TCP/IP Networking

Duration: 5 Days Course Code: GK9025

Overview:

TCP/IP is the globally accepted group of protocols at the core of the Internet and organizational intranets. A solid understanding of each of these protocols and how they work will give you the ability to deploy the most effective network for your organization. In this course, you will gain the essential knowledge and skills required to set up, configure, support, and troubleshoot your TCP/IP-based network.
Our expert instructors and extensive hands-on labs will prepare you to face and overcome the challenges of today's complex networks. This course-the longest running of its kind in the industry-also prepares you for more specialized courses in network security, wireless integration, and Voice over IP, as well as for product-specific training such as Cisco, Nortel, and Microsoft.

Target Audience:

Anyone who is responsible for designing, installing, configuring, and maintaining TCP/IP networks or who needs to understand TCP/IP protocol structures and functions will benefit from this course. This course also provides excellent preparation for more advanced networking training.

Objectives:

- At the end of this course delegates will be able to
- The essential elements of the TCP/IP protocol suite
- Install and configure TCP/IP in a live classroom network
- The roles of various devices in a TCP/IP network
- IP addressing and subnetting including Variable Length Subnet Masking (VLSM)
- Subnet an IP network and implement the resulting addresses
- Details of ARP, IP, ICMP, TCP, and UDP - their functions and relationships
- Automate address assignment and name resolution using DHCP and DDNS
- IP routing and the protocols that support it, such as RIP and OSPF
- How applications like FTP, HTTP, Telnet, and others work in a TCP/IP network
- Functions of IPv6 and its related protocols
- Functions and capabilities of multicasting, Voice over IP, and e-mail
- Use of a protocol analyzer to isolate and troubleshoot network problems
- Troubleshoot problems at each layer of a TCP/IP network

Prerequisites:

The skills and knowledge required for a delegate to attend this course are as follows;

- Delegates must have a solid understanding of the basics on networking and one years experience is highly recomended

Content:

History and Standards

- Origin of TCP/IP
- ARPANET Requirement Documents
- Collaborative Network Requirements
- One Protocol?
- Documentation and RFCs
- RFC Categories

TCP/IP Numbering Systems

- Data Representation
- Converting Binary or Hexadecimal to Decimal
- Converting Decimal to Binary or Hexadecimal
- Converting Hexadecimal to Binary and Binary to Hexadecimal
- Counting
- Guidelines for Determining Base

Local Signaling

- Local Signaling
- Ethernet Addressing
- The Ethernet Header
- CSMA/CD

IP Addressing

- A Logical Address
- IP Address Structure
- Private Addressing
- Network Address Translation
- Address Assignment IP Subnets
- A Logical Address
- Multiple Subnets
- Planning for Growth
- Subnetting Subnets

Address Resolution Protocol

- Address Mapping
- ARP Cache
- ARP Restrictions
- ARP Message Fields
- How Else Can ARP Help?

Multicasting

- What is Multicasting?
- " Multicast Groups and Internet Group Management Protocol (IGMP)
- Mapping a Class D IP Address to an Ethernet Multicast Address
- How Does It All Work Together?

Internet Protocol

- TCP/IP Protocols
- Self-Healing Networking
- IP Header
- IP Sample Data Exchanges

IP Routing

- TCP/IP Protocol
- Routing Function
- The IP Routing Algorithm
- The Routing Table
- Exterior or Interior Protocol
- Routing Information Protocol
- Layer 3 Switching

Simple Sessions with User Datagram Protocol

- TCP/IP Protocols
- Host-to-Host Layer Categories
- UDP Header
- Port Basics
- UDP Ports and Sockets
- Applications
- UDP Sample Data Exchanges

Robust Sessions with TCP

- TCP/IP Protocols
- TCP Headers
- TCP Three-Step Handshake
- Congestion and TCP
- Four Step Session Shutdown
- TCP Sample Session

Autoconfiguration

- BootP and DHCP
- Manual vs. Automatic Address Assignment
- DHCP New Lease Acquisition Process
- DHCP Scopes and Options
- DHCP in a Routed Network
- Troubleshooting

DNS: Names Instead of Numbers

- DNS Overview
- A Distributed Service
- The DNS Tree
- Generic Top-Level Domains
- Sponsored Top-Level Domains
- Name Server
- DNS Database
- Resource Records
- The Name Resolution Process
- Reversing the Process
- Dynamic DNS
- Troubleshooting

Diagnostics and Error Reports via ICMP

- ICMP Overview
- ICMP Basics
- ICMP Message Destinations
- ICMP Messages
- ICMP Sample Data Exchanges

Common TCP Applications

- TCP/IP Protocols
- Uses of Telnet
- File Transfer Protocol (FTP)
- E-mail
- World Wide Web
- Uniform Resource Locator (URL)

Common UDP Applications

- TCP/IP Protocols
- Trivial File Transfer Protocol (TFTP)
- TFTP Sample Sessions
- Simple Network Management Protocol (SNMP)
- The Structure of Management Information
- Remote Network Monitoring

VoIP

- What is VoIP?
- Why VoIP Instead of TDM Voice?
- Uses for VoIP
- Communication Characteristics
- Protocol Standards
- How VoIP Works
- LANs and WANs

Security

- Protocol Limitations
- Threats
- Solutions
- User Authentication
- Security-Related Protocols and IPSec
- Virtual Private Networks (VPNs)

IPv6

- Overview
- Addressing
- Header
- ICMPv6
- IPv6 DNS operation
- Routing Services and Protocols
- Internet2

Further Information:

For More information, or to book your course, please call us on 00 971 4 446 4987

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