Fundamentals of Network Operations

Course Summary

Description

This course offers an overview of the primary concepts of Network Devices (Hubs, Switches, Routers, WAPs, etc.) and Network Protocols (Ethernet, MAC, ARP, IP, TCP, etc.). The class begins with a general introduction to networking, which is discussed in terms of both computers and the Internet. Next, the course progresses through TCP/IP protocols, implementation and management. In addition, the instructor will incorporate labs and exercises throughout the course where appropriate to let the student apply what they have learned in real world scenarios. Finally, TCP/IP inter-networking equipment and security issues will be discussed during the class.

Objectives

At the end of this course, students will be able to:

- Understand the history of TCP/IP and its evolution as a network protocol
- Conceptually design a network
- Describe the concepts behind switching, routing, and the logical flow of data
- Understand network security issues and possible ways to protect a network
- Use basic TCP/IP utilities and tools

Topics

- Simple Networking concepts
- Wide Area and Remote Connectivity
- Networking and Data Transmission Standards
- IP Addresses
- Domain Name System (DNS)
- Switching
- Routing
- Internet Control Message Protocol (ICMP)
- Security
- Managing a TCP/IP Network

Audience

This course is intended for those who want to learn about Core Networking Devices and Protocols and their implementation. Since inter-networking devices and protocols are so widely used, technicians, network managers and almost any person who deals with a network in some way or another could benefit from this class.

Prerequisites

The student should have a basic operational knowledge of computers.

Duration

Five half days

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... to Your Success!"

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Course Outline

I. Introduction
- A. Class logistics
- B. Course overview

II. The Basics
- A. Definitions
  - 1. Network
  - 2. Protocol
- B. TCP/IP
  - 1. History
  - 2. Benefits
- C. Intranets and Extranets

III. Networking 101
- A. The two number systems
  - 1. Binary
  - 2. Decimal
- B. Logic Tables
- C. Topologies
  - 1. Star
  - 2. Bus
  - 3. Ring
- D. Network Mediums
  - 1. Ethernet
  - 2. Token ring
  - 3. ISDN
  - 4. Frame Relay
  - 5. SMDS
  - 6. FDDI
  - 7. ATM
  - 8. DSL

IV. Wide Area and Remote Connectivity
- A. Protocols
- B. Extending the network
  - 1. Repeaters
  - 2. Bridges
  - 3. Routers

V. Standards
- A. OSI Model (Seven layer)
- B. TCP/IP Alternative
- C. RFCs
- D. TCP/IP vs. OSI

VI. Inter-networking Devices
- A. Hubs
- B. Switches
- C. Routers
- D. Gateways
- E. Firewalls

VII. IP Addresses
- A. Classes
- B. Network vs. Host Address
- C. Subnetting and Segmentation

VIII. Domain Name System (DNS)
- A. Numbers to Names
- B. Structure
- C. Hierarchical Order

IX. Routing
- A. ARP-Address Resolution Protocol
- B. Reverse ARP
- C. Types of Routing
  - 1. Direct
  - 2. Static
  - 3. Dynamic

X. Security
- A. Access
- B. Planning
- C. Passwords
- D. Firewalls

XI. Managing a TCP/IP Network
- A. Network Health
- B. Troubleshooting
- C. Ping
- D. Traceroute
- E. IP Tunneling
- F. TCP/IP Applications
  - 1. FTP
  - 2. Telnet
  - 3. SMTP, etc.

XII. Course Review

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