

Introduction to Next Generation Networks

The term Next Generation Networks refers to networks being designed to deliver virtually any service including telephony, broadband data and multimedia services over a common infrastructure. For a number of years now telecommunications operators have been switching traditional circuit-switched voice services to IP networks, which are packet switched. In fact Internet Protocol will be the common denominator for all services. Underlying IP, it is proposed that Ethernet will be the data link layer standard, although SDH will play a part for a while yet. IP Core networks will and are being MPLS enabled to provide a Quality of Service link between Ethernet and IP.

Prerequisites

This course is suitable for staff with no prior technical knowledge, but it could be beneficial if delegates had some prior low level knowledge of telecommunications services and / or IP-based communications

Aim:

To provide delegates with a technical overview of the common technologies being used in Next Generation Networks.

Objectives:

By the end of the course you will :

Be aware of what a multi-service network is designed to deliver

Understand the common technologies used in the core, distribution and access layers

Have an appreciation of the architecture required to deliver multiple services over a single architecture.

Appreciate the benefits for both the provider and customer alike

Who should attend?

Engineers, Technician Managers and Support staff who are likely to be involved in the move from traditional circuit switched voice services to a multiservice IP-based network.

Course Outline:

Introduction to Next Generation Networks

- What is a Next Generation Network?
- A single Architecture
- VoIP and IP Telephony
- What Services will these new networks carry?
- How will the architecture differ?
- Control and Access Protocols

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Course Code - TEL13002

Transmission

- Ethernet Services (10, 100, Gigabit, 10 Gigabit)
- Digital Subscriber Line
- HDSL
- SDSL
- ADSL
- ADSL2
- ADSL2+
- VDSL
- Last Mile / First Mile
- EFM – Ethernet First Mile
- PON – Passive Optical Networks
- EPON – Ethernet over PON

IP Services

- IP Version 4
- IP Addressing
- NAT – Network Address Translation
- ARP – Address Resolution Protocol
- DHCP – Dynamic Host Configuration Protocol
- Multicasting
- TCP – Transmission Control Protocol
- UDP – User Datagram Protocol
- IP Version 6 or IPng

IP Multicasting

- Unicast and Multicast
- Why Multicast?
- Multicast Addressing
- IGMP – Internet Group Management Protocol
- QoS – Quality of Service
- Best Effort
- Integrated Services
- Differentiated Services
- IP Precedence
- Diffserv
- Queuing and Scheduling
- VLANs and IEEE 802.1p/q

MPLS – Multi Protocol Labeled Switching

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- What is MPLS
- MPLS Shim Labels
- MPLS Operation

Real Time Media over IP

- Review of traditional voice services
- Codecs
- Quality of Service
- Video over IP
- Voice over IP
- H.323 Overview
- Q.931

SIP - Session Initiation Protocol

- What is SIP?
- SIP URLs
- SIP Registration
- SIP Proxy Server
- SIP Redirect Server
- SDP – Session Description Protocol
- Basic SIP Messages
- SIP Response Codes

IPTV

- What is IPTV?
- IPTV Streams
- IGMP
- Switched Digital Video
- Video on Demand

Signalling and Control Protocols

- H.248
- Megaco
- Media Gateways
- Softswitches

Signalling and IP

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- Sigtran
- Sigtran Protocol Architecture
- SCTP – Stream Control Protocol
- SCTP vs TCP
- M2PA
- M2UA
- M3UA

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