



CCNA Certification Guide

Top Cisco resources to plan
and prepare for certification

[Get started](#)



Table of contents

- 03 Overview
- 08 CCNA study guide
- 19 Exam success
- 22 Next steps
- 27 Resources
- 43 Opportunities

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

CCNA certification overview: Your gateway to IT excellence



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Unlock your career potential and drive success

If you're looking to embark on a rewarding and lucrative information technology (IT) career, obtaining your CCNA certification is a great place to start.

Earning your CCNA gives you a solid foundation for any field, role, or specialty you want to pursue in IT. It covers the basics, from IP addressing to security, automation, and AI. A CCNA certification is the perfect start if you know you want to build or support IT infrastructure. You can specialize later.

A CCNA can help you prepare for a wide variety of IT jobs, including:

- Network engineer
- Network support technician
- Network administrator
- Business roles in IT organizations, from sales and marketing to the management track



THE WHY

Earning your CCNA is a strategic investment, validating skills that drive significant career advancement and organizational success in today's dynamic IT landscape.

Overview

CCNA study guide

Exam success

Next steps

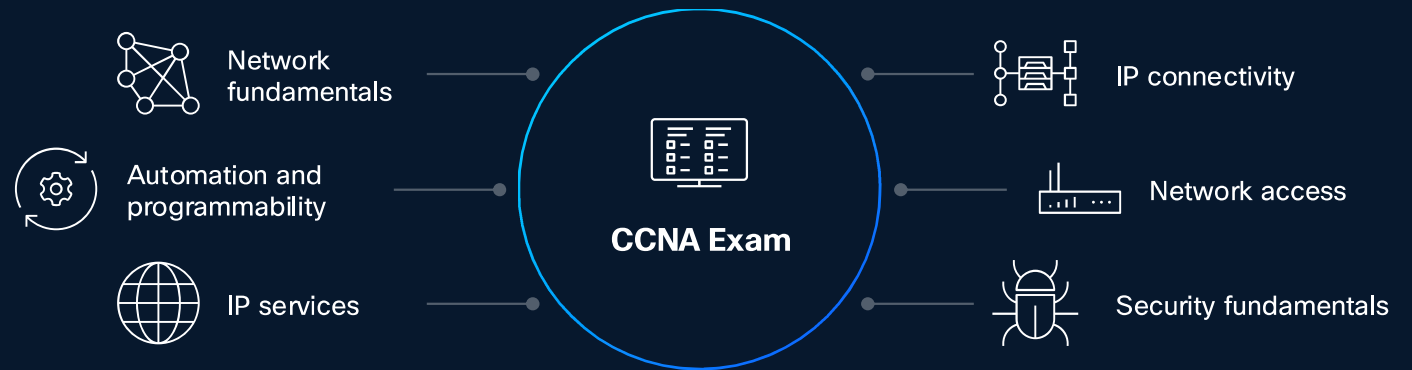
Resources

Opportunities

The network needs you

The field of IT is full of rewarding, meaningful, and challenging work. Earning your CCNA certification can make your resume stand out and get your foot in the door. The CCNA equips you with a broad range of career skills.

[Learn more](#)



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Why certify? Elevate your career.

Certifications are powerful catalysts for personal and professional growth, offering tangible benefits. According to the latest Pearson VUE 2025 Value of IT Certification Candidate report, certifications help to:

Boost your confidence and opportunities

82%

of respondents have reported gaining confidence in their abilities to pursue new job opportunities.

Grow your career and salary

63%

of certified professional respondents receive or anticipate promotions, 32% see salary increases, with 31% of those raises exceeding 20%.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Why Cisco? Build on excellence.

Cisco certifications are the recognized gold standard, bringing significant value to individuals and the organizations that employ them. And employers, including Fortune 500 companies, know it.

From entry to expert, Learn with Cisco is with you

Cisco best-in-class training helps you gain the skills employers are looking for. Our certifications are available in multiple levels of expertise and for various professional areas. Whether you're just starting out or advancing to expert level, Learn with Cisco is with you every step of the way in your entry-to-expert tech learning journey.

Highlight your accomplishments at every milestone

Our certificates of training completion and certification logos allow you to highlight your professional achievements every step of the way. Share on social, resumes, and digital profiles to prove the knowledge you've gained and stand out in the technologies of your choice.

Earn top salaries

Cisco certifications consistently rank among the highest-paying in the IT industry. The in-demand skills gained from these certifications in networking and security allow professionals to command top salaries.¹

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Certifications matter to employers

Skillsoft's Global Knowledge 2024 IT Skills and Salary Report examined data from thousands of IT professionals and confirmed that certified staff add value to an organization. In fact, 49% of IT decision-makers say that certified staff add value by closing organizational skill gaps and by spending less time on troubleshooting issues.

Certified professionals also see their added value:

60%

of certified professionals believe the quality of their work has improved

48%

reported being more engaged in their work

43%

are faster at performing their jobs

By choosing CCNA, you become a highly valuable, innovative, and productive asset, securing your place in the industry and contributing directly to organizational success.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

CCNA study guide



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Exam topics



Already decided to get certified, and want to get started? Exam topics are the best place to start to kickstart your studies. They tell you what to focus on, including how much weight is placed on each topic in the 200–301 CCNA v1.1 exam.

Let's start with network fundamentals.

