Broadband Cable Service Deployment at WorldCall Telecom - Pakistan

Hassan Zaheer | Manager Operations | Broadband Division

Broadband Cable

- Cable services provides
  - Intelligent network
  - Mix of IP and MPEG
  - Multiple businesses & services, one network
  - Security, provisioning, management
  - Voice, data, video convergence
- For the service provider, a converged network means
  - Common provisioning/management/security
- For the consumer, a converged application means
  - Device-independence
  - Same "look and feel"
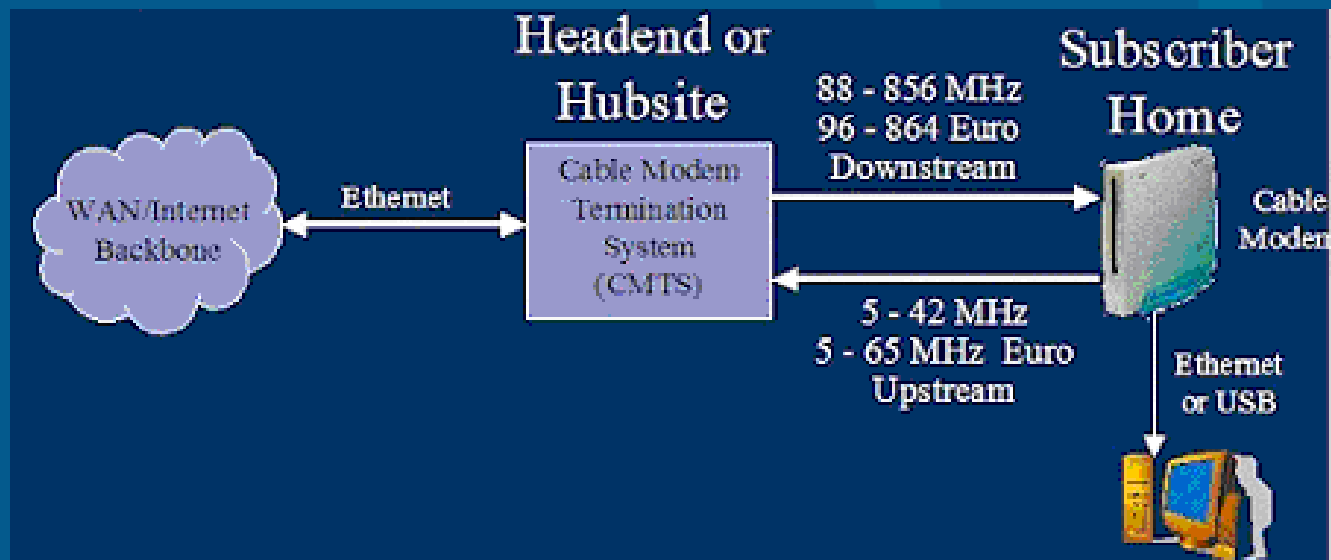 - Ease of use, plug and play

DOCSIS® — Project Primer

- **The Cable Modem & The CMTS**
  - Cable modems are devices at the subscriber premises that convert digital information into a modulated radio frequency (RF) signal in the upstream direction, and convert the RF signals to digital information in the downstream direction.
  - Another piece of equipment, called a cable modem termination system (CMTS), performs the converse operation for multiple subscribers at the cable operator's headend. .

