Computer Network Essentials

Course Outline

Part 1: Networking Fundamentals
Modules

• Basics of Networking
• Physical Layer
• Data Link Layer

Part 2: TCP/IP Protocol Suite
Modules

• Network Layer
• Transport Layer

Part 3: Network Applications
Modules

• Application Layer
• Configuring and Managing SOHO Routers
Module 1: Networking Fundamentals

This module provides an overview of computer network types, and focuses on standard network protocol models such as ISO OSI and TCP/IP models.

Lessons
- Common Network Models
- Network Topologies
- ISO OSI and TCP/IP Models

Module 2: Physical Layer

This module explains the hardware components of a modern computer network. It will also explain how wireless connections are implemented.

Lessons
- Network Hardware
- LAN Cabling Technologies and Connector Types
- Wireless Connection Standards

Labs
- Connecting Computers With a Simple Local Area Network

Module 3: Data Link Layer

This module provides detailed explanations about networking concepts within the single subnet. It will also explain how to capture and analyze network frames.

Lessons
- Media Access Control Addressing
- Ethernet Framing
- LAN Switching and Bridging
- Capturing Network Traffic
- Implementing VLANs

Labs
- Viewing and Changing MAC Addresses of Network Interfaces
- Capturing and Analyzing Ethernet Traffic Frames
Module 4: Network Layer

This module explains the IPv4 addressing system and binary math that is used to establish multiple network segments. It will also describe internetwork communication technologies, such as Routing and VPN.

Lessons

- Binary Numeral System
- IPv4 Addressing and Subnetting
- Internetwork Routing
- Virtual Private Networks

Labs

- Calculating IP Address Ranges and Subnet Masks
- Configuring Basic Router
- Configuring Routing Tables
- Establishing Connection to a VPN Server

Module 5: Transport Layer

This module explains the most popular transport layer protocol working principles. It will also explain how packets filters are used to provide network security.

Lessons

- ARP and ICMP Protocols
- Ports in TCP and UDP Protocols
- NAT and PAT Concepts
- Understanding Traffic Flows
- Stateless, Stateful and Application Firewalls

Labs

- Capturing and Analyzing ARP and ICMP Traffic
- Analyzing Port Usage in Common Network Communication Scenarios
- Configuring NAT/PAT Router
- Building Simple Stateful Firewall
Module 6: Application Layer

This module explains how to implement DHCP and Name Resolution to support network services. It will also explain the types of traffic used in Web and Mail Server communications.

Lessons

- Dynamic Host Configuration Protocol
- NetBIOS Name System
- Domain Name System
- Web and Mail Server Protocols

Labs

- Configuring and Managing DHCP Server and Clients
- Managing NetBIOS Name Resolution
- Configuring and Managing DNS Server
- Analyzing Web and Mail Server Traffic

Module 7: Configuring and Managing SOHO Routers

This module provides an overview of Small Office / Home Office Router Configuration and Management.

Lessons

- Configuring WAN and LAN Connectivity
- Port Forwarding
- Wireless Settings
- Managing Router Settings

Labs

- Configuring WAN, LAN and DHCP Settings
- Configuring Port Forwarding for Intranet Services
- Configuring and Securing Wireless Connection
- Upgrading Router Firmware