20%

1.0 Network Fundamentals

- | | |
|---|--|
| 1.1 Explain the role and function of network components | 1.8 Configure and verify IPv6 addressing and prefix |
| 1.2 Describe characteristics of network topology architectures | 1.9 Describe IPv6 address types |
| 1.3 Compare physical interface and cabling types | 1.10 Verify IP parameters for Client OS (Windows, Mac OS, Linux) |
| 1.4 Identify interface and cable issues (collisions, errors, mismatch duplex, and/or speed) | 1.11 Describe wireless principles |
| 1.5 Compare TCP to UDP | 1.12 Explain virtualization fundamentals (server virtualization, containers, and VRFs) |
| 1.6 Configure and verify IPv4 addressing and subnetting | 1.13 Describe switching concepts |
| 1.7 Describe private IPv4 addressing | |

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Exam topics



Walk through network access. This domain is where the rubber meets the road. Learn what you need to know to configure and deploy devices in the network

20%

2.0 Network Access

- | | |
|--|---|
| 2.1 Configure and verify VLANs (normal range) spanning multiple switches | 2.6 Describe Wireless Architectures and AP modes |
| 2.2 Configure and verify interswitch connectivity | 2.7 Describe physical infrastructure connections of WLAN components (AP, WLC, access/trunk ports, and LAG) |
| 2.3 Configure and verify Layer 2 discovery protocols (Cisco Discovery Protocol and LLDP) | 2.8 Describe network device management access (Telnet, SSH, HTTP, HTTPS, console, TACACS+/RADIUS, and cloud managed) |
| 2.4 Configure and verify (Layer 2 / Layer 3) EtherChannel (LACP) | 2.9 Interpret the wireless LAN GUI configuration for client connectivity, such as WLAN creation, security settings, QoS profiles, and advanced settings |
| 2.5 Interpret basic operations of Rapid PVST+ Spanning Tree Protocol | |

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Exam topics



Welcome to IP connectivity. This topic has the most weight of any domain in our list. Why is this so important? AI. Cloud. Security. Automation. These are the foundation for IP connectivity—if network traffic can't reach its destination, none of these can happen.

25%

3.0 IP Connectivity

- 3.1 Interpret the components of routing table
- 3.2 Determine how a router makes a forwarding decision by default
- 3.3 Configure and verify IPv4 and IPv6 static routing
- 3.4 Configure and verify single area OSPFv2
- 3.5 Describe the purpose, functions, and concepts of first hop redundancy protocols

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Exam topics



Learn about IP services. Even though this topic is only weighted at 10%, be sure to spend some time here. You'll need to be comfortable and ready to configure, explain, and describe some of these services for the exam.

10%

4.0 IP Services

- | | |
|---|--|
| 4.1 Configure and verify inside source NAT using static and pools | 4.7 Explain the forwarding per-hop behavior (PHB) for QoS, such as classification, marking, queuing, congestion, policing, and shaping |
| 4.2 Configure and verify NTP operating in a client and server mode | 4.8 Configure network devices for remote access using SSH |
| 4.3 Explain the role of DHCP and DNS within the network | 4.9 Describe the capabilities and functions of TFTP/FTP in the network |
| 4.4 Explain the function of SNMP in network operations | |
| 4.5 Describe the use of syslog features including facilities and levels | |
| 4.6 Configure and verify DHCP client and relay | |

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Exam topics



Security fundamentals is a critical domain for any network. One key area to dive into: How to secure network access to the device itself.

15%

5.0 Security Fundamentals

- 5.1 Define key security concepts (threats, vulnerabilities, exploits, and mitigation techniques)
- 5.2 Describe security program elements (user awareness, training, and physical access control)
- 5.3 Configure and verify device access control using local passwords
- 5.4 Describe security password policies elements, such as management, complexity, and password alternatives (multifactor authentication, certificates, and biometrics)
- 5.5 Describe IPsec remote access and site-to-site VPNs
- 5.6 Configure and verify access control lists
- 5.7 Configure and verify Layer 2 security features (DHCP snooping, dynamic ARP inspection, and port security)
- 5.8 Compare authentication, authorization, and accounting concepts
- 5.9 Describe wireless security protocols (WPA, WPA2, and WPA3)
- 5.10 Configure and verify WLAN within the GUI using WPA2 PSK

Overview

CCNA study guide

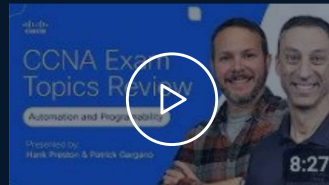
Exam success

Next steps

Resources

Opportunities

Exam topics



Understand automation and programmability. Learn what's possible in this domain, so you can be ready to explain, compare, and describe how these topics relate to what you'll be doing as a network engineer.

