

# Cisco Network Convergence System 540 Medium Density Routers

---

# Contents

Overview	3
Key product highlights	3
Model comparison	4
Supported transceiver modules	9
Additional features	9
Environment	10
Regulatory standards compliance	10
Ordering information	11
Service and support	13
Warranty	14
Product sustainability	14
Cisco Capital	14
For more information	14
Document history	15

---

## Overview

The Cisco Visual Network Index predicts that by 2023, 5G speeds will be 13 times higher than the average mobile connection and 66% of the global population will have internet access. There will be nearly 30 billion devices/connections by 2023 – 45% of those will be mobile and average broadband speeds will rise from 46 Mbps to 110 Mbps. With millions of users and devices connecting to the network, the demands on the service provider network will not be limited to higher bandwidth at lower operating costs but will also require the capabilities to support new applications such as pervasive mobile broadband, massive IoT, tactile internet, smart city and virtual reality.

The Cisco Network Convergence System 540 Medium Density Routers (NCS 540) are designed for cost-effective delivery of next-generation services and applications. These routers are temperature-hardened, high-throughput, small form factor, low-power-consumption devices suitable for both outdoor and indoor deployments. With in-built trust anchor hardware infrastructure and anti-counterfeit protection along with software enabled security features, NCS 540 is most trusted and secured platform. They are powered by the industry-leading carrier-class version of Cisco IOS XR software designed for operational efficiency and service agility. Cisco IOS XR software offers advanced features such as programmability, application awareness, network visibility, and automation. The Cisco NCS 540 series of routers is an intelligent converged access platform which enables service providers to deliver next-level business and entertainment experiences.

## Key product highlights

- 1 RU small form factor with depth <300mm
- Side-to-side or front-to-back airflow
- Environmental hardened, suitable for deployments in indoor or outdoor cabinets
- Low power consumption, minimum <100W, typical <200W, maximum 250W
- Versatile Ethernet interface options: 10/100/1000M, 1/10/25/40/100G
- Low latency forwarding, typically <10  $\mu$ s
- Precise frequency and phase/time synchronization using the latest industry standards
- Integrated GNSS receiver in some model
- Rich Quality of Service capabilities for different SLAs
- Security-Trust Anchor infrastructure, secure boot, image signing, run-time defense
- MEF 3.0 Compliant
- Excellent manageability
- Flexible consumption model
- Third-party app hosting



