

Understanding
TeleCom Networks Today II
The World of Data



Course Description

Explore the world of data 2.5/3G, Optical, Frame Relay, ATM Networks, Wireless and more...

Networks are converging. No more discrete data and voice networks now its all going to be one. If you are a telecom professional, you need to "get" the data side of things. If you dont know data, you cant do convergence well. If you dont know data, you will be left behind as TeleCom Today continues to change with fast growing technologies.

TeleCom Networks Today II provides you with an in-depth understanding of the "World of Data," tied to how current advancements fit into todays networks to build the next generation of telecommunication services. This course has been recently updated, with over 90 NEW content to ensure that it reflects the very latest developments in the world of data.

Students Will Learn

- **Transmission and Multiplexing Over Analog and Digital Networks**
- **Why Frame Relay is Vitrally Important to Many Organizations Today**
- **The Basics of Audio, Graphics, Image, and Video Transmission**
- **What Broadband Networks Are, and the Role ATM Plays With Them**
- **The Different Services Offered Over Wireless Data Networks**
- **How Telecommunications and the Internet Have Changed the Way Organizations Function**
- **The Evolving Role of Residential Broadband Networks (RBB) and How It Will Change the Way We Live and Work**
- **How Satellites Are Being Used to Rapidly Transmit Video and Data**

Target Audience

This course is for individuals who need to go beyond the basics of voice networks - voice professionals needing data training, consultants, executives, IT managers, marketing/sales, and network analysts, designers, engineers, and technicians.

Course Outline

1. The Need to Communicate

Entities that utilize communications services

Government

Commercial

Residential

Education

Healthcare

Applications used in data communications networks

Standard applications

Services

Differentiating carriers from other service providers

Local access carriers

Transport (backbone) carriers

Application service providers

Internet service providers

Key ingredients of public carriers

Rights-of-way

Infrastructure

Know how ?

Customer premises equipment and connectivity

Types of customer equipment

Voice and data networks

Connecting to carrier/service provider networks

Comparing leased lines, circuit switching, and packet switching

Leased (private) lines

Circuit switched

Packet switched

2. Data Communications in a Telecom World

Protocol defined

Network communications

Internetwork communications

Connection-oriented vs. connectionless services

Example of connection-oriented service

Example of connectionless service

OSI (Open Systems Interconnect) Model

Modular design approach

Description of OSI layer functions

Packaging and transmitting messages

TCP/IP protocol suite

OSI layer functions compared

TCP/IP protocol suite

Data link and network layer address functions

Network layer

Data link layer

Comparing routing and switching functions

Routing IP packets

Frame switching

Label switching

3. Technology Fundamentals II

Data terminal and communications equipment

DTE

DCE

- Interfaces between PCs and modems
- Dial-up data connections
- Example of single user Internet access
- Data transport over analog circuits
- Analog signals
- Modulation techniques
- Modem standards
- Signal conversions between analog and digital systems
- Functions of a Codec
- Converting analog signals to digital signals
- Interfaces for multi-user access networks
- Customer equipment interfaces
- LAN protocols
- Leased (private) line connections
- Data transport over digital circuits
- DCE (Data Communications Equipment) - digital
- Corporate connections
- Comparing different multiplexing methods
- FDM (Frequency Division Multiplexing)
- TDM (Time Division Multiplexing)
- STDM (Statistical Time Division Multiplexing)

4. Optical Networking

- Optical transmission components
- Light sources
- Photodetectors
- Characteristics relating to fiber optic transmission
- Scattering
- Absorption
- Dispersion
- Types of single mode fiber cables
- Standard SMF (Single Mode Fiber) characteristics
- DSF (Dispersion-Shifted Fiber)
- NZ-DSF (NonZero-Dispersion-Shifted Fiber)
- Comparison of 1st and 2nd generation optical networks
- First generation
- Second generation
- DWDM (Dense Wave Division Multiplexing)
- WDM defined
- DWDM defined
- ITU-T channel spacing for DWDM
- Building blocks for optical networks
- Optical amplifiers
- OXC (Optical Cross-Connect)
- OADM (Optical Add/Drop Multiplexer)
- MEMS (MicroElectroMechanical Systems)
- Deploying fiber optic cable systems
- Intercontinental fiber optic cable systems
- Short-haul undersea cable systems

5. Frame Relay

- Frame relay defined
- Packet-switching technology
- Statistical multiplexing
- Variable bit-rate traffic

Variable-length frames for efficient transport of data
Important terms for frame relay service
Access methods
Virtual circuits
DLCI (Data Link Connection Identifier)
Traffic management
Congestion indicators
Frame relay network illustration
Comparing the cost of frame relay service to dedicated leased lines

6. Introduction to ATM

Evolution of networking
Circuit-switched world
Packet-switched world
Convergence with ATM
ATM defined
Broadband ISDN
Concepts of ATM
Transporting different traffic types
Transfer mode
Packet switching comparison
Packet-switching with X.25
Frame switching with Frame Relay
Cell switching with ATM
Comparing cells, frames, and packets
Cells defined
Migration from packet switching to frame switching
Migration from frame switching to cell switching
ATM networks and interfaces
Networks
Interfaces
Virtual connections
Identifiers
Connections
ATM traffic management
Quality of service parameters
Traffic policing
ATM traffic descriptors
ATM service categories
CBR (Constant Bit Rate)
VBR-RT/NRT (Variable Bit Rate Real-Time/Non-Real-Time)
ABR (Available Bit Rate)
UBR (Unspecified Bit Rate)
ATM adaptation layers and attributes
AAL-1
AAL-2
AAL-3/4
AAL-5

7. Broadband Services and Technology

Categories of broadband services
Residential broadband
Commercial broadband
Broadband transport networks
Broadband access technologies

Digital subscriber line service
High-speed cable modem service over HFC networks
Fixed wireless services

8. The New World of Wireless

Cellular concept of frequency reuse
Frequency reuse
Cellular and PCS (Personal Communications Service)/PCN (Personal Communications Network) frequency spectrum
Evolution from 1st to 2nd generation wireless
Multiple 2nd generation standards
2.5G wireless communications
Enhanced 2nd generation (2.5G) digital cellular and PCS/PCN services
Mobile standards supporting high-speed data
Third generation (3G) wireless attributes and technologies
3rd generation wireless defined
International Mobile Telecommunications 2000 CDMA-based wireless standards
3G global harmonization
Harmonizing multiple CDMA and TDMA standards
Allowing 2G networks to evolve independently
Specifying a network-to-network protocol for intercommunication between family member networks
Evolving to a new IMT-2000 network standard
Understanding 802.x

Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

2 Days