10%

6.0 Automation and Programmability

- 6.1 Explain how automation impacts network management
- 6.2 Compare traditional networks with controller-based networking
- 6.3 Describe controller-based, software defined architecture (overlay, underlay, and fabric)
- 6.4 Explain AI (generative and predictive) and machine learning in network operations
- 6.5 Describe characteristics of REST-based APIs (authentication types, CRUD, HTTP verbs, and data encoding)
- 6.6 Recognize the capabilities of configuration management mechanisms, such as Ansible and Terraform
- 6.7 Recognize components of JSON-encoded data

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

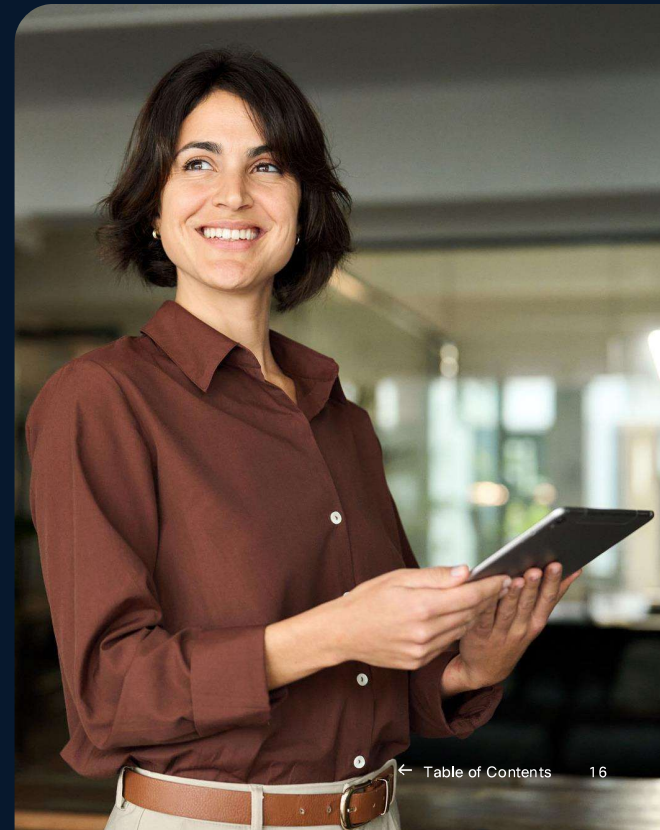
Pro tips

When the verb for a topic area is “describe,” you won’t need the same depth of knowledge for that topic as when the verbs are “configure,” “troubleshoot,” and “design.”

Download the current
200–301 CCNA Exam Topics

For a detailed review of all the exam topics, watch the “CCNA Exam Topics Review” series on the official Learn with Cisco YouTube channel. It’s a fantastic resource for a deeper understanding of the material.

Watch the video series



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Official training: Cisco Networking Academy

If you're a student or new to networking, this might be the best place for you to start. Find online courses, in-person learning, and certification-aligned pathways like CCNA to help begin, change, or propel your first career in tech. Did we mention it's free?

Choose from several no-cost training options to start learning:

CCNA: Introduction to Networks

The first in a three-course series to build your networking skills and get ready for CCNA certification and associate-level jobs.

CCNA: Switching, Routing, and Wireless Essentials

The second in the three-course series. Learn the skills vital to your network infrastructure while you continue to prep for CCNA.

CCNA: Enterprise Networking, Security, and Automation

The third in a three-course series. Gain the expertise required to handle even the most complex networks and get CCNA exam-ready.

Cisco Packet Tracer

Dive into Cisco official, structured CCNA curriculum with interactive online modules, comprehensive lessons, and essential hands-on labs. Delivered through educational institutions worldwide, NetAcad often provides instructor support and is a fantastic foundation for mastering CCNA concepts.

Pro tip

Not quite ready to start CCNA? The CCST Networking training and certification might be the perfect first step.

[Learn more](#)

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Official training: Cisco Certifications

Start here. Go anywhere. This is where the real work happens. You'll need two things: the exam topics as well as a strategy for learning, studying, and practicing. Learn with Cisco has everything you need to build upon what you already know.

Choose from several training options to help you prepare:

Online, on-demand training from Cisco U.

[Implementing and Administering Cisco Solutions](#) | CCNA Learning Path will build the skills you need to install, operate, configure, and verify basic networks, while you prepare to take the CCNA exam. Short on time? Catch our free [CCNA tutorials](#) on the topics you care about.

Practice exam

The [Cisco Exam Review: CCNA](#) helps you prepare to take the CCNA exam. You will gain practical experience for exam topics by testing your key knowledge, skills, and abilities.

Instructor-led courses

Use the [Cisco Learning Locator](#) to find courses both in-person and virtual.

If books are your thing

Check out the [Cisco Press CCNA 200-301 Official Cert Guide, Volume 2](#), a perfect addition to your self-study plan.



Regardless of how you prepare for the exam, it's crucial to get your hands on the gear to practice. This is called "labbing," as in "practicing in a lab environment." Your ability to execute critical tasks will be tested on the exam, so you need to practice. Lab early. Lab often. Then lab some more. [Explore Cisco Modeling Labs.](#)

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Exam success



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

What to expect

CCNA certification exams are administered by our testing partner, Pearson VUE, as proctored exams. When you take the exam, you'll be in a controlled environment to ensure fairness and to give you the best, most consistent experience.

CCNA Exam v1.1 (CCNA 200-301) is a 120-minute exam associated with the CCNA certification. This exam tests a candidate's knowledge and skills related to network fundamentals, network access, IP connectivity, IP services, security fundamentals, automation and programmability. The course, Implementing and Administering Cisco Solutions (CCNA), helps candidates prepare for this exam.

Cisco performance-based testing gives you an experience that best replicates a true lab environment. As a result, the number of questions on your exam may vary. To find out more about this testing experience, read our [Performance-Based Lab Exam Items Build Opportunities](#) blog.



To view a walk-through demonstration of the various exam question types and how they function, check out the [Cisco Certification Exam Tutorial Videos](#) page.

