

## TCP/IP: A Comprehensive Hands-On Introduction - 4 Days

### *Course 367 Overview*

**You Will Learn How To**

- Configure hosts and access internetworks using TCP/IP protocols
- Identify the role of each TCP/IP component
- Leverage all major TCP/IP application services
- Avoid common internetworking problems
- Troubleshoot TCP/IP networks using protocol analysis techniques
- Employ popular Internet/intranet tools: FTP, Web browsers, WWW and others

**Course Benefits**

TCP/IP is the communications protocol suite on which the Internet and most commercial networks operate. In this course, you gain a comprehensive technical introduction to TCP/IP. Extensive hands-on exercises provide the practical experience you need to configure a host, employ TCP/IP tools, use application services and access TCP/IP-based internetworks.

**Who Should Attend**

Anyone working with TCP/IP protocols, or involved in developing or migrating to TCP/IP networks or accessing Internet services. Familiarity with local area network concepts and either Windows or UNIX is helpful.

**Hands-On Training**

Exercises throughout this course provide practical experience with TCP/IP internet- working issues and services, including:

- Deploying protocol analysis techniques for Internet protocols: IP, ARP, TCP, UDP and HTTP
- Solving duplicate IP address problems
- Troubleshooting IP configuration problems
- Building internets with IP routers: configuration and testing
- Troubleshooting TCP/IP networks with ICMP and ping
- Exploiting FTP and TELNET
- Performing protocol analysis of FTP sessions
- Examining SMTP headers
- Decoding HTTP traffic

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## Course 367 Outline

### Introduction and Overview

#### Introducing TCP/IP networks

- What TCP/IP provides: key application services and multivendor capabilities
- TCP/IP and the Internet
- How Internet RFCs and STDs affect TCP/IP

- Providing a reliable data delivery with TCP
- Associating remote applications using port numbers and process addressing
- TCP packet structure
- TCP performance issues
- Troubleshooting the protocol successfully

#### Introducing TCP/IP protocol architecture

- Protocol layering concepts
- TCP/IP layering
- Components of TCP/IP networks

#### The User Datagram Protocol

- Connectionless protocol operation
- Providing reliability at the Application Layer

### The Internet Protocol (IP)

#### Internet Layer functions

- Fundamental internetworking concepts
- Connecting networks
- Providing Physical Layer independence
- Internet addressing: Classless Addressing vs. Classful Addressing (Class A, B, C)
- Examining IPv4 headers

### Applications and Management

#### Protocols

#### Functions and operation of application protocols

- File transfer protocols: FTP, TFTP
- Network Virtual Terminal (TELNET)
- Employing DNS BIND
- Examining SMTP headers
- Utilising workstation mail: POP3, IMAP4
- Examining the mechanisms of VoIP

#### Address resolution

- Resolving MAC addresses with ARP
- Avoiding duplicate IP addresses with RARP, BOOTP and DHCP

#### Vendor implementations

- Sharing files with NFS
- NFS protocols: RPC, XDR, others
- TCP/IP for Windows Server and UNIX

#### IP address resolution

- Building your own IP network
- NIC-registered addresses
- Using private IP addresses: application proxy firewalls
- Introduction to IPv6
- IP on non-Ethernet LANs: SNAP and LLC

#### Managing TCP/IP networks

- SNMP management paradigm
- Simple Network Management Protocol (SNMP)
- The management database: MIB
- SNMP evolution: MIB I and II, RMON, SNMPv2, SNMPv3

### Internetworking with IP Routers

#### Implementing routed networks

- The role of the IP router
- Common IP routing protocols: RIP, OSPF
- Troubleshooting router problems

### Exploring Internet Services

#### Internet service access methods

- Permanent direct connection
- Building virtual private networks (VPNs) with PPP

#### Going beyond the intranet

- Subdividing IP networks (subnetting)
- Control messages on IP networks: ICMP
- Subnetting and supernetting calculation formulas
- Classless Inter-Domain Routing (CIDR)
- Network Address Translation (NAT)

#### Internet service tools

- Retrieving files using Anonymous FTP
- Leveraging traceroute on the Internet
- Utilising Putty, Console and Wireshark
- Applying World Wide Web (WWW) tools

### Transport and Protocols: TCP and UDP

#### Transport Layer fundamentals

- The role of the transport protocol
- Reliable vs. best-effort services

#### The Transmission Control Protocol (TCP)