

## A Comprehensive Introduction to Networking - 4 Days

### *Course 450 Overview*

- You Will Learn How To**
- Apply fundamental network concepts, terminology and solutions
  - Implement networks using data links and physical media
  - Deploy Local Area Networks (LANs) using Ethernet and Wi-Fi
  - Manage reliable internetworks and intranets using effective TCP/IP design
  - Enhance network security using industry-standard solutions and practices
  - Evaluate and select leading-edge enterprise network technologies

**Course Benefits** Today's professionals must possess a solid foundation in networking concepts and practices to streamline enterprise operations and maintain a competitive edge. This course provides you with a working knowledge of IP addressing, TCP/IP operation, LAN solutions, Quality of Service (QoS) requirements, wireless network options, security elements, enterprise internetworking and modern hardware.

**Who Should Attend** Anyone who needs an introduction to networking technology and data communication systems as well as those who seek to broaden or update their networking knowledge. This course is particularly beneficial to managers, developers, IT staff and help desk personnel.

**Workshop Course** A series of intensive group workshops include:

- Estimating user and department bandwidth requirements
- Designing campus network cabling
- Analyzing the frame and packet flow for TCP/IP LANs
- Deploying wired and wireless hosts
- Scaling and selecting Ethernet LAN components
- Assigning IPs and designing subnets

Live, instructor-led demonstrations include:

- Dissecting packet structure with Wireshark
- Utilizing, monitoring and securing Ethernet and Wi-Fi LANs
- Configuring TCP/IP on hosts and routers

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### Course 450 Outline

#### Introduction

##### Defining networks, form and function

- Specifying communication requirements
- Supporting QoS
- Classifying networks: LAN, WAN
- Packet
- Circuit
- Wired
- Wireless

##### Employing protocols and operating systems

- Standardizing data communications
- Dividing tasks with layered protocols

##### Constructing Networks Using Data Links

##### Encoding information

- Defining bits, bytes and packets
- Taking advantage of digital encoding

##### Improving efficiency with error control

- Carrying packets in frames
- Detecting and correcting errors
- Using ACKs and feedback error correction

##### Deploying Physical Media

##### Identifying media types and challenges

- Selecting copper cable types, Cat-5e and better
- Benefiting from fiber optics

##### Employing wireless links

- Utilizing radio frequencies and bands
- Managing interference and noise

##### Capitalizing on Ethernet

##### Examining 802 LAN standards

- Forwarding with MAC addresses
- 1 Mb/s to 100 GB/s
- Contrasting shared and switched LANs

##### Investigating Ethernet operations

- Dissecting Etherswitch operation
- Adding QoS to Ethernet
- Comparing Layer 2 and Layer 3 switching

##### Harnessing Wi-Fi for User Mobility

##### Communicating via radio waves

- Types of Wi-Fi networks: a, b, g and n
- Capitalizing on instant infrastructure and mobility

##### Integrating Wi-Fi operations

- Mitigating the challenges of sharing bandwidth
- Verifying accurate transmission
- Boosting speed and range with 802.11n
- Providing QoS for voice and multimedia

##### Deploying Access Points (AP)

- Forwarding traffic via the AP
- Leveraging dual-band APs
- Utilizing Service Set Identifiers (SSIDs)

##### Building Internetworks Using TCP/IP and Routers

##### TCP/IP: A practical protocol suite

- Employing TCP for data and UDP for voice and video
- Distinguishing between hosts and routers
- Maximizing TCP/IP's multiple applications and utilities
- Streamlining data and VoIP traffic

##### IP addressing and datagrams

- Increasing efficiency with addressing schemes
- Interpreting net-prefixes and subnet masks

##### How routers operate

- Relaying traffic with NetID and routing tables
- Discovering paths with routing protocols
- Upgrading routers for QoS

##### Implementing Security Best Practices

##### Virtual Private Networks (VPNs)

- Authenticating users
- Enabling VPN encrypted tunnels
- Verifying information integrity and source

##### Benchmarking risks and deploying countermeasures

- Analyzing threats and security requirements
- Encrypting data
- Implementing L2 and L3 tunnels
- Adopting digital certificates and signatures

##### Ensuring LAN security

- Wi-Fi security: WPA, WPA2, 802.11i, AES
- Isolating workgroups with VLANs

##### Creating Enterprise Networks

##### Employing telecom circuits

- Circuit-switching data streams

- E1 and T1 leased lines

##### Facilitating intersite communications

- Choosing xDSL options
- LAN Extension Services (LES) and Metro-Ethernet
- Integrating teleworkers and branch offices

##### Selecting scalable networking services

- Multiprotocol Label Switching (MPLS)
- Frame Relay
- Enhanced ISP services
- Cloud computing and services