Scope and Sequence

CCNA 1: Networking Basics

Cisco Networking Academy Program
Version 3.1

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Target Audience

The target audience is anyone who desires a practical, technical introduction to the field of networking. This includes high school students, community college students, and lifelong-learning students who are interested in careers as network technicians, network engineers, network administrators, and network help-desk staff.

Prerequisites

The successful completion of this course, requires the following:

- Reading Age Level (RAL) of 13
- Basic computer literacy and awareness of the Internet

The following skills are beneficial, but not required:

- Prior experience with computer hardware, binary math, and basic electronics
- Background in cabling

Course Description

CCNA 1: Networking Basics is the first of four courses leading to the Cisco Certified Network Associate (CCNA) designation. CCNA 1 introduces Cisco Networking Academy Program students to the networking field. The course focuses on the following:

- Network terminology
- Network protocols
- Local-area networks (LANs)
- Wide-area networks (WANs)
- Open System Interconnection (OSI) model
- Cabling
- Cabling tools
- Routers
- Router programming
- Ethernet
- Internet Protocol (IP) addressing
- Network standards

In addition, the course provides instruction and training in the proper care, maintenance, and use of networking software, tools, and equipment.

Course Objectives

The CCNA certification indicates knowledge of networking for the small office, home office (SOHO) market, and the ability to work in small businesses or organizations using networks that have fewer than 100 nodes. A CCNA certified individual can perform the following tasks:

- Install and configure Cisco switches and routers in multiprotocol internetworks using LAN and WAN interfaces
- Provide Level 1 troubleshooting service
- Improve network performance and security
- Perform entry-level tasks in the planning, design, installation, operation, and troubleshooting of Ethernet and TCP/IP networks.

CCNA 1 is an important step toward achieving CCNA certification.

Upon completion of this course, students will be able to perform tasks related to the following:

- Networking mathematics, terminology, and models
- Networking media such as copper, optical, and wireless
- Testing and cabling LANs and WANs
- Ethernet Operation and 10/100/1000/10 G versions of Ethernet
- Ethernet Switching
- IP addressing and subnetting
- IP, TCP, UDP, and application layer protocols

Lab Requirements

Please refer to the CCNA Equipment Bundle Spreadsheets on Academy Connection.

Certification Alignment

The curriculum is aligned with the Cisco Internet Learning Solution Group (ILSG) INTRO and ICND courses.

Course Overview

The course has been designed for 70 contact hours. Approximately 35 hours will be designated to lab activities and 35 hours will be spent on curriculum content. A case study on structured cabling is required, but format and timing will be determined by the Local Academy.

The following changes have taken place since CCNA version 2.x:

- More information on optical and wireless media
- More cable testing terminology and concepts

- More details on the operation of Ethernet
- More focus on Fast, Gigabit, and 10-Gigabit Ethernet
- Structured cabling resource materials have been moved to the case study
- Case study is now required with format and timing determined by the Local Academy
- More interactive flash activities
- Lab focus on cable making, building small networks, and interconnecting devices

The following changes have taken place since CCNA version 3.0:

- Technical updates
- Improved readability

Course Outline

Module 1. Introduction to Networking

Overview

1.1 Your Connection to the Internet

- 1.1.1 Requirements for Internet connection
- 1.1.2 PC basics
- 1.1.3 Network interface card
- 1.1.4 NIC and modem installation
- 1.1.5 Overview of high-speed and dialup connectivity
- 1.1.6 TCP/IP description and configuration
- 1.1.7 Testing connectivity with ping
- 1.1.8 Web browser and plug- ins
- 1.1.9 Troubleshooting Internet connection problems

1.2 Networking Math

- 1.2.1 Binary presentation of data
- 1.2.2 Bits and bytes
- 1.2.3 Base 10 number system
- 1.2.4 Base 2 number system
- 1.2.5 Converting decimal numbers to 8-bit binary numbers
- 1.2.6 Converting 8-bit binary numbers to decimal numbers
- 1.2.7 Four-octet dotted decimal representation of 32-bit binary numbers
- 1.2.8 Hexadecimal
- 1.2.9 Boolean or binary logic
- 1.2.10 IP addresses and network masks

Summary

Module 2. Networking Fundamentals

Overview

2.1 Networking Terminology

- 2.1.1 Data networks
- 2.1.2 Network history
- 2.1.3 Networking devices
- 2.1.4 Network topology

Module 4. Cable Testing

Module 5. Cabling LANs and WANs

Module 6. Ethernet Fundamentals

Module 7. Ethernet Technologies

Module 8. Ethernet Switching

Module 9. TCP/IP Protocol Suite and IP Addressing

9.1.1 History and future of TCP/IP

9.1.2 Application layer

9.1.3 Transport layer

9.1.4 Internet layer

9.1.5 Network access layer

9.1.6 The OSI model and the TCP/IP model

9.1.7 Internet architecture

9.2 Internet Addresses

9.2.1 IP addressing

9.2.2 Decimal and binary conversion

9.2.3 IPv4 addressing

9.2.4 Class A, B, C, D, and E IP addresses

9.2.5 Reserved IP addresses

9.2.6 Public and private IP addresses

9.2.7 Introduction to subnetting

9.2.8 IPv4 versus IPv6

9.3 Obtaining an IP Address

9.3.1 Obtaining an Internet address

9.3.2 Static assignment of an IP address

9.3.3 RARP IP address assignment

9.3.4 BOOTP IP address assignment

9.3.5 DHCP IP address management

9.3.6 Problems in address resolution

9.3.7 Address Resolution Protocol (ARP)

Summary

Module 10. Routing Fundamentals and Subnets

Overview

10.1 Routed Protocol

10.1.1 Routable and routed protocols

10.1.2 IP as a routed protocol

10.1.3 Packet propagation and switching with a router

10.1.4 Connectionless and connection-oriented delivery

10.1.5 Anatomy of an IP packet

10.2 IP Routing Protocols

10.2.1 Routing overview

10.2.2 Routing versus switching

10.2.3 Routed versus routing

10.2.4 Path determination

10.2.5 Routing tables

10.2.6 Routing algorithms and metrics

10.2.7 IGP and EGP

10.2.8 Link state and distance vector

10.2.9 Routing protocols

10.3 The Mechanics of Subnetting

10.3.1 Classes of network IP addresses

10.3.2 Introduction to and reason for subnetting

10.3.3 Establishing the subnet mask address

10.3.4 Applying the subnet mask

10.3.5 Subnetting Class A and B networks

10.3.6 Calculating the resident subnetwork through ANDing

Summary

Module 11. TCP/IP Transport and Application Layer

Overview

11.1 TCP/IP Transport Layer

11.1.1 Introduction to transport layer

11.1.2 Flow control

11.1.3 Session establishment, maintenance, and termination overview

11.1.4 Three-way handshake

11.1.5 Windowing

11.1.6 Acknowledgement

11.1.7 TCP

11.1.8 UDP

11.1.9 TCP and UDP port numbers

11.2 The Application Layer

11.2.1 Introduction to the TCP/IP application layer

11.2.2 DNS

11.2.3 FTP and TFTP

11.2.4 HTTP

11.2.5 SMTP

11.2.6 SNMP

11.2.7 Telnet

Summary

Case Study: Structured Cabling