- **DOCSIS (**Data Over Cable Service Interface Specifications)
  - Published in 1997
  - Defines interface specifications for CMs and CMTS headend equipment
  - Provides basis for open non-proprietary, multi-vendor cable systems
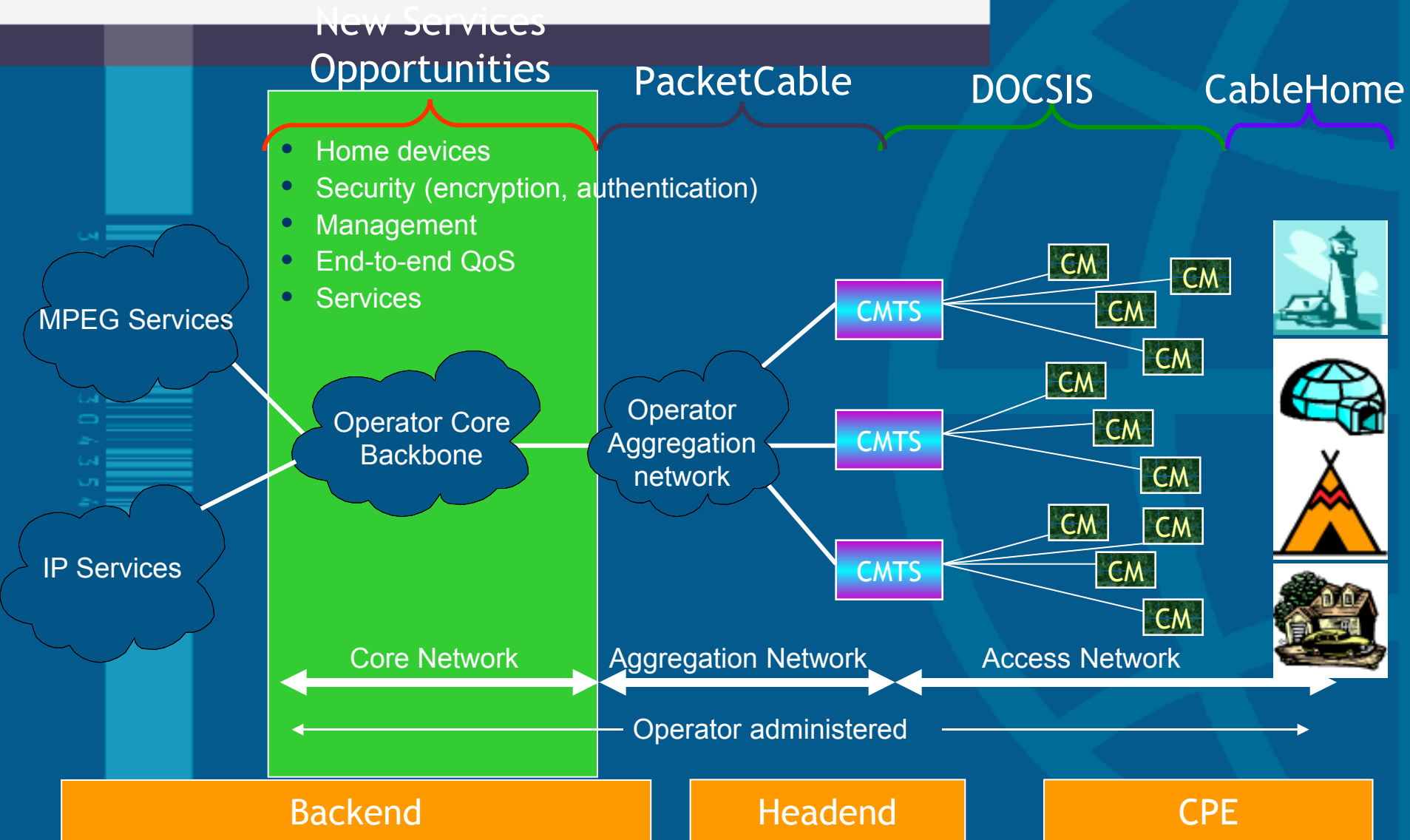
Basic Cable Data Network

- **Principal Function of the DOCSIS Cable Modem System Is to Transmit Internet Protocol (IP) Packets Transparently Between the Head end and the Subscriber Location.**
- Data and video channels use different frequencies
- Up & down data channels use separate frequencies
- CMTS controls both Data channels
  - Only transmission in downstream
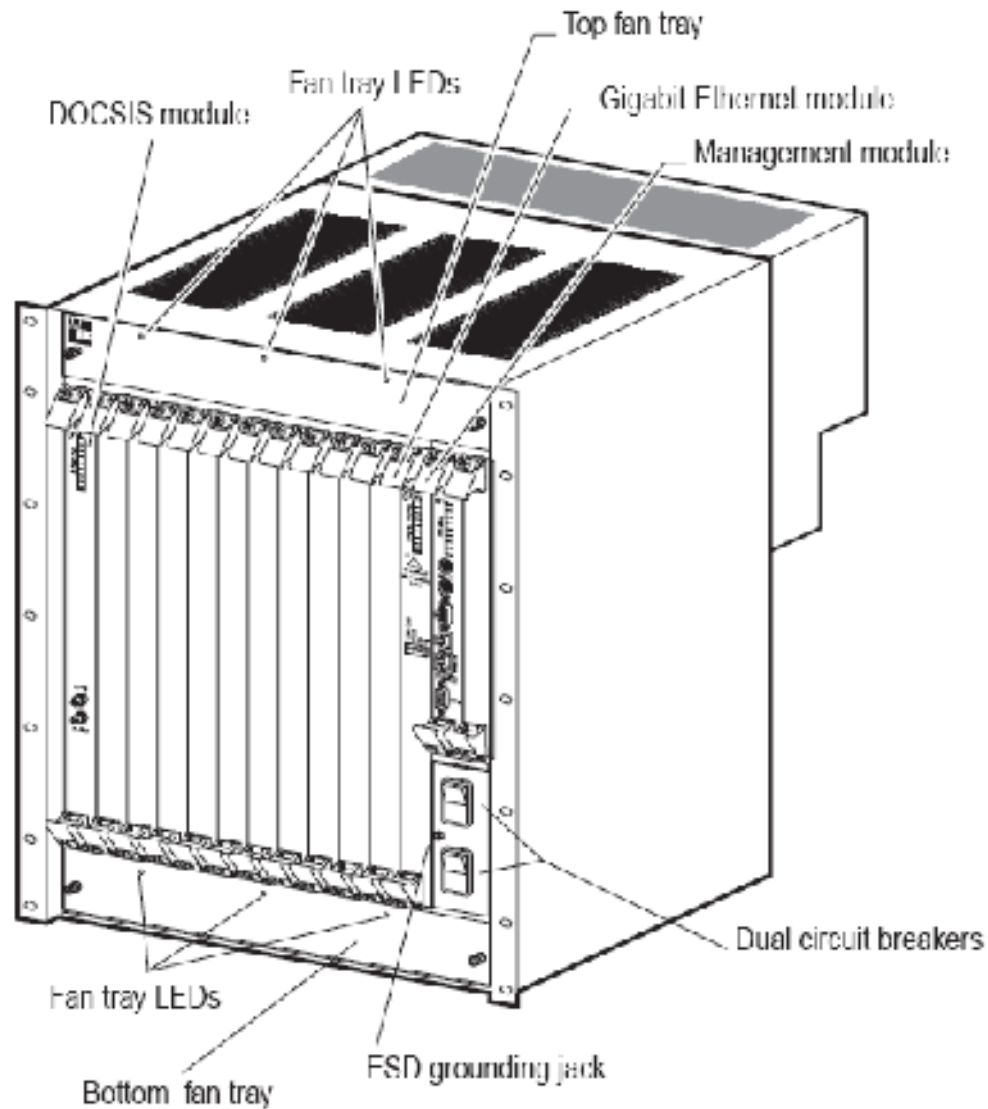 - Assigns Tx opportunities to transmit in the upstream

