

CCNA



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CCNA Exam v1.0 (200-301)

Exam Description:

CCNA Exam v1.0 (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, and automation and programmability. The course, Implementing and Administering Cisco Solutions (CCNA), helps candidates prepare for this exam.

The following topics are general guidelines for the content likely to be included on the exam. However, other related topics may also appear on any specific delivery of the exam. To better reflect the contents of the exam and for clarity purposes, the guidelines below may change at any time without notice.



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1.0 Network Fundamentals

1.1 Explain the role and function of network components

1.1.a Routers

1.1.b L2 and L3 switches

1.1.c Next-generation firewalls and IPS

1.1.d Access points

1.1.e Controllers (Cisco DNA Center and WLC)

1.1.f Endpoints

1.1.g Servers

1.2 Describe characteristics of network topology architectures

1.2.a 2 tier

1.2.b 3 tier

1.2.c Spine-leaf

1.2.d WAN

1.2.e Small office/home office (SOHO)

1.2.f On-premises and cloud

1.3 Compare physical interface and cabling types

1.3.a Single-mode fiber, multimode fiber, copper

1.3.b Connections (Ethernet shared media and point-to-point)

1.3.c Concepts of PoE

1.4 Identify interface and cable issues

(collisions, errors, mismatch duplex, and/or speed)

1.5 Compare TCP to UDP

1.6 Configure and verify IPv4 addressing and subnetting

1.7 Describe the need for private IPv4 addressing

1.8 Configure and verify IPv6 addressing and prefix



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1.0 Network Fundamentals

1.9 Compare IPv6 address types

1.9.a Global unicast

1.9.b Unique local

1.9.c Link local

1.9.d Anycast

1.9.e Multicast

1.9.f Modified EUI 64

1.10 Verify IP parameters for Client OS (Windows, Mac OS, Linux)

1.11 Describe wireless principles

1.11.a Nonoverlapping Wi-Fi channels

1.11.b SSID

1.11.c RF

1.11.d Encryption

1.12 Explain virtualization fundamentals (virtual machines)

1.13 Describe switching concepts

1.13.a MAC learning and aging

1.13.b Frame switching

1.13.c Frame flooding

1.13.d MAC address table



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2.0 Network Access

- 2.1 Configure and verify VLANs (normal range) spanning multiple switches
 - 2.1.a Access ports (data and voice)
 - 2.1.b Default VLAN
 - 2.1.c Connectivity

- 2.2 Configure and verify interswitch connectivity
 - 2.2.a Trunk ports
 - 2.2.b 802.1Q
 - 2.2.c Native VLAN

- 2.3 Configure and verify Layer 2 discovery protocols (Cisco Discovery Protocol and LLDP)

- 2.4 Configure and verify (Layer 2/Layer 3) EtherChannel (LACP)

- 2.5 Describe the need for and basic operations of Rapid PVST+ Spanning Tree Protocol and identify basic operations
 - 2.5.a Root port, root bridge (primary/secondary), and other port names
 - 2.5.b Port states (forwarding/blocking)
 - 2.5.c PortFast benefits

- 2.6 Compare Cisco Wireless Architectures and AP modes

- 2.7 Describe physical infrastructure connections of WLAN components (AP, WLC, access/trunk ports, and LAG)

- 2.8 Describe AP and WLC management access connections (Telnet, SSH, HTTP, HTTPS, console, and TACACS+/RADIUS)

- 2.9 Configure the components of a wireless LAN access for client connectivity using GUI only such as WLAN creation, security settings, QoS profiles, and advanced WLAN settings



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4.0 IP Services

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



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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 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 remote access and site-to-site VPNs
- 5.6 Configure and verify access control lists
- 5.7 Configure Layer 2 security features (DHCP snooping, dynamic ARP inspection, and port security)
- 5.8 Differentiate authentication, authorization, and accounting concepts
- 5.9 Describe wireless security protocols (WPA, WPA2, and WPA3)
- 5.10 Configure WLAN using WPA2 PSK using the GUI



