



The bridge to possible

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Cisco Network Convergence System 540 Small Density Routers

Contents

Product overview	3
Key product highlights	3
Model comparison	5
Key software feature support	6
Supported transceiver modules	9
Regulatory standards compliance	9
Ordering information	11
Service and support	13
Warranty information	13
Product sustainability	13
Cisco Capital	13
Document history	14

Cisco® NCS 540 Small Density Routers are compact 1RU, temperature-hardened, conformal-coated platforms with advanced timing (Class C), security, and QoS features that revolutionize sub-100G routing by bringing the power of the IOS® XR operating system to 3G/4G/5G cell sites (CSRs) and ease “IP”fication of Radio Access Network (RAN) and small-cell backhaul.

Product overview

The next phase of the network traffic explosion will be driven by use cases that make massive demands on communication service providers. Not only do these new-age applications stipulate greater data bandwidth, but they also need to be complemented by ultra-reliable, low-latency communications to deliver use cases like AR/VR media, UltraHD and new multimedia consumer experiences, massive Internet of Things (IoT), tactile internet, smart cities, AI surveillance, smart health, and Machine-to-Machine (M2M) applications such as smart meters.

Cisco Network Convergence System 540 (NCS 540) Small Density Routers, part of the larger [NCS 540 router family](#), are compact 1RU systems designed for cost-effective delivery of next-generation services and applications for mobile and wireline. These routers are sub-100G-bandwidth, cost-effective, native-25G, carrier-class, I-Temp, conformal-coated, 232-mm-deep, ETSI-compliant, ultra-low-power, 1RU devices capable of Class-C timing, best-in-class security, service exposure using NC/YANG, streaming telemetry, and flexible rollouts using SDN. Built for deployment in any-gen RAN backhaul, sub-6 5G cell sites, Fixed-Wireless Access (FWA), small-cell backhaul, FTTx, utilities, mission-critical enterprise applications, and low-speed Ethernet rings, the three variants of NCS 540 Small Density Routers support a programable SR (segment routing) fabric and EVPN (Ethernet Virtual Private Network) as overlay for a unified end-to-end architecture with cross-domain orchestration via the industry-leading IOS XR software bundled with best-in-class services.

Key product highlights

- Cell site routers based on IOS XR extending Cisco’s 5G Converged SDN Transport with the smallest footprint, ever
- The only router in the industry with native 25G interfaces in a sub-100G bandwidth form factor allowing cost-effective and seamless backhauling of 5G NR
- G.8273.2 Class C Timing complaint
- Low power consumption: minimum <40W, typical <70W, maximum 100W
- Height: 1 RU; width: 445 mm; depth: 232 mm
- Dual power supplies for both AC and DC variants and redundant fans: 3+1
- Suitable for indoor or outdoor (Sealed IP65/IP66 cabinet with heat exchanger conforming to GR487 Specs with sufficient cooling) cabinets: I-Temp, conformal-coated form factors conforming to GR-3108 class 2 and ETSI standards
- Side-to-side airflow
- Segment Routing with MPLS (SR-MPLS) and IPv6 data plane (SRv6)
- Versatile Ethernet interface options: 10/100/1000M, 1/10/25G
- Security - Trust Anchor infrastructure, secure boot, image signing, run-time defense

- True, secure zero-touch provisioning with the Cisco Crosswork™ automation suite
- Fully compliant to MEF3.0 architecture for wireline networks*
- Flexible consumption model