**Figure 1.**  
Cisco NCS 540 Medium Density Router Family

## Model comparison

**Table 1.** Model comparison

Chassis PID	N540-24Z8Q2C-SYS N540-24Z8Q2C-M	N540-ACC-SYS N540X-ACC-SYS (Conformal Coated)	N540X-16Z4G8Q2C -A N540X-16Z4G8Q2C -D	N540X-12Z16G-SYS-A N540X-12Z16G-SYS-D	N540-28Z4C-SYS -A N540-28Z4C-SYS -D	N540-12Z20G-SYS -A N540-12Z20G-SYS -D	N540X-16Z8Q2C-D
<b>CPU</b>	4-core 1.5Ghz x86 CPU	4-core 1.5Ghz x86 CPU	8-core 1.7GHz x86 CPU	4-core 1.6GHz x86 CPU	8-core 1.7GHz x86 CPU	4-core 1.6GHz x86 CPU	8-core 1.7GHz x86 CPU
<b>Memory</b>	32GB DRAM	16GB DRAM	8GB DRAM	8GB DRAM	8GB DRAM	8GB DRAM	8GB DRAM
<b>Storage</b>	128GB storage	128GB storage	32GB storage	32GB storage	32GB storage	32GB storage	32GB storage
<b>Interfaces</b>	24x 1GE/10GE 8x 1GE/10GE/25GE 2x 40GE/100GE	24x 1GE/10GE 8x 1GE/10GE/25GE 2x 40GE/100GE	4x 1GE RJ-45 (10/100M) 16x 1GE/10GE 8x 1GE/10GE/25GE 2x 40GE/100GE	4x 1GE RJ-45 (10/100M) 12x 1GE 12x 1GE/10GE	28x 1GE/10GE 4x 40GE/100GE	20x 1GE 12x 1GE/10GE	16x 1GE/10GE 8x 1GE/10GE/25GE 2x 40GE/100GE
<b>Performance</b>	Up to 300 Mpps	Up to 300 Mpps	Up to 300 Mpps	Up to 160 Mpps	Up to 300 Mpps	Up to 160 Mpps	Up to 300 Mpps
<b>Power Supplies</b>	2 hot-swappable AC/DC power supplies provide 1+1 redundancy	2 hot-swappable AC/DC power supplies provide 1+1 redundancy	Fixed dual redundant DC power supplies	Fixed dual redundant DC power supplies	Fixed dual redundant DC power supplies	Fixed dual redundant DC power supplies	Fixed dual redundant DC power supplies
<b>Fans</b>	4 modular fans provide 3+1 redundant system cooling	4 modular fans provide 3+1 redundant system cooling	Fixed single AC power supply	Fixed single AC power supply	Fixed single AC power supply	Fixed single AC power supply	Modular Fan Tray with redundant fans
<b>Airflow</b>	Front-to-back airflow	Front-to-back airflow	Modular Fan Tray with redundant fans Side-to-side Airflow (right to left)	Fixed redundant fans Side-to-side Airflow (right to left)	Fixed redundant fans Front-to-back airflow	Fixed redundant fans Front-to-back airflow	Side-to-side Airflow (right to left)

Chassis PID	N540-24Z8Q2C-SYS N540-24Z8Q2C-M	N540-ACC-SYS N540X-ACC-SYS (Conformal Coated)	N540X-16Z4G8Q2C -A N540X-16Z4G8Q2C -D	N540X-12Z16G-SYS-A N540X-12Z16G-SYS-D	N540-28Z4C-SYS -A N540-28Z4C-SYS -D	N540-12Z20G-SYS -A N540-12Z20G-SYS -D	N540X-16Z8Q2C-D
<b>Temperature Range</b>	I-Temp: -40° C to +70° C at 1,000ft +65° C at 6,000ft +55° C at 13,000ft	I-Temp: -40° C to +70° C at 1,000ft +65° C at 6,000ft +55° C at 13,000ft Conformal coated SKU option for hot humid conditions	I-Temp: -40° C to +70° C at 1,000ft +65° C at 6,000ft +55° C at 13,000ft Conformal coated SKU for hot humid conditions	I-Temp: -40° C to +70° C at 1,000ft +65° C at 6,000ft +55° C at 13,000ft Conformal coated SKU for hot humid conditions	C-Temp: -5° C to +55° C at 6,000ft +40° C at 13,000ft	C-Temp: -5° C to +55° C at 6,000ft +40° C at 13,000ft	I-Temp: -40° C to +70° C at 1,000ft +65° C at 6,000ft +55° C at 13,000ft Conformal coated SKU for hot humid conditions
<b>Surge Rating As per IEC 61000-4-5</b>	AC: 1kV DM, 2kV CM DC: 1kV DM, 1kV CM	AC: 1kV DM, 2kV CM DC: 1kV DM, 1kV CM	AC: 2kV DM, 2kV CM DC: 1kV DM, 2kV CM	AC: 2kV DM, 2kV CM DC: 1kV DM, 1kV CM	AC: 2kV DM, 2kV CM DC: 1kV DM, 1kV CM	AC: 2kV DM, 2kV CM DC: 1kV DM, 1kV CM	AC: 2kV DM, 2kV CM DC: 1kV DM, 2kV CM
<b>Timing</b>	SyncE, PTP Internal GNSS receiver Interfaces: 1pps, 10MHz, ToD, antenna for GNSS Class B	SyncE, PTP Internal GNSS receiver Interfaces: 1pps, 10MHz, ToD, antenna for GNSS Class B	SyncE, PTP Internal GNSS receiver Interfaces: BITS, 1pps, 10MHz, ToD, antenna for GNSS Class C	SyncE, PTP Internal GNSS receiver Interfaces: BITS, 1pps, 10MHz, ToD, antenna for GNSS Class C	SyncE, PTP Interfaces: BITS, 1pps, 10MHz, ToD Class B	SyncE, PTP Interfaces: BITS, 1pps, 10MHz, ToD Class B	SyncE, PTP Internal GNSS receiver Interfaces: BITS, 1pps, 10MHz, ToD, antenna for GNSS Class C
<b>Physical Specification</b>	1RU Depth: 26 cm 1.72 in. x 17.3 in. x 10.1 in. Weight: 5.9 kg	1RU Depth: 26 cm 1.72 in. x 17.3 in. x 10.1 in. Weight: 5.9 kg	1RU Depth: 28 cm 1.72 in. x 17.3 in. x 11.02 in. Weight: 5.5 kg	1RU Depth: 25 cm 1.72 in. x 17.3 in. x 9.84 in. Weight: 6.0 kg	1RU Depth: 25 cm 1.72 in. x 17.3 in. x 9.84 in. Weight: 4.7 kg	1RU Depth: 25 cm 1.72 in. x 17.3 in. x 9.84 in. Weight: 4.7 kg	1RU Depth: 28 cm 1.72 in. x 17.3 in. x 11.02 in. Weight: 5.5 kg
<b>NEBS GR-63-CORE and GR-1089-CORE</b>	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant
<b>NEBS GR-3108</b>	Designed to meet Class III when installed in sealed cabinets	Designed to meet Class III when installed in sealed cabinets	Designed to meet Class III when installed in sealed cabinets	Designed to meet Class III when installed in sealed cabinets	Compliant to Class I	Compliant to Class I	Designed to meet Class III when installed in sealed cabinets

