Networking 4 VoIP

Course Objectives

This course will give delegates a good understanding of LANs, WANs and Voice over IP.

It is aimed at those who want to move into the world of VoIP and require a solid foundation before attending any other telephony manufacturers IP based PBX courses. It can also be taken as a standalone course.

Being a modular training course, delegates can work through all modules or simply choose the module they really need.

'Average' times are shown though these can vary greatly depending on the existing skill levels of each student. Also, the average time to complete the course and take the SSVP™ certification test is 8 hours and 48 minutes

Each module has it's own 'mini' quiz at the end to help delegates 'gauge' how well they are doing and the 'Final' Accreditation test is available from the delegates own 'Course' list page on the main site.

The Modules are as follows

What is Voice over IP?   This is an introduction module that sets out the scope of the course and introduces the concepts of LANs and WANs.

Average time ~ 2 min

Networking Components   This module is designed to introduce you to Data networks and how devices connect to them. It does this by describing the most commonly used topologies and cabling types in use today.

Topologies
What is a Protocol?
UTP and STP Cables
RJ-45 Connectors
UTP Implementations
Power over Ethernet
Fiber Optics

Average Time (inc. quiz) ~ 12mins

Ethernet   Ethernet is the predominant force in networking today and this module introduces all of the concepts needed to understand this specification along with introducing basic network components like LAN cards and LAN switches.

Ethernet and 802.3

NIC Cards
Hubs and Ethernet
Collisions and CSMA/CD
Repeaters
Bridges
LAN switches
Routers
Bandwidth

Average Time (inc. quiz) ~ 11mins

The OSI Model

The OSI Model was designed to break networking components and software into 'bite-size' interoperable chunks. This module explains the 7 layers of the OSI model and compares them to the real world implementation of the TCP/IP layered model.

The Reasons for OSI
The 7 Layers
Role of the 'Application' layers
Role of the 'Data' layers
OSI v TCP/IP
Physical Layer functions
Datalink Layer functions and MAC addresses
IEEE 802.2/3 Frame format
Switches and the Datalink layer
Network Layer Functions
Transport Layer Functions
Encapsulation / De-encapsulation

Average Time (inc. quiz) ~ 17mins

WANS

Wide Area Networks connect buildings, homes and people together. This module aims to explain what a WAN is and how they work along with explaining some WAN protocols such as PPP, ADSL, Frame Relay and the newly popular - MPLS

What is a WAN?
DTE/DCE
Synchronous communications
The Point to Point Protocol – PPP
DSL
'Local Loop' unbundling
ADSL @ Home
ADSL Channels and Contention ratios
Fiber options
Frame Relay
LAN Extension Services
EPS9/EPS8

MPLS Introduction
WAN Physical Layer implementations

Average Time (inc. quiz) ~ 22mins

TCP/IP Networks

This module explains how TCP/IP networks work by describing the functionality of each TCP/IP layer. By understanding these layers you will understand how a TCP/IP network works which will give you a good understanding of how voice can be carried across an IP network.

TCP/IP Protocol Stack
Application Layer overview
Transport Layer overview
Ports and Sockets
TCP/IP Internet Layer – Overview
Address Resolution Protocol – ARP
IP Datagrams
ICMP

Average Time (inc. quiz) ~ 12mins

TCP/IP Addresses

IP Addresses, Subnet Masks, Default Gateways. It's all here and delivered to you in a way so that you will understand what these numbers are for and how they work with each other.

Analogies
Binary and Hexadecimal
The IP address
IP Address Classes – A, B, C and more!
Special IP addresses
TCP/IP addressing quizzes
The Subnet mask
IP Address and Subnet mask 'in combination'
Sample IP networks
Addressing without subnets
Why subnet at all?
How many Subnets do you need?
Easy Subnetting

Average Time (inc. quiz + exercises) ~ 167mins

DHCP

This Module introduces the Dynamic Configuration protocol (DHCP) and describes what it is, how it works and how it works in a multi-network environment along with introducing some troubleshooting commands.

