Cisco NCS 6008 Single-Chassis System

The Cisco® Network Convergence System 6000 Series System delivers outstanding network agility, packet optical convergence, and petabits-per-second system scale. It also facilitates the build-out of the next-generation core to support elastic capacity at the lowest TCO and to deliver high-bandwidth mobile, video, and cloud services.

Running the industry-leading Virtualized Cisco IOS® XR operating system, Cisco's innovative, industry-leading virtualized operating environment, the Cisco NCS 6000 Series advances the concept of distributed routing and virtualization. With Cisco Virtualized IOS XR, the Cisco NCS 6000 Series brings new levels of programmability and virtualization to enhance application service offerings, increase provisioning speed, and optimize network economics.

The Cisco NCS 6000 Series is powered by the Cisco nPower Network Processor Units (NPU), an innovative programmable forwarding application-specific integrated circuit (ASIC). The Cisco nPower X1 is designed to deliver the industry's first zero packet loss (ZPL) and zero topology loss (ZTL) In-Service Software Upgrade (ISSU) capability.

The Cisco NCS 6000 Series is engineered for environmental efficiency, using an adaptable power consumption model for both the ASIC and complementary metal-oxide semiconductor (CMOS) photonics technology. These technologies give the Cisco NCS 6000 Series the lowest carbon footprint in service provider routing.

The Cisco NCS 6008 single-chassis system (Figure 1) provides 8 Tbps of full-duplex network bandwidth through 8 line cards. Each card delivers up to 1 Tbps throughput using a mix of 10-Gbps, 40-Gbps, or 100-Gbps interfaces per card. The Cisco NCS 6008 also provides modular optics options to meet a wide range of distance requirements. In a multi-chassis configuration, the Cisco NCS 6008 Series can be expanded to support up to 128 Tbps of full-duplex forwarding throughput.

Figure 1. Cisco NCS 6008 Single-Chassis System

The market demand for high-capacity data networks is accelerating: Most global communications now occur online, Internet and mobile use continue to expand, and video and interactive multimedia usage are increasing exponentially.

The Cisco NCS 6008 single-chassis system offers many advantages that can help meet usage demands for the foreseeable future:

- The system is powered by the new Cisco nPower NPUs, which meet the demands of the next-generation core without compromise.
- The Cisco NCS 6000 Series is a fully distributed system. All packet-forwarding decisions and actions take place on the individual line cards to provide high-speed, flexible forwarding. The control plane is independently managed by the route processors, which communicate with other network elements, then send the feature and forwarding instructions to the line cards.
- The Cisco NCS 6008 System (refer to Figure 2) provides an operationally efficient infrastructure. All common components, route processors, switching fabric, fans, and power supplies are fully redundant. In addition, the platform uses power on an as-needed basis, depending on system requirements. Power has been modularized to reduce capital expenditures (CapEx) and provide operationally efficient deployment. For environment efficiency, each line card's power consumption is adapted to the number of ports used.
- The Cisco NCS 6000 Series uses the Cisco IOS XR operating system, well known for its use in the highly successful Cisco Carrier Routing System (CRS) and Aggregation Services Router (ASR) 9000 platforms. Cisco IOS XR Software is the only fully modular, fully distributed internetworking operating system that uses control plane distribution to allow scaling from a single-chassis system to a large multichassis system. The Cisco IOS XR operating system is purpose-built for distributed systems. In the Cisco NCS 6000 series, it is further extended by running in the virtual IOS-XR environment. This modularity provides the path to nonstop operations during software image upgrades or module changes.
- Integrated technology includes IP and Multiprotocol Label Switching (MPLS) routing, IP over dense wavelength-division multiplexing (DWDM), network virtualization with secure domain routers (SDRs), fabric multicast replication, fabric quality of service (QoS), Cisco NetFlow Accounting, and a services implementation infrastructure to provide an outstanding quality of experience (QoE) at the lowest possible TCO.
- Optical extensions are supported to improve packet-data integration, by enhancing power, footprint and future growth.
- The Cisco NCS 6000 series provides outstanding support for control plane integration between the router and optical extensions, for configuration, monitoring, and proactive protection.

