

Intro to data communications & networking

A 3 day **Hands on** training course



Description

A hands on training course introducing the concepts of data communications, moving on to covering both LAN and WAN technology. Quizzes are used extensively to ensure material has sunk in and to maximise learning time. Hands on sessions ensure that by the end of the course delegates have made cables, built LANS and WANS, configured TCP/IP, switches and routers.



Key outcomes

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

- ✓ Use the seven layer model to classify networking buzzwords.
- ✓ Build and troubleshoot Ethernet LAN/WAN and WiFi networks.
- ✓ Evaluate LAN and WAN technologies.
- ✓ Explain the difference between switches and routers.
- ✓ Connect networks with routers.



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?

Anyone who requires a technical introduction to networks.






Prerequisites

None.

Duration: 3 days

Course rating:



Generic training 	Small class sizes 	Hands On training 	Our courseware 	Customise your course 
<p>Generic training complements product specific courses covering the complete picture of all relevant devices including the protocols “on the wire”.</p>	<p>We limit our maximum class size to 8 delegates; often we have less than this. This ensures optimal interactivity between delegates and instructor.</p>	<p>The majority of our courses use hands on sessions to reinforce the theory.</p>	<p>We write our own courses; courseware does not just consist of slides and our slides are diagrams not bullet point text.</p>	<p>Please contact us if you would like a course to be customised to meet your specific requirements. Have the course your way.</p>
<p><i>“Friendly environment with expert teaching that teaches the why before the how.”</i> G.C. Fasthosts</p>	<p><i>“Excellent course. The small class size was a great benefit...”</i> M.B. IBM</p>	<p><i>“Not many courses have practice added to it. Normally just the theoretical stuff is covered.”</i> J.W. Vodafone</p>	<p><i>“Comprehensive materials that made the course easy to follow and will be used as a reference point.”</i> V.B. Rockwell Collins</p>	<p><i>“I was very impressed by the combination of practical and theory. Very informative. Friendly approachable environment, lots of hands on.”</i> S.R. Qinetiq</p>

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Course content

What are networks?

What is data communications? What are networks? Types of network, LANs, LAN choices, WANs, WAN choices, PANs, SANs, MANs, connecting networks. Internetworks, the internet, clouds.

Networks and standards

Standards bodies, ISO, ITU, IEEE, IETF, OSI 7 layer reference model, TCP/IP and OSI, ping and the 7 layer model, encapsulation, fragmentation.

The physical layer

Transmission media: Copper, Fibre, RF, UTP, Cat 5/5e/6/7..., RJ45, straight and cross over cables. Coax, Fibre cable & connectors, SFP, MMF, SMF, radio spectrum, frequencies, ranges, noise and electrical distortion, repeaters. Hands on: Cabling, ping.

Bandwidth

Definition, Bits, bytes, speeds, simplex, half/full duplex, a/symmetrical, aggregation, latency. Calculating bandwidth requirements.

The Data Link layer

Frames, classifications, standards, LAN/WAN layer 2 technologies (Point to point, virtual circuits).

Ethernet

What is Ethernet? 802.3, evolution from CSMA/CD, choosing cables, topologies, NICs, MAC addresses. Ethernet frame format. Hands on: Analysing Ethernet frames.

Ethernet switches

Connecting multiple devices, switches work at layer 2, Switches vs. hubs, simultaneous conversations, full duplex, MAC address database, how switches work, switch benefits, loops, STP. Console ports. Hands on: Switches and WireShark, configuring switches, broadcast storms, STP.

VLANS

What are VLANs, why have VLANs. Hands on: The effect of VLANs on network traffic.

Wireless LANs

Type of wireless network. WiFi, 802.11b/g/n/ac, WiFi6, antennae, interference, 802.11 frame format, CSMA/CA, half duplex, Wireless Access Points, security. Hands on: Building a WiFi network.

WANS

WAN architecture, WAN types, service providers, access equipment, DTE, DCE, core equipment, WANs and the 7 layer model, choosing a WAN.

WAN access

Point to point, multi access, Internet, phone lines, leased lines, xDSL, broadband architecture. DOCSIS, FTTH, PON, SD-WAN. Older technologies (if required): Modems, ISDN, 64k, E1, TDM.

Packet switched networks

Packet switching, virtual circuits, Hub & spoke, partial & full mesh, MPLS, MPLS and routers, Why MPLS? MPLS -TE, MPLS VPN, Internet VPN. Older technologies (if required).

Service provider technologies

Transport plane, SDH, SONET, WDM, CWDM, DWDM, DWDM architectures, OTN.

TCP/IP

Definition, protocols, services, internetworking, the Internet, intranets, IAB, RFCs, IP header, IP addressing, subnet masks, IPv6, TCP, UDP. Hands on: IP address and subnet mask configuration.

Routers

What are routers? Routers vs switches, when to route and when to switch, default gateways, routing tables, static routes, routing protocols. Firewalls, how firewalls work. Hands on: Router configuration, tracer.

Applications

Clients, servers, web, HTTP, Email, resource sharing, IM, VoIP, Video over IP, terminal emulation, ftp, ssh. Hands on: telnet

