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Cisco NCS 560-4 Route Switch Processor 4

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Control plane, forwarding plane and management plane elements, centralized network timing, full device programmability, and services orchestration. The Cisco® NCS 560-4 Route Switch Processor 4 (RSP4) is the powerful centralized engine that is designed to accommodate new programmable deployment models and convergence of advanced Layer 2 and Layer 3 services. The NCS 560-4 RSP4 (Figure 1) addresses the evolving requirements for converged service provider networks, delivering a variety of advanced technologies for mobile xHaul, Radio Access Network Aggregation (RAN), carrier Ethernet, and Data Center Interconnect (DCI), such as MPLS, segment routing, segment routing traffic engineering, and advanced Ethernet VPN technologies. With in-built trust anchor hardware infrastructure and software enabled security features, NCS 560-4 RSP4 is trusted and secured platform. The NCS 560-4 RSP4 helps service providers add innovative traffic management, packet switching, intelligent routing, and service creation features.

Product overview

The NCS 560-4 RSP4 modules contain separate control plane, forwarding (data) plane, and management plane components. These include the main control plane CPU for the Cisco IOS-XR® software operating system and platform control software. The forwarding (data) plane packet processing and traffic management are performed by the carrier Ethernet Application-Specific Integrated Circuit (ASIC) embedded in the RSP.



Figure 1.
NCS 560-4 RSP4

Fully distributed and unique packet capabilities for converged access and aggregation networks

The Cisco NCS 560-4 Route Switch Processor 4 is compatible with the following Ethernet interface modules:

- Cisco NCS 560 2-Port 40/ 100GE QSFP28 Module: This module supports two 40/ 100 Gigabit Ethernet ports.
- Cisco ASR 900 Series 8-Port 10GE SFP+ Module: This module supports eight SFP+ ports.
- Cisco ASR 900 Series 8/16-port 1GE SFP/CSFP + 1-port 10GE SFP+/1/2-port GE SFP/CSFP Module: This module supports up to 18 Gigabit Ethernet CSFP ports or up to 16 Gigabit Ethernet CSFP ports and one 10 Gigabit Ethernet SFP+ port.
- Cisco NCS 560 1-Port 100/ 200GE CFP2 DCO Module: This module supports one 100 Gigabit Ethernet port or one 200 Gigabit Ethernet port.
- Cisco NCS 560 2-Port 100GE QSFP28/ QSFP-DD Module: This module supports two 100 Gigabit Ethernet ports.

- Cisco ASR 900 Series 8-Port 10GE SFP+ Ethernet Only Module: This module supports eight SFP+ ports.
- Cisco NCS 560 Series Router 8-Port 10GE (SFP+)/ 25GE SFP28 or 4-Port 50 GE (SFP56) Module. This module supports eight 10/ 25 Gigabit Ethernet ports or four 50 Gigabit Ethernet ports

The Cisco NCS 560-4 Route Switch Processor 4 also supports a field-replaceable Global Navigation Satellite System (GNSS) module that allows direct interface to external antennas. The GNSS module supports several satellite systems, such as the Global Positioning System (GPS), GLONASS, GALILEO, BEIDU, QZSS, and SBAS.

The Cisco NCS 560-4 Route Switch Processor 4 is available in two different memory (TCAM) configurations to support large- and extra-large-scale capabilities. The software is identical between the two RSPs.

The Cisco NCS 560-4 interface module support is not dependent on the type of RSP used. The NCS 560 Series Interface Modules Datasheet contains the slot compatibility matrix for the NCS 560-4 RSP.