Headend or Hubsite — Subscriber Home

WAN/Internet Backbone — Ethernet — Cable Modem Termination System (CMTS)

88 - 856 MHz
96 - 864 Euro Downstream

5 - 42 MHz
5 - 65 MHz Euro Upstream

Cable Modem

Ethernet or USB

DOCSIS Roadmap

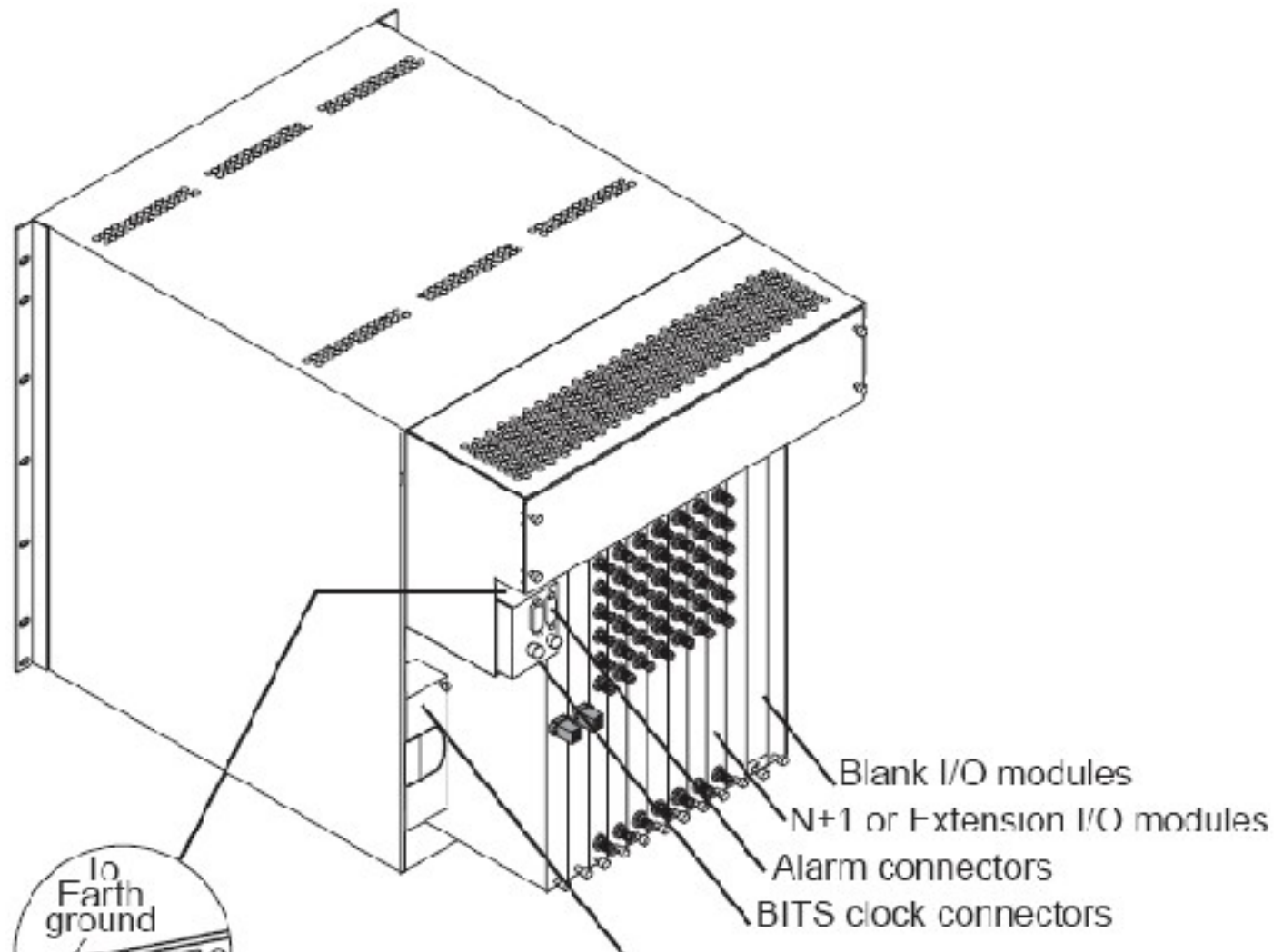| DOCSIS	Key Features	Benefits/Services
DOCSIS 3.0 (120 Mbps u/s)	• Channel Bonding • IPv6 Support • IPTV Support • Best of DOCSIS	• 160 Mbps Downstream • Competition with FTTx • IPTV offering
DOCSIS 2.0 (30 Mbps u/s)	• Mandatory S-CDMA/ TDMA	• Symmetric services • Peer-to-peer • Business-to-business (20 T1 capacity)
DOCSIS 1.1 (10 Mbps u/s)	• QoS • Pre-EQ • Operations • Security	• Tiered service • Double u/s capacity • Lower op's costs • Better than competitor
DOCSIS 1.0 (5 Mbps u/s)	• Spec'd for retail • Standard spec	• High speed data • Internet access

