

Course Description

The next generation of telecommunications networks will deliver broadband data and multimedia services to users. Integration of Internet Access with TV, music and radio distribution will become a reality provided mechanisms to provide multicast delivery are implemented. IP Television will provide an alternative mechanism for delivering services.

DOCSIS (Data Over Cable Service Interface Specifications) is a set of standards produced by the Cable Television industry for delivering Internet access and other data services over traditional cable television Networks. It has evolved from version 1 through version 2 into version 3 which is able to produce bonded services to customers at speeds in excess of 100 Mbit/s. Versions exist for North American and European markets separately.

This course provides an understanding of how modern installed Cable systems work today, how they have evolved from analogue into digital services using DOCSIS and Euro-DOCSIS 1.0/2.0 , then discuss how they will continue to evolve into DOCSIS 3.0 services. It will further identify the motivations and mechanisms that will be used to allow new cable systems to support voice, IPTV, Video on demand and provide IMS services for convergence with new 3G mobile networks.

Students Will Learn

- **Describe The Basic Structure Of DOCSIS And Euro-DOCSIS Standards**
- **Select The Appropriate Parts Of The DOCSIS Specifications**
- **Implement The Required Services At The Customer And Network Sides**
- **Provide Baseline Privacy Plus Service**
- **Select Appropriate IP Service Mechanisms For Address Allocation**
- **Carry Internet Services Over Cable Network Infrastructures**

Prerequisites

Students should have a solid understanding of IP.

Course Outline

Module I: Evolution of Digital Cable Systems

CATV evolution

Analogue cable services

Motivation for Digital Cable

Anatomy of a modern cable TV service

Data over cable

Cable Modems

Structure of Standardization

DOCSIS and Euro-DOCSIS Standardization

- DOCSIS 1.1 and 2.0

- Objectives of DOCSIS 3.0

- Relationship with ETSI DVB and ITU

Module II: Radio Frequency Specifications

Upstream and downstream channel characteristics

Radio Frequency Interface Specification

Functional Assumptions

Protocol Stack on the RF interface

Data forwarding through the interface

MAC requirements and operation

Module III: Physical Medium Dependent Sublayer Specification

Signal Processing Requirements

Modulation Formats

R-S Frame Structure

S-CDMA Framing Considerations
Downstream Transmission Convergence Sublayer
MPEG Payload for DOCSIS
MAC Control Specification
Quality of Service and fragmentation
Cable Modem CMTS Interaction
Downloading Cable Modem Software

Module IV: Cable Modem to Customer Premise Equipment Interface

Customer Side
Functional Reference Model
Internal and External modem considerations
Standalone Modems
Interfaces; Ethernet and USB
CPE Controlled Cable Modems
CCCM Protocol Requirements
Internal PCI Interfaces
PHY
Diagnostics
Security Considerations

Module V: Cable Modem Termination System Network Side Interface Specification

IP over ATM
IP over DS3
IP over FDDI
IP over IEEE 802

IP over Ethernet

Module VI: Operations Support System Interface Specification

Operational Management with SNMP

Operational and Network Side

Functional Reference

Transmission over ATM

Transmission over FDDI

Transmission over IEEE 802

Transmission over Ethernet

SNMP Management

Management Information Bases

SNMPv1, SNMPv2c and SNMPv3

OSSI RF Interface

Module VII: Baseline Privacy Plus Interface Specification

DOCSIS MAC Frame Formats

Baseline Privacy Key Management (BPKM) Protocol

Dynamic SA Mapping

Key Usage

Cryptographic Methods

Physical Protection of Keys

BPI+ X.509 Certificate profile and management

Module VIII: DOCSIS 3.0 MAC and Upper Layer Protocols Interface Specification

DOCSIS 3.0 MULPI Key Features

- MAC Operation
- Multicast Operation
- Network and Higher Layer Protocols
- CM and CMP Provisioning and Management
- Relationship to Physical HCF Plant and topology
- Cable Modem Service Group (CM-SG)
- CMTS Downstream Service Model
- MAC Specifications
- MAC Formats
- Time Sync
- Upstream features
- Dynamic Service Features
- Dynamic Bonding
- MAC Protocol Operation
- Quality of Service
- Channel Bonding
- Data Forwarding
- Dynamic Bonding and Load Balancing

Module IX: DOCSIS 3.0 Physical Layer Specification

- Frequency Plan
- Compatibility with other services
- Fault isolation
- Cable system terminal devices
- RF Channels
- Physical Medium Dependent Sublayer

Module X: Digital Certificate Validation and Reissue

Operational Status Visualisation

Data over Cable Reference Architecture

Radio Frequency Specifications

Cable Modem to Customer Premise Equipment Interface

Network Side Interface Specification

Operations Support System Interface Specification

Baseline Privacy Plus Interface Specification

Acceptance Testing

Revue and Evaluation

Delivery Method

Instructor led with numerous Hands-On labs and exercises.

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