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

Introducing TCP/IP protocol architecture

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

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

Address resolution

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

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

Internetworking with IP Routers

Implementing routed networks

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

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)

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)

- 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

The User Datagram Protocol

- Connectionless protocol operation
- Providing reliability at the Application Layer

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
- Utilizing workstation mail: POP3, IMAP4
- Examining the mechanisms of VoIP

Vendor implementations

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

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

Exploring Internet Services

Internet service access methods

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

Internet service tools

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