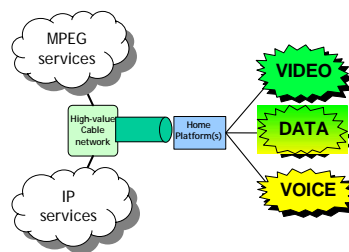


# DOCSIS® Overview

Cable Television Laboratories, Inc.  
September 2003

## Cable Industry Broadband Advantages

- Capacity
  - Multiple Gigabits
- Interactivity
  - MPEG/IP (video, data, voice)
- Security
  - It's a service, not just technology
- Management
  - Providing end-to-end services



## Home Is Where The Net Is

- Cable is **THE BROADBAND** of choice
  - Intelligent network
  - Mix of IP and MPEG
  - Multiple businesses & services, one network
  - Best in Class
    - 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

## Global Broadband Subscribers\*

(provided by McKinsey Quarterly)

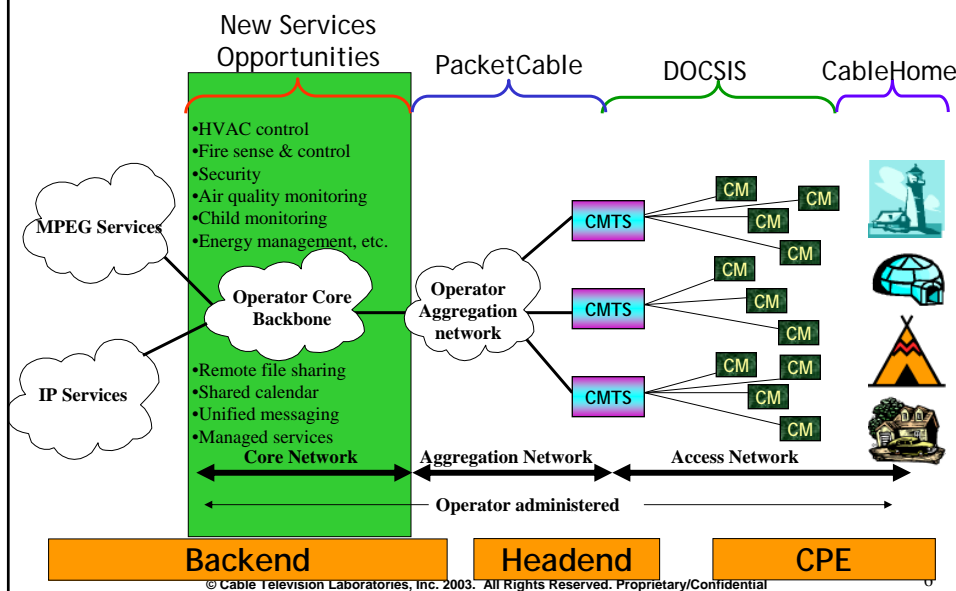


United States	15,100,000
South Korea	8,810,000
Japan	4,580,000
Canada	3,000,000
Germany	2,230,000
China	1,050,000
France	767,000
Netherlands	722,000
United Kingdom	619,000
Spain	570,000
Sweden	560,000
Belgium	539,000
Italy	409,000
Brazil	340,000
Switzerland	238,000
Australia	206,000

# Broadband Market View

- By the end of 2007, Yankee Group projects 86.5 million PC households and 42 million homes will have Broadband Internet Access
- YE'02 13 Million CM's deployed in N.A.
- CM Cost Decline (from US\$300 → US\$50)
- Emergence of Home Networking
  - Two will develop; 1) One PC-based for data; 2) the other media-centric and focused on the TV set-top box
  - Total revenue from structured wiring sales is projected to grow to more than \$2 billion by 2004<sup>1</sup>
- VoIP Economics
  - the highest ARPU product with a 60% incremental margin. NPV turns positive within two years and exceeds the NPV per customer of every other product in years five through eight, with the exception of basic<sup>2</sup>

# Cable Architecture



# DOCSIS Solid Gold

CableLabs®

- DOCSIS
  - Open standards process in the ITU and SCTE
  - Based on member requirements
  - Managed by operators for global use
  - Multi-supplier support and cost advantages
    - 500+ vendors have signed the DOCSIS NDA
    - 70+ vendors have received certification or qualification
  - Low cost, consumer-oriented brand
- DOCSIS is fundamental technology
  - PacketCable
  - CableHome
  - Scalable, Manageable, Interoperable
  - Catalyst for development of new cable services



