

Course Code – TCP11001

TCP/IP – A Practical Foundation

This Hands On TCP/IP training course introduces the basic fundamentals of the Internet Protocols suite and utilises a number of hands-on exercises to allow delegates to develop practical skills. Delegates will be introduced to the function and workings of core TCP/IP suite protocols and will also build a functioning classroom network with hubs, switches routers and server applications.

The Internet Protocol Suite, commonly known as TCP/IP, forms the basis for the Internet and the next generation of telecommunications services. Not only is it being used for pure data services such as Electronic Mail and Web-Based services but it is now also used as the core for mobile phone networks and Next Generation Services.

It is now important for engineers and technicians to understand how the core protocols function and interact with each other in order to configure and troubleshoot modern computer networks.

Objectives:

On completion of this course delegates will be able to:

- Use a protocol analyser to identify and troubleshoot the core Internet Protocols.
- Configure IP Addresses and identify IP Address problems
- Troubleshoot IP configuration problems
- Build networks using Hubs, Switches and Routers
- Troubleshoot TCP/IP networks with ICMP, ping and other PC utilities
- Configure and exploit FTP and TELNET
- Perform detailed protocol FTP, TFTP and Telnet sessions
- Understand the management of an Intranet through the use of SNMP

Prerequisites:

Delegates are expected to have a basic understanding of PC principles.

Course Profile:

Introduction to TCP/IP Networking

- What is TCP/IP
- TCP/IP and the Internet
- Request for Comments
- TCP/IP Protocol Suite
- TCP/IP – A Layered Model
- TCP/IP layering and encapsulation
- Network Components and Devices
- Protocol Analysis

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The Internet Protocol (IP)

- What is an Internetwork
- What do we Need to Build a Network
- IP addressing and address classes
- IP Protocol Header
- Address Mapping and Resolution
- Address Resolution Protocol
- Automatic Addresses Allocation with BOOTP and DHCP

Building an Intranet

- Providing and Implementing an IP Addressing Scheme
- Lets put our IP Network together
- Global IP Addresses
- The use of Private IP Addresses
- IPv6
- How is IP Implemented on different Physical Networks
- IP on non-Ethernet LANs: SNAP and LLC
- Using IP on WANs
- IP used on Frame Relay AND ATM

Internetworking with IP Routers

- What is a Routed Networks
- What is the Primary Function of a Router
- Interior Gateway Routing Protocols – RIP and OSPF
- Exterior Gateway Routing Protocols - BGP
- Working with Routers and Troubleshooting Issues
- Intranets and the Internet
- Dividing our Network into Logical Sub Networks
- Management of IP with ICMP
- Supernetting
- Classless Inter-Domain Routing (CIDR)
- Network Address Translation (NAT)

The Transport Layer

- TCP/IP Transport Layer Protocols: TCP and UDP
- What is the Function of the Transport Layer
- The role of the transport protocol
- Connection-Orientated vs Connectionless protocols
- Transmission Control Protocol in Detail
- Reliable Data Communications with TCP
- Port Numbers and Sockets
- TCP packet structure and troubleshooting
- TCP performance issues

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- User Datagram Protocol in Detail
- Connectionless protocol operation
- Providing reliability at the Application Layer
- Applications and Management Protocols

Applications

- TCP/IP Applications
- What do we mean by the Client/Server Model?
- What do we mean by the Peer-to-peer Model?
- File transfer protocols - FTP
- Trivial File Transfer Protocol - TFTP
- Remote Configuration and Management with Telnet
- The Domain Name Service (DNS)
- SMTP, the basis of Internet mail
- Utilising workstation mail: POP3, IMAP4
- The basics of Voice over Internet Protocol - VoIP
- SIP – Session Initiation Protocol
- TCP/IP for Windows XP, Windows 7 and UNIX
- Exploring Internet Services
- Permanent direct connection
- Dial Services with PPP, PPPoE and PPPoA
- What is a VPN?
- Internet Service tools
- Retrieving files using Anonymous FTP
- Using World Wide Web (WWW) tools

Managing TCP/IP Networks

- What is SNMP?
- Simple Network Management Protocol (SNMP)
- The management database: MIB
- SNMP evolution: MIB I and II, RMON, SNMPv2, SNMPv3
- Community Strings

Hands-on Exercises (over duration of course)

- Analyze TCP/IP Protocols using a Network Protocol Analyzer
- Set up FTP Services
- Use Telnet Services
- Undertake detailed analysis of IP, TCP, FTP, Telnet and other applications
- Configure a PC to use TCP/IP
- Set up a Routed Network with the Correct IP Addressing Scheme
- Configure basic routing services on a Router
- Make and analyze Voice over IP Calls
- Troubleshooting basic network routing problems