*Indicates certification post FCS



Figure 1.
Cisco NCS 540 Small Density Routers

Model comparison

Chassis PID	N540X-6Z18G-SYS-A	N540X-8Z16G-SYS-A	N540X-4Z14G2Q-A
	N540X-6Z18G-SYS-D	N540X-8Z16G-SYS-D	N540X-4Z14G2Q-D
CPU	4-core 2GHz CPU	4-core 2GHz CPU	4-core 2GHz CPU
Memory	8 GB DRAM	8 GB DRAM	8 GB DRAM
Storage	16 GB eMMC	16 GB eMMC	16 GB eMMC
Interfaces	6x 10/1GE 18x 1GE	8x 10/1GE 4x 1GE SFP 4x 1GE RJ45 8x 1GE SFP or 16x 1GE cSFP	2x 25/10/1GE 4x 10/1GE 10x 1GE SFP 4x 1GE Combo SFP/RJ45
Performance	Up to 125 Mpps	Up to 125 Mpps	Up to 125 Mpps
Power Supplies	1 + 1 Fixed redundant DC 1 + 1 Fixed redundant AC	1 + 1 Fixed redundant DC 1 + 1 Fixed redundant AC	1 + 1 Fixed redundant DC 1 + 1 Fixed redundant AC
Fans	Fixed redundant fans: 3+1	Fixed redundant fans: 3+1	Fixed redundant fans: 3+1
Airflow	Side to side: right to left	Side to side: right to left	Side to side: right to left
Operating Temperature Range	I-Temp: -40° C to +70° C up to 300 m -40° C to +65° C up to 1800 m -40° C to +55° C up to 4000 m	I-Temp: -40° C to +70° C up to 300 m -40° C to +65° C up to 1800 m -40° C to +60° C with CSFP -40° C to +55° C up to 4000 m	I-Temp: -40° C to +70° C up to 300 m -40° C to +65° C up to 1800 m -40° C to +55° C up to 4000 m
Nonoperating (Storage) Temperature	-40° C to +70° C	-40° C to +70° C	-40° C to +70° C
Operating Humidity Range	5-95% RH, noncondensing	5-95% RH, noncondensing	5-95% RH, noncondensing
Storage (Relative) Humidity	5-95% at 40° C per NEBS GR-63-Core	5-95% at 40° C per NEBS GR-63-Core	5-95% at 40° C per NEBS GR-63-Core
Power	Universal AC (90-265V; 50-60 Hz) Wide range DC (-20V to -72V)		
Surge Rating*	4KV common mode 2KV differential mode	4KV common mode 2KV differential mode	4KV common mode 2KV differential mode

Chassis PID	N540X-6Z18G-SYS-A N540X-6Z18G-SYS-D	N540X-8Z16G-SYS-A N540X-8Z16G-SYS-D	N540X-4Z14G2Q-A N540X-4Z14G2Q-D
Timing	SyncE, PTP, Interfaces: 1pps, 10MHz, ToD Class C	SyncE, PTP, Interfaces: 1pps, 10MHz, ToD Class C Class B on RJ45 1GE	SyncE, PTP, Interfaces: 1pps, 10MHz, ToD Class C Class B on RJ45 1GE Class B on Ports 14, 15
Physical Specification	Height: 1 RU Width: 445 mm Depth: 232 mm Weight: 5.85 kg – AC unit 5.5 kg – DC unit	Height: 1 RU Width: 445 mm Depth: 232 mm Weight: 5.85 kg – AC unit 5.5 kg – DC unit	Height: 1 RU Width: 445 mm Depth: 232 mm Weight: 5.85 kg – AC unit 5.5 kg – DC unit
Conformal Coated	Yes	Yes	Yes
Mounting Options	19", 23", ETSI	19", 23", ETSI	19", 23", ETSI
Management Interfaces	USB console port, USB memory port, RJ45 console	USB console port, USB memory port, RJ45 console	USB console port, USB memory port, RJ45 console
Sensors	Humidity	Humidity	Humidity

*Requires external surge protection devices for installations where higher surge levels are expected. Failure to do so might lead to permanent damage.