Cable Architecture

Cable Modem Termination System (CMTS)

Cable Modem Termination System (CMTS)

Blank I/O modules
N+1 or Extension I/O modules
Alarm connectors
BITS clock connectors

To Earth ground

Cable Modems

Connect to *either*
Ethernet or USB

Computer

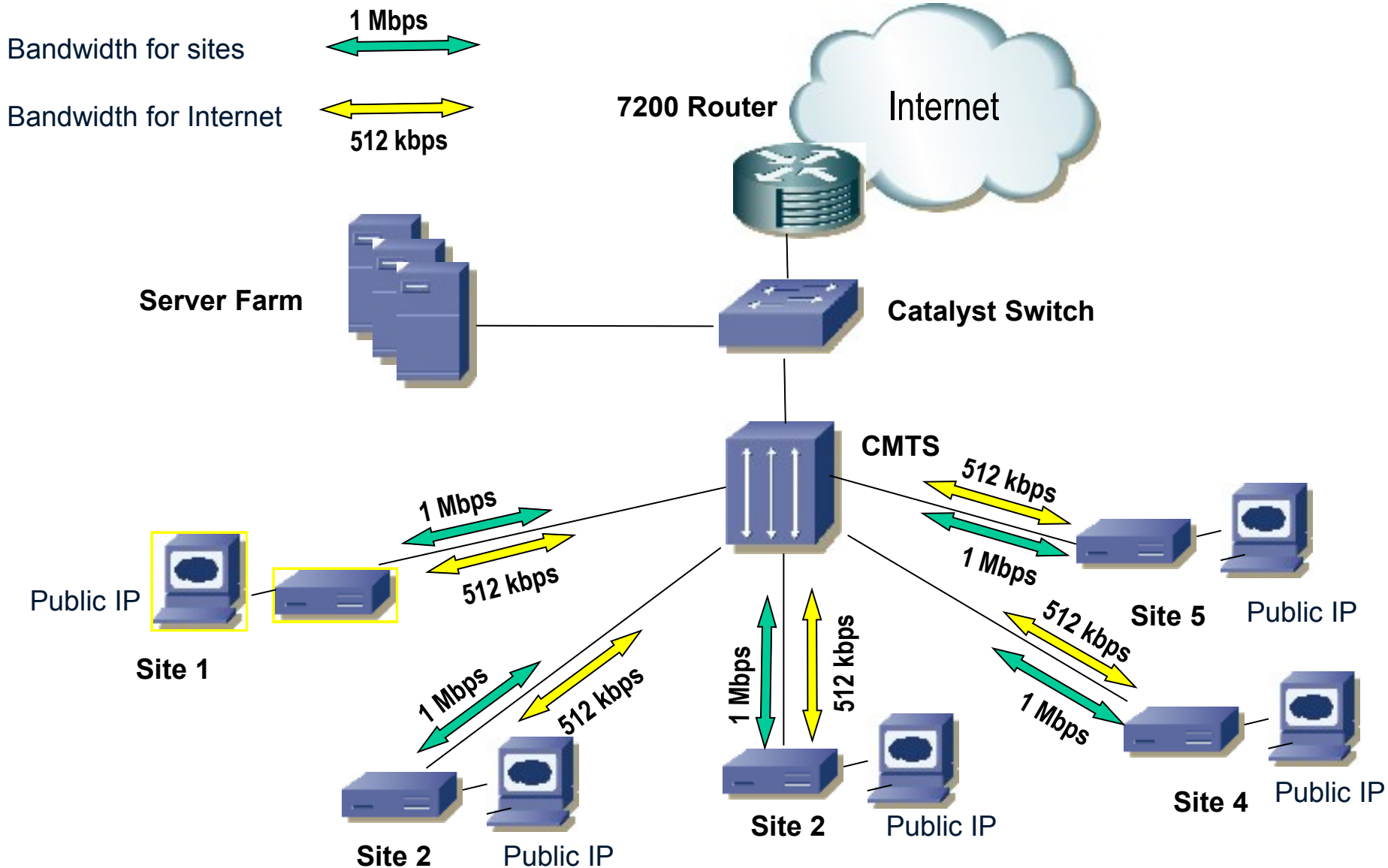SURFboard cable modem

SBG900
Wireless Data Modem
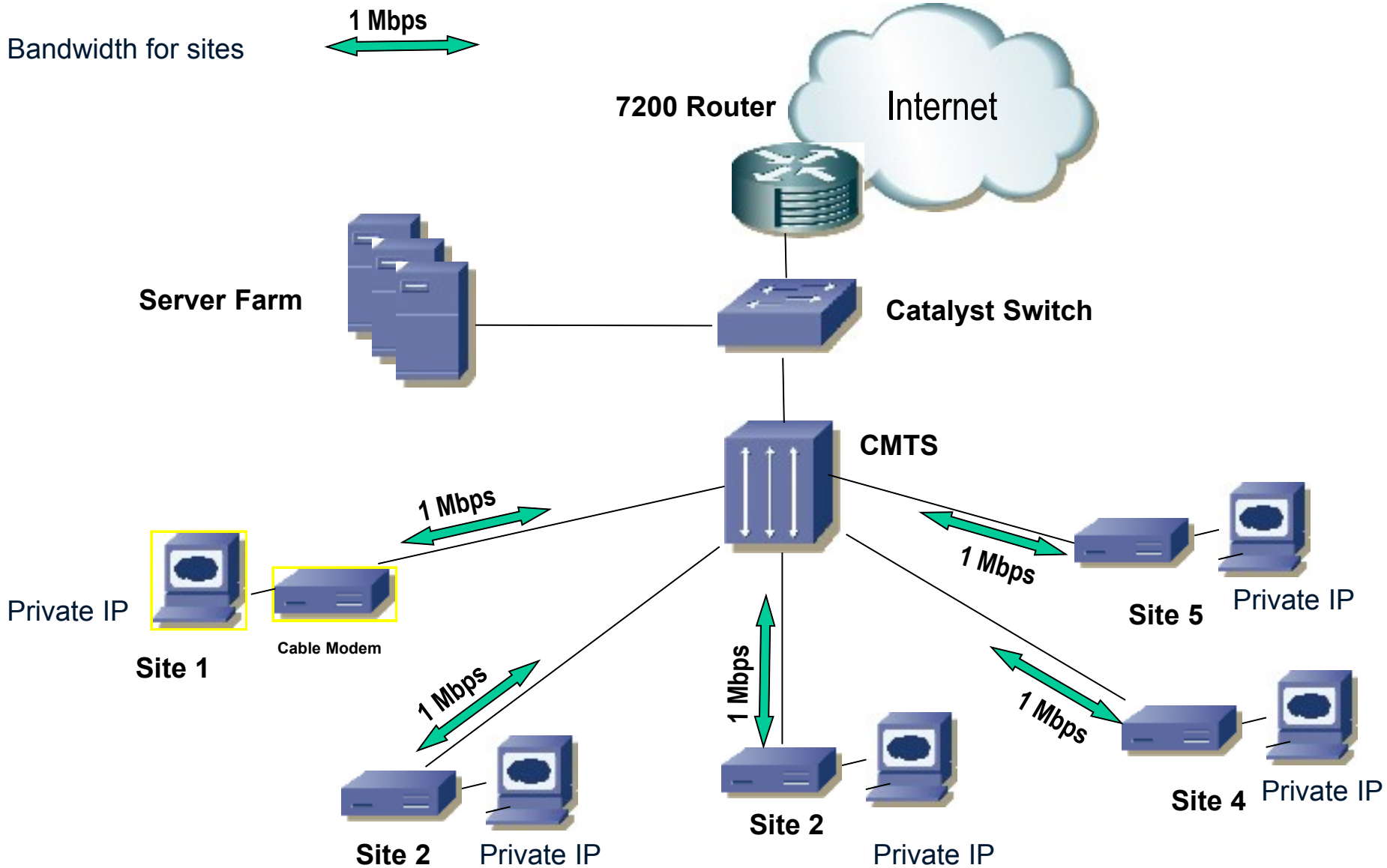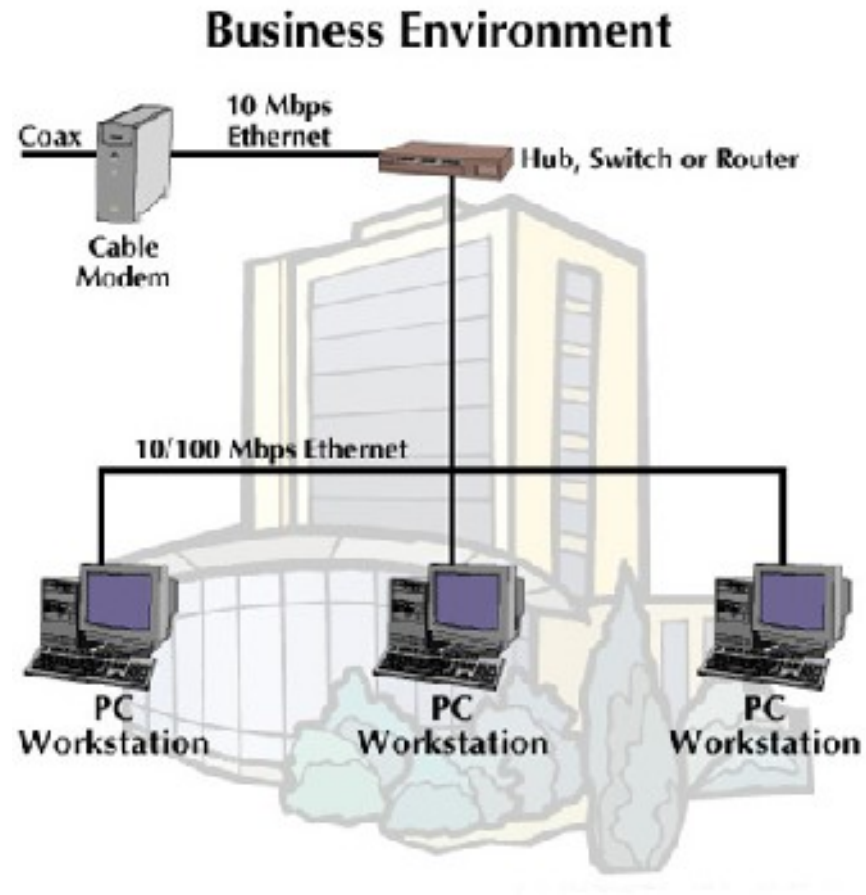
SB5101
Data Modem

