

# Cisco Network Convergence System 540 Router

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## Overview

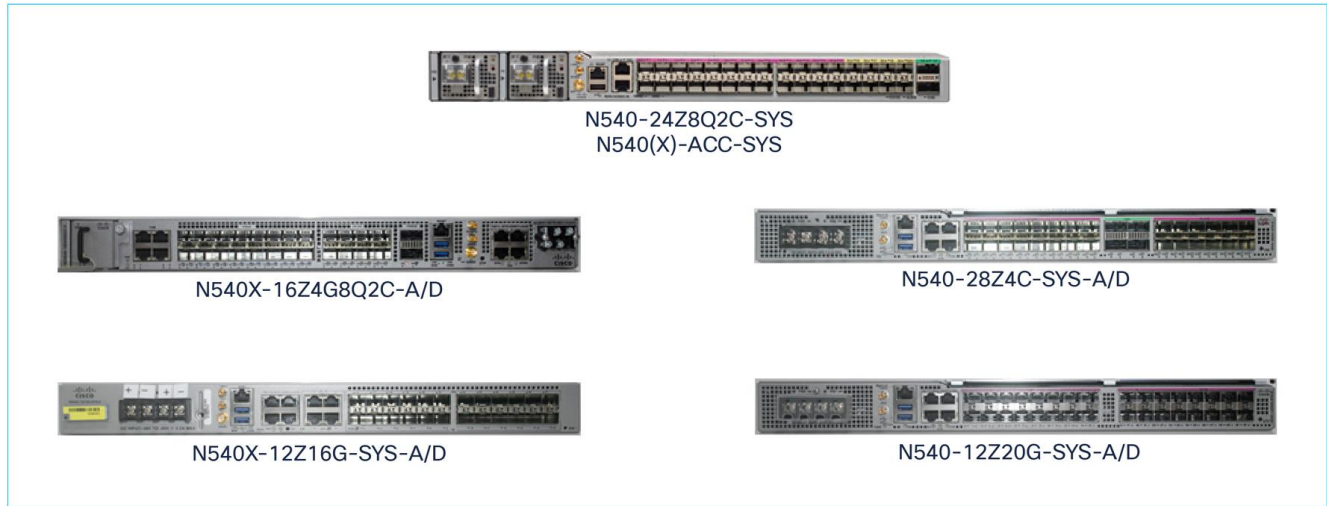
The Cisco Visual Network Index™ forecasts that global IP traffic will increase threefold by 2021, driven by both mobile and wireline traffic.

This explosion will be driven by next generation technologies such as 5G for mobile, Remote PHY for cable and Carrier Ethernet evolution. The service provider network of the future will not just provide exponentially higher bandwidth at lower operating costs but will also be capable of enabling new applications such as pervasive mobile broadband, massive IoT, tactile Internet, smart cities, and virtual reality. A growing number of M2M applications, such as smart meters, video surveillance, healthcare monitoring, transportation, and package or asset tracking, are contributing in a major way to the growth of devices and connections.

The Cisco® Network Convergence System 540 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. 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 µs
- Precise frequency and phase/time synchronization using the latest industry standards
- Integrated GNSS receiver
- Rich Quality of Service capabilities for different SLAs
- MEF 3.0 Compliant
- Excellent manageability
- Flexible consumption model



**Figure 1.**  
Cisco NCS 540 Family

## 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
<b>CPU</b> <b>Memory</b> <b>Storage</b>	4-core 1.5Ghz x86 CPU 32GB DRAM 128GB storage	4-core 1.5Ghz x86 CPU 16GB DRAM 128GB storage	8-core 1.7Ghz x86 CPU 8GB DRAM 32GB storage	4-core 1.6Ghz x86 CPU 8GB DRAM 32GB storage	8-core 1.7Ghz x86 CPU 8GB DRAM 32GB storage	4-core 1.6Ghz x86 CPU 8GB DRAM 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
<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
<b>Power Supplies</b> <b>Fans</b> <b>Airflow</b>	2 hot-swappable AC/DC power supplies provide 1+1 redundancy  4 modular fans provide 3+1 redundant system cooling  Front-to-back airflow	2 hot-swappable AC/DC power supplies provide 1+1 redundancy  4 modular fans provide 3+1 redundant system cooling  Front-to-back airflow	Fixed dual redundant DC power supplies Fixed single AC power supply Modular Fan Tray with redundant fans Side-to-side Airflow (right to left)	Fixed dual redundant DC power supplies Fixed single AC power supply Fixed redundant fans Side-to-side Airflow (right to left)	Fixed dual redundant DC power supplies Fixed single AC power supply Fixed redundant fans Front-to-back airflow	Fixed dual redundant DC power supplies Fixed single AC power supply Fixed redundant fans Front-to-back airflow

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
Temperature Range	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
Surge Rating As per IEC 61000-4-5	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
Timing	SyncE, PTP Internal GNSS receiver SW* Interfaces: 1pps, 10MHz, ToD, antenna for GNSS Class B	SyncE, PTP Internal GNSS receiver SW* Interfaces: 1pps, 10MHz, ToD, antenna for GNSS Class B	SyncE, PTP Internal GNSS receiver SW* Interfaces: BITS, 1pps, 10MHz, ToD, antenna for GNSS Class C	SyncE, PTP Internal GNSS receiver SW* Interfaces: BITS, 1pps, 10MHz, ToD, antenna for GNSS Class C	SyncE, PTP Interfaces: BITS, 1pps, 10MHz, ToD, antenna for GNSS Class B/C*	SyncE, PTP Interfaces: BITS, 1pps, 10MHz, ToD, antenna for GNSS Class B/C*
Physical Specification	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