Key software feature support

Specification	Description
Layer 2	VPWS, VPLS, IRB/BVI v4/v6 Layer 2 forwarding and bridging Bridge Domains (BD) Ethernet Flow Point (EFP) IEEE 802.1Q VLANs and Q-in-Q Ethernet Link Aggregation Group (LAG) Link Aggregation Control Protocol (LACP) 802.3ad G.8032

Specification	Description
Layer 3	<p>IPv4 and IPv6 unicast routing</p> <p>Layer 3 interfaces: physical interfaces and subinterfaces</p> <p>Virtual Routing and Forwarding (VRF)</p> <p>Open Shortest Path First (OSPFv2, OSPFv3)</p> <p>Border Gateway Protocol (BGP) v4/v6, LU, PIC, Path Selection, Attributes, TE, Authentication, Security, LS</p> <p>Multiprotocol Border Gateway Protocol (MP-BGP)</p> <p>Intermediate System to Intermediate System (ISIS, ISISv6)</p> <p>Equal-Cost Multipath (ECMP)</p> <p>Bidirectional Forwarding Detection (BFD) v4/v6, Timers, Routing Protocols, Bundle Interfaces, BFD unnumbered</p> <p>Virtual Router Redundancy Protocol (VRRP)</p> <p>Integrated Routing Bridging (IRB) with Bridge Virtual Interface (BVI)</p> <p>Generic Routing Encapsulation (GRE)</p>
MPLS	<p>Label switching (LER, LSR)</p> <p>Label Distribution Protocol (LDP)</p> <p>BGP Labeled Unicast (BGP-LU)</p> <p>L3 VPN, MPLS Traffic Engineering with RSVP-TE</p> <p>Point-to-point L2VPN - Static, T-LDP, EVPN-VPWS</p> <p>Multipoint L2VPN - VPLS, EVPN</p> <p>L2/L3 EVPN with Anycast IRB</p> <p>6PE, 6VPE</p> <p>IP Loop-Free Alternate (LFA) Fast Reroute (FRR)</p> <p>RSVP-TE Fast Reroute (FRR)</p>
Segment Routing (SR)	<p>Segment Routing with MPLS data plane (SR-MPLS)</p> <p>Segment Routing with IPv6 data plane (SRv6)</p> <p>ISIS, OSPF, BGP extensions to segment routing</p> <p>BGP Egress Peering Engineering (BGP-EPE)</p> <p>Segment Routing Traffic Engineering (SRTE)</p> <p>Segment Routing Path Computation Element (SR-PCE)</p> <p>Topology Independent Loop-Free Alternate (TI-LFA)</p> <p>Segment Routing On-Demand Next-hop (SR-ODN)</p>

Specification	Description
Multicast	IPv4 and IPv6 multicast routing PIM-SM, PIM-SSM IGMPv3, MLDv2 mLDP mVPN P2MP-TE
Quality of Service (QoS)	Class-based 3-level Hierarchical QoS Virtual Output Queueing (VOQ) Policing, Shaping Multilevel priority queuing Match, Stats, Classification, Queue management, Remarking Classification based on L2/L3/L4 fields Weighted Random Early Detection (WRED) Deep packet buffer
Timing	SyncE with ESMC External GNSS receiver IEEE 1588-2008 PTP T-GM, T-BC, T-TSC G.8265.1, G.8275.1, G.8275.2 G.8273.2 Class C (Class B on RJ45 1GE)
Security	Control-plane and management plane protection Local Packet Transport Services (LPTS) Authentication, Authorization, and Accounting (AAA) Terminal Access Controller Access-Control System Plus (TACACS+) Secure Shell (SSH) Layer 3 ingress and egress ACLs for IPv4 and IPv6 Layer 2 ingress ACLs Unicast Reverse Path Forwarding (Unicast RPF)
OAM	CDP, LLDP, ICMP, DHCP Relay IP SLA MPLS OAM Ethernet OAM: CFM, Y.1731 DM/SLM TWAMP NetFlow SPAN/ERSPAN

Specification	Description
Manageability	CLI, ICMP, EEM, FTP, TFTP, Telnet SNMP MIB NETCONF/gRPC (XML, JSON, GPB) YANG models (native, open: OpenConfig, IETF) Model/Event-Driven Telemetry RPM-based SW infrastructure Zero-Touch Provisioning (ZTP) with iPXE

Supported transceiver modules

Please refer to the [Transceiver Module Group \(TMG\) Compatibility Matrix](#) for the NCS 540 Series supported transceivers.

