Cisco CRS-1 4-Slot Single-Shelf System

The Cisco® CRS-1 Carrier Routing System is the industry's only carrier router offering continuous system operation, unprecedented service flexibility, and system longevity. The Cisco CRS-1 is powered by Cisco IOS® XR Software – a unique self-healing, distributed operating system designed for always-on operation while scaling system capacity up to 92 Tbps. The innovative system architecture combines the Cisco Silicon Packet Processor, the first programmable 40-Gbps application-specific integrated circuit (ASIC), with the Cisco Service Separation Architecture and IP over DWDM for service flexibility and speed to service. The Cisco CRS-1 marks a new era in carrier IP communications by powering the foundation for network and service convergence today while protecting investments for decades to come.

This data sheet provides detailed product specifications for the Cisco CRS-1 4-Slot Single-Shelf System (Figure 1). For more information about the Cisco CRS 1, visit: http://www.cisco.com/go/crs.

Figure 1. Cisco CRS-1 4-Slot Single-Shelf System

Product Specifications

Table 1 gives specifications of the Cisco CRS-1 4-Slot Single-Shelf System.

Table 1. Specifications of Cisco CRS-1 4-Slot Single-Shelf System

Feature	Description
Product compatibility	Compatible with all current Cisco CRS-1 physical layer interface modules (PLIMs) and the modular services card (MSC)
Software compatibility	Cisco IOS XR Software Release 3.4 or higher
Protocols	• Cisco Discovery Protocol • IPv4 and IPv6 addressing • Internet Control Message Protocol (ICMP) • Layer 3 routing protocols, including: ◦ Border Gateway Protocol Version 4 (BGPv4) ◦ Open Shortest Path First Version 2 (OSPFv2) ◦ OSPFv3 ◦ Intermediate System-to-Intermediate System (IS-IS) • Multicast forwarding with support for source-based and shared distribution trees and the following protocols: ◦ Protocol Independent Multicast sparse mode (PIM SM)

Feature	Description
	◦ Bidirectional PIM ◦ PIM Source Specific Multicast (PIM SSM) ◦ Automatic route processing (AutoRP) ◦ Internet Group Management Protocol (IGMP) Versions 1, 2, and 3 ◦ Multiprotocol BGP (MBGP) ◦ Multicast Source Discovery Protocol (MSDP) • Multiprotocol Label Switching (MPLS) ◦ MPLS Label Distribution Protocol (LDP) ◦ Resource Reservation Protocol (RSVP) ◦ Differentiated Services (DiffServ)-aware traffic engineering • MPLS Traffic Engineering control plane (RFCs 2702 and 2430) • Routing Policy Language (RPL) • Management ◦ Simple Network Management Protocol (SNMP) ◦ Programmatic interfaces (Extensible Markup Language [XML]) • Security ◦ Message Digest Algorithm 5 (MD5) ◦ IP Security (IPsec) Protocol ◦ Secure Shell (SSHv2) Protocol ◦ Secure FTP (SFTP) ◦ Secure Sockets Layer (SSL)
Components	Each Cisco CRS-1 4-Slot Line-Card Chassis includes: • Two CRS-1 8-Slot Line Card Chassis Route Processor (part number CRS-8-RP) • Four Cisco CRS-1 4-Slot Fabric Cards (part number CRS-4-FC) • Four power supplies (either DC or AC) • One fan tray Optional items follow: • Four Cisco CRS-1 Modular Services Cards (part number CRS-MSC-40G) • Four Cisco CRS-1 PLIMs
Cards, ports, and slots	• 1-port OC-768C/STM-256C Tunable WDMPOS • 1-port OC-768c/STM-256c Packet over SONET/SDH (PoS) • 4-port 10GE Tunable WDMPHY • 8-port 10 Gigabit Ethernet • 4-port OC-192c/STM-64c PoS/Dynamic Packet Transport (DPT) • 16-port OC-48c/STM-16 PoS/DPT • SPA Interface Processor-800 • Plus support for all future PLIMs supported on Cisco CRS-1
Connectivity	PoS, DPT, 10 Gigabit Ethernet, Gigabit Ethernet, and T3/E3
Features and functions	IP Features • Control-plane packet handling • IPv4 host services • IPv4 unicast forwarding • IPv4 equal-cost multipath (ECMP) • IPv6 host services • IPv6 forwarding services • IPv6 ECMP Forwarding Features • Access control lists (ACLs) • Quality of service (QoS) and class of service (CoS) using Modular QoS CLI (MQC) • IP packet classification and marking • Queuing (both ingress and egress) • Policing (both ingress and egress) • Diagnostic and network-management support Routing Features • MBGPv4 • OSPFv2 • OSPFv3 • IS-IS