Visit cisco.com/go/onlinetesting to perform a system check.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Ensure your exam success: Safeguard and Safeguard Plus

To help you build more confidence, Cisco Exam Safeguard offers two ways to help give passing your exam a backup plan. Register for your exam as usual, if you don't pass your first exam attempt, you can retake the exam at no additional cost. You'll get the peace of mind that comes from knowing you've invested in a second chance, whether you need it or not.

With Safeguard Plus, we also include the practice exam so you can practice as many times as you need to feel ready.

[Learn more](#)

Overview

CCNA study guide

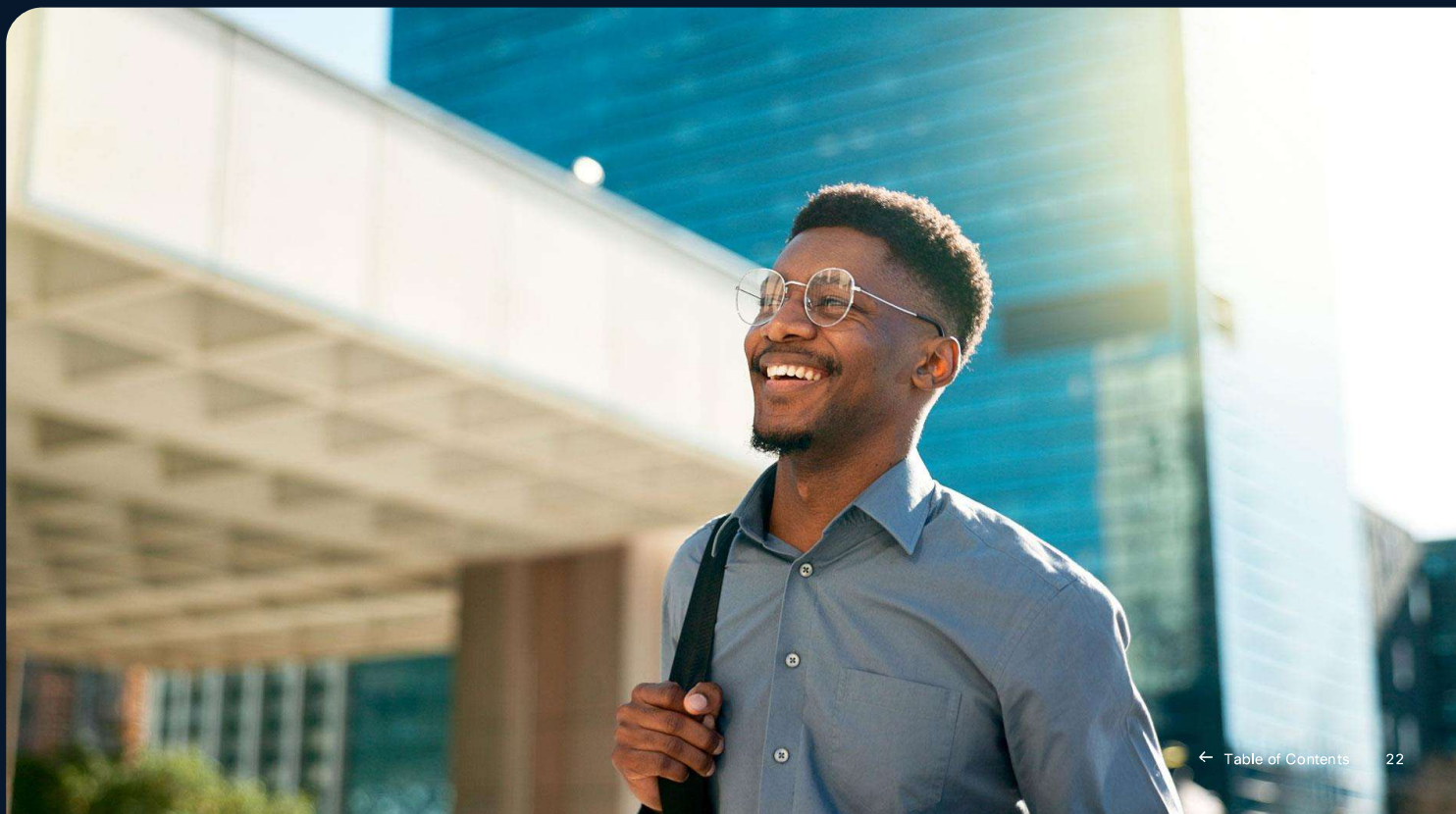
Exam success

Next steps

Resources

Opportunities

Next steps



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Next steps

The IT landscape evolves daily, and your CCNA provides the core foundation to build your career. With your CCNA, you'll be more knowledgeable and confident about all things IT, positioning you for a rewarding and lucrative IT career.

Here's how to leverage your certification and continue your growth:



Communicate your value

Use this guide and [email template](#) to let your manager know why training and certification is so beneficial for you—and for them. Ask your manager to sponsor your training to help transform your career, income, and skill set.



Explore further certifications

Your CCNA is a gateway. Consider pursuing Specialist, Professional, or Expert-level certifications to deepen your expertise and open new doors.



Never stop learning

The self-confidence gained from setting and accomplishing goals through certification will continue to empower your career. Stay updated with new technologies and industry trends.



Find inspiration

Learn how earning a Cisco certification has positively changed the life and career for others. View certification success stories to find out the secrets to their success and get inspired to land your dream role in tech!