Regulatory standards compliance

Regulatory standards compliance: Safety and EMC

Specification	Description
Regulatory Compliance	Products comply with CE markings according to directives 2004/108/EC and 2006/95/EC
Network Equipment Building Standards (NEBS)	Designed to meet GR-63-CORE and GR-1089-CORE
Safety	UL 60950-1 Second Edition CAN/CSA-C22.2 No. 60950-1 Second Edition EN 60950-1 Second Edition IEC 60950-1 Second Edition AS/NZS 60950-1 GB4943 CSA 62368-1 ANSI/UL 62368-1 IEC 62368-1:2014 EN 62368-1:2014+A11:2017

Specification	Description
EMC Standards	EN55032:2015 KN61000-3-12:2014 EN61000-3-2:2014 ICES-003:2016:Iss:6 EN55032:2012 EN61000-3-12:2011 KN61000-3-11:2014 47 CFR Part 15:2016 KN61000-3-3:2014 CISPR32:2015:Ed:2 CISPR32:2012:Ed:1 CNS13438:2006 KN32:2015 EN300 386:2012:V1.6.1 KN61000-3-2:2014 EN61000-3-11:2000 VCCI-CISPR 32:2016 EN61000-3-3:2013
EMC Immunity	IEC 61000-4 series CISPR24:2010+A1:2015 CISPR35:2016:Ed:1 EN IEC61000-6-1:2019 EN300 386:2012:V1.6.1 EN55024:2010 EN55024:2010:A1 EN55035:2017 EN61000-6-1:2007 EN61000-6-2:2005 EN61000-6-2:2019 IEC61000-6-1:2016:Ed:3 IEC61000-6-2:2016:Ed:3 KN35:2015

Specification	Description
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
RoHS	The product is RoHS-6 compliant with exceptions for leaded-Ball Grid-Array (BGA) balls and lead press-fit connectors.

Ordering information

Router PID	N540X-6Z18G-SYS-A N540X-6Z18G-SYS-D	N540X-8Z16G-SYS-A N540X-8Z16G-SYS-D	N540X-4Z14G2Q-A N540X-4Z14G2Q-D
Description	NCS540 18x1G SFP + 6x1/10G SFP+ Dual-AC iTEMP Conformal-Coated Chassis NCS540 18x1G SFP + 6x1/10G SFP+ Dual-DC iTEMP Conformal-Coated Chassis	N540 12/20(CSFP) x1G + 4x1GCu + 8x1/10G Dual-AC iTEMP Conformal-Coated Chassis N540 12/20(CSFP) x1G + 4x1GCu + 8x1/10G Dual-DC iTEMP Conformal-Coated Chassis	NCS540 14x1G + 4x1/10G + 2x10/25G Dual-AC iTEMP Conformal-Coated Chassis NCS540 14x1G + 4x1/10G + 2x10/25G Dual-DC iTEMP Conformal-Coated Chassis
Rackmount for AC Variant	N540-RCKMT-19-ACA N540-RCKMT-23-ACA N540-RKMT-ETSI-ACA	N540-RCKMT-19-ACA N540-RCKMT-23-ACA N540-RKMT-ETSI-ACA	N540-RCKMT-19-ACA N540-RCKMT-23-ACA N540-RKMT-ETSI-ACA
Rackmount for DC Variant	N540-RCKMT-19-ACD N540-RCKMT-23-ACD N540-RKMT-ETSI-ACD	N540-RCKMT-19-ACD N540-RCKMT-23-ACD N540-RKMT-ETSI-ACD	N540-RCKMT-19-ACD N540-RCKMT-23-ACD N540-RKMT-ETSI-ACD
Cable Bracket	N540-CBL-BRKT-AC	N540-CBL-BRKT-AC	N540-CBL-BRKT-AC
FCS Software	IOS XR 7.3.1	IOS XR 7.3.1	IOS XR 7.4.1

Ordering information for software licenses available on NCS 540 portfolio. [Learn more.](#)