Feature	Description
	• Static routes • RPL IPv4 Multicast Features • Dynamic registration using IGMP • Multicast Reverse Path Forwarding (RPF) • PIM SM • PIM Source Specific Multicast (PIM SSM) • Automatic route processing • MSDP • MBGP • Bidirectional PIM • SSM with IGMPv3 • Explicit tracking of hosts, group, and channels for IGMPv3 • Multicast nonstop forwarding (NSF) MPLS Features • MPLS forwarding and load balancing • LDP • RSVP • MPLS traffic-engineering features • User-Network Interface (UNI) • Link Management Protocol (LMP) Security Features • MD5 • SSL • SSH and SFTP • SHTTP support • Control packet policing • IPsec Manageability Features • Alarms management • Configuration management • Accounting and statistics management • Performance management • Control point and network management – Generic requirements • Terminal services enhancements • Enhanced command-line interface (CLI) • XML interface • XML schemas (refer to specifications given previously) • Cisco Craft Works Interface (CWI) • Common Object Request Broker Architecture (CORBA) support • SNMP and MIB support (refer to specifications given previously)
Memory	4 GB
Performance	320-Gbps switching capacity
Reliability and availability	System Redundancy • Power module redundancy 1:1 • Route-processor redundancy 1:1 • Fabric card redundancy 1:4 • Dual homing with line cards • Fan redundancy in single fan tray • Support for automatic protection switching (APS) Software Features • NSF using graceful restart for: IS-IS, OSPF, BGP, LDP, and RSVP • SONET APS (1:1) • Line card online insertion and removal (OIR) support • Fabric card OIR support • Out-of-resource management • Process restartability • MPLS Fast Reroute (FRR)

Feature	Description
	• Hot Standby Router Protocol (HSRP) and Virtual Router Redundancy Protocol (VRRP)
MIBs	SNMP Framework Support • SNMPv1 • SNMPv2c • SNMPv3 • MIB II, including interface extensions (RFC 1213) • SNMP-FRAMEWORK-MIB • SNMP-TARGET-MIB • SNMP-NOTIFICATION-MIB • SNMP-USM-MIB • SNMP-VACM-MIB System Management • CISCO- BULK-FILE-MIB • CISCO-CONFIG-COPY-MIB • CISCO-CONFIG-MAN-MIB • CISCO-FLASH-MIB • CISCO-MEMORY-POOL-MIB • Cisco FTP Client MIB • Cisco Process MIB • Cisco Syslog MIB • CISCO-SYSTEM-MIB • CISCO-CDP-MIB • IF-MIB (RFCs 2233 and 2863) Chassis • ENTITY-MIB (RFC 2737) • CISCO-entity-asset-MIB • CISCO-entity-sensor-MIB • CISCO-FRU-MIB (Cisco-Entity-FRU-Control-MIB) Fabric MIB • CISCO-Fabric-HFR-MIB • CISCO-Fabric-Mcast-MIB • CISCO-Fabric-Mcast-Appl-MIB Routing Protocols • BGP4-MIB Version 1 • OSPFv1MIB (RFC 1253) • CISCO-IETF-IP-FORWARDING-MIB • IP-MIB (was RFC2011-MIB) • TCP-MIB (RFC 2012) • UDP-MIB • CISCO-HSRP-EXT-MIB • CISCO-HSRP-MIB • CISCO-BGP-POLICY-ACCOUNTING-MIB QoS • MQC-MIB (Cisco Class-Based QoS MIB) • CISCO-PING-MIB Traps • RFC 1157 • Authentication • Linkup • Linkdown • Coldstart • Warmstart
Network management	• Enhanced CLI • XML interface • Cisco CWI • SNMP and MIB support
Programming interfaces	• XML schema support
Physical dimensions	Chassis height: 30.0 in. (76.2 cm)

Feature	Description
	Chassis width: 17.643 in. (44.813 cm) Chassis depth: 30.28 in. (76.91 cm) Weight: • 260 lb (117.93 kg) chassis with fans, power modules, and blanks (as shipped) • 380 lb (172.37 kg) chassis as shipped, including power shelf, fabric cards and all line cards and route processors
Power	• Maximum power consumption when chassis is fully configured with line cards with traffic running: 2551W • Chassis power supply maximum output capacity: 4kW for both DC power supply and AC power supply
Environmental conditions	Storage temperature: –40 to 158°F (–40 to 70°C) Operating temperature: • Normal: 41 to 104°F (5 to 40°C) • Short term: 23 to 122°F (–5 to 50°C) Relative humidity: • Normal: 5 to 85 percent • Short-term: 5 to 90 percent but not to exceed 0.024 kg water per kg of dry air **Note**: 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. (It refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)

Approvals And Compliance

Table 2 gives approval and compliance information about the Cisco CRS-1 4-Slot Single-Shelf System.

Table 2. Approvals and Compliance for Cisco CRS-1 4-Slot Single-Shelf System

Feature	Description
Safety standards	• UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 laser safety • AS/NZS 60950 • FDA – Code of Federal Regulations laser safety
EMI	• FCC Class A • ICES 003 Class A • AS/NZS 3548 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 (10 V/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: Surge Signal Ports (1 kV indoor, 2 kV outdoor) • IEC/EN-61000-4-5: Surge DC Port: 100V DM and 500V CM • 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

System Capacity

Table 3 gives capacity information for the Cisco CRS-1 4-Slot Single-Shelf System.

Table 3. System Capacity for Cisco CRS-1 4-Slot Single-Shelf System

Number of Interface Slots	Maximum Capacity per Slot	Total Capacity
4	40 Gbps per slot ingress + 40 Gbps per slot egress	320 Gbps per single-shelf system

Ordering Information

To place an order, visit the Cisco Ordering Home Page or refer to Table 4.

Table 4. Ordering Information for Cisco CRS-1 4-Slot Single-Shelf System

Product Name	Product Part Number
Cisco CRS-1 4-Slot Single-Shelf System	CRS-4/S

Service And Support

Cisco Systems® offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, refer to Cisco Technical Support Services or Cisco Advanced Services.

For More Information

For more information about the 4-slot single-shelf configuration of the Cisco CRS-1 and the new world of networking, visit Cisco at http://www.cisco.com/go/crs or contact your local Cisco account representative.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

Printed in USA C78-359511-03 01/09