Telecom Architectures and Information Technologies

Duration: 5 Days	Course Code: GK3765

Overview:

Discover the intricacies of a new era in telecommunications. Telecom is undergoing a series of radical changes, molded by the legacy of telephony and an Internet Protocol network. A new era in telecommunications has exploded with the adoption of Wireless LAN, Unified Communications (UC), Voice over IP (VoIP), 3G and 4G mobile networks, cloud computing, and the next generation of voice and data services.

In this comprehensive course, you will gain an in-depth understanding of the current telecom landscape and how voice has migrated from a circuit- to a packet-switched network. You will learn how to evaluate existing technology options to determine which will best meet your organization's data and telephony requirements, from mature digital transport/access services to emerging voice and data services using voice over packet technologies.

The technology, marketplace, and regulatory structure of telecommunications are in a continuous state of transition. This powerful course will ensure that you fully understand the service options available to your organization and how voice technologies integrate into your existing data networks.

Target Audience:

Individuals who are new to telecommunications, have experience in data networking, and are in the process of converging your telephony and data network infrastructures or are responsible for implementing or supporting telephony services. Voice professionals needing data training. Data professionals needing to know about VoIP. Consultants, executives, IT managers, marketing/sales staff, and network analysts, designers, engineers, and technicians.

Objectives:

- Applications supported on today's telecom networks
- Set up of circuit-switched calls vs. packet-switched calls
- Digitizing voice
- Types of communication mediums
- Multiplexing techniques used for fixed and wireless communication systems
- Modulation techniques used to increase connections and capacity for wireless networks
- Power over Ethernet
- Wireless LAN standards
- Packet switching
- VoIP and UC
- Carrier data services
- Video conferencing solutions and features
- Mobile cellular networks
- Attributes of 3G networks and services
- Femtocells vs. FMC service
- 4G WiMAX services and technology
- 4G LTE services and technology

Prerequisites:

- Introduction to Information Technology (CompTIA Strata IT Fundamentals)

Follow-on-Courses:

- Understanding Networking Fundamentals
- Voice over IP Foundations
Content:

1. The Current State of the Telecom Industry
   - Applications on Today’s Telecom Networks
   - Carrier Categories
   - Types of Customer Networks

2. Circuit-Switched Networks and Digital Multiplexing Standards
   - Analog Voice Service
   - Digital Access Service: ISDN
   - Signaling System 7 (SS7) Capabilities and Features
   - Digital Trunking in the Transport Network: Preserves Voice Quality

3. Digitizing Voice
   - Frequency Ranges Related to Human Communication
   - Digitizing Voice Signals Using Codecs
   - Voice Compression
   - Narrowband and Wideband Codecs

4. Mediums and Modulation
   - Basic Telecommunications Systems
   - Transmission Mediums
   - Basic Modulation Techniques

5. Multiplexing
   - Fixed Medium Communication Multiplexing
   - Wireless Communication Multiplexing

6. Carrier Access Network Architectures
   - Access Network Technologies
   - Improving the Telco Infrastructure
   - Voice Services
   - Improving Cable Architecture for Broadband Services
   - Type of PON Architectures
   - Quad Play Networks

7. Local Area Networks
   - LAN Topologies
   - Devices that Comprise a LAN
   - Data Frames
   - Data Link Layer Addressing for LAN Interfaces
   - Ethernet LAN
   - Moving Data Between Network Devices on the LAN

8. Wireless LANs
   - The Wireless Link
   - Wireless LAN Organizations
   - The Basic Service Set (BCC)
   - The Extended Service Set (ESS)
   - Frequency Bands Used for Wireless LANs
   - Air Interfaces and Standards
   - Security

9. Packet-Switched Networks
   - Introduction to Packet Switching
   - The Layered Approach
   - TCP/IP Networks
   - Routing Packets between Networks
   - Adding Applications to the Protocol Stack
   - Transporting Packets over the Network
   - Internet Protocol: IPv4 Address Structure
   - The Need for Private Addressing
   - Network Address Translation
   - Internet Protocol: IPv6 Address Structure

10. Voice over IP and Unified Communications
    - Introduction to VoIP Networks
    - VoIP Protocols
    - Unified Communications
    - Quality of Service (QoS)
    - Security Protocols

11. Carrier Data Services
    - Enterprise Network Connections using Leased Lines
    - Shared Network Resources: Clouds
    - Why Carriers Prefer Switched Technologies over Routing Traffic
    - Frame Relay
    - Asynchronous Transfer Mode (ATM)
    - Multiprotocol Label Switching (MPLS)
    - Carrier Ethernet Services

12. Video Technology and Services
    - Video Attributes
    - Video Codecs
    - Broadcast Video Standards
    - Video Conferencing Solutions
    - Video Conferencing Web-Based Services
    - Internet Protocol Television

13. Cloud Computing
    - Introduction to Software as a Service (SaaS): A Cloud-Based Approach
    - Cloud-Based Applications and Services
    - Costing Models
    - Online vs. Offline Services
    - Cloud Computing Examples

14. Introduction to Mobile Cellular Networks
    - Cellular Networks
    - Global Frequency Spectrum Allocations for Mobile Wireless
    - The GSM Network Architecture
    - Adding Data Services to GSM Networks
    - The Evolution of Cellular Standards: First and Second Generation
    - CDMA Architecture (IS-95A/B)
    - Evolution of US Cellular Technology up to Third Generation
    - Top Four US Mobile Operators

15. 3G Networks: Enabling Mobile Broadband
    - The Mobile Internet Traffic Growth Predictions
    - The Impact of Smartphones
    - Application Stores
    - Global Standards Organizations for 3G Networks
    - 3G to 4G Mobile Standards Summary
    - Global Mobile Wireless Subscriber Market Share

16. Femtocell and Fixed Mobile Convergence (FMC)
    - Macrocells
    - Femtocells
    - LTE Femtocell Architecture
    - FMC
    - Unlicensed Mobile Access (UMA)/Generic Access Network (GAN)
    - Problems with Poor In-Building Coverage
    - Enterprise VoIP Network Using Wi-Fi
    - Seamless Roaming and Handover with FMC UMA/GAN Standard
    - Femtocell and FMC Market in the US

17. Introduction to 4G Networks: WiMAX
    - WiMAX Mobile vs. Fixed and Nomadic Service
    - Examples of Wireless Networks
    - 802.16 Broadband Wireless Access (BWA) Standards Development
    - WiMAX Forum
    - WiMAX User Equipment Examples
    - Access Service Network
    - Connectivity Service Network
    - End-to-End WiMAX Architecture
18. Introduction to 4G Networks: LTE

- Benefits and Drawbacks of the LTE Standard
- LTE Network Architecture
- IP Multimedia Subsystem (IMS)
- LTE User Equipment
- evolved NodeB (eNB)
- Mobility Management Entity (MME)
- Serving Gateway (S-GW)
- Packet Data Network Gateway (P-GW)
- Expected Data Rates for LTE
- Spectrum used for 4G Services in the US
- Fractional Frequency Reuse
- Voice

Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931
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