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Your certification journey: Beyond CCNA

CCNA is one of many steps you can take on your learning journey. With each step, you build your knowledge base—and your reputation—and become increasingly valuable to any IT organization.

Download certifications poster



Achieve your potential with Cisco Certifications

You have a goal, and Cisco Certifications get you there. Certifications get your foot in the door, put you on the road to success, and keep you learning for life. So, embrace today's dynamic technologies, find the IT job you want, and the rewarding career you dream about. It all begins with Cisco Certifications and tech learning shaped to you.



Entry-level	Associate	Professional	Expert																									
<p>Validate your skills and readiness for the field.</p> <p>Certification Requirements:</p> <p>CCST</p> <p>Cisco Certified Support Technician (CCST) IT Support Exam 100-160 CCST</p> <p>Cisco Certified Support Technician (CCST) Networking Exam 100-150 CCST</p> <p>Cisco Certified Support Technician (CCST) Cybersecurity Exam 100-160 CCST</p>	<p>Master the essentials needed to launch a rewarding career.</p> <p>Certification Requirements:</p> <p>CCNA</p> <p>200-301 CCNA</p>	<p>Customize your professional certification by choosing a technology track and concentration exam. This will help you develop specialized skills and boost your expertise.</p> <p>Certification Requirements:</p> <table><tr><td>CCNP Enterprise</td><td>CCNP Service Provider</td><td>CCNP Data Center</td><td>CCNP Security</td><td>CCNP Collaboration</td></tr><tr><td>Core exam: 350-401 ENCOR</td><td>Core exam: 350-501 SPCOR</td><td>Core exam: 350-701 SCOR</td><td>Core exam: 350-601 DCCOR</td><td>Core exam: 350-801 CCOR</td></tr><tr><td>(Choose one) 300-410 ENARSI 300-415 ENARSI 300-420 ENARSI 300-425 ENARSI 300-430 ENARSI 300-435 ENARSI 300-440 ENCI 300-445 ENNA</td><td>(Choose one) 300-710 SNCF 300-715 SNCF 300-720 SNCF 300-725 SNCF 300-730 SNCF 300-735 SNCF 300-740 SNCF 300-745 SNCF</td><td>(Choose one) 300-610 DCO 300-615 DCO 300-620 DCO 300-625 DCO 300-630 DCO 300-635 DCO 300-640 DCO 300-645 DCO</td><td>(Choose one) 300-710 SNCF 300-715 SNCF 300-720 SNCF 300-725 SNCF 300-730 SNCF 300-735 SNCF 300-740 SNCF 300-745 SNCF</td><td>(Choose one) 300-810 CCUKA 300-815 CCUKA 300-820 CCUKA 300-825 CCUKA 300-830 CCUKA 300-835 CCUKA 300-840 CCUKA 300-845 CCUKA</td></tr></table>	CCNP Enterprise	CCNP Service Provider	CCNP Data Center	CCNP Security	CCNP Collaboration	Core exam: 350-401 ENCOR	Core exam: 350-501 SPCOR	Core exam: 350-701 SCOR	Core exam: 350-601 DCCOR	Core exam: 350-801 CCOR	(Choose one) 300-410 ENARSI 300-415 ENARSI 300-420 ENARSI 300-425 ENARSI 300-430 ENARSI 300-435 ENARSI 300-440 ENCI 300-445 ENNA	(Choose one) 300-710 SNCF 300-715 SNCF 300-720 SNCF 300-725 SNCF 300-730 SNCF 300-735 SNCF 300-740 SNCF 300-745 SNCF	(Choose one) 300-610 DCO 300-615 DCO 300-620 DCO 300-625 DCO 300-630 DCO 300-635 DCO 300-640 DCO 300-645 DCO	(Choose one) 300-710 SNCF 300-715 SNCF 300-720 SNCF 300-725 SNCF 300-730 SNCF 300-735 SNCF 300-740 SNCF 300-745 SNCF	(Choose one) 300-810 CCUKA 300-815 CCUKA 300-820 CCUKA 300-825 CCUKA 300-830 CCUKA 300-835 CCUKA 300-840 CCUKA 300-845 CCUKA	<p>Certification Requirements:</p> <table><tr><td>CCIE Enterprise Infrastructure</td><td>CCIE Enterprise Wireless</td></tr><tr><td>Core exam: 350-401 ENCOR + CCIE Enterprise Infrastructure lab</td><td>Core exam: 350-401 ENCOR + CCIE Enterprise Wireless lab</td></tr><tr><td>(Choose one) 350-501 SPCOR + CCIE Service Provider lab</td><td>(Choose one) 350-501 SPCOR + CCIE Data Center lab</td></tr><tr><td>CCIE Security</td><td>CCIE Collaboration</td></tr><tr><td>Core exam: 350-701 SCOR + CCIE Security lab</td><td>Core exam: 350-801 CCOR + CCIE Collaboration lab</td></tr></table>	CCIE Enterprise Infrastructure	CCIE Enterprise Wireless	Core exam: 350-401 ENCOR + CCIE Enterprise Infrastructure lab	Core exam: 350-401 ENCOR + CCIE Enterprise Wireless lab	(Choose one) 350-501 SPCOR + CCIE Service Provider lab	(Choose one) 350-501 SPCOR + CCIE Data Center lab	CCIE Security	CCIE Collaboration	Core exam: 350-701 SCOR + CCIE Security lab	Core exam: 350-801 CCOR + CCIE Collaboration lab
CCNP Enterprise	CCNP Service Provider	CCNP Data Center	CCNP Security	CCNP Collaboration																								
Core exam: 350-401 ENCOR	Core exam: 350-501 SPCOR	Core exam: 350-701 SCOR	Core exam: 350-601 DCCOR	Core exam: 350-801 CCOR																								
(Choose one) 300-410 ENARSI 300-415 ENARSI 300-420 ENARSI 300-425 ENARSI 300-430 ENARSI 300-435 ENARSI 300-440 ENCI 300-445 ENNA	(Choose one) 300-710 SNCF 300-715 SNCF 300-720 SNCF 300-725 SNCF 300-730 SNCF 300-735 SNCF 300-740 SNCF 300-745 SNCF	(Choose one) 300-610 DCO 300-615 DCO 300-620 DCO 300-625 DCO 300-630 DCO 300-635 DCO 300-640 DCO 300-645 DCO	(Choose one) 300-710 SNCF 300-715 SNCF 300-720 SNCF 300-725 SNCF 300-730 SNCF 300-735 SNCF 300-740 SNCF 300-745 SNCF	(Choose one) 300-810 CCUKA 300-815 CCUKA 300-820 CCUKA 300-825 CCUKA 300-830 CCUKA 300-835 CCUKA 300-840 CCUKA 300-845 CCUKA																								
CCIE Enterprise Infrastructure	CCIE Enterprise Wireless																											
Core exam: 350-401 ENCOR + CCIE Enterprise Infrastructure lab	Core exam: 350-401 ENCOR + CCIE Enterprise Wireless lab																											
(Choose one) 350-501 SPCOR + CCIE Service Provider lab	(Choose one) 350-501 SPCOR + CCIE Data Center lab																											
CCIE Security	CCIE Collaboration																											
Core exam: 350-701 SCOR + CCIE Security lab	Core exam: 350-801 CCOR + CCIE Collaboration lab																											
<p>Certification Requirements:</p> <p>CCIE Shield Technician</p> <p>800-150 FLTEC</p>	<p>Certification Requirements:</p> <p>Cisco Certified DevNet Associate</p> <p>200-901 DEVASC</p> <p>Certification Requirements:</p> <p>Cybersecurity Associate</p> <p>(CCNA Cybersecurity)</p> <p>200-201 CBROPS</p>	<p>Certification Requirements:</p> <p>Cisco Certified DevNet Professional</p> <p>(CCNP Automation)</p> <p>Core exam: 350-901 DEVCOR</p> <p>Certification Requirements:</p> <p>Cybersecurity Professional</p> <p>(CCNP Cybersecurity)</p> <p>Core exam: 350-201 CBRCOR</p>	<p>Certification Requirements:</p> <p>CCIE Automation</p> <p>350-901 DEVCOR + DevNet Expert lab</p>																									