SBV5120
Voice & Data Modem

PCBA Cable Internet Architecture over DOCSIS 1.1 Service Classification

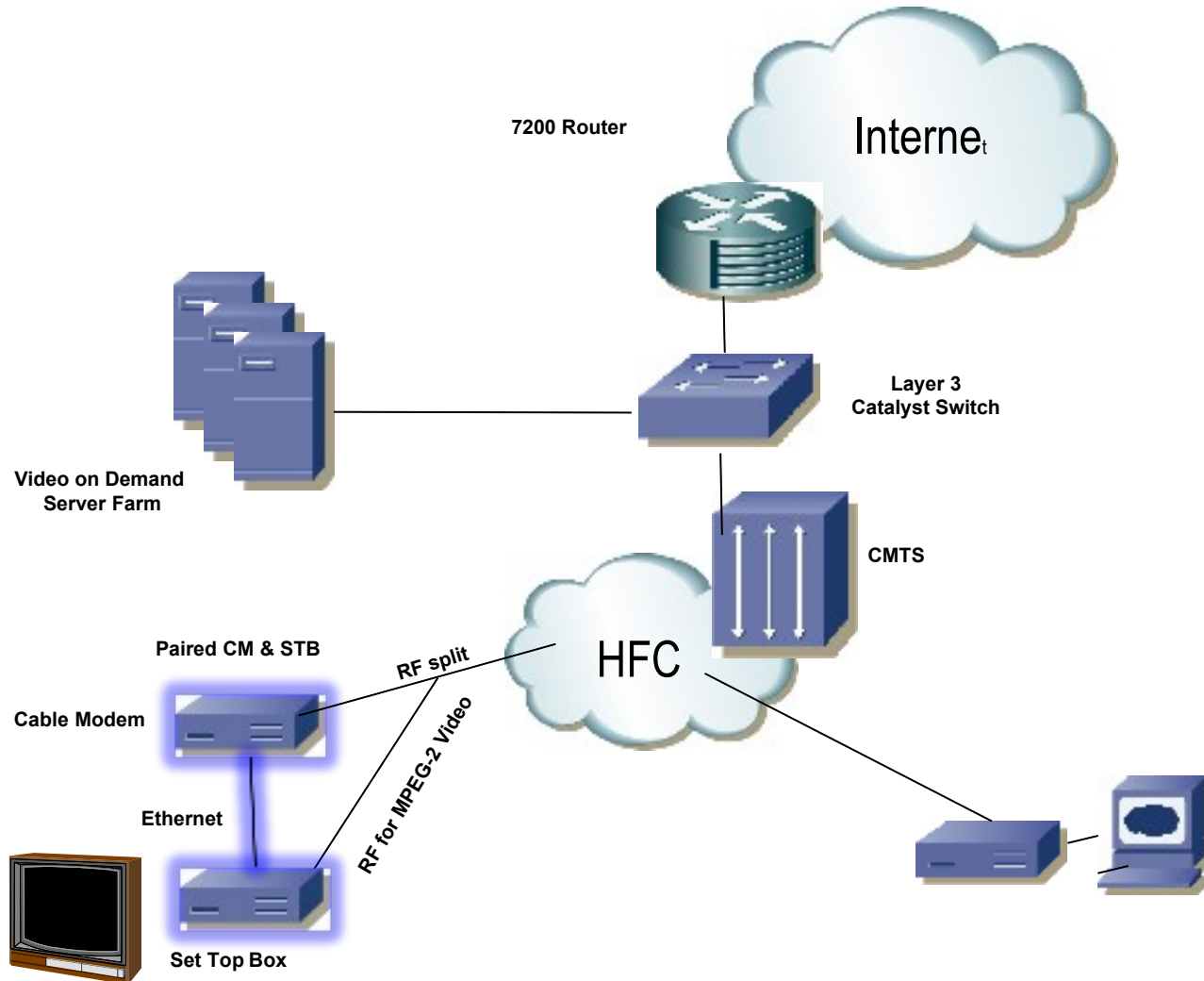# Metro Connectivity for Customer Sites

Bandwidth for sites — **1 Mbps**

7200 Router

Internet

Server Farm

Catalyst Switch

CMTS

1 Mbps

Private IP

Site 1

Cable Modem

1 Mbps

Site 2

Private IP

