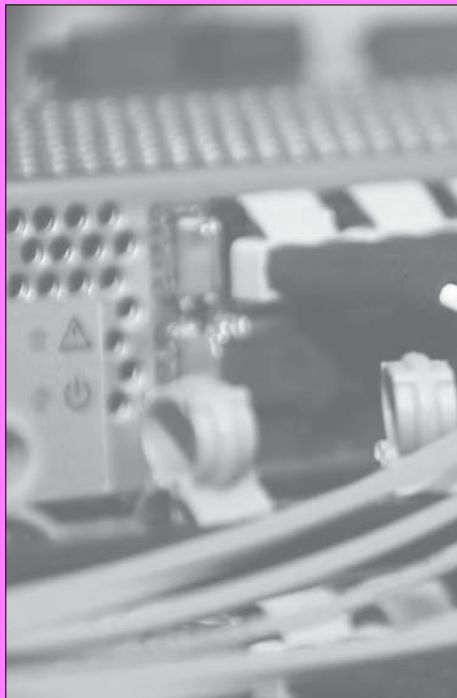

PRACTICAL TROUBLESHOOTING OF TCP/IP NETWORKS



OBJECTIVES:

At the end of this workshop you will be able to:

- Troubleshoot TCP/IP networks
- Find faults at the Network Interface, Internet, Host-Host and Application levels
- Understand the essentials of Network Management
- Detect hackers

WHO SHOULD ATTEND:

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

The Workshop

This is a hands-on workshop in the true sense of the word, where you will spend over 70% of the course time in setting up and troubleshooting TCP/IP-based networks. We have distilled all the practical tips and tricks in maintaining and troubleshooting TCP/IP networks into this intensive two-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 (TCP) layer also be covered in considerable practical detail. The Application layer of the TCP/IP protocol suite will be covered by a detailed examination of protocols such as BOOTP, DHCP and SNMP. The simple but vital TCP/IP utilities such as Ping, Arp and Tracert will then be tested out on the network. 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 the required know-how.

Pre-requisites:

A basic working knowledge of industrial communications and applications is useful.

Practical Sessions

This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

To gain full value from this workshop, please bring your laptop/notebook computer.

The Program

DAY ONE

NETWORKING BASICS (OVERVIEW)

- OSI model
- Ethernet
- TCP/IP protocol suite
- Internet Layer (OSI Layer 3) protocols: IP, ARP, ICMP
- Host-Host Layer (OSI Layer 4) protocols: TCP, UDP
- Application Layer (OSI Layer 5/6/7) protocols: FTP, HTTP, Telnet
- Network components

TOOLS

- DOS utilities
- Windows utilities (IP scanners, port scanners, route tracers)
- Protocol analysers

NETWORK CONSTRUCTION

- Constructing a simulated Wide Area Network simulation with hubs, switches and routers
- Setting up Cisco routers
- Setting up managed switch
- Setting up DHCP and BOOTP servers
- Configuring IP

BASIC SYSTEM CHECKS

- Host configuration (ipconfig, wntipcfg)
- Router configuration
- Switch configuration
- Connectivity (ping, arp, tracert)
- Name resolution (Hosts file, NetBIOS name resolution)

TROUBLESHOOTING THE MEDIUM

- Fiber connectivity
- Cat5 connectivity (damaged and mis-wired cabling)

TROUBLESHOOTING AT LAYER 2

- Ethernet packet analysis
- Checking Ethernet NIC driver configuration
- Detecting duplicate MAC addresses

DAY ONE continued

TROUBLESHOOTING AT LAYER 3

- Checking stack operation (loop-back test)
- Connectivity checking (ping, trace) between subnets
- Pinging and tracing via router (Telnet)
- Packet debugging via router (Telnet)
- Tracing Ethernet packet contents between subnets
- Detecting duplicate IP addresses
- Effect of incorrect subnet masks
- Effect of incorrect routing tables
- Automatic IP address allocation (DHCP server down)
- Faulty WINS resolution
- Inability of application programs to resolve NetBIOS names
- Checking router CPU resources and ACLs

TROUBLESHOOTING AT LAYER 4

- Checking TCP connections
- Observing TCP sequence numbers and acknowledgements
- Checking open connections on hosts
- Scanning ports on network
- Checking TCP/UDP delay and data rate between hosts on WAN

INTERNET CONNECTION

- Setting up NAT router
- Testing Internet uplink/downlink performance
- Ping and tracing across the Internet (DOS and Windows utilities)

HACKING TOOLS

- Cain and Abel (packet diversion and analysis, password cracking)

SUMMARY, OPEN FORUM AND CLOSING