Professional-level certifications each require 2 exams:

1 Core Exam + 1 Concentration Exam = 1 CCNP

Core exams in each CCNP technology track also serve as qualifying exams for CCIE lab exams.

Make the next move

www.cisco.com/go/certs

Kevin Brown

Cybersecurity Analyst, CCNA & Cybersecurity Associate Certifications

"People always want to know who they're talking to. They want to know if you're qualified. Certifications give you instant credibility."

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Choose your certification level and any specializations

Earning the certification you need can lead you to the career you want. It can also keep you competitive in a field where 92% of IT professionals hold certifications. The Cisco certification portfolio offers more options than ever before, empowering you to customize your learning plan to meet your career needs, interests, and aspirations. Since every Cisco exam you pass earns you a certification, each of these milestones you reach tells a new chapter in your story.

Here are the different levels of Cisco certifications to choose from:

Entry

Validates your skills and qualifications for entry-level IT roles

Associate

Proof that you've mastered the essentials to build your IT career

Professional

A core technology track to sharpen your specialized expertise

Expert

The most prestigious certification you can earn

Specialist

Advanced networking knowledge in tech such as security, data center, or video

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Resources to help your studies



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Study toolkit

We have many resources to help your progress. We encourage you to sign up for the [Cisco Learning Network](#) to be able to access learning resources, including videos, learning plans, and more. For example, the CCNA Training Video learning plan has over 58 hours of self-study preparation tools and content.

We've also provided a vocabulary list and a command-line cheat sheet to help your studies.



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Vocabulary

Knowing these key vocabulary terms will help you on your CCNA journey.

Application Programming Interfaces (APIs) and REST APIs

APIs are published instructions to interface with a product or service. APIs enable developers to assemble a command or request for a service or data, to submit it, and to receive any output. They are published and maintained by the vendor.

Attack surface

A collection of all the possible paths a hacker or a malware application might follow to compromise protected data.

Authentication (Authentication, Authorization, and Accounting [AAA], Radius)

Authentication is how you control access to your network and prevent intrusions, data loss, and unauthorized users.

Continuous Integration / Continuous Development (CICD)

A CICD system provides automated builds and tests for creating software, making configuration changes, or completing other deployment tasks. When using a CICD pipeline, coders can continually merge their changes to a main branch of an existing application, run integration tests on changes, keep changes small, and minimize the potential for problems due to multiple, gated test result requirements.

Data formats

(XML, JavaScript Object Notation [JSON], YAML Ain't Markup Language [YAML]) Common data formats that are both machine-readable and human-readable for providing input to programs and applications using interfaces (APIs).

