Scope and Sequence

CCNA 3: Switching Basics and Intermediate Routing

Cisco Networking Academy Program

Version 3.1

Last updated: September 2004

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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, community college, and lifelong-learning students interested in careers as network technicians, network engineers, network administrators, and network help-desk staff.

Prerequisites

The completion of this course requires the following:

- Reading Age Level (RAL) of 13
- Successful completion of CCNA 2

Course Description

CCNA 3: Switching Basics and Intermediate Routing is the third of four courses leading to the Cisco Certified Network Associate (CCNA) designation. The course focuses on the following advanced IP addressing techniques:

- Variable Length Subnet Masking (VLSM)
- Intermediate routing protocols such as RIP v2, single-area OSPF, and EIGRP
- Command-line interface configuration of switches
- Ethernet switching
- Virtual LANs (VLANs)
- Spanning Tree Protocol (STP)
- VLAN Trunking Protocol (VTP)

Students will be required to apply lessons from CCNA 1 and 2 to a network and should be able to explain how and why a particular strategy is used.

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 with 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 network.

The completion of CCNA 3 is an integral step toward achieving CCNA certification.

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 should be determined by the Local Academy.

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

- Removal of the IPX, Network Management, and TCS chapters
- A case study is now required with format and timing determined by the Local Academy
- IGRP and access lists moved to CCNA 2
- Addition of VLSM, an IP address technique for subnetting subnets
- Addition of RIP v2, EIGRP, and single-area OSPF routing protocols
- Addition of CLI configuration of switches
- Additional material on VLANs and VTP
- More interactive flash activities
- Sequence of over 40 e-labs
- Lab focus on intermediate routing and command-line interface configuration of switches

The following changes have taken place since CCNA version 3.0:

- Technical updates
- Improved readability

Course Outline

Module 1. Introduction to Classless Routing

Overview

1.1 VLSM

- 1.1.1 What is VLSM and why is it used?
- 1.1.2 A waste of space
- 1.1.3 When to use VLSM?
- 1.1.4 Calculating subnets with VLSM
- 1.1.5 Route aggregation with VLSM
- 1.1.6 Configuring VLSM

1.2 RIP Version 2

- 1.2.1 RIP history
- 1.2.2 RIP v2 features
- 1.2.3 Comparing RIP v1 and v2
- 1.2.4 Configuring RIP v2
- 1.2.5 Verifying RIP v2
- 1.2.6 Troubleshooting RIP v2
- 1.2.7 Default routes

Summary

Module 2. Single-Area OSPF

Overview

2.1 Link-State Routing Protocol

- 2.1.1 Overview of link-state routing
- 2.1.2 Link-state routing protocol features
- 2.1.3 How routing information is maintained
- 2.1.4 Link-state routing algorithms
- 2.1.5 Advantages and disadvantages of link-state routing
- 2.1.6 Compare and contrast distance vector and link-state routing

2.2 Single Area OSPF Concepts

- 2.2.1 OSPF overview
- 2.2.2 OSPF terminology
- 2.2.3 Comparing OSPF with distance vector routing protocols
- 2.2.4 Shortest path algorithm

Module 3. EIGRP

Module 4. Switching Concepts

Module 5. Switches

Module 6. Switch Configuration

8.1.5 VLAN types

8.2 VLAN Configuration

8.2.1 VLAN basics

8.2.2 Geographic VLANs

8.2.3 Configuring static VLANs

8.2.4 Verifying VLAN configuration

8.2.5 Saving VLAN configuration

8.2.6 Deleting VLANs

8.3 Troubleshooting VLANs

8.3.1 Overview

8.3.2 VLAN troubleshooting process

8.3.3 Preventing broadcast storms

8.3.4 Troubleshooting VLANs

8.3.5 VLAN troubleshooting scenarios

Summary

Module 9. Virtual Trunking Protocol

Overview

9.1 Trunking

9.1.1 History of trunking

9.1.2 Trunking concepts

9.1.3 Trunking operation

9.1.4 VLANs and trunking

9.1.5 Trunking implementation

9.2 VTP

9.2.1 History of VTP

9.2.2 VTP concepts

9.2.3 VTP operation

9.2.4 VTP implementation

9.2.5 VTP configuration

9.3 Inter-VLAN Routing Overview

9.3.1 VLAN basics

9.3.2 Introducing inter-VLAN routing

9.3.3 Inter-VLAN issues and solutions

9.3.4 Physical and logical interfaces

Case Study: Switching Basics and Intermediate Routing