## Software feature support on NCS 540 in Cisco IOS XR:

**Table 2.** Software feature support in Cisco IOS XR

Description	Specification
<b>Layer 2</b>	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 Spanning tree Jumbo frames on all ports
<b>Layer 3</b>	IPv4 and IPv6 unicast routing Layer 3 interfaces: physical interfaces and sub-interfaces Virtual Routing and Forwarding (VRF) Open Shortest Path First (OSPFv2, OSPFv3) Intermediate System to Intermediate System (ISIS, ISISv6) Multiprotocol Border Gateway Protocol (MP-BGP) Equal-Cost Multipath (ECMP) Bidirectional Forwarding Detection (BFD) Virtual Router Redundancy Protocol (VRRP) Integrated Routing Bridging (IRB) with Bridge Virtual Interface (BVI) Generic Routing Encapsulation (GRE)
<b>MPLS</b>	Label switching (LER, LSR) Label Distribution Protocol (LDP) BGP Labeled Unicast (BGP-LU) MPLS Traffic Engineering with RSVP-TE Point-to-point L2VPN - Static, T-LDP, EVPN-VPWS Multipoint L2VPN - VPLS, EVPN L2/L3 EVPN with Anycast IRB 6PE, 6VPE IP Loop-Free Alternate (LFA) Fast Reroute (FRR) RSVP-TE Fast Reroute (FRR) Flex-Algo

Description	Specification
<b>Segment Routing (SR)</b>	Segment Routing with MPLS data plane (SR-MPLS) Segment Routing with IPv6 data plane (SRv6) ISIS, OSPF, BGP extensions to segment routing BGP Egress Peering Engineering (BGP-EPE) Segment Routing Traffic Engineering (SRTE) Segment Routing Path Computation Element (SR-PCE) Topology Independent Loop-Free Alternate (TI-LFA) Segment Routing On-Demand Next-hop (SR-ODN) Advanced OAM- SR Performance Monitoring
<b>Multicast</b>	IPv4 and IPv6 multicast routing PIM-SM, PIM-SSM IGMPv3, MLDv2 mLDP mVPN P2MP-TE
<b>Quality of Service (QoS)</b>	Class-based 3-level Hierarchical QoS Virtual Output Queueing (VOQ) Policing, Shaping Multi-level priority queuing Classification based on L2/L3/L4 fields Remarking Weighted Random Early Detection (WRED) Deep packet buffer
<b>Timing</b>	SyncE with ESMC Integrated 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 B/C

