

## Network Configuration and Troubleshooting: Hands-On - 4 Days

### *Course 451 Overview*

- You Will Learn How To**
- Configure, maintain and troubleshoot multiple network configurations
  - Configure and test network adapters for optimum LAN performance
  - Install a switched network with VLANs
  - Access and secure your wireless network
  - Manage IP address assignments and subnetting
  - Identify and resolve application layer issues using protocol analysis

**Course Benefits** Providing users with constant access to critical data is essential for the success of today's rapidly evolving networks. In this course, you gain the skills necessary to configure networks and resolve problems related to cables, wireless connections, protocols and applications. You learn to configure, maintain and troubleshoot networks using a comprehensive set of tools and techniques.

**Who Should Attend** Anyone involved in designing, configuring, installing or maintaining a network. Networking experience at the level of Course 450, "Networking Comprehensive Introduction," or equivalent knowledge is assumed.

**Hands-On Training** You gain hands-on experience configuring and troubleshooting a network. Exercises include:

- Testing cables and connections using a cable scanner
- Diagnosing cable and connection configuration to ensure operation
- Analyzing traffic with Wireshark
- Upgrading to a switched network
- Implementing VLANs and 802.1X
- Troubleshooting Virtual Machines
- Setting up a wireless network
- Allocating an IP address with DHCP
- Interpreting a routing table
- Troubleshooting name resolution

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## Course 451 Outline

### Networking Overview

#### Fundamentals of a network

- Types of networks
- Hardware and software

#### Applying the OSI model to troubleshooting

- The 7-layer model
- Executing a troubleshooting methodology
- Employing fault isolation at each layer

#### Connecting the Physical Layer

##### Distinguishing media terminology

- Twisted pair
- Fiber
- Wireless
- EIA/TIA standards

#### Cabling and port configuration

- Strategies for successful configuration
- Validating wiremap with cable scanner
- MDI/MDI-X port configuration
- Specifying various fiber types

#### Building the Data Link Layer

##### Working with network adapters

- Designating Layer 2 MAC address
- Demystifying access methods: Collision Detection/Avoidance
- Displaying NIC configuration

#### Assessing LAN topologies

- Logical and physical topologies
- Star
- Hybrid
- Mesh

#### LAN and WAN standards at Layer 2

- 802 standards
- Wireless
- Fast and Gigabit Ethernet
- xDSL
- Cable modem
- Frame Relay
- ATM

#### Interfacing with the network

- Testing speed and duplex settings
- Authenticating using 802.1X and EAP

#### Switching at the Data Link Layer

##### Analyzing protocols

- Differentiating between Ethernet and 802.3 frame formats

- Choosing a hardware or software analyzer
- Capturing and filtering traffic with Wireshark

#### Solving network congestion

- Deploying switches
- Interpreting Layer 2 traffic
- Upgrading to a switch

#### Implementing VLANs

- Defining the VLAN
- Interconnecting VLANs across switches
- Port tagging with 802.1Q

#### Wireless Networking

##### Traversing the wireless topology

- Network types and standards
- Selecting infrastructure or ad hoc mode
- IBSS
- BSS
- ESS

##### Building the wireless network

- Setting up the access point
- Configuring the SSID on a client
- Securing the wireless traffic

#### Integrating the Network and Transport Layers

##### The role of TCP/IP

- The TCP/IP protocol suite
- OSI model vs. TCP/IP model

##### Configuring IP addresses

- Characterizing NetID and HostID
- Public vs. private addresses
- Allocating addresses with DHCP
- Managing addresses with ifconfig/ipconfig
- Resolving address conflicts

##### Enabling the routing function

- Subnetting and the adjacency test
- Interpreting a routing table

##### Investigating protocol headers

- TCP
- UDP
- IP
- ARP
- ICMP
- Identifying common protocol issues

#### Troubleshooting the Application Layer

#### Managing OS functions

- File
- Print
- Messaging
- Database

#### Fine-tuning network services

- DNS
- Web services
- Debugging name resolution with nslookup

#### Managing Your Network

- Identifying network management components using SNMP
- Querying the MIB for device status