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Vocabulary

DevOps

A combination of Development (Dev) and Operations (Ops), DevOps focuses on automation, regularly allowing failures that can be automatically fixed with mitigated risks, as well as connecting business outcomes to the availability goals for a given system. The DevOps movement makes developers responsible for deployment and has teams use coding workflows and tools to manage infrastructure.

DNS

The Domain Name Service (DNS) is like a phone book that translates IP addresses into human readable form. For example, www.facebook.com is 157.240.22.35 (IPv4), or 2001:558:feed::1.

Infrastructure, containers, and virtual machines

Infrastructure is a generic term for the underlying devices, physical or virtual, that provide computing power or storage capacity or networks, used to deliver software or applications. Virtual machines can emulate a computer system and are typically built as images, providing the same functionality as the physical computer. Containers package up software and dependencies into one descriptive file that contains everything to run an application, regardless of the underlying systems.

IP address (IPv4 and IPv6, classes, Open Systems Interconnection [OSI] and TCP/IP networking stack)

IP Addresses are like street addresses. Every service or server on the internet has a unique address where it can be accessed.

Malware analysis

The process of determining the functionality, origin, and potential impact of a given malware.

Network Address Translation (NAT)

IPv4 is limited to approximately 4 billion unique addresses. NAT is a scheme that allows a single address for a network (such as a small business) to be shared by all the users and devices on your network.

Network data models (YANG, RESTCONF, NETCONF)

YANG is a data modeling language for configuration and state data for network devices. It stands for Yet Another Next Generation. RESTCONF and NETCONF are protocols defined by a standards body, so that you can manage configuration of network devices modeled with YANG.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Vocabulary

Packet

A unit of data that can be sent from one network endpoint to another. A packet has headers, footers, and a data payload, or some other information that it carries. The headers encode details about how to route the packet.

Python

A general-purpose, interpreted programming language. Python emphasizes code readability with whitespace requirements, so it is approachable and powerful. Many network automation applications and tutorials are centered around Python.

Role-based access control

Access to data given to a person based on their job function or role.

Router

A router connects different networks together, providing a route between two computers (or servers) in different networks. Routers build the internet.

Routing protocols such as Border Gateway Protocol (BGP), Enhanced Interior Gateway Routing Protocol (EIGRP), and Open Shortest Path First (OSPF)

Routing protocols provide the overall map and directions for a packet to find the proper destination.

Security Incident and Event Management (SIEM)

An approach to security management that gathers data from multiple sources (such as syslog, device events, and error logs), processes the data (including correlation to identify potential threats), and raises an alert or ticket for further investigation if the threat is deemed to be real.

Security Orchestration and Automation Response (SOAR)

An approach that enables SOC teams to manage tickets raised through SIEM (Security Incident and Event Management) for threat response. SOAR enables automated workflows for responding to threats.

Software Development Kit (SDK)

A platform for writing programs and applications targeting an API. It often includes documentation, configurations, and tools (such as compilers or linkers) to write and execute the code to interface with the API.

Subnet

Subnetting is a scheme for efficiently apportioning or assigning your IP addresses to systems in your organization.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Vocabulary

Switch

A switch is a component that is used to build a network and to connect hosts and servers within a network. A switch cannot route packets or data between networks.

Threat hunting

The process of proactively and iteratively searching through networks to detect and isolate advanced threats.

Threat intelligence

Evidence-based knowledge, including context, mechanisms, indicators, implications, and action-oriented advice about an existing or emerging hazard to assets.

Time-based access control

Temporary access to data given to a person on a need basis for a period of time.

VLAN

A Virtual Local Area Network is a simple scheme to build in access control and restrictions within a network. It allows you to keep “Sales” separate from “Engineering,” for example, and to prevent inappropriate access to data.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Sample command-lines

Keep this list as a handy reference when you're prepping for the exam. Each page is organized by the kind of task you need to complete for easy access.

Basic device access and modes:

enable

Moves from User EXEC mode (Router>) to Privileged EXEC mode (Router#). This is where you can view configurations and execute most show commands.

disable

Returns from Privileged EXEC mode to User EXEC mode.

configure terminal (or conf t)

Enters Global Configuration mode (Router(config)#). From here, you can make global changes to the device.

exit

Moves back one step in the command hierarchy (e.g., from config mode to privileged mode, or interface config mode to global config mode).



Use code CCNACOMM to save 40%* on CCNA 200-301 Portable Command Guide, 5th Edition, print book or eBook. Offer ends December 31, 2026.

*Discount code CCNACOMM confers a 40% discount off the list price of ISBNs 9780135937709 and 9780135937822, when purchased on [ciscopress.com](https://www.ciscopress.com).

