

CIW Internetworking Professional Series – Course 2: Advanced TCP/IP Concepts and Practices (March 2002)

Advanced TCP/IP Concepts and Practices is an 18-hour course that emphasizes Transmission Control Protocol/Internet Protocol (TCP/IP) routing, network troubleshooting, network management, and next-generation Internet protocol technologies. It guides students through the concepts and protocols used in Internet routing, and teaches them how to troubleshoot TCP/IP networks using a packet sniffer and TCP/IP utilities. Students will configure the Simple Network Management Protocol (SNMP) to effectively manage a network, and implement a functional Internet Protocol, version 6 (IPv6), network in the classroom.

Topics

Routing

- Introduction to Routing
- Routing Process
- Static vs. Dynamic Routing
- Routing and Packets
- Routing Protocols
- Routing Information Protocol (RIP)
- Open Shortest Path First (OSPF)
- Exterior Gateway Protocol (EGP)
- Border Gateway Protocol (BGP)
- Classless Interdomain Routing (CIDR)

TCP/IP Troubleshooting Tools – Files, Protocols and Commands

- Troubleshooting Tools
- Useful Network Files
- Internet Control Message Protocol (ICMP)
- Troubleshooting General Network Problems
- Troubleshooting Name and Address Problems

Troubleshooting TCP/IP Networks

- Troubleshooting Analysis
- Performance Factors
- Identifying Performance Degradation
- System and Network Environment
- Client/Server Applications

Network Management Fundamentals

- Network Management
- Management Functional Areas (MFAs)
- Network Management Model
- Network Management Architecture

SNMP History, Process and Architecture

- SNMP Overview
- Popularity and History of SNMP
- Structure of Management Information (SMI)
- The SNMP Process and Architecture
- Common NMS Applications
- Agents and Windows 2000 Server
- SNMP Agents and UNIX
- Agents and Internetworking

Management Information Base

- Accessing MIBs
- The MIB Tree
- MIB Terminology and Groups
- Groups Residing Off the Enterprises or Management Group
- Accessing MIB Variables

SNMP in the Enterprise

- Implementing SNMP
- SNMPv1 Message Format, Error Messages and Drawbacks
- Remote Network Monitoring MIB (RMON)

IPv6 - Introduction and IPv4 Comparison

- The Future of IP
- Introduction to IPv6
- The Need for IPv6
- History of IPv6
- IPv4 vs. IPv6: Key Differences
- IPv4 New, Removed and Revised Fields

IPv6 Header and Extension Headers

- Introduction to Headers in IPv6
- IPv6 Header in Detail
- IPv6 Extension Headers and Header Order
- Windows 2000 and IPv6
- Linux and IPv6

IPv6 Address Architecture

- Introduction to IPv6 Address Architecture
- IPv4 vs. IPv6 Addresses
- IPv6 Address Abbreviation
- IPv6 Address Types and Assignments
- Aggregatable Global Unicast Addresses
- Special Unicast Addresses
- Multicast Addresses
- Fixed Length vs. Variable Length

IPv6 Routing and Security

- IPv6 Routing and Security Introduction
- IPv6 Routing
- Aggregatable Routing Hierarchy
- Multicast Routing
- IPv6 Routing Protocols and Security
- IPv6 Security

Reduced Network Management (IPv6)

- IPv6 Reduced Management Introduction
- Neighbor Discovery (ND) Protocol
- Internet Control Message Protocol version 6 (ICMPv6)
- Plug-and-Play Autoconfiguration
- Address Resolution

Transitioning to IPv6

- Introduction to IPv6 Transitioning
- Simple Internet Transition (SIT) Mechanisms
- Dual IP Stacks
- IPv4 Address Compatibility
- IPv6-in-IPv4 Tunneling: The 6Bone

Voice-over Internet Protocol (White Paper)

- Converting Voice to Digital Format Using Pulse Code Modulation (PCM)
- Transmitting Sound Bytes Using PSTN and Voice-over Internet Protocol (VoIP)
- IP Gateway Devices
- VoIP Shortcomings and Solutions

SNMPv2 and SNMPv3 (White Paper)

- Alterations and Structure of the PDU
- Backward Compatibility
- Security Architecture

Multicast IP (White Paper)

- Multicast Applications and Class D Addresses
- IGMP, Mbone and Routing Protocols

Mobile IP (White Paper)

- Goals, Entities, Functions, and Operations

Target Audience

Network engineers, network architects, internetworking engineers, LAN/WAN administrators, systems administrators, systems managers, intranet administrators.

Prerequisites

Students must have CIW Foundations certification or equivalent experience, and have completed *TCP/IP Internetworking* or have equivalent knowledge of TCP/IP architecture and core protocols. Experience with UNIX, Novell or Windows NT/2000 systems and network administration is also required.

Duration

18 hours

Job Responsibilities

Define network architecture; identify infrastructure components; monitor and analyze network performance; and design, manage and troubleshoot enterprise TCP/IP networks.