1 Mbps

Site 2

Private IP

1 Mbps

Site 5

Private IP

1 Mbps

Site 4

Private IP

Broadband Connectivity for Buildings

Business Environment

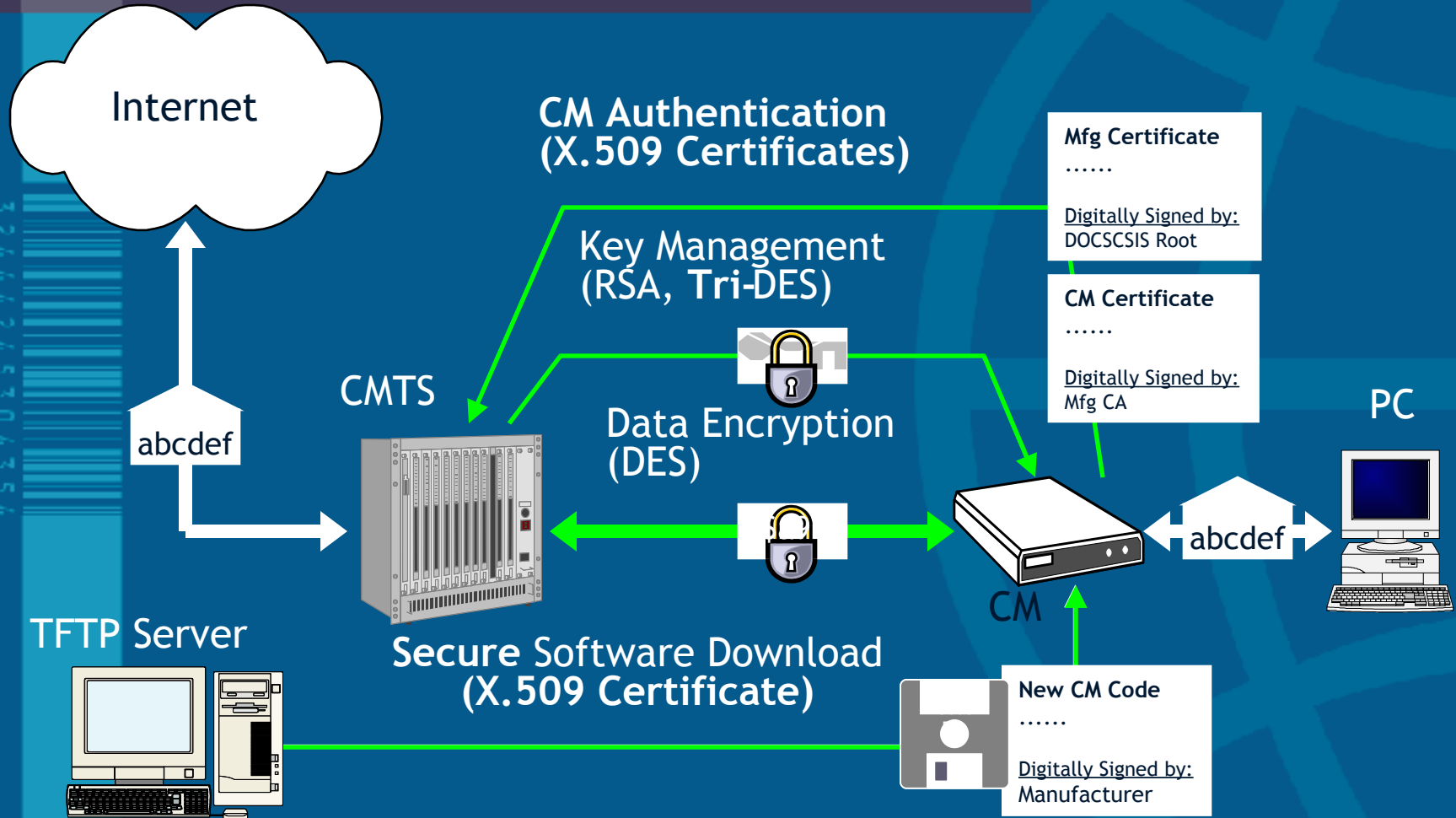# Video On Demand over Broadband Cable

Video On Demand Service Provisioning and Control

- Restriction of Video On Demand Service was the management first priority.