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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 and software defined architectures (overlay, underlay, and fabric)
 - 6.3.a Separation of control plane and data plane
 - 6.3.b North-bound and south-bound APIs
- 6.4 Compare traditional campus device management with Cisco DNA Center enabled device
- 6.5 Describe characteristics of REST-based APIs (CRUD, HTTP verbs, and data encoding)
- 6.6 Recognize the capabilities of configuration management mechanisms Puppet, Chef, and Ansible
- 6.7 Interpret JSON encoded data



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LINUX



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RH124 - Red Hat System Administration I

- Accessing the Command Line
- Managing Files from the Command Line
- Getting help in Red Hat Enterprise Linux
- Creating, Viewing and Editing Text Files
- Managing Local Linux Users and Groups
- Controlling Access to Files
- Monitoring and Managing Linux Processes
- Controlling Services and Daemons
- Configuring and Securing OpenSSH Service
- Analyzing and Storing Logs
- Managing Red Hat Enterprise Linux Networking
- Archiving and Copying Files Between Systems
- Installing and Updating Software Packages
- Accessing Linux File Systems
- Analyzing Servers and Getting Support

RH134 - Red Hat System Administration II

- Installing Red Hat Enterprise Linux
- Improving Command Line Productivity
- Scheduling Future Linux Tasks
- Managing Priority of Linux Processes
- Controlling Access to Files With Access Control Lists (ACLs)
- Managing SELinux Security
- Maintaining Basic Storage
- Managing Logical Volume Management (LVM) Storage
- Implementing Advanced Storage Features
- Accessing Network Storage with Network File System (NFS)
- Controlling and Troubleshooting the Red Hat Enterprise Linux Boot Process
- Managing Network Security



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RH294 - Red Hat System Administration III

- Introduction to Ansible
- Deploying Ansible
- Implementing Playbooks
- Managing Variables and Facts
- Implementing Task Control
- Deploying Files to Managed Hosts
- Managing Large Projects
- Simplifying Playbooks with Roles
- Troubleshooting Ansible
- Automating Linux Administration Tasks



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Devops



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Introduction to Devops:

- What is DevOps?
- Why DevOps?
- Principles of DevOps
- History of DevOps
- SDLC models
- Understand Agile Methodology
- Prerequisites for DevOps
- DevOps with Agile using Scrum
- Overview of DevOps Tools
- How to achieve DevOps?
- What is CICD?

Prerequisite for DevOps

Topic 1: – Networking Concepts (Duration: 02:00:00 Hrs)

- Network Fundamental
- Communication Models and Protocols
- IP Addressing and Subnetting

Topic 2: - Introduction to Virtualization (Duration: 00:30 Mins)

- What is Virtualization?
- What is Hypervisor?
- Types of Server Virtualization
- Benefits of Virtualization
- Important Virtualization products
- Create VM's using Hypervisors



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Topic 3: - Linux Administration (Duration: 04:00 Hrs)

Linux Introduction

Linux Installation

Basic Linux concepts

Vim Editor

Process Management

Controlling Services & Daemons

SSH with key-based Authentication

Linux Networking

System logs management

Archiving and Copying Files Between Systems

Package Management

Cron Jobs Scheduling

Configure Apache server

Limiting Network Communication with firewall

Topic 4: - Database Concepts and Shell Scripting (Duration: 02:00 Hrs)

Installing MariaDB

Working with MariaDB Databases

Managing Databases Users and Access Rights

Creating and Restoring MariaDB Backups

Shell scripting examples

How real-time shell scripts work

How to call scripts with different tools

Different conditions while using scripts

Database Backup using Scripts

Development ide setup

Installation of java and configuration

Eclipse ide software installation and configuration

Backup / Artifactory Tool:



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Jira Bug Tracking Tool

- Introduction to Jira
- Scrum introduction with Scrum Roles
- Jira login and creating projects
- User creation and deletion
- Account creation and bug issues checking
- Standalone Jira vs cloud Jira
- The workflow of the Scrum process with project

Version Control System

- What is Version Control System?
- What Is Git?
- Git Installation with Different environments
- Commands And Operations In Git with GitHub
(Initialize, Status, Add, Commit,
Clone, Pull, Push, Difference, Reset, Log, Show, Tag, Stash, Remove)
- Advanced Git operations (Branching, Merging, Rebasing,
Merge vs Rebase, Conflict resolving, Deleting remote repositories,
Fork Operation)
- Git integration with Eclipse