Features and benefits

Feature	Benefit
Carrier Ethernet	<p>Delivers essential carrier Ethernet technologies such as Hierarchical Quality of Service (H-QoS), IPv4, IPv6, MPLS, segment routing, Segment Routing Traffic Engineering (SR-TE), On-Demand Next Hop (ODN), Topology Independent Loop Free Alternate (TI-LFA), Layer 2 VPN (VPLS/H-VPLS), Ethernet VPN (EVPN-VPWS), and Layer 3 VPN services. It provides line-rate performance and incorporates innovative traffic management capabilities while providing intelligent packet switching and routing operations. Device programmability and services orchestration capabilities for carrier Ethernet are embedded as part of the Evolved Programmable Network Solution Architecture.</p> <p>Is MEF CE 3.0 Certified.</p>
Service enhancement	<p>Provides advanced per-traffic-class metering and offers bidirectional packet-count and byte-count statistics. The service offering is enhanced with Operations, Administration, and Maintenance (OAM) functionality that includes Layer 2 Connectivity Fault Management (CFM), IP Service-Level Agreements (IP SLA) for Layer 3, and MPLS OAM.</p>
Service scale	<p>Provides flexible and high service scalability in a small footprint, delivering high performance and scale for point-to-point and multipoint services, accommodating the requirements from the most demanding wireline and wireless applications.</p>
Clocking and timing services	<p>Offers integrated support for the Global Navigation Satellite System (GNSS), Building Integrated Timing Supply (BITS), 10 MHz, 1 Pulse Per Second (1 PPS), and Time-Of-Day (TOD) interfaces, crucial functions required in a modern unified network. As the central system clocking and timing functions for the NCS 560-4 Router, the Cisco NCS 560 RSPs support Synchronous Ethernet (SyncE) and IEEE 1588-2008 Precision Time Protocol (PTP). The NCS 560-4 router can act as an IEEE 1588-2008 ordinary clock, boundary clock, end-to-end transparent clock, and primary clock function in an IEEE 1588-2008 timing domain.</p>
High availability and modularity	<p>Delivers optional intrachassis hardware redundancy for all hardware components and supports software redundancy with In-Service Software Upgrade (ISSU) support when a pair of route switch processor 4s is inserted in the Cisco NCS 560 system chassis fully modular platform.</p> <p>With two RSPs inserted in the Cisco NCS 560-4 router, one RSP operates in active mode, and the other RSP operates in hot standby mode. The Cisco NCS 560 RSP is a Field-Replaceable Unit (FRU), and it can be Online Inserted and Removed (OIR) while the Cisco NCS 560 system is operating. The removal or failure of the active RSP in the Cisco NCS 560 system results in the automatic switchover to the standby RSP.</p>

Feature	Benefit
Management interfaces	<p>Contains the Out-Of-Band (OOB) management interfaces for the system. To offer flexible access to the router, a variety of interfaces are available for management access to the platform, including a dual-mode console port that functions as either a USB console or a serial console port.</p> <p>In addition to the serial console access, the Cisco NCS 560 RSP contains an Ethernet management port that has no interaction with actual carrier Ethernet ASIC traffic. In addition to the OOB control interfaces, a USB port can connect USB flash devices for loading Cisco IOS software images and configurations on the platform.</p>

Industry-leading, carrier-class Cisco IOS XR software

The Cisco NCS 560-4 router delivers extra-large scale, service flexibility, and high availability into access and (pre)aggregation networks. It is powered by Cisco IOS XR software, an innovative self-healing, distributed operating system designed for always-on operation. Cisco IOS XR software supports a Software-Maintenance-Update (SMU) capability, which allows bug fixing or even small feature releasing without interrupting existing services.

The Cisco IOS XR software provides scale and serviceability for service providers by:

- Supporting the complete set of Cisco IOS XR software features for a consistent experience
- Scaling advanced service delivery without affecting system performance
- Integrating applications in the network, improving security, reliability, and simplicity
- Facilitating programmability for service orchestration

The initial software support for the Cisco NCS 560-4 router is with IOS XR 6.6.25 software

Product specifications

Tables 1 through 3 list the product specifications and compliance information for the Cisco NCS 560-4 router RSP modules. Individual modules are identified by product number.