Product ID (PID)	Description
ESS-AC-10G-RTU-1	Access Essentials SW Right-to-Use v1.0 per 10G
ADV-AC-10G-RTU-1	Access Advantage w/o Essentials SW RTU v1.0 10G
ADN-AC-10G-RTU-1	Access Advantage w/ Essentials SW RTU v1.0 10G
ESS-ADN-AC-10G-RT	Access Essentials to Advantage Upgrade RTU per 10G
ESS-AC-10G-SIA-3	Access Essentials SIA 10G 3-5 year term
ESS-AC-10G-SIA-5	Access Essentials SIA 10G 5-10 year term

Product ID (PID)	Description
ADV-AC-10G-SIA-3	Access Advantage w/o Essentials SIA 10G 3-5 year term
ADV-AC-10G-SIA-5	Access Advantage w/o Essentials SIA 10G 5-10 year term
ADN-AC-10G-SIA-3	Access Advantage w/ Essentials SIA 10G 3-5 year term
ADN-AC-10G-SIA-5	Access Advantage w/ Essentials SIA 10G 5-10 year term
ESS-ADN-AC-10G-S3	Access Essentials to Advantage Upgrade SIA 10G 3-5 yrs
ESS-ADN-AC-10G-S5	Access Essentials to Advantage Upgrade SIA 10G 5-10 yrs
N540-24Z8Q2C-FC-SW	NCS 540 Series additional Software Licenses (RTU, SIA)

Ordering information for power cables supported

Part number	Description
CAB-AC-SA	Power Cord - South Africa, 16/10A,250V,1830mm, -40C to +85C
CAB-AC-ARG	Power Cord - Argentina, 10A,250V,2500mm, -40C to +85C
CAB-AC-ISR	Power Cord - Israel, 16/10A,250V,2500mm, -40C to +85C
CAB-AC-TAI	Power Cord - Taiwan, 15/10A,125V,2500mm, -40C to +85C
CAB-AC-CHI	Power Cord - China, 10A,250V,2500mm, -40C to +85C
CAB-AC-KOR	Power Cord - Korea, 16/10A,125V,2500mm, -40C to +85C
CAB-AC-EUR	Power Cord - Europe, 16/10A,250V, 2500mm, -40C to +85C
CAB-AC-ITL	Power Cord - Italy, 10A,250V, 2500mm, -40C to +85C
CAB-AC-UK	Power Cord - UK, 13/10A, 250V, 2500mm, -40C to +85C
CAB-AC-AUS	Power Cord - Australia, 10A,250V,2500mm, -40C to +85C
CAB-AC-US	Power Cord - US, 15A,125V,2500mm, -40C to +85C
CAB-AC-BRA	Power Cord - Brazil, 10A,250V,2500mm, -40C to +85C
CAB-AC-IND	Power Cord - India, 16/10A,250V,2500mm, -40C to +85C
CAB-AC-SUI	Power Cord - Swiss, 10A,250V,2500mm, -40C to +85C

Service and support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco NCS 540. These innovative [Cisco Customer Experience \(CX\)](#) offerings are delivered through a unique combination of people, processes, tools, and partners, and they are focused on helping you increase operating efficiency and improve your network operation. Cisco CX helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. Spanning the entire network lifecycle, Cisco CX offerings help increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise.

Warranty information

The Cisco NCS 540 Small Density Routers has a 1-year limited hardware warranty. The warranty includes hardware replacement with a 10-day turnaround from receipt of a Return Materials Authorization (RMA).

Product sustainability

Information about Cisco's environmental, social and governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability [reporting](#).

Table 1. Cisco Environmental Sustainability Information

Sustainability Topic		Reference
General	Information on product-material-content laws and regulations	Materials
	Information on electronic waste laws and regulations, including our products, batteries and packaging	WEEE Compliance
	Information on product takeback and reuse program	Cisco Takeback and Reuse Program
	Sustainability Inquiries	Contact: csr_inquiries@cisco.com
Material	Product packaging weight and materials	Contact: environment@cisco.com

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Document history

New or revised topic	Described in	Date
Updated Section Ordering information		7/14/2021
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