\* Post FCS

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

Description	Specification
Layer 2	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 Jumbo frames on all ports

Description	Specification
Layer 3	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)
MPLS	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)
Segment Routing (SR)	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)
Multicast	IPv4 and IPv6 multicast routing PIM-SM, PIM-SSM IGMPv3, MLDv2 mLDP mVPN P2MP-TE

Description	Specification
Quality of Service (QoS)	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
Timing	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
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 Model/Event Driven Telemetry Netflow SPAN/ERSPAN
Manageability	CLI SNMP MIB NETCONF/gRPC (XML, JSON, GPB) YANG models (native, open: OpenConfig, IETF) RPM-based SW infrastructure Zero-Touch Provisioning (ZTP) with iPX 3 <sup>rd</sup> party application hosting on N540-24Z8Q2C-SYS

## Supported transceiver modules

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

## Environment

- Environmental properties for NCS 540 fixed systems

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

## Regulatory standards compliance

- Regulatory standards compliance: safety and EMC

Specification	Description
Regulatory compliance	Products should 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
EMC standards	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



Specification	Description
	CNS13438 Class A
EMC immunity	EN55024 CISPR24 EN300386 KN 61000-4 series
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	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
Description	NCS 540 24x1/10GE, 8x10/25GE, 2x100GE chassis	NCS 540 24x1/10GE, 8x10/25GE, 2x100GE chassis	NCS 540 24x1/10GE, 8x10/25GE, 2x100GE conformal coated chassis	Cisco NCS 540 System with 16x10G+4x1G Cu+8x25G+2x100G, AC  Cisco NCS 540 System with 16x10G+4x1G Cu+8x25G+2x100G, DC	Cisco NCS 540 System with 12x1G SFP + 4x1G Cu + 12x10G AC  Cisco NCS 540 System with 12x1G SFP + 4x1G Cu + 12x10G, DC	Cisco NCS 540 System with 28x10G+4x100G, AC  Cisco NCS 540 System with 28x10G+4x100G, DC	Cisco NCS 540 System with 20x1G+12x10G, AC  Cisco NCS 540 System with 20x1G+12x10G, DC
Power Supplies	Power Supply: N540-PWR400-A	Power Supply: N540-PWR400-A	Power Supply: N540-PWR400-A	Fan Tray: N540-X-BB-FAN	Rackmounts for DC variant: N540-RCKMT-19-ACD	Rackmounts for DC variant: N540-RCKMT-19-CLD	Rackmounts for DC variant: N540-RCKMT-19-CLD
Fans	N540-PWR400-D	N540-PWR400-D	N540-PWR400-D		N540-RCKMT-23-ACD	N540-RCKMT-23-CLD	N540-RCKMT-23-CLD
Accessories	Fan: N540-FAN	Fan: N540-FAN	Fan: N540-X-FAN	Rackmounts for DC variant: N540-RCKMT-19-EGD	N540-RKMT-ETSI-ACD	N540-RKMT-ETSI-CLD	N540-RKMT-ETSI-CLD
	Rackmount for AC variant: N540-RCKMT-19	Rackmount for AC variant: N540-RCKMT-19	Rackmount for AC variant: N540-RCKMT-19	N540-RCKMT-23-EGD			
	N540-RCKMT-23	N540-RCKMT-23	N540-RCKMT-23	N540-RKMT-ETSI-EGD	Rackmounts for AC variant: N540-RCKMT-19-ACA	Rackmounts for AC variant: N540-RCKMT-19-CLA	Rackmounts for AC variant: N540-RCKMT-19-CLA
	N540-RKMT-ETSI	N540-RKMT-ETSI	N540-RKMT-ETSI		N540-RCKMT-23-ACA	N540-RCKMT-23-CLA	N540-RCKMT-23-CLA
	Cable Brackets: N540-CBL-GD-19	Cable Brackets: N540-CBL-GD-19	Cable Brackets: N540-CBL-GD-19	Rackmounts for AC variant: N540-RCKMT-19-EGA	N540-RKMT-ETSI-ACA	N540-RKMT-ETSI-CLA	N540-RKMT-ETSI-CLA
				N540-RCKMT-23-EGA	Cable Brackets: N540-RKMT-ETSI-ACA	Cable Brackets: N540-RKMT-ETSI-CLA	Cable Brackets: N540-RKMT-ETSI-CLA
				N540-RKMT-ETSI-			

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
				EGA Cable Brackets: N540-CBL-BRKT-EG	N540-CBL-BRKT-AC	N540-CBL-BRKT-CL N540-WALLMT-CLA	N540-CBL-BRKT-DN N540-WALLMT-CLA
Software	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

#### Ordering information for software licenses available on NCS 540

Part number	Description
ESS-AC-10G-RTU-1	Essentials SW Right-to-Use per 10G
ADV-AC-10G-RTU-1	Advanced SW Right-to-Use per 10G
ESS-10G-SIA-3	Essentials SW Innovation Access per 10G 3-year subscription
ESS-10G-SIA-5	Essentials SW Innovation Access per 10G 5-year subscription
ADV-10G-SIA-3	Advanced SW Innovation Access per 10G 3-year subscription
ADV-10G-SIA-5	Advanced SW Innovation Access per 10G 5-year subscription

#### Ordering information for power cables supported on NCS 540

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

Part number	Description
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.

## 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.](#)

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## 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).

## For more information

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

### Americas Headquarters

Cisco Systems, Inc.  
San Jose, CA

### Asia Pacific Headquarters

Cisco Systems (USA) Pte. Ltd.  
Singapore

### Europe Headquarters

Cisco Systems International BV Amsterdam,  
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