Build Tool

- Introduction to maven
- Maven compare with ant and other tools
- Maven setup in multiple environments
- Maven lifecycle
- Maven repository structure
- Real-time maven settings for the project
- Maven structure coding and implementation with Eclipse

Backup / Artifactory Tool:



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Application Server Implementation

Need for application and web server
Deploy Tomcat server in different environments
Setup, configure of Tomcat, Apache, Nginx servers
Deploy war file using Tomcat Server

Working with Cloud computing

Cloud Computing + AWS Introduction

Create a free tier AWS account

Basic Overview of services, AWS Billing and account

Virtual Private Cloud:

Set Budget

Instance creation and access using MobaXterm & putty also with RDP

using different platforms

Basic Overview of VPC

Subnetting

VPC Creation with multi-tier architecture

Inter VPC peering

VPN - On-premises to Cloud premise connectivity

NAT

AWS Marketplace

EC2:

Purchase, Type & Pricing

Instance Monitoring

SNS

Cloud Watch

IAM

Boot Script

EBS

EFS

Snapshot

AMI Creation

Auto Scaling

ELB

Backup / Artifactory Tool:



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Storage:

- Basic Storage introduction
- Versioning
- Replication
- S3 Browser
- Fast Glacier

Cloud Formation

Container Management:

- Why need configuration management?
- Introduction to tools like ansible, chef, puppet
- What is Ansible?
- How Ansible Works?
- Ansible setup and configuration
- Ansible Inventory Introduction
- Ansible ad-hoc commands
- Managing Ansible Configuration file
- Creating playbooks with structures and conditions
- Managing Ansible Roles
- Real-time servers management
- Ansible vault to protect ansible playbooks
- AWS Provisioning using Ansible

Container Management

- What is Containerization?
- What is Docker?
- Docker setup in multiple environments
- Docker Images
- Docker file creation and deployment
- Working with Docker hub
- Docker ad-hoc commands like push, pull, etc.
- Create Your Own Private Docker Registry on Linux Server
- Manage Docker Volumes
- What is Docker Compose?
- Manage containers using Docker Compose files



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Container Orchestration

- What is Container Orchestration?
- What is Docker Swarm?
- Working with Docker Swarm Using EC2 Instance
- Introduction of Kubernetes
- Installing Kubernetes Cluster
- Manage Kubernetes Master and Nodes
- What is Pod?
- Managing pod network with Example
- Replication Controller
- ReplicaSet
- Deployment
- Volume management

Jenkins – Continuous Integration

- Introduction to CICD
- Introduction to Jenkins, TeamCity
- Installation and configuration of Jenkins
- Jenkins users and Roles Management
- Jobs in Jenkins
- Jenkin node setup and configuration
- Jenkins integration with GIT (SCM)
- AutoDeployment with Jenkins using git, maven and Tomcat server

Backup / Artifactory Tool

- What is Artifactory tools and purposes
- Jfrog vs nexus
- Install and setup Jfrog
- Maven dependencies backup with Jfrog
- Jenkin Jfrog automation job



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Monitoring Tools

- Introduction to Nagios XI and Zabbix
- Installation and setup of Nagios
- Adding nodes to Nagios master
- Monitor Windows Servers
- Monitor Linux Servers
- Monitor EC2 Instances
- Monitoring different metrics in Nagios

DevOps Projects:

- Project 1: Simple DevOps project for CI/CD through Jenkins
- Project 2: CI/CD pipeline using GIT, Jenkins, and Ansible
- Project 3: Automatic deployment using Docker



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AWS Solutions Architect



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Introduction to Cloud Computing

Legacy Datacenters and Software Defined Datacenters.
IaaS, PaaS and SaaS.

Introduction to Amazon Web Services

Account Setup, Introduction to Console, General Settings.