Description	Specification
<b>Security</b>	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)
<b>OAM</b>	CDP, LLDP, ICMP, DHCP Relay IP SLA MPLS OAM Ethernet OAM: CFM, Y.1731 DM/SLM TWAMP H/W based timestamping Y.1564 Model/Event Driven Telemetry Netflow SPAN/ERSPAN
<b>Manageability</b>	CLI SNMP MIB NETCONF/gRPC (XML, JSON, GPB) YANG models (native, open: OpenConfig, IETF) RPM-based SW infrastructure Zero-Touch Provisioning (ZTP) with iPXE 3 <sup>rd</sup> party application hosting



---

## Supported transceiver modules

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

## Additional features

The NCS 540 Series Router is a key part of the innovative and new Cisco Secure DDoS Edge Protection solution.

The following platforms are supported with IOS XR Release 7.10.1:

- N540-ACC-SYS (16GB)
- N540X-ACC-SYS (16GB)
- N540-24Z8Q2C-SYS (32GB)
- N540X-16Z4G8Q2C-D
- N540X-16Z4G8Q2C-A
- N540X-16Z8Q2C-D
- N540-28Z4C-SYS-D
- N540-28Z4C-SYS-A
- N540X-12Z16G-SYS-D
- N540X-12Z16G-SYS-A
- N540-12Z20G-SYS-D
- N540-12Z20G-SYS-A

This is the first solution to integrate leading DDoS protection directly into the access convergence platform for true on-box protection and to stop DDoS attacks at the edge of the network while optimizing the hardware required for the mitigation infrastructure.

## Environment

**Table 3.** Environment

Description	NCS 540 Router
<b>Normal operating temperature</b>	Industrial temperature: -40° C to +70° C (1,000 ft.), +65° C (6,000 ft.), +55° C (13,000 ft.) Commercial temperature: -5° C to +55° C (6,000 ft.), +40° C (13,000 ft.)
<b>Nonoperating (storage) temperature</b>	-40 to 70° C (-40 to 158° F)
<b>Operating humidity</b>	All variants of NCS 540: 5% to 95% (noncondensing) except N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D: 15% to 85% (noncondensing)
<b>Storage (relative) humidity</b>	5% to 95% at 40° C per NEBS GR-63-Core
<b>Altitude</b>	0 to 13,000 ft.
<b>Power</b>	Worldwide ranging AC (90-265V; 50-60 Hz) Worldwide ranging DC (-40V to -72V)

## Regulatory standards compliance

**Table 4.** Regulatory standards compliance

Specification	Description
<b>Regulatory compliance</b>	Products should comply with CE markings according to directives 2004/108/EC and 2006/95/EC
<b>Safety</b>	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
<b>EMC standards</b>	47CFR Part 15 (CFR 47) Class A AS/NZS CISPR22 Class A CISPR22 Class A EN55022 Class A ICES003 Class A VCCI Class A EN61000-3-2 EN61000-3-3 KN22 Class A CNS13438 Class A



