Cisco Network Convergence System 560-7 Router

Contents

Cisco® NCS 560-7 Router is a full-featured, modular and programmable aggregation platform. It is designed for the cost-effective delivery of converged mobile, residential, and business services. The NCS 560-7 provides Redundancy, shallow depth, low power consumption, high Ethernet interface density and high services scale, optimized for aggregation and remote Point-Of-Presence (POP) applications.

The Cisco NCS 560-7 Router (Figure 1) provides a comprehensive and scalable feature set, supporting Layer 2 VPN, Layer 3 VPN, Ethernet VPN (E-VPN) and Multicast services in a compact design.

Figure 1.
Cisco NCS 560 Router

Major applications

Broadband aggregation

The modular Cisco NCS 560-7 Router supports broadband aggregation for delivering "any-play" services (voice, video, data, and mobility). Designed to support thousands of subscribers, the NCS 560 includes Quality of Service (QoS) features that allow the routers to scale to a large number of queues per device. Combined with a highly granular, three-level hierarchical QoS algorithm, a large number of queues can result in a greatly enhanced broadband user experience. This full-featured Layer 2 and Layer 3 router supports a variety of broadband applications, including IPTV and Video on Demand (VoD), enhancing and extending the Cisco Evolved Programmable Network architecture.

Pre-aggregation for mobile applications

Deployed as a pre-aggregation platform for mobile backhaul, the NCS 560-7 Router can aggregate cell sites and use Segment Routing (SR, SR-TE) or Multiprotocol Label Switching (MPLS) as a transport for Radio Access Network (RAN) backhaul traffic. It also provides the timing services required in today's converged access networks by offering integrated support for the Building Integrated Timing Supply (BITS), 10 MHz, 1 Pulse Per Second (1PPS), and Time Of Day (TOD) interfaces. The router also supports synchronous Ethernet (SyncE), IEEE-1588 Precision Time Protocol, and Global Positioning System (GPS) interfaces. In addition, the NCS 560-7 Router can be deployed in small and rugged environments, due to its shallow depth and qualification for extended temperature ranges.

Metro ethernet aggregation

The NCS 560-7 Router is built to meet service provider requirements for Carrier Ethernet aggregation. It is optimized for remote central office and smaller aggregation sites where a full-featured, modular, small-footprint, and fully redundant aggregation platform is needed. This router offers service flexibility and

delivers Layer 2, IP, MPLS, and Segment Routing transport for advanced L2VPN, L3VPN, EVPN and multicast services.

Major differentiators

The NCS 560-7 Router helps service providers deliver highly scalable advanced services for residential broadband, mobile, and Metro Ethernet applications. This allows an operator to provide differentiated and cost-effective services to end users.

Flexible deployment options

The NCS 560 Router is designed with a compact form factor to accommodate deployment in small spaces. Available with a range of mounting options, the router can be deployed in space-constrained locations such as ETSI 300-mm deep cabinets. The side-to-side airflow design allows two Cisco NCS 560-7 Routers to be mounted back-to-back in a 600-mm cabinet, while the extended temperature range supported by the router allows it to be deployed in locations with minimum environmental control. Small footprint and extended temperature range support allow service providers to extend the reach of their Carrier Ethernet networks to more challenging and remote locations, yet save money on air conditioning.

High availability and modularity

The NCS 560-7 Router is a modular platform. Cisco offers redundant Route Switch Processors (RSPs), AC and DC power supplies, a high-speed fan tray, and a wide range of Ethernet interface modules. The Ethernet interfaces are available in copper and fiber, with speeds ranging from 100 Mbps to 100 Gbps. The interface modules, power supplies, and fan tray are all field replaceable.

The design of the Cisco NCS 560-7 Router delivers in-box hardware redundancy and supports software redundancy with In-Service Software Upgrade (ISSU) support when a pair of route switch processors is inserted in the chassis.

Operational efficiency

The NCS 560-7 Router features essential capabilities that help service providers simplify and automate the management of their networks through device programmability and services orchestration, promoting efficiency gains in the deployment and operation of the networks. The router provides proactive diagnostic and telemetry tools which help service providers avoid potential problems before they occur, troubleshoot any problems, and implement solutions when problems are diagnosed.

System design

The NCS 560-7 Router is built as fully modular systems with a future-ready design. The router chassis supports online field replacement and upgrades of all components. The NCS 560-7 Router is designed to contain one fan tray, up to three power supplies, two Route Switch Processor (RSP) cards, and up to 16 interface module cards. All components support online replacement and field upgrades.

Fan tray

The NCS 560-7 Router has a single high-speed fan tray slot, which must be populated for the system to operate. The fan tray contains redundant fans. The system continues to operate on a single fan failure. The system has been designed to remain operational during the replacement of the fan tray. The duration of the fan tray replacement has a hard time limit imposed on reinsertion of the fan tray depending on the system's ambient temperature. In addition to cooling the chassis, the fan tray also contains a connector for dry-

contact inputs and several system-level alarm LEDs. The NCS 560-7 Router fan module supports an optional field-serviceable dust filter.

