Gigabit Ethernet Interface Module
	• Full-duplex operation • 802.1Q VLAN termination • Per-port byte and packet counters for policy drops, oversubscription drops, cyclic redundancy check (CRC) error drops, packet sizes, and unicast, multicast, and broadcast packets • Per-VLAN byte and packet counters for policy drops, oversubscription drops, and unicast, multicast, and broadcast packets • Per-port byte counters for good bytes and dropped bytes	• 802.1Q VLAN termination • Per-port byte and packet counters for policy drops, oversubscription drops, cyclic redundancy check (CRC) error drops, packet sizes, and unicast, multicast, and broadcast packets • Per-VLAN byte and packet counters for policy drops, oversubscription drops, and unicast, multicast, and broadcast packets • Per-port byte counters for good bytes and dropped bytes
OTN (G.709 feature summary)	ITU G.709 • Alarm reporting: Loss of signal (LOS), loss of OTN frame (LOF), and loss of OTN multiframe (LOM) • OTU backward defect indication (OTU-BDI), ODU alarm indication signal (ODU-AIS), ODU open connection indication (ODU-OCI), ODU locked (ODU-LCK), ODU backwards defect indication (ODU-BDI), ODU payload type identifier mismatch (ODU-PTIM), OTU signal fail (OTU_SF_BER), and OTU signal degrade (OTU_SD_BER) • OTU_SF_BER and OTU_SD_BER alarms are based on monitoring of OTU BIP errors with a user-configurable threshold crossing • Error counts: OTU BIP, OTU BEI, ODU BIP, and ODU BEI • Threshold crossing alerts (TCAs) for OTU BIP errors (SM-TCA) and ODU BIP errors (PM-TCA) with user-configurable threshold • Local (internal) and line (network) loopback	-
Performance	• 400-Gbps line-rate throughput • Maximum number of interface modules per chassis: 8 slot (8) and 16 slot (16)	• 100-Gbps line-rate throughput • Maximum number of interface modules per chassis: 4 slot (4), 8 slot (8), and 16 slot (16)
Reliability and availability	• Line-card online insertion and removal (OIR) support without affecting system	
Network management	• Cisco IOS XR Software command-line interface (CLI) • Simple Network Management Protocol (SNMP) • Extensible Markup Language (XML) interface • CraftWorks Interface (CWI) • Cisco Active Network Abstraction (ANA)	
Physical dimensions	• Occupies one-half slot on a Cisco CRS chassis • Weight: 8.60 lb (3.9 kg) • Height: 20.6 in. (52.2 cm) • Depth: 11.2 in. (28.4 cm) • Width: 1.8 in. (4.49 cm)	• Occupies one-half slot on a Cisco CRS chassis • Weight: 7.17 lb (3.24 kg) • Height: 20.6 in. (52.2 cm) • Depth: 11.2 in. (28.4 cm) • Width: 1.8 in. (4.49 cm)
Power	Expected value < 120W in 400-Gbps mode, <80W in 200-Gbps mode *Energy monitor functionality allows real-time power monitoring of each individual component, including PLIMs and line cards, fabric, PRP through CLI beginning with IOS XR Release 5.1.1	150W
Environmental conditions	Storage temperature: -40 to 158℉ (-40 to 70℃) Operating temperature: • Normal: 32 to 104℉ (0 to 40℃) • Short-term: 23 to 122℉ (-5 to 50℃) Relative humidity: • Normal: 5 to 85% • Short-term: 5 to 90% but not to exceed 0.024 kg water per kg of dry air Short-term refers to a period of not more than 96 consecutive hours or a total of 360 hours but not more than 15 instances in 1 year.	

Approvals and Compliance

Table 2 provides standards and compliance information for the Cisco CRS 100 Gigabit Ethernet Interface Modules.

Table 2. Compliance and Agency Approvals

Feature	Description	
	Cisco CRS-X 4-port 100GE LAN/OTN Interface Module	Cisco CRS-3 1-Port 100 Gigabit Ethernet Interface Module
Safety standards	• UL/CSA/IEC/EN 60950-1, 2nd ed, AM 1 • AS/NZS 60950.1 • IEC/EN 60825 Laser Safety • FDA - Code of Federal Regulations Laser Safety	
EMI	• FCC Class A • ICES 003 Class A • AS/NZS CISPR 22 Class A • CISPR 22 (EN55022) Class A • VCCI Class A • IEC/EN 61000-3-2: Power Line Harmonics • IEC/EN 61000-3-3: Voltage Fluctuations and Flicker	
Immunity (Basic standards)	• IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8-kV contact, 15-kV air) • IEC/EN-61000-4-3: Radiated Immunity (10V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2-kV power, 1-kV signal) • IEC/EN-61000-4-5: Surge AC Port (4-kV CM, 2-kV DM) • IEC/EN-61000-4-5: Signal Ports (1 kV) • IEC/EN-61000-4-5: Surge DC Port (1 kV) • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10 Vrms) • IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m) • IEC/EN-61000-4-11: Voltage Dips, Short Interruptions, and Voltage Variations	
ETSI and EN	• EN300 386: Telecommunications Network Equipment (EMC) • EN55022: Information Technology Equipment (Emissions) • EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: Generic Immunity Standard	
Network Equipment Building Standards (NEBS)	This product is designed to meet the following requirements (qualification in progress): • SR-3580: NEBS Criteria Levels (Level 3) • GR-1089-CORE: NEBS EMC and Safety • GR-63-CORE: NEBS Physical Protection	

Additional Specifications

Table 3 provides information about Cisco CRS100 Gigabit Ethernet pluggables.

Table 3. Ordering Information

100 Gigabit Ethernet Optics	Maximum Distance
100 Gigabit Ethernet long-reach over 4 WDM Lanes (LR4) Optics (single-mode fiber)	6.2 mi (10 km)
Cisco 4-port 100G CPAK Gigabit Ethernet LR4 (10 km) Optics	6.2 mi (10 km)
Cisco 4-port 100G SR10 Gigabit Ethernet SR10 (100M) Optics	100m

Ordering Information

Table 4 provides ordering information. To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center.

Table 4. Ordering Information

Product Name	Part Number
Cisco CRS-3 1-port 100 Gigabit Ethernet Interface Module	CRS-FP40
Cisco CRS-X 4-port 100GE LAN/OTN Interface Module	4x100GE-LO
Cisco CRS-X Series 200G to 400G upgrade license	XC-MSC200GTO400G
Cisco 4-port 100G CPAK Gigabit Ethernet LR4 (10 km) Optics	CPAK-100G-LR4
Cisco 4-port 100G SR10 Gigabit Ethernet SR10 (100M) Optics	CPAK-100G-SR10
Cisco 100 Gigabit Ethernet LR4 (10 km) Optics	CFP-100G-LR4

Cisco Services

Services from Cisco and our partners help you get the most value from your investments in Cisco converged IP and optical solutions, quickly and cost effectively. We can help you:

- Design, implement, and validate your solution to speed migration and cutover
- Coordinate every step through to interworking, and deploy your solution in a predictable, efficient, and accurate way
- Strengthen your team by sharing what we know

We develop award-winning services that incorporate our history of market-changing innovation, which are delivered by deeply experienced engineers using proven methods and automated tools built through more than 28 years of industry leadership.

For More Information

For more information about the Cisco CRS, visit http://www.cisco.com/go/crs or contact your local account representative.

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