Router PID	N540-24Z8Q2C-SYS	N540-ACC-SYS	N540X-ACC-SYS	N540X-16Z4G8Q2C-A N540X-16Z4G8Q2C-D	N540X-12Z16G-SYS-A N540X-12Z16G-SYS-D	N540-28Z4C-SYS-A N540-28Z4C-SYS-D	N540-12Z20G-SYS-A N540-12Z20G-SYS-D	N540X-16Z8Q2C-D
	<b>Cable Brackets:</b> N540-CBL-GD-19	<b>Cable Brackets:</b> N540-CBL-GD-19	N540-RKMT-ETSI <b>Cable Brackets:</b> N540-CBL-GD-19	23-EGA N540-RKMT-ETSI-EGA <b>Cable Brackets:</b> N540-CBL-BRKT-EG	<b>Cable Brackets:</b> N540-CBL-BRKT-AC	RCKMT-23-CLA N540-RKMT-ETSI-CLA <b>Cable Brackets:</b> N540-CBL-BRKT-CL N540-WALLMT-CLA	<b>Cable Brackets:</b> N540-CBL-BRKT-DN N540-WALLMT-CLA	EGA N540-RCKMT-23-EGA N540-RKMT-ETSI-EGA <b>Cable Brackets:</b> N540-CBL-BRKT-EG
<b>Software</b>	XR-6.5-AC-TRK TRK-6.5-54	XR-6.5-AC-TRK TRK-6.5-54	XR-6.5-AC-TRK TRK-6.5-54	XR-7.0-AC-TRK TRK-7.0-54	XR-7.0-AC-TRK TRK-7.0-54	XR-7.0-AC-TRK TRK-7.0-54	XR-7.0-AC-TRK TRK-7.0-54	XR-7.3-K9-AC-TRK TRK-7.3-27-54L-K9

## Ordering information for software licenses available on NCS 540

**Table 6.** Ordering information for software licenses

Product ID (PID)	Description
<b>ESS-AC-10G-RTU-1</b>	Access Essentials SW Right-to-Use v1.0 per 10G
<b>ADV-AC-10G-RTU-1</b>	Access Advantage w/o Essentials SW RTU v1.0 10G
<b>ADN-AC-10G-RTU-1</b>	Access Advantage w/ Essentials SW RTU v1.0 10G
<b>ESS-ADN-AC-10G-RT</b>	Access Essentials to Advantage Upgrade RTU per 10G
<b>ESS-AC-10G-SIA-3</b>	Access Essentials SIA 10G 3-5 year term
<b>ESS-AC-10G-SIA-5</b>	Access Essentials SIA 10G 5-10 year term
<b>ADV-AC-10G-SIA-3</b>	Access Advantage w/o Essentials SIA 10G 3-5 year term
<b>ADV-AC-10G-SIA-5</b>	Access Advantage w/o Essentials SIA 10G 5-10 year term
<b>ADN-AC-10G-SIA-3</b>	Access Advantage w/ Essentials SIA 10G 3-5 year term
<b>ADN-AC-10G-SIA-5</b>	Access Advantage w/ Essentials SIA 10G 5-10 year term
<b>ESS-ADN-AC-10G-S3</b>	Access Essentials to Advantage Upgrade SIA 10G 3-5 yrs
<b>ESS-ADN-AC-10G-S5</b>	Access Essentials to Advantage Upgrade SIA 10G 5-10 yrs
<b>N540-24Z8Q2C-FC-SW</b>	NCS 540 Series additional Software Licenses (RTU, SIA)

## Ordering information for power cables supported on NCS 540

Table 7. Ordering information for power cables

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
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

## 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 Services 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 Advanced Services uses an architecture-led approach to help you align your data center infrastructure with your business goals and achieve long-term value. Cisco Services helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. With this service, you can take advantage of the Cisco Smart Call Home service, which offers proactive diagnostics and real-time alerts on your Cisco NCS 540. Spanning the entire network lifecycle, Cisco Services offerings help increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise.

## Warranty

The Cisco NCS 540 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 8.** Product sustainability

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

## Cisco Capital

### Flexible payment solutions to help you achieve your objectives

Cisco Capital makes it easier to get the right technology to achieve your objectives, enable business transformation and help you stay competitive. We can help you reduce the total cost of ownership, conserve capital, and accelerate growth. In more than 100 countries, our flexible payment solutions can help you acquire hardware, software, services and complementary third-party equipment in easy, predictable payments. [Learn more](#).

### For more information

For more information about the Cisco NCS 540, contact your Cisco representative.

---

## Document history

**Table 9.** Document history

New or revised topic	Described in	Date
Updated Section Ordering information		July 14, 2021

**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 <https://www.cisco.com/go/offices>.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <https://www.cisco.com/go/trademarks>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)