Apply discount code during checkout to receive savings. Ineligible titles include book + eBook bundles, book/eBook + video bundles, Rough Cuts, O'Reilly Online Learning, or individual video lessons. Discount code may not be combined with any other offer and is not redeemable for cash. Discount offer expires 11:59 p.m. EST December 31, 2025. Offer subject to change.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Sample command-lines

Basic device access and modes:

end (or Ctrl+Z)

Immediately returns to Privileged EXEC mode from any configuration mode.

line console 0

Enters console line configuration mode.

password <password>

Sets a password for console access.

login

Requires the password to log in.

logging synchronous

Prevents console messages from interrupting your command input.

line vty 0 4

Enters virtual terminal line configuration mode (for Telnet/SSH access). (The range 0 4 allows 5 simultaneous connections).

password <password>

Sets a password for VTY access.

login

Requires the password to log in.

transport input {all | ssh | telnet}

Specifies allowed remote access protocols.

service password-encryption

Encrypts plaintext passwords in the running configuration.

enable secret <password>

Sets an encrypted password for Privileged EXEC mode (more secure than enable password).

hostname <name>

Sets the device hostname in Global Configuration mode.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Sample command-lines

Basic device access and modes:

banner motd # <message> #

Configures a Message Of The Day banner that appears when users log in. The # is a delimiter; you can use any character not in the message.

no ip domain-lookup

Disables DNS lookup when you type a mistyped command (prevents delays).

interface <type> <number> (e.g., interface Gigabit Ethernet 0/1, int g0/1)

Enters interface configuration mode for a specific interface.

ip address <ip-address> <subnet-mask>

Assigns an IP address and subnet mask to an interface.

no shutdown

Activates an interface (interfaces are typically shut down by default on routers).

shutdown

Deactivates an interface.

description <text>

Adds a descriptive label to an interface.

switchport mode access

Configures a switch port as an access port (for end devices).

switchport mode trunk

Configures a switch port as a trunk port (for connecting to other switches or routers).

switchport access vlan <vlan-id>

Assigns an access port to a specific VLAN.

switchport trunk allowed vlan <vlan-list>

Specifies which VLANs are allowed on a trunk.

switchport trunk native vlan <vlan-id>

Sets the native VLAN for a trunk.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Sample command-lines

VLAN configuration (on switches):

vlan <vlan-id>

Creates a VLAN and enters VLAN configuration mode.

name <vlan-name>

Assigns a name to the VLAN.

interface vlan <vlan-id>

Creates a Switched Virtual Interface (SVI) for a VLAN, allowing it to be assigned an IP address for routing / management.

ip default-gateway <ip-address>

Sets the default gateway for a switch (for management access outside its local VLAN).

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Sample command-lines

Routing commands (on routers):

ip route <destination-network> <subnet-mask> {<next-hop-ip> | <exit-interface>}

Configures a static route.

ip route 0.0.0.0 0.0.0.0 {<next-hop-ip> | <exit-interface>}

Configures a default static route (route of last resort).

router rip / router ospf <process-id> / router eigrp <asn>

Enables a routing protocol.

network <network-address>

Advertises a network into a routing protocol (within the routing protocol configuration mode).

passive-interface <interface-type-number>

Prevents routing updates from being sent out a specific interface.

show ip protocols

Displays information about active routing protocols.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Sample command-lines

Verification and troubleshooting (show commands):

show running-config (or show run)

Displays the current active configuration running in RAM. This is one of the most important commands!

show startup-config (or show start)

Displays the configuration saved in NVRAM, which will be loaded upon reboot.

show interfaces

Displays detailed information and statistics for all interfaces.

show ip interface brief (or sh ip int br)

Provides a concise summary of IP addresses and interface status (up/down). **Extremely useful for quick checks.**

show ip route

Displays the device's IP routing table.

show cdp neighbors detail

Displays detailed information about directly connected Cisco devices using CDP (Cisco Discovery Protocol).

show vlan brief

Displays a summary of VLANs and their assigned ports on a switch.

show mac address-table

Displays the MAC address table on a switch.

show interface trunk

Displays information about trunk links on a switch.

show version

Displays information about the IOS version, uptime, hardware, and configuration register.

ping <ip-address>

Tests basic network connectivity to an IP address.

tracert <ip-address> (or traceroute on Windows)

Traces the path packets take to reach a destination.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

Additional resources

Other CCNA resources include:

[CCNA Certification Overview](#)

[Download 200-301 CCNA Exam Topics](#)

[CCNA Certification Community](#)

[CCNA Certification Training Videos](#)

[Cisco Learning Blogs](#)

[Cisco Certification Blogs](#)

Stay connected through:



[Cisco Learning Network](#)

[Cisco Networking Academy](#)

[Cisco U](#)



Use code CCNAGUIDE to
save 35% on CCNA 200-301
Official Cert Guide Library at:
www.ciscopress.com/ccnlibrary

Discount code CCNAGUIDE confers a 35% discount off the list price of ISBNs 9780138221393 and 9780138221447, when purchased on ciscopress.com. Apply discount code during checkout to receive savings. Ineligible titles include book + eBook bundles, book/eBook + video bundles, Rough Cuts, O'Reilly Online Learning, or individual video lessons. Discount code may not be combined with any other offer and is not redeemable for cash. Discount offer expires 11:59 p.m. EST December 31, 2025. Offer subject to change.

Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

So many opportunities not to miss



Overview

CCNA study guide

Exam success

Next steps

Resources

Opportunities

So many opportunities not to miss



Because CCNA covers so many IT fundamentals, it's a great way to stand out no matter where your career takes you. This certification provides a strong foundation for your future career growth and success.



Certifications matter. To employers they indicate the promise of higher productivity and proof of your abilities. For new and current IT professionals, they reflect far more. [Find out why.](#)



[Land your dream role in tech.](#) The tech industry is growing rapidly, adding hundreds of thousands of new jobs a year. It's a great time to launch or expand your career, and no matter what inspires you, your dream role is out there.



Learn how earning a Cisco certification has positively changed the life and career of others. Meet the professionals who connect, secure, and automate the world while you find out the secrets to their success. Get inspired! [View certification success stories.](#)