Overview of DHCP

Static or Dynamic addressing
DHCP Discovery
DHCP Offers
Lease and Renewal Times
Multiple DHCP Servers
Relay Agents
DHCP Options
IPconfig utility
Home setup 'example'

Average Time (inc. quiz + exercises) ~ 24mins

Troubleshooting

Follow the tips in this module and you will be able to solve the majority of problems you will encounter on a Network.

Troubleshooting Rules
Layer 8
Are you connected?
Ping utility
Loopback address
IPconfig utility
APIPA addresses
Ping Tests
Troubleshooting exercises

Average Time (inc. quiz + exercises) ~ 22mins

LAN Monitoring

This module teaches you how to use a Network monitoring program to analyse traffic on the network in order to help troubleshoot even the trickiest problems.

Lan Monitoring Tools
Capturing Traffic
Analyzing Frames
Filtering to assist in analysis

Average Time (inc. exercises) ~ 86mins

Switches and VLANS

This module explains the fundamental operation of a LAN switch along with the important concepts of Virtual LANs (VLANS).

Switch Functions
LAN Switch Structure
Address learning
Filtering and Forwarding Frames
Broadcast Frames
Redundant Topologies

Broadcast Storms and Loops
Multiple Frame Copies
MAC table instability
The Spanning Tree Protocol
How STP works
VLANS
802.1Q/P Tagging
Connecting VLANs
Router Sub-interfaces
Layer 3 Switches

Average Time (inc. quiz) ~ 16mins

Routing

Routers are used on the edge of networks to pass data onto a WAN and within Layer 3 LAN switches. This module describes how routers work along with a brief explanation of Routing protocols such as RIP, IGRP and EIGRP.

What is Routing?
Routers
Port guides
Static and Dynamic routes
Default Routes
Routing Decisions
Distance Vector Routing Protocols
RIP and Routing Table updates
Interior Gateway Protocol – IGRP
Other Routing Protocols
Testing Routes with TraceRT (Trace Route)

Average Time (inc. quiz + exercises) ~ 23mins

Wireless

Wireless is one of the fastest moving areas in the world of networking. This module explains the basics of Wireless networking along with information on securing your wireless network.

Wireless Networks
Wireless Bridging
WiFi
WiMax
VoWiFi
Wireless Security
Bluetooth
Other Wireless Technologies

Average Time (inc. quiz) ~ 14mins

SNMP

The Simple Network Monitoring Service is a valuable protocol that enables Network Operation centers to keep an eye on valuable systems and services across a network. This module is an introduction to this important protocol

SNMP Components
Managers and Agents
The Management Information Base – MIB
The SNMP Name tree
SNMP Get Request
Other SNMP Commands
Configuring SNMP

Average Time (inc. quiz + exercises) ~ 29mins

IP Applications and Services

So many other services can be found on a network and some, if not all, will have an impact on how your voice will work. This modules looks at services such as FTP, TFTP, Firewalls, NAT, Proxy Server, DNS and VPNS.

IP Applications
FTP – File Transfer Protocol
Setting up FTP
The FTP Default directory
Connecting to FTP
Transferring files
FTP Clients
TFTP - Trivial File Transfer Protocol
Firewalls
Network Addresses Translation
Proxy Servers
Telnet
DNS – The Domain Name System
VPNs – Virtual Private Networks
Virtualization

Average Time (inc. quiz) ~ 27mins

VoIP

This module introduces the different implementations of Voice over IP and describes the basics of codecs, signalling, the real time protocol (RTP), quality of service (QoS) and the basics of network design to reduce delay and jitter that can affect the quality of voice on a network.

What is Voice over IP
VoIP over the Internet
Branch to Branch VoIP
IP PBX
Encoding
Codec types

RTP – The Real Time Protocol
Bandwidth Requirements
Delay, Jitter and Packet Loss
Measuring Delay
Jitter and Packet Loss
VoIP acceptance criteria
LAN guidelines for Voice quality
Dedicated voice LAN
Shared LAN for Voice and Data
Utilizing VLANS and 802.1Q
VLAN Tagging and Priority
Quality of Service for Wide Area Networks

Average Time (inc. quiz + exercises) ~ 23mins

Note:
An access license for any of our training courses and certification tests is for 12 months from the date of purchase.