

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