Table 1. Cisco NCS 560-4 RSP 4 product specifications

Product ID	Cisco N560-4-RSP4-E	Cisco N560-4-RSP4
Typical power consumption	166W	146W
Maximum power consumption	190W	160W
RSP CPU DRAM memory	32 GB	32 GB
Flash memory	64 GB	64 GB
Service scale	Extra-large	Large

Product ID	Cisco N560-4-RSP4-E	Cisco N560-4-RSP4
Ethernet interface module compatibility	N560-IMA-2C A900-IMA-8Z A900-IMA-8CS1Z N560-IMA-1W N560-IMA-2C-DD A900-IMA-8Z-L N560-IMA-8Q/4L	N560-IMA-2C A900-IMA-8Z A900-IMA-8CS1Z N560-IMA-1W N560-IMA-2C-DD A900-IMA-8Z-L N560-IMA-8Q/4L
Maximum Transmission Unit (MTU)	Configurable MTU of up to 9646 bytes, for bridging on Gigabit Ethernet, 10, 25, 40 and 100 Gigabit Ethernet	
Maximum interface throughput	800 Gbps	800 Gbps
IP version 4 performance	720 Mpps	720 Mpps
IP version 6 performance	720 Mpps	720 Mpps
Management ports⁴	Copper 10/100/1000Base-T LAN management port - RJ45 connector port Console/Aux RS232 serial ports - RJ45 connector port Console - USB 2.0 type A receptacle connector port	
Timing ports⁵	BITS simultaneous input and output (J1/T1/E1) - RJ48 connector port 1 pps input - mini-coax connector port 1 pps output - mini-coax connector port 2.048/10 MHz input - mini-coax connector port 2.048/10 MHz output - mini-coax connector port	
External USB flash memory	Mass storage - USB 2.0 type A receptacle connector port	
Shipment package size (LxWxH)	14.38 in. x 14.38 in. x 6.25 in.	14.38 in. x 14.38 in. x 6.25 in.
Shipment package weight	6.2 lbs.	6.1 lbs.
MTBF at 104° F (40° C) operating temperature (25° C/77° F ambient temperature)	223,400 hours	237,000 hours

Table 2. Environmental specifications

	Cisco NCS 560-4 router
Operating environment and altitude¹	-40 to 65° C operating temperature (DC operation, with the 900W or 1200W power supplies) -40 to 65° C operating temperature (AC operation, with the 900W or 1200W power supplies) -60 to 1800 m operating altitude (for full operating temperature range) Up to 4000 m operating altitude (at up to 40° C temperature)

	Cisco NCS 560-4 router
Outside plant	For an outside plant installation, it is required that the system be protected against airborne contaminants, dust, moisture, insects, pests, corrosive gases, polluted air, or other reactive elements present in the outside air. To achieve this level of protection, it is recommended that the unit be installed in a fully sealed enclosure. Examples of such cabinets include IP65 cabinets with heat exchanger complying with Telecordia GR487.
Relative humidity	5% to 95%, noncondensing
Acoustic noise³	Acoustic noise peak operation complies with Network Equipment Building Standards (NEBS) GR-63-Core Issue 4 sound power level of 78 dB at 27° C operation as measured by the ANSI S12.10/ISO 7779 NAIS noise measurement test standard.
Storage environment	Temperature: -40 to 70° C; altitude: 15,000 ft. (4570 m)
Seismic	Zone 4
Hazardous substances	Reduction Of Hazardous Substances (ROHS) 6

¹ Minimum temperature range of chassis, fan tray, RSP engine, power supply, optics, and interface modules will dictate the supported operating temperature range. Maximum cooling fan tray module is assumed.

² Not more than the following in a one-year period: 96 consecutive hours, or 360 hours total, or 15 occurrences.

³ The above are for normal (nonfailure) operation. When operating with a fan failure, the above may be exceeded.

Table 3. Safety and compliance

Type	Standards
Safety	<ul style="list-style-type: none"> • UL 60950-1, 2nd edition • CAN/CSA C22.2 No. 60950-1-07 2nd edition • IEC 60950-1, 2nd edition • EN 60950-1, 2nd edition • AS/NZS 60950.1:2003
Electromagnetic	<ul style="list-style-type: none"> • FCC CFR47 Part 15 Class A
Emissions compliance	<ul style="list-style-type: none"> • EN55022, Class A • CISPR22, Class A • ICES-003, Class A • EN 300 386, Class A • VCCI, Class A • KN22, Class A • EN61000-3-2 to EN61000-3-3