Virtual Private Cloud (VPC)

1. Introduction to On-Prem Networking and Addressing.
2. Concepts, Limits, Pricing and Features of VPC.
3. Concepts of CIDR, EIP and Public Address in AWS.
4. AWS Regions and Availability Zones.
5. Create and Manage VPC, Subnets.
6. Concepts, creation and management of Internet Gateways, NAT Gateways.
7. Routing theory, design and implementation for VPC.
8. Concepts and creation of Inter VPC Peering.
9. Design and Implementation of network security with ACL's and Security Groups.
10. Designing and configuring On-Prem to Cloud-Prem connectivity with VPN.

Elastic Compute Cloud (EC2)

1. Introduction to EC2.
 2. VM purchase options in EC2.
 3. VM types and pricing in EC2.
 4. KeyPair concepts, creation on AWS console and non AWS tools.
- A. Instance Management:
1. Instance Tags.
 2. Changing Instance Size.
 3. Increasing Storage.
 4. Opening Ports.
 5. Configuring Elastic IP to Instance.
 6. Boot Scripts.
 7. Monitoring Instance with Cloud Watch.
 8. Using Placement Group.
 9. Configuring Alarms and Event Notification.



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B. Instance Storage:

1. Introduction to Elastic Block Storage(EBS).
2. Types of EBS.
3. Creating EBS volumes
4. Attaching EBS volumes to Instances.
5. EBS Snapshots.
6. Migration of EBS Snapshots.
7. Restoring EBS Snapshots.

C. Instance Image:

1. Introduction to Amazon Machine Image(AMI).
2. Various methods of creating AMI.
3. Creating AMI and using AMI to create Instances

D. Instance Load Balancing:

1. Introduction to Elastic Load Balancer(ELB).
2. Types of ELB.
3. Concepts and implementation of ELB.
4. Target Group and Instance Health Concepts.
5. Adding Instances to Target Groups.
6. Testing the Deployment.

E. Instance Auto Scaling:

1. Introduction and concepts of Auto Scaling.
2. Concepts of Launch Configuration.
3. Creating a custom Launch Configuration.
4. Creating Auto Scaling Group.
5. Auto Scaling Policies.
6. Adding Target Group to Auto Scaling.
7. Testing Auto Scaling Configuration

F. Migrating On-Prem VM to EC2:

1. Migration concepts and Prerequisite.
2. Preparing VM for Migration.
3. IAM Role for Migration.
4. Uploading .ova or .vmdk of VM to S3.
5. AWS CLI Intro.
6. Creating AMI from Files in S3.
7. Create the Instance.



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AWS Storage

A. Simple Storage Service (S3):

1. Introduction to S3.
2. Pricing of S3.
3. Concepts of Buckets and creating Buckets in S3.
4. Public vs Private Buckets.
5. S3 Object Class and their differences.
6. S3 Versioning.
7. S3 Objects Replication and Limitations.
8. S3 Objects lifecycle policy.
9. S3 Locks.
10. S3 Bucket Encryption.
11. S3 Static Website Hosting.
12. AWS CloudFront for low latency delivery of S3 Objects

B. Azure Blob Storage:

1. Introduction to EFS.
2. Pricing of EFS.
3. Concepts of NFS vs SMB.
4. Configuring EFS and various configuration options.
5. Mounting EFS Shares on multiple Instances Simultaneously.

C. Glacier:

1. Glacier Concepts.
2. Pricing of Glacier vs On-Prem Backup Technologies.
3. Creating Glacier Vault.
4. Backup Data to Glacier Vault.
5. Data Recovery from Glacier Vault.
6. Data Recovery Options and Pricing.

D. Storage Gateway:

1. Introduction to Storage Gateway.
2. Concepts and Pricing of ASG.
3. Prerequisites for implementation of ASG virtual appliance on premises.
4. Connecting ASG to Cloud-Prem Storage.
5. Testing ASG Implementation.



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AWS Database

A. Relational Database Service(RDS):

1. Introduction to SQL and On-Prem SQL solutions.
2. Introduction to RDS.
3. SQL solutions supported by RDS.
4. Special introduction to Amazon Aurora Database.
5. Creating Database in RDS.
6. Multi-Az Deployment.
7. Connection to RDS
8. RDS Snapshots and Restore.
9. RDS ReadOnly Replica.
10. Promoting ReadOnly Replica.
11. RDS Backup.

