

TCP/IP foundation for engineers

A 5 day **Hands on** training course



Description

An intensive hands on IP foundation. The course focuses on all parts of TCP/IP including layers 4 to 7 on end stations as well as layer 3 on routers. The TCP/IP protocols are also studied to enable delegates to be able to troubleshoot TCP/IP using Wireshark. Hands on sessions are used to reinforce the theory rather than teach specific manufacturer equipment.

An optional multiple choice exam, leading to the LAIT I certification, is included at the end of the course. The exam consists of 40 questions and lasts 1.5 hours.



Key outcomes

By the end of the course delegates will be able to:

- ✓ Use ping, traceroute and other tools to diagnose faults on a network.
- ✓ Configure IP on PCs and routers.
- ✓ Plan IP addresses and subnets.
- ✓ Analyse IP and TCP packets using Wireshark.
- ✓ Troubleshoot TCP/IP.



Training Approach

This structured course uses Instructor Led Training to provide the best possible learning experience. Small class sizes ensure students benefit from our engaging and interactive style of teaching with delegates encouraged to ask questions throughout the course. Quizzes follow each major section allowing checking of learning. Hands on sessions are used throughout to allow delegates to consolidate their new skills.



Details

Who will benefit?

Technical staff working with networks.

Prerequisites

None.

Duration: 5 days

Customer rating



Generic Training



Generic training compliments product specific courses covering the complete picture of all relevant devices including the protocols "on the wire".

"Friendly environment with expert teaching that teaches the why before the how."
G.C. Fasthosts

Small Class Sizes



We limit our maximum class size to 8 delegates; often we have less than this. This ensures optimal interactivity between delegates and instructor.

"Excellent course. The small class size was a great benefit..."
M.B. IBM

Hands On Training



The majority of our courses use hands on sessions to reinforce the theory.

"Not many courses have practice added to it. Normally just the theoretical stuff is covered."
J.W. Vodafone

Our Courseware



We write our own courses; courseware does not just consist of slides and our slides are diagrams not bullet point text.

"Comprehensive materials that made the course easy to follow and will be used as a reference point."
V.B. Rockwell Collins

Customise Your Course



Please contact us if you would like a course to be customised to meet your specific requirements. Have the course your way.

"I was very impressed by the combination of practical and theory. Very informative. Friendly approachable environment, lots of hands on."
S.R. Qinetiq

TCP/IP foundation for engineers

Course content

What is TCP/IP?

TCP and IP are protocols, 7 layer model, hardware/software layers, network layers, internetworking, protocols, What is IP? What is TCP? The internet, The IAB, RFCs.

Ping and Wireshark

Host configuration, IP addresses, subnet masks, default gateways, ping. Hands on: Base configuration. Testing with ping. Analysing packets with Wireshark.

Switches and Wireshark

Switches versus hubs, layer 2 forwarding table, flooding, broadcasts. Hands on: Building a switched based network.

Configuring network devices

Configuration options, console port, putty, telnet. Hands on: Configuring switches, telnet.

IP

IP packet format, protocol field, TTL, DiffServ, fragments, ICMP. Hands on: IP packet analysis.

IP addressing

32 bits, dotted decimal, rules, networks, role of subnet masks, simple subnetting, prefix notation. Broadcasts, special use addresses. Hands on: Planning and implementing addressing.

IP and the lower layers

ARP, PPP, other media. Hands on: ARP.

Routing

What are routers? What routers do, default gateways, routing and addressing, routing tables, ways to update routing tables. Hands on: Building a routed network, traceroute.

Routing protocols

IGPs and EGPs, RIP, RIPv2, Why not to use RIP, OSPF, OSPF metrics, convergence, distance vector protocols, link state protocols. Hands on: RIP, OSPF analysing routing tables.

GNS3

Network simulators. Hands on: Using GNS3.

Subnetting

Subnetting to the bit level, ranges, how prefixes are used. Hands on: Subnetting.

VLANS and IP addressing

What are VLANs, tagging, 802.1Q, Inter VLAN routing. Hands on: Inter VLAN routing.

TCP and UDP

Layer 4, port numbers, client ports, broadcasts multicasts and layer 4, UDP header, TCP header, connections, ACK, sliding windows, options, connection states. Sockets. Hands on: Analysing TCP packets.

IPv4 address configuration

Private addresses, NAT, NAPT, dynamic addressing, DHCP, link local addresses. Hands on: DHCP, NAT.

IPv6

What is IPv6, 128 bit addresses, address formats, IPv6 address allocation, header format, migration, dual stack, tunnelling, NAT64, DNS64. Hands on: IPv6 setup troubleshooting.

IPv6 address configuration

Static addressing, EUI-64 addresses, IPv6 address order, SLAAC, DHCPv6. Hands on: SLAAC.

Applications

Clients, servers, HTTP, Email, resource sharing, VoIP, video, terminal emulation, remote desktop. Network management and SNMP. Hands on: Servers, TFTP, VoIP packet analysis.

DNS

Names and addresses, hosts file, how DNS works. FQDNs, DNS client configuration. Hands on: Troubleshooting DNS.

The Internet

Autonomous systems, Peering, transit, looking glasses. Hands on: Internet routing tables.

Security

Firewalls, firewall architectures, DMZ, how firewalls work, proxy servers, filtering, ACLs, IDS, VPNs, authentication, encryption, tunnels, secure protocols. Hands on: Firewalls, SSH

Troubleshooting

Methods, tools. Using the 7 layer model.

Troubleshooting toolkits. Hands on: Fixing the network.

