Cisco CRS-3 Forwarding Processor Card

The Cisco® CRS-3 Carrier Routing System offers industry-leading performance, advanced services intelligence, environmentally conscious design, and system longevity. The Cisco CRS-3 is powered by the Cisco QuantumFlow Array – a chipset architecture based on multidimensional engineering and Cisco IOS® XR Software, a unique self-healing, distributed operating system.

Packet-based data communications are being replaced by video and rich media traversing the IP Next-Generation Network (NGN) in multiple directions, straining the architectural foundations of both public and private networks serving businesses and consumers. As part of the medianet, a media-aware Cisco IP NGN, the Cisco CRS-3 delivers continuous, always-on operations and scales easily from numerous single-chassis form factors to a massive multi-chassis system. Its design provides an industry-leading efficiency consuming lowest power, cooling and rack-space resources for an intelligent service-rich bandwidth capacity. The CRS-3 builds on the CRS-1 being backward and forward compatible, protecting existing and future investments for decades to come.

This data sheet provides detailed product specifications for the Cisco CRS-3 140-Gbps Forwarding Processor Card (product number CRS-FP140). For more information about the Cisco CRS Family and other available interfaces, visit: http://www.cisco.com/go/crs.

Figure 1. Cisco CRS-3 140-Gbps Forwarding Processor Card

The Cisco CRS-3 Forwarding Processor Card provides distributed forwarding engine capability for the Cisco CRS Family. It is responsible for data-plane processing tasks, handling all network traffic flows through it. The card performs all baseline packet routing operations, including Layer 3 forwarding, quality-of-service (QoS) classification, policing and shaping, security access control lists (ACLs), VPNs, load balancing, and NetFlow. The performance highlights of the card include hardware-assisted policing, and jitter- and latency-minimizing multicast packet replication.

The Cisco CRS-3 Forwarding Processor Card offers many advantages:

- Powered by QuantumFlow Array, one of the world's most sophisticated chipset architectures. QuantumFlow Array was engineered for the Cisco CRS Family of routers to provide higher bandwidth than competing products without any compromise on service performance
- Supported across all the Cisco CRS-3 form factors: 4-slot, 8-slot, 16-slot, and multi-chassis
- Supported across all the Cisco CRS-1 form factors: 4-slot, 8-slot, 16-slot, and multi-chassis
- Scales the Cisco CRS per-slot forwarding capacity 3.5 times from 40 Gbps to 140 Gbps

- Always paired with interface module through the chassis mid-plane, thus occupying one-half of a slot
- Can be paired with a variety of interface modules, providing deployment flexibility
- Can be mixed with 40-Gbps-per-slot modules occupying other slots in the chassis
- Features two 140-Gbps forwarding ASICs for discreet ingress and egress packet handling
- Single-flow Layer 3 traffic processing at 140 Gbps in each direction
- Enhanced onboard multi-core CPU for accelerated software processing
- Optimized for peering edge and core applications
- Layer 3 forwarding engine with industry-leading, wire-rate performance at
- Additional services such as class of service (CoS) processing, Multicast, Traffic Engineering (TE), and statistics gathering are also performed at line-rate
- Supports up to 8 queues per port
- Built-in hardware acceleration for critical network control traffic
- Built-in support for video monitoring for a rich video quality of experience (QoE)
- Accurate hardware-assisted time-stamping support for service-level agreement (SLA) monitoring
- Supports several forwarding protocols, including IPv4, IPv6, and MPLS
- Enhanced performance with hardware-based prefix lookup for IPv4, IPv6, and MPLS
- Industry-leading environmental efficiency with a lower power and weight profile than competition

Product Specifications

Table 1 gives specifications for the Cisco CRS-3 Forwarding Processor Card.

Table 1. Product Specifications

Feature	Description
Chassis compatibility	• Compatible with all current Cisco CRS-3 line-card chassis • Compatible with all current Cisco CRS-1 line-card chassis with 140G fabric cards • Always paired with an interface module • Compatible with 1X100GBE, 14X10GBE-WL-XFP & 20X10GBE-WL-XFP interface modules
Software compatibility	Cisco IOS XR Software Release 4.0.0 or later

Feature	Description
Features and protocols	IP Features: • IPv4 unicast services • IPv6 unicast services • IPv4/IPv6 ECMP • IPv4/IPv6 load balancing Forwarding Features: • Access control lists (ACLs/xACLs) • Quality of service/class of service (QoS/CoS) using Modular QoS CLI (MQC) • IP packet classification/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) • Multicast Forwarding Information Base (MFIB) MPLS Features: • MPLS forwarding • MPLS load balancing • Traffic Engineering (TE), Point-to-Multipoint TE (P2MP) • Policy-based TE Selection (PBTS) • MPLS OAM • UNI • LMP Security Features: • Access control list • Unicast Reverse Path Forwarding (uRPF) • QoS based Policy Propagation through BGP (QPPB) • Control packet policing (CPP) • Dynamic control plane protection (DCoPP) • GTSM RFC 3682 (formally BTSH) Error Detection and Fast Convergence Features: • Bidirectional Forwarding Detection (BFD) • Ethernet OAM (E-OAM), Service-Level Agreement (SLA), 802.1ag, 802.3ah, Y.1731 Accounting: • NetFlow • BGP Policy Accounting
Memory	• Configurable with up to 8 GB of route table memory • 1 GB of packet buffer memory per side (2 GB total per line card [ingress and egress])
Performance	• 140 Gbps line-rate throughput • Maximum number of FP per chassis: 4 slot (4), 8 slot (8), 16 slot (16)
Reliability and availability	• Line-card online insertion and removal (OIR) support without system impact • In-service software patching • Out of Resource Management • Process Restartability • IP Fast Reroute (FRR) • MPLS Fast Reroute (FRR)
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)

Feature	Description
Physical dimensions	• Occupies one-half slot on a Cisco CRS-3 chassis • Weight: 14.75 lbs (6.68 kg) • Height: 20.6 in. (52.2 cm) • Depth: 18.62 in. (47.25 cm) • Width: 1.8 in. (4.49 cm)
Power	446 watts
Environmental conditions	• Storage temperature: –40 to 70°C (–40 to 158°F) • Operating temperature: ◦ Normal: 5 to 40°C (41 to 104°F) ◦ Short-term: –5 to 50°C (23 to 122°F) • Relative humidity: ◦ Normal: 5 to 85% ◦ Short-term: 5 to 90% but not to exceed 0.024 kg water/kg of dry air Short-term refers to a period of not more than 96 consecutive hours and a total of 360 hours but not more than 15 instances in 1 year.

Approvals and Compliance

Table 2 gives standards compliance information for the Cisco CRS-3 Forwarding Processor Card.

Table 2. Compliance and Agency Approvals

Feature	Description
Safety Standards	• UL/CSA/IEC/EN 60950-1 • 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

Ordering Information

To place an order, contact your local Cisco representative or visit the Cisco Ordering Home Page. Use the ordering information in Table 3.

Table 3. Ordering Information

Product Part Number	Product Name
CRS-FP140	Cisco CRS-3 Forwarding Processor Card (140 Gbps)

Cisco Services

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For More Information

For more information about the Cisco CRS-3 Forwarding Processor Card, contact your local Cisco representative or visit: http://www.cisco.com/go/crs.

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