Cisco NCS 6008 Line Cards

With the rapid growth of bandwidth in service provider networks, solutions must be both flexible and cost efficient. The Cisco NCS 6008 delivers the highest throughput in the industry, while allowing for natural evolution of existing network architectures - and for tighter integration between the routing and optical transport networks. To help achieve these performance objectives, Cisco NCS 6008 line cards can be deployed in the following ways, based on the capabilities required:

- Multiservice (MS): Supports core and peering applications requiring high-scale IPv4/IPv6/MPLS forwarding and queuing capabilities
- Label switch routing (LSR): Supports MPLS switching applications with limited IPv4/IPv6 capabilities

For more information please refer to the Cisco NCS 6008 line card data sheets.

Figure 2. Cisco NCS 6008 Single-Chassis System

Product Specifications

Table 1 lists specifications for the single-chassis configurations of the Cisco NCS 6008. For more information about the Cisco NCS 6008, visit: http://www.cisco.com/go/ncs6000.

Table 1. Cisco NCS 6008 Product Specifications

Feature	Description
Software compatibility	Cisco IOS XR Software Release 5.0 or later running in the Cisco nVisor environment
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, and Intermediate System-to-Intermediate System (IS-IS) Protocol • Multicast forwarding with support for source-based and shared distribution trees and the following protocols: ◦ Protocol Independent Multicast Sparse Mode (PIM-SM) ◦ Bi-directional PIM (Bidir-PIM) ◦ PIM Source Specific Multicast (PIM SSM) ◦ Automatic route processing (AutoRP) ◦ Internet Group Management Protocol (IGMP) versions, 2 and 3 ◦ Multiprotocol BGP (MBGP) ◦ Multicast Source Discovery Protocol (MSDP) • Multiprotocol Label Switching (MPLS) ◦ MPLS Label Distribution Protocol (LDP) ◦ Resource Reservation Protocol (RSVP) ◦ Diffserv Aware Traffic Engineering (TE) • MPLS Traffic Engineering control plane (RFCs 2702 and 2430) • Route Policy Language (RPL) • Management ◦ Simple Network Management Protocol (SNMP) ◦ Programmatic interfaces (XML) • MPLS Traffic Engineering control plane • Management: ◦ Simple Network Management Protocol (SNMP) ◦ Programmatic interfaces (XML) • Security

Feature	Description
	◦ Message Digest Algorithm (MD5) ◦ IP Security (IPsec) Protocol ◦ Secure Shell Protocol Version 2 (SSHv2) ◦ Secure FTP (SFTP) ◦ Secure Sockets Layer (SSL) • Ethernet ◦ 100 Gigabit Ethernet IEEE 802.3 ◦ 40 Gigabit Ethernet IEEE 802.3 ◦ 10 Gigabit Ethernet IEEE 802.3 ◦ Support for short- and long-reach IEEE standards
Components	Each Cisco NCS 6008 line card chassis include: • Standalone chassis (no rack required) • 2 route processors • 6 fabric cards • 8 line card slots • 2 fan trays • Air inlet filter • 6 power shelves (DC or AC)
Line cards	100-G line cards • 10 x 100-Gigabit Ethernet -multiservice cards with CXP optics • 10 x 100 Gigabit Ethernet -multiservice cards with CPAK optics • 10 x 100- Gigabit Ethernet LSR cards - CXP optics • 10 x 100 Gigabit Ethernet LSR cards with CPAK optics 10-G line cards • 60 x 10 - Gigabit Ethernet multiservice cards with Enhanced Small Form-Factor Pluggable (SFP+) optics
Connectivity	100, 40, and 10 Gigabit Ethernet on 100-Gbps line cards using breakout or patch panel solutions
Features and functions	IP features: • IPv4 unicast services • IPv6 unicast services • IPv4/IPv6 equal-cost multipathing (ECMP) • IPv4/IPv6 load balancing) Forwarding features: • Access control lists (ACLs) • Qos and class of service (CoS) using modular QoS command-line interface (CLI; MQC) • IP packet classification and marking • Queuing (ingress and egress) • Policing (ingress and egress) • Diagnostic and network management support IPv4 multicast features: • Multicast reverse path forwarding (RPF) • Multicast nonstop forwarding (NSF) • Multicast forwarding information base (MFIB) MPLS features: • MPLS forwarding • MPLS load balancing • User network interface (UNI) • Link management protocol (LMP) Security features: • Control packet policing • Dynamic control plane protection • GTSM RFC 3682 (formerly BTSH)
System capacity	2 Tbps per line card capability (1 Tbps per slot ingress and 1 Tbps per slot egress) for a total switching capacity of 16 Tbps
Reliability and availability	System redundancy: • Power redundancy 1:1 or 1:N • Fan tray redundancy 1:1 • Route processor redundancy 1:1 • Fabric card redundancy 1:6 Software features: • NSF using graceful restart for IS-IS, OSPF, BGP, LDP, and RSVP • Line-card online insertion and removal (OIR) support • Fabric card OIR support • Out of resource management • Virtual machine redundancy • MPLS Fast Reroute (FRR) • Hot Standby Router Protocol (HSRP) and Virtual Router Redundancy ProtocolVRRP)