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# DOCSIS Evolution & Road Map

CableLabs®

## DOCSIS 1.0 (High Speed Internet Access)

- 23 million products shipped worldwide as of YE2002
- Modem price has declined from \$300 in 1998 to <\$50 in 2003
- Over 400 CM Certified, 29 CMTS Qualified

## DOCSIS 1.1 (Voice, Gaming, Streaming)

- Interoperable and backwards-compatible with DOCSIS 1.0
- "Quality of Service" and dynamic services, a MUST for PacketCable™
- Service Security: CM authentication and secure software download
- Operations tools for managing bandwidth service tiers
- In the field NOW - 64 CM Certified, 22 CMTS Qualified

## DOCSIS 2.0 (Capacity for Symmetric Services)

- Interoperable and backwards compatible with DOCSIS 1.x
- More upstream capacity than DOCSIS 1.0 (x6) & DOCSIS 1.1 (x3)
- Improved robustness against interference (A-TDMA and S-CDMA)
- Available NOW - 29 CM Certified, 1 CMTS Qualified

## eDOCSIS™

- DOCSIS in MTA, RG, etc.
- DOCSIS IP connectivity for new service categories

## High Density CMTSes

- More CMs per port, high scalability - DOCSIS 2.0 adds even more capacity
- Heart of Cable TV Headends of the future

## OCAP Hardware Platform

- Two-way POD
- DSG



DOCSIS is a global standard deployed on all continents

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## DOCSIS 1.1 Overview

CableLabs®

- **Interoperable** with DOCSIS 1.0, plus more...
  - Access to bandwidth at high data rates or lower latency adds more value
- **Enhanced "Quality of Service" (QoS)**
  - Guarantees and/or limits for data rates
  - Guarantees for latency
- **Improved security** - designed to reduce possibility of "theft of service, provide secure software downloading."
- **Interoperability** - DOCSIS 1.0 and DOCSIS 1.1 cable modems and CMTSs on the same plant. Better operation and OSS features
- **Transmit Equalization** - more robust transmission

Increased Revenue Opportunities for Operators

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## DOCSIS 2.0 Overview

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(100% backward compatible with DOCSIS 1.0/1.1)

- Symmetrical services are enabled by DOCSIS 2.0
  - 1.5x greater efficiency
    - operates at 64 QAM
  - 2x wider channels
    - new 6.4 MHz wide channel
- DOCSIS 2.0 widens the pipe for IP traffic, allowing cable providers to create more and better services for voice, video, and data
- It does this by using enhanced modulation and improved error correction
- Superior ingress and impulse noise performance

Up to 3x better upstream performance than DOCSIS 1.1  
Up to 6x better upstream performance than DOCSIS 1.0

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## Moving DOCSIS Forward



- 1.1 in the field now
  - Multiple operators moving aggressively
  - Voice over IP trials underway by 3Q02
- Field trials underway for 2.0
  - Multiple operators evaluating
  - Product certified and ready for deployment
- High Density CMTSes
  - More CMs per port, more revenue
  - DOCSIS 2.0 adds even more capacity
  - Highly competitive marketplace
- eDOCSIS
  - DOCSIS in STB, MTA, etc.
  - DOCSIS integration into a myriad of applications

## DOCSIS™ Road Map

DOCSIS	Key Features	Benefits/ Services
<b>DOCSIS 2.0</b> (30 Mbps u/s)	<ul style="list-style-type: none"> <li>• Mandatory S-CDMA/ TDMA</li> <li>• Best of DOCSIS</li> </ul>	<ul style="list-style-type: none"> <li>• Symmetric services</li> <li>• Peer-to-peer</li> <li>• Business-to-business (20 T1 capacity)</li> </ul>
<b>DOCSIS 1.1</b> (10 Mbps u/s)	<ul style="list-style-type: none"> <li>• QoS</li> <li>• Pre-EQ</li> <li>• Operations</li> <li>• Security</li> </ul>	<ul style="list-style-type: none"> <li>• Tiered service</li> <li>• Double u/s capacity</li> <li>• Lower op's costs</li> <li>• Better than competitor</li> </ul>
<b>DOCSIS 1.0</b> (5 Mbps u/s)	<ul style="list-style-type: none"> <li>• Spec'd for retail</li> <li>• Standard spec</li> </ul>	<ul style="list-style-type: none"> <li>• High speed data</li> <li>• Internet access</li> </ul>