Type	Standards
Immunity compliance	<ul style="list-style-type: none"> • EN 300 386 • EN 61000-6-1 • EN 50082-1 • CISPR24 • EN 55024 • KN 24 • EN 50121-4 • EN/KN 61000-4-2 to EN/KN 61000-4-6 • EN/KN 61000-4-8 • EN/KN 61000-4-11
NEBS	<ul style="list-style-type: none"> • GR-63-CORE Issue 4 • GR-1089-CORE Issue 6 • SR-3580 NEBS Level 3
ETSI	<ul style="list-style-type: none"> • ETS/EN 300 119 Part 4 • ETS/EN 300 019 - Storage: Class 1.2, Transportation: Class 2.3, In-Use/Operational: Class 3.2 • ETS/EN 300 753
Network synchronization	<ul style="list-style-type: none"> • GNSS • ANSI T1.101 • GR-1244-CORE • GR-253-CORE • ITU-T G.813 • ITU-T G.823 • ITU-T G.824 • ITU-T G.703 clause 5 • ITU-T G.703 clause 9 • ITU-T G.8261/Y.1361 • ITU-T G.781I • ITU-T G.8265.1 • IYU-T G.8273.2 Class-B • ITU-T G.8275.1 • ITU-T G.8275.2 • IEEE1588-2008

Ordering information

Table 4 describes the Cisco IOS XR FCS Software

Table 5 lists the hardware parts available for Cisco NCS 560 RSP 4 modules.

Table 4. Cisco IOS XR software packages for Cisco NCS 560 RSP modules

Cisco IOS XR FCS Software	XR 6.6.25
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Table 5. Hardware components for Cisco NCS 560 RSP modules

Part number	Description
N560-4-RSP4-E	Cisco NCS 560-4 RSP4 Enhanced - 800G, XL Scale (/w ext. TCAM)
N560-4-RSP4-E=	Cisco NCS 560-4 RSP4 Enhanced - 800G, XL Scale (/w ext. TCAM), spare
N560-4-RSP4	Cisco NCS 560-4 RSP4 - 800G, L Scale
N560-4-RSP4=	Cisco NCS 560-4 RSP4 - 800G, L Scale, spare
A900-CM-GNSS	ASR 900 Global Navigation Satellite System Module
A900-CM-GNSS=	ASR 900 Global Navigation Satellite System Module, spare
N560-4-RSP-BLANK	NCS 560-4 Route Switch Processor 4 Blank Cover
N560-4-RSP-BLANK=	NCS 560-4 Route Switch Processor 4 Blank Cover, spare
A900-WWA-RJ48-V	ASR 900 RSP wire wrap adapter for RJ48 connector - Vertical
A900-WWA-RJ48-H	ASR 900 RSP wire wrap adapter for RJ48 connector - Horizontal

Warranty information

Warranty information is available on Cisco.com at the [Product Warranties](#) page.

Cisco environmental sustainability

Information about Cisco’s environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the “Environment Sustainability” section of Cisco’s [Corporate Social Responsibility](#) (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the “Environment Sustainability” section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

Service and support

Cisco offers a wide range of services programs to help accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, promoting 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.

Cisco is committed to reducing your total cost of ownership. Cisco offers a portfolio of technical support services to help ensure that Cisco products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 6 are available as part of the Cisco Carrier Ethernet Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 6. Service and support

Advanced Services	Features	Benefits
<p>Cisco Total Implementation Solutions (TIS), available directly from Cisco</p> <p>Cisco Packaged TIS, available through resellers</p>	<ul style="list-style-type: none"> • Project management • Site survey, configuration, and deployment • Installation, test, and cutover • Training • Major moves, adds, and changes • Design review and product staging 	<ul style="list-style-type: none"> • Supplement existing staff • Help ensure functions meet needs • Mitigate risk
<p>Cisco SP Base Support and Service Provider-Based Onsite Support, available directly from Cisco</p> <p>Cisco Packaged Service Provider-Based Support, available through resellers</p>	<ul style="list-style-type: none"> • 24-hour access to software updates • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance replacement of hardware parts 	<ul style="list-style-type: none"> • Facilitate proactive or expedited problem resolution • Lower total cost of ownership by taking advantage of Cisco expertise and knowledge • Reduce network downtime

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