SCTE Conference on Broadband Learning & Development

Cable’s Triple Play: VoIP is Here!

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Technical Leader
Broadband Competitive Landscape

- **Cable (HFC, DOCSIS)**
  - Triple play bundling
- **Telco/PTTs (DSL)**
  - HSD
  - FTTx
- **Satellite**
  - Entertainment, HSD
- **Vonage VoIP**
- **AT&T VoIP**
- **Skype VoIP**
- **Wireless (Wi-Fi)**
  - Tiered & per-sub services
- **Utilities (FTTH, BPL)**
  - Bandwidth + triple-play

High-speed
Personalized
Dynamic
Triple-Play
Services
A Changing Cable Industry Model

Changing Models

Old Model
- Regulated
- Analog networks
- Proprietary systems
- Single service
- Headend to subscriber
- Residential only

New Model
- Competition
- Digital networks
- Standards based
- Multi-services
- End-to-end network
- Commercial + resident

Blurring Services

Service Convergence
- Video
- Data
- Voice

Device Convergence
- TV
- PC
- Phone

New Requirements

Migration Challenges
- Build triple-play network
- Lower CAPEX/OPEX
- Personalize services
- Enable end-to-end QoS
- Subscriber perceptions

Key Drivers
- Subscriber retention
- Revenue growth
- Subscriber growth
- Market expansion
- Lower CAPEX
Cable’s Triple Play

**Video:**
- Analog video
- Digital video

**Data:**
- Proprietary cable modems
- DOCSIS® cable modems

**Voice:**
- Circuit-switched
- VoIP

**VoIP:** Voice Over Internet Protocol
Cable: An Industry In Transition

Competitive Context
- Past: Competition from DBS, FW and DSL
- Present: Increasing Competition from DBS, LECs & VDSL
- Future: Full Competition from DBS, FTTH, LRE, Mobility

Service Mix
- Past: Video Broadcast Service
- Present: Video, HSD & Some Voice
- Future: IP service-based, On-Demand & Interactive

Supplier Solutions
- Past: Purpose-Built, Analog Networks
- Present: Parallel Silo, Hybrid Analog & Digital network
- Future: Converged Digital Infrastructure

Subscriber Profile
- Past: One-way Video home Only service
- Present: Triple play with TDM residential Service
- Future: Mobile subs with bundled dynamic IP-based services
Evolving Cable Network from Analog to Digital

Silo Networks

Video Server → DVB/ASI → STB

Voice

PSTN → TDM → Phone

Data

ISP → IP → PC

Converged Network

Intelligent Network

Video

Data

Voice

One Architecture
New Services: Increased $ and Reduced Churn

Exciting New Devices and Services Demand Intelligent Infrastructure

- VoIP ~$40/mo
- VPN ~$70/mo
- Gaming ~$10/mo
- Digital Music ~$10/mo
- Home Net ~$10/mo
- HSD ~$40/mo
- NetPVR ~$10/mo
- Video & xVOD ~$50/mo
Triple Play Will Fuel Cable Growth

Goldman Sachs

By 2007 20% of cable revenue will come from VoIP
- But VoIP is more than revenue -
Bundling and Churn

Voice Is Key Driver For Reducing Churn

Bundling Reduces Churn

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<tr>
<th>Monthly Churn</th>
<th>Video Only</th>
<th>Video+Data</th>
<th>Video+Data+Voice</th>
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Value Of Churn Reduction

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Service Bundle

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<th>Service Bundle</th>
<th>Value From Services</th>
<th>Value From Churn Savings</th>
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Source: Cisco Internal Modeling, Morgan Stanley 2003. Assumes 11.5% WACC
Is the Time Right? 
The “Perfect Storm” for U.S. Public VoIP Services

Increasing broadband penetration, a favorable regulatory environment, and significant advances in technology are creating a “perfect storm” for VoIP deployment.
U.S. Cable IP Services Market Trends

What analysts thought would happen...

What actually happened...

- Economic downturn – Free Cash flow
- Delayed VoIP launch
- DOCSIS 2.0 sidetrack
Cable VoIP Subscriber/Revenue Growth

Source: MRG, Inc.
HFC Architecture: A Broadband Pipe

Headend

Fiber

Power supply

Node

Feeder

Tap

Subscriber drop

Amplifier, tap & splitter
Cable System Topology for High-Speed Data

- Modem
- Fiber Node
- E/O/O: E
- CMTS
- FE Links
- T-1s or DS-3
- Internet
- Servers: Provisioning Cache Web E-mail
A much-too-common myth: "High-speed data works fine in my system, so voice should be no problem!"
VoIP—The Philosophy

VoIP requires an organizational change:
It’s not your father’s high-speed data!
VoIP—The Reality

- High-speed data *and* voice services can in most cases be successfully deployed on a CATV network if the **ENTIRE** cable system—headend, distribution network, and subscriber drops—meets or exceeds certain minimum technical performance parameters.
Recommended Network Specifications

- The first is the technical requirements in Part 76 of the FCC Rules
  www.access.gpo.gov/nara/cfr/waisidx_03/47cfr76_03.html
- The second is the assumed RF channel transmission characteristics outlined in the DOCSIS® Radio Frequency Interface Specification
  www.cablemodem.com/specifications
- The third is ensuring the HFC plant’