Feature	Description	
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 (RFC 2233/RFC 2863) QoS: • MQC-MIB (Cisco Class-Based QoS MIB) • CISCO-PING-MIB	Chassis: • ENTITY-MIB (RFC 2737) • CISCO-entity-asset-MIB • CISCO-entity-sensor-MIB • CISCO-FRU-MIB (Cisco-Entity-FRU-Control-MIB) Fabric: • CISCO-Fabric-Mcast-MIB • CISCO-Fabric-Mcast-Appl-MIB Routing protocols: • BGP4-MIB Version 1 • OSPFv1-MIB (RFC 1253) • CISCO-IETF-IP-FORWARDING-MIB • IP-MIB (was RFC 2011-MIB) • TCP-MIB (RFC 2012) • UDP-MIB • CISCO-HSRP-EXT-MIB • CISCO-HSRP-MIB Traps: • RFC 1157 • Authentication • Linkup • Linkdown • ColdstartWarmstart
Network management	Enhanced CLI XML interface Simple Network Management Protocol (SNMP) and MIB support Cisco Prime™ Network	
Programmatic interfaces	XML schema support	
Physical dimensions	Chassis height: • 84 in. (213.36 cm) Chassis width: • 23.6 in. (59.94 cm) Chassis depth: (inclusive of external cosmetic doors) • 42 in. (106.68 cm)	
Power	• Support for both DC and AC power modules[1] (AC ranges:200-240V; 50-60 Hz; 16A maximumWorldwide ranging DC (-40 to -72V; 50A nominal, and 60A maximum)	
Environmental conditions	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℃) (see note) 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 and a total of not more than 15 days in 1 year. (This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)	

[1] Mixing of AC and DC modules is not supported.

Approvals and Compliance

Table 2 lists compliance and agency approvals for both models of the Cisco NCS 6008 single-chassis system.

Table 2. Compliance and Agency Approvals for the Cisco NCS 6008 Single-Chassis System

Feature	Description
Safety standards	• UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • FDA: Code of Federal Regulations Laser Safety
Electromagnetic interference (EMI)	• FCC Class A • ICES 003 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 Systems (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, visit the Cisco Ordering Home Page and refer to Table 3.

Table 3. Ordering Information

Part Number	Description Name
NCS-6008-SYS-S	Cisco NCS Single-chassis System

Cisco Services for Migrating Converged IP+Optical Solutions

Services from Cisco and our partners help you get the most value from your investments in Cisco's converged IP+Optical solution, 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. Strengthen your team. And make the most of tomorrow's opportunities. Learn more at http://www.cisco.com/go/spservices.

For More Information

For more information about the Cisco NCS 6008 single-chassis system, contact your local account representative or visit Cisco at: http://www.cisco.com/go/ncs6000.

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