# DOCSIS Summary

	Spec	Interop	Certification
DOCSIS 1.0	1997	1998	1999
DOCSIS 1.1	1999	Q3, 2000	Q3, 2001
CCCM	2000	Q2, 2001	Q3, 2002
DOCSIS 2.0	Q4, 2001	Q2, 2002	Q4, 2002
eDOCSIS	Q2, 2003	Q2, 2003	Q2, 2003

# Broadband 1.0 (Data, Voice, Video)



## For Operators

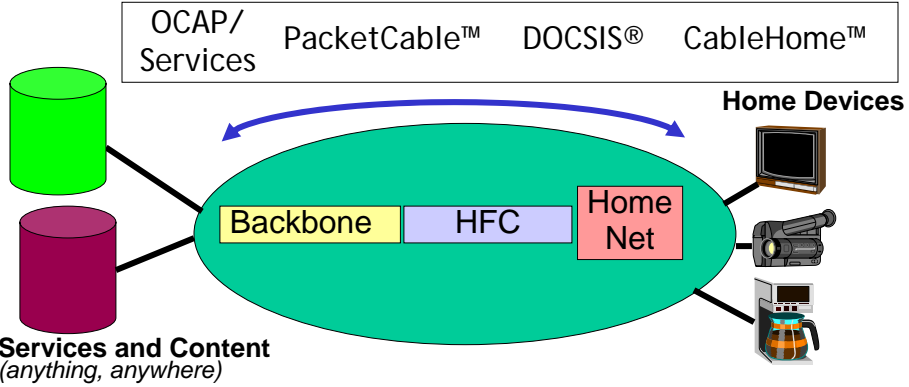
- No forklift upgrades
- MPEG/IP operations
- Tier 1 Relationships
- Competitive
- Low CapEx & OpEx
- Open Standards
- Multiple suppliers

## For Consumer

- “Gotta Have” toys
- Interactive
- On-demand
- Personalized
- Huge capacity
- High definition
- Innovation

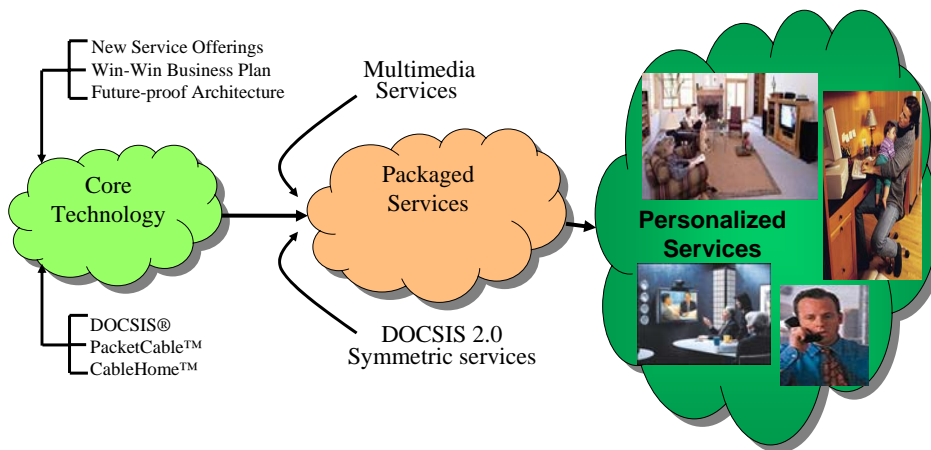
Cable has bandwidth & interactivity resources that have not been exploited

# Broadband Platform



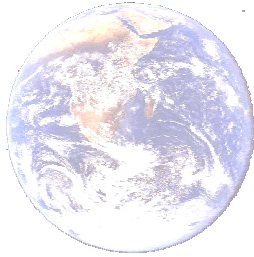
- Home devices
- Security (encryption, authentication)
- Management
- End-to-end QoS
- Services

# Broadband Roadmap





## Broadband Global Achievement



DOCSIS has become the fundamental platform to enable integrated end-to-end managed IP and digital services for global customers

15 million DOCSIS CMs have been shipped as of 2001

***“BROADBAND HAS ARRIVED”***

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