- Service control mechanism
  - Set top boxes were paired with cable modems so STB will work only with specific cable modem
  - Cable modems will not allow any other CPE to get connected

DOCSIS Security Overview
-- BPI+ --

Internet

CM Authentication (X.509 Certificates)

Mfg Certificate
......

Digitally Signed by:
DOCSCSIS Root

Key Management (RSA, Tri-DES)

CM Certificate
......

Digitally Signed by:
Mfg CA

CMTS

PC

Data Encryption (DES)

abcdef

abcdef

CM

Secure Software Download (X.509 Certificate)

TFTP Server

New CM Code
......

Digitally Signed by:
Manufacturer

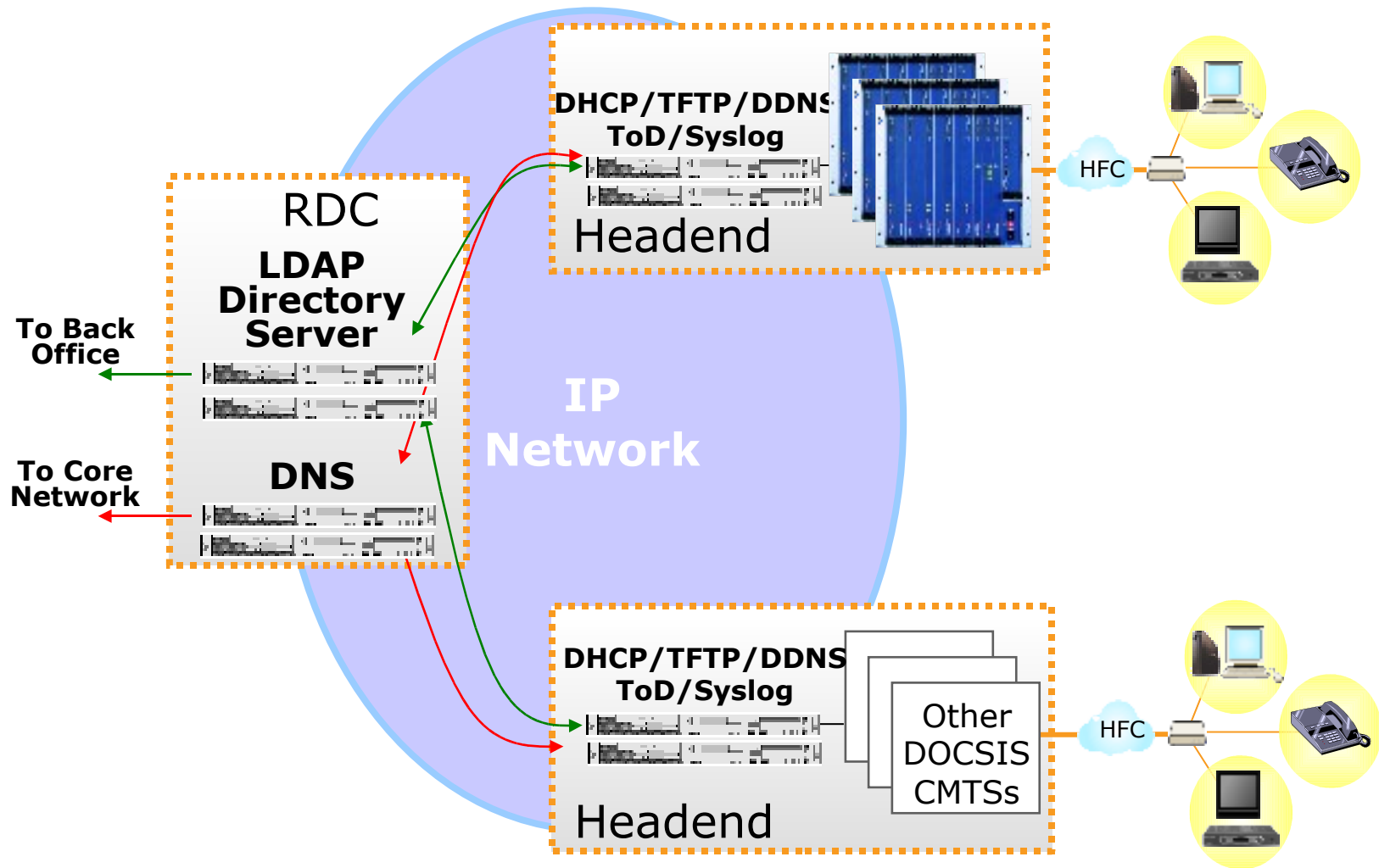# Broadband Cable Service Provisioning

Broadband Service Provisioning Requirements

- Dynamic generation of CM configuration files

- Open interfaces for easy integration with mediation and billing servers

  - LDAP, SNMP, XML/SOAP

Broadband Provisioning Server Placement in the Network

Broadband Service Provisioning Challenges

- Bulk provisioning of Customer Cable modems
- Simplified Interface for Customer Services personnel
- Customer Data extraction and analysis
- Integration with Billing application

- Solutions
  - Used LDAP interface
  - Developed Web based interface as per requirement for provisioning, viewing and data extraction
  - Synchronized Billing using LDAP transactions

Questions

Thank you