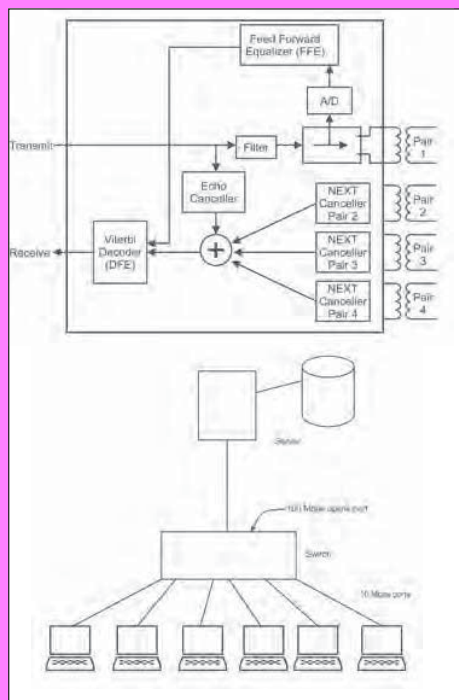


# PRACTICAL TCP/IP, TROUBLESHOOTING AND PROBLEM SOLVING FOR INDUSTRY

A three-day workshop for all those designing, installing, monitoring, maintaining and troubleshooting Industrial Ethernet, TCP/IP and Intra/Internet sites



## WHAT YOU WILL LEARN:

- Gain a practical understanding and application of TCP/IP
- Learn the basic skills to effectively set up TCP/IP networks
- Construct a secure, robust Local Area Network
- Diagnose and fix problems with TCP/IP utilities
- Plan and design improved networks
- Analyse and construct a typical firewall
- Understand how to optimise your company's connectivity with LANs/Intranets and the Internet
- How to troubleshoot TCP/IP networks
- The essentials of network management
- How to track hackers and network problems
- To use a protocol analyser to diagnose real TCP/IP problems
- How to set up Virtual Private Networks (VPNs)
- How to construct Virtual LANs (VLANs)

## WHO SHOULD ATTEND:

- Network Technicians
- Design Engineers
- Data Communications Managers
- Network Engineers
- Communications Specialists
- Electrical Engineers
- IT Support Managers and Personnel
- IT and MIS Managers
- Network Planners
- System Integrators
- Designers
- Network Support Staff
- Programmers
- System Analysts
- Network Administrators
- Systems Engineers

## The Workshop

This is a truly hands-on workshop in the sense that you will spend over 70% of the course time in setting up TCP/IP based networks and troubleshooting problems. We have distilled all the practical tips and tricks in maintaining and troubleshooting TCP/IP based networks into this hard-hitting three-day workshop. Commencing with a simple introduction to the hardware level of Ethernet, you will quickly move onto coverage of the Internet (IP) layer.

The host-to-host or TCP layer will then be covered in considerable practical detail. The application layer of TCP/IP will be covered by a detailed examination of protocols such as Bootp, DHCP, SNMP and DNS. The vital but simple TCP/IP utilities such as ping, ARP and traceroute will then be tested out on the network. The SNMP protocol will be looked at with hands on tests. Finally, you will construct a Virtual LAN and Virtual Private Network and configure a simple firewall.

One of the best ways to learn and retain your knowledge is with hands-on sessions where you will gain a broad range of skills that every competent network engineer needs in his skills toolbox. We believe this workshop provides this know-how.

## Practical Sessions

In addition to the 15 practical mini-sessions that expose you to typical problems that could occur with TCP/IP networks, there are at least 10 practical sessions where you will get hands-on training to take advantage of the material covered in the class during days one and two:

- Construct simple 100 BaseTX LAN
- Configure network parameters
- Communicate over networks
- Configure IP addresses and Subnet Mask
- Use Ping utility and observe ARP in operation
- Analysis of ARP/ICMP/IP/UDP/TCP
- Router configuration
- Tracert and Route commands
- Use of Hosts file
- Set up and analyse FTP sessions

## The Program

### INTRODUCTION

- Terms and definitions
- LANs, WANs, VLANs and VPNs
- Open Systems Interconnection, OSI and ARPA models

### ETHERNET

- Fundamentals
- 10Mbps Ethernet systems
- Fast and Gigabit Ethernet
- Collisions and performance
- Full duplex, deterministic and dual-redundant Ethernet

*Practical Session*

### INTERNET LAYER PROTOCOLS

- IPV4
  - Addressing
  - Subnetting
  - Supernetting and CIDR
  - Fragmentation
  - Header structure

- ARP
- ICMP
- Routing protocols
- IPV6
  - Addressing modes
  - Header structure
  - Extension headers

*Practical Session*

### HOST-TO-HOST LAYER PROTOCOLS

- TCP
  - Ports and sockets
  - Sequence and acknowledgement numbers
  - Establishing and closing connections
  - Sliding windows

- UDP

*Practical Session*

### APPLICATION LAYER PROTOCOLS

- BOOTP, DHCP, TELNET, FTP, TFTP, NFS, SMTP, POP3, HTTP, SNMP and DNS

*Practical Session*

### TCP/IP UTILITIES

- Ping, arp, tracert, netstat, ipconfig and winipcfg

*Practical Session*

### CONNECTION DEVICES

- Repeaters, hubs, bridges, switches, routers and gateways

### SNMP NETWORK MANAGEMENT

- SNMP overview
- MIB details
- SNMP traps
- Network management

### CONFIGURING AND TROUBLESHOOTING ETHERNET AND TCP/IP

*To be covered during the practical sessions:*

- Configuration
- Use of TCP/IP and third party utilities
- Use of protocol analysers

*Practical Session*

### SATELLITE COMMUNICATIONS

- Essentials of satellites
- Challenges with TCP/IP

### VIRTUAL LANS (VLANs)

- Introduction to VLANs
- VLAN identification
- IEEE 802.1p/Q
- Configuring a trunk line
- VLAN Trunk Protocol (VTP)
- VTP pruning
- Managing redundant links
- Inter VLAN routing

*Practical Session*

### SECURITY

- Fundamentals
- Authentication
- Encryption
- Layer 2 Tunneling Protocol Concept
- IPSec Protocol
- Key management for IPSecs

*Practical Session*

### VIRTUAL PRIVATE NETWORKS (VPNs)

- Introduction to VPNs
- Layer 2 Tunneling Protocol Concept
- IPSec Protocol
- Key management for IPSec

*Practical Session*

### FIREWALLS

- Fundamentals
- Types of firewalls
- Tips and tricks

*Practical Session*

### TYING IT ALL TOGETHER

- Current and future trends
- Critical areas of focus