



Telecom Architectures and Information Technologies

Code: 3765

5 days

Course Overview

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.

Who Needs To Attend

- 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

Course Details

Topics Include

- 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

Course Outline

1. The Current State of the Telecom Industry

- Applications on Today's Telecom Networks
- Carrier Categories
- Types of Customer Networks
 - Retail Customers
 - Enterprise Customers
 - Who They Are
 - Enterprise Data Networks
 - Carrier-Based Connections for Enterprises
 - Carrier-Based Leased Line Connections for Enterprise Data
 - Carrier-Based Packet Network Connections for Enterprise Data
 - Circuit-Switched vs. Packet-Switched Networks
 - Routing Traffic over Packet-Switched Networks
 - Mapping a Phone Call over Circuit-Switched Networks

2. Circuit-Switched Networks and Digital Multiplexing Standards

- Analog Voice Service
 - In-Band Signaling
- Digital Access Service: ISDN
 - Common Channel Signaling
- Signaling System 7 (SS7) Capabilities and Features
 - Local (End-to-End) Call Connection between Central Offices
 - Call Routing over a Long-Distance Network using SS7
- Digital Trunking in the Transport Network: Preserves Voice Quality
 - T1 (DS1) Circuit Description and Frame Format (North American Standard)
 - T3 (DS-3) Circuits
 - SONET
 - How SONET Works
 - SONET and SDH Multiplexing Rates
 - Wavelength Division Multiplexing (WDM)

3. Digitizing Voice

- Frequency Ranges Related to Human Communication
 - Human Speech Explained
- Digitizing Voice Signals Using Codecs
 - Sample Rates for Digitizing Waveforms
 - Coding the Signal
 - Transmitting the Signal
 - Decoding the Signal
- Voice Compression
 - Synthesizing Speech
 - Silence Suppression
- Narrowband and Wideband Codecs

4. Mediums and Modulation

- Basic Telecommunications Systems
 - Transmitters
 - Receivers
 - Mediums
- Transmission Mediums
 - Copper Cable: Electrical Energy
 - Voice Grade Cabling
 - Data Category Cabling
 - Fiber Optic Cable: Optical Energy
 - Wireless: Radio Frequency Energy
- Basic Modulation Techniques
 - Amplitude
 - Frequency
 - Phase

5. Multiplexing

- Multiplexing: A More Efficient Way to Move Traffic over Networks
- Fixed Medium Communication Multiplexing
 - Frequency Division Multiplexing
 - Time Division Multiplexing
 - Wavelength Division Multiplexing
 - Coarse-Wave Division
 - Dense-Wave Division
 - Code Division Multiplexing
 - Orthogonal Frequency Division Multiplexing
- Wireless Communication Multiplexing
 - Frequency Division Multiplexing
 - Time Division Multiplexing
 - Code Division Multiplexing
 - Orthogonal Frequency Division Multiplexing

6. Carrier Access Network Architectures

- Access Network Technologies
 - Copper Local Loops

- ISDN: Digital-Access Service
- Cable TV Networks
- Improving the Telco Infrastructure
 - Digital Trunking over Copper
 - Digital Trunking over Fiber (Fiber in the Loop)
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