Power supply

AC and DC power supplies are available for NCS 560-7 Router. Depending on the system module configuration, and redundancy requirements, two or three power supplies might be needed. The system supports operation on a single power supply, while two power supplies will function in a load-share configuration and three power supplies will function in a 2+1 protection scheme. Mixing of AC and DC power supplies in a single operational chassis is supported.

Route switch processor

The Cisco NCS 560-7 Route Switch Processor (RSP4) is the centralized card in the system responsible for control plane, forwarding (data) plane and management plane, and also provides the network-timing. The Cisco NCS 560-7 Route Switch Processor is a Field Replaceable Unit (FRU).

Interface modules

The Cisco NCS 560-7 Router is a modular system with sixteen interface module slots (slots 0 to 15). These slots support a variety of Ethernet interface modules, with interface speeds ranging from 10Mbps to 100Gbps.

Software

The Cisco NCS 560-7 Router operates with Cisco IOS® XR Software, which is a modular operating system. This software is designed to provide modular packaging, feature velocity, and powerful resiliency. For more information on the supported features and software capabilities, see the Cisco IOS XR Software for Cisco NCS 560-7 Router data sheet.

Network management

The Cisco NCS 560-7 Router is supported in the Cisco Evolved Programmable Network (EPN) architectures. Cisco Evolved Programmable Networks Manager (EPN-M) is an end-to-end network management solution that drastically simplifies the design, provisioning, and management of carrier-grade networks. It is a comprehensive solution that centralizes and automates service design, fulfillment, assurance, and performance analysis to help service providers and enterprises lower their costs while meeting high customer expectations.

In addition to the support for EPN-M, the Cisco NCS 560-7 Router also supports device programmability & Services Orchestration capabilities through a variety of embedded Transport Controllers, SDN Controllers and Network Services Orchestration Solutions.

System components

Table 1 lists the system components available for the Cisco NCS 560-7 Router.

Table 1.   System components for the Cisco NCS 560-7 Router

Part Number	Description
N560-7-SYS-E	NCS 560 7RU System ATO, 800G, XL scale, Flexible Consumption

Part Number	Description
N560-7-SYS	NCS 560 7RU System ATO, 800G, LL scale, Flexible Consumption
N560-RSP4-E	NCS 560 Route Switch Processor, 800G, XL scale
N560-RSP4-E=	NCS 560 Route Switch Processor, 800G, XL scale, Spare
N560-RSP4	NCS 560 Route Switch Processor, 800G, L scale
N560-RSP4=	NCS 560 Route Switch Processor, 800G, L scale, Spare
N560-FAN-H	NCS 560 High Speed Fan Tray
N560-FAN-H=	NCS 560 High Speed Fan Tray, Spare
N560-FAN-F	NCS 560 Fan Tray Filter
N560-FAN-F=	NCS 560 Fan Tray Filter Spare
ASR-907	ASR 907 Router Chassis
ASR-907=	ASR 907 Router Chassis, Spare
A907-RCKMNT-ETSI=	ETSI Rack Mount Option for the Cisco ASR 907, Spare
A907-RCKMNT-19IN=	EIA 19in Rack Mount Option for the Cisco ASR 907, Spare
A907-CAB-BRACKET=	ASR 907 Cable Guide Bracket, Spare
A900-PWR1200-A	ASR 900 1200W AC Power Supply
A900-PWR1200-A=	ASR 900 1200W AC Power Supply, Spare
A900-PWR1200-D	ASR 900 1200W DC Power Supply
A900-PWR1200-D=	ASR 900 1200W DC Power Supply, Spare
N560-PWR1200-D-E	NCS 560 1200W DC Power Supply Enhanced, Dying Gasp
N560-PWR1200-D-E=	NCS 560 1200W DC Power Supply Enhanced, Dying Gasp, Spare
A900-PWR-BLANK=	ASR 900 Power Supply Blank Cover, Spare
A9XX-RSPB-BLANK=	ASR 900 Route Switch Processor Type-B Blank Cover, Spare
A900-IMA-BLANK=	ASR 900 Interface Module Type-A Blank Cover, Spare

Product specifications

Tables 2 through 4 list the product, power, and environmental specifications for the Cisco ASR 900 Series routers. Tables 5 and 6 provide safety, compliance, and certification information.