B. DynamoDB:

1. Introduction to NoSQL and On-Prem NoSQL solutions.
2. Introduction to DynamoDB.
3. Creating Tables in DynamoDB.
4. Writing to tables in DynamoDB.
5. Security concepts for DynamoDB.
6. Performance configuration and AutoScaling.

C. RedShift:

1. Data Warehousing concepts and On-Prem Solutions.
2. Introduction to AWS RedShift.
3. Comparing AWS RedShift to On-Prem solution



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Elastic Bean Stalk (EBS)

1. Introduction to On-Prem Application Hosting Technologies.
2. Introduction to EBS.
3. Creating EBS Applications.
4. Configuration of Application Environment.
5. Hosting a Custom Application.
6. Creating Environment Clone.
7. Swapping Environment URL's

Identity and Access Management (IAM)

1. Introduction to IAM.
2. Creating Users and Groups.
3. Password Policies.
4. MFA and Access Keys.
5. User Policies and defining custom policies.
6. IAM Roles and creating Roles.

Route53

1. Introduction to Name Resolution.
2. Domain Name Registration and Domain Name Registrars.
3. Hosting Zones in AWS Route 53.
4. Public and Private Zones.
5. Creating Records and testing them.
6. Record Types, Load Balancing.
7. Traffic Management Concepts

AWS Lambda

1. Introduction to Serverless Computing.
2. Introduction to Lambda.
3. Creating Functions in Lambda.
4. Creating IAM Roles for Lambda.
5. Triggering Lambda Functions.
6. Testing a simple Python Boto3 function in Lambda.



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AWS Cloud Formation

1. Introduction to Automated Provisioning.
2. AWS Cloud Formation concepts.
3. Introduction to JSON and YAML.
4. Defining a JSON or a YAML template.
5. Using CloudFormation Designer.
6. Create Stack and Provision Resources in AWS

Simple Notification Service (SNS)

1. Introduction to SNS.
2. Creating SNS Topics.
3. Email and SMS subscriptions.
4. Triggering SNS Topic.

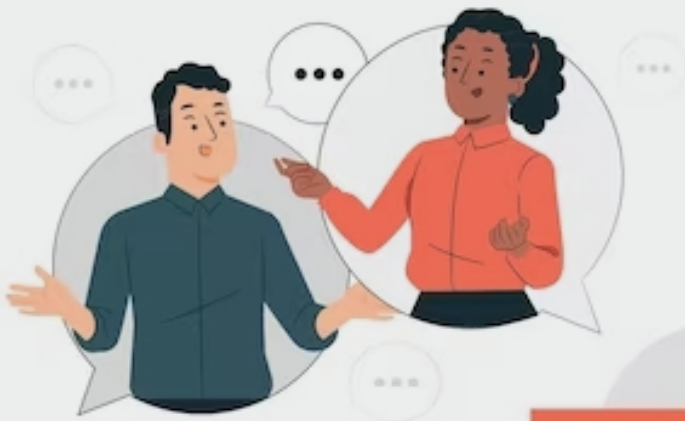
Other AWS Services

1. Introduction to AWS SnowBall.
2. Introduction to AWS SnowMobile.
3. Introduction to AWS Kinesis.
4. Introduction to AWS Lex.
5. Introduction to AWS Polly.
6. Introduction to AWS SQS.
7. Introduction to AWS SES.
8. Introduction to AWS CodeCommit.
9. Introduction to AWS CodeBuild.
10. Introduction to AWS CodePipeline.
11. Introduction to AWS ECS.



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BUSINESS SOFT SKILLS



Soft Skills



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SPOKEN ENGLISH-

- Basic Introduction of oneself
- Parts of speech (Noun/pronoun/verb/adjective/adverbs/conjunctions, etc.)
- Types of speech (active-passive/direct-indirect)
- Homophones/articles/punctuation/conjunctive adverbs
- Synonyms/ antonyms/similes
- Idioms/proverbs/phrases

PERSONALITY DEVELOPMENT-

- Group discussion
- Extempore
- Picture composition
- Sense of dressing up
- Basic body language attributes
- Pronunciation/Enunciation
- Email writing
- Report writing

Other benefits-

- FAQs- HR Round
- Vocabulary building
- Live activities to enhance confidence
- Self-explanatory notes



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