Table 2.   Cisco NCS 560-7 Router System Specifications

Description	Cisco NCS 560-7 Router
Physical specifications[1]	Height: 12.22 in. (310.38 mm) – 7RU Width: 17.44 in. (443 mm) Depth: 9.22 in. (234.2 mm) Weight: • 69.32 lb (31.4 kg) with two RSPs, two DC power supplies, and loaded with a typical combination of interface module cards • 34.9 lb (15.9 kg) for an empty chassis • 58 lb shipment weight
Rack mounts	ETSI rack mount kit 19 in. rack mount kit 23 in. rack mount kit
Power supplies	3 power supply slots
Interface modules	16 interface module slots
Route switch processors	2 RSP slots
Fan tray	1 fan tray with fan redundancy 4 dry contact input alarms on the fan tray
Air flow	Side-to-side airflow; inlet on the right side, outlet on the left side when looking from the front
Power supplies	Up to 3 power supplies (AC or DC) Modules operate in load share mode System can operate on a single power supply and supports mixing of AC and DC power supplies in a single chassis.
Chassis MTBF at 40° C (104° F) operating temperature (25° C / 77° F ambient temperature)	6,620,000 hours
Fan Tray MTBF at 40° C (104° F) operating temperature (25° C / 77° F ambient temperature)	193,000 hours

Table 3.   Power specifications

Description	Cisco NCS 560-7 Router
Power consumption	Maximum input power 1680W (fully loaded, @ 55 degrees operation temperature, including loss). This is equivalent to 5800 BTU per hr. Typical input power depends on the actual configuration and can be checked using the Cisco power calculator tool at http://tools.cisco.com/cpc/
AC input voltage and frequency	Voltage range: 85 to 264 VAC, nominal 115 to 230 VAC Frequency Range: 47 to 63 Hz, nominal 50 to 60 Hz

Description	Cisco NCS 560-7 Router
AC Power Supply MTBF at 40° C (104° F) operating temperature (25° C / 77° F ambient temperature)	1,300,000 hours
DC input voltage	For 1200W DC power supply, voltage range: –40.8V to –72V DC, nominal –48V/–60V DC
DC Power Supply MTBF at 40° C (104° F) operating temperature (25° C / 77° F ambient temperature)	1,460,000 hours
Power Supply shipment packaging size (LxWxH)	15.44 in. x 9.44 in. x 4.31 in.
Power Supply shipment weight	3.6 lbs.

Table 4.   Environmental specifications

Description	Cisco NCS 560-7 Router
Operating environment and altitude[1]	–40 to 65° C operating temperature (DC operation, with 1200W power supplies) –40 to 65° C operating temperature (AC operation, with 1200W power supply) –60 to 1800m operating altitude (for full operating temperature range) Up to 4000m operating altitude (at up to 40° C temperature)
Outside plant	For an outside plant installation, it is required that the router 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 Telcordia GR487.
Relative humidity	5 to 95%, noncondensing
Acoustic noise[3]	Acoustic noise peak operation complies with Network Equipment Building Standards (NEBS) GR-63-Core Issue 3 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 (4570m)
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.

Table 5.   Safety and Compliance

Type	Standards
Safety	• UL 60950-1, 2nd edition • CAN/CSA C22.2 No. 60950-1-07 2nd edition

Type	Standards
	• IEC 60950-1, 2nd edition
	• EN 60950-1, 2nd edition
	• AS/NZS 60950.1:2003
Electromagnetic	• FCC CFR47 Part 15 Class A
Emissions compliance	• 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
Immunity compliance	• 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[1]	• GR-63-CORE Issue 3
	• GR-1089-CORE Issue 5
	• SR-3580 NEBS Level 3
ETSI	• 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	• ANSI T1.101
	• GR-1244-CORE
	• GR-253-CORE
	• ITU-T G.703 clause 5
	• ITU-T G.703 clause 9
	• ITU-T G.781
	• ITU-T G.813
	• ITU-T G.823
	• ITU-T G.824
	• ITU-T G.8261/Y.1361
	• ITU-T G.8265.1
	• ITU-T G.8273.2 – Class B
	• ITU-T G.8275.1
	• ITU-T G.8275.2
	• IEEE1588-2008

[1] Notable exception: All cabling is provided through the front panel.

Table 6.   Certifications

Description	Cisco NCS 560-7 Router
Common Criteria	Cisco NCS 560-7 Router running Cisco IOS XR 6.6.1 Software
MEF	Carrier Ethernet (CE) 1.0 and CE 2.0. MEF 9 and MEF 14 Carrier Ethernet (CE) 3.0 with XR 6.6.25 Software
IEEE 1588-2008	1588™ SLAVE (IEEE CONFORMITY ASSESSMENT PROGRAM) • IEEE 1588™ Conformity Test Suite for Frequency Synchronization in Telecommunications Networks - Packet Slave Clock • IEEE Std 1588™-2008 and Recommendation ITU-T G.8265.1 (10/2010) with Amendments 1 (04/2011) and 2 (10/2012)

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 7 are

available as part of the Cisco Carrier Ethernet Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 7.   Service and Support

Advanced Services	Features	Benefits
Cisco Total Implementation Solutions (TIS), available directly from Cisco **Cisco Packaged TIS, available through resellers**	• Project management • Site survey, configuration, and deployment • Installation, text, and cutover • Training • Major moves, adds, and changes • Design review and product staging	• Supplement existing staff • Help ensure functions meet needs • Mitigate risk
Cisco SP Base Support and Service Provider-Based Onsite Support, available directly from Cisco **Cisco Packaged Service Provider-Based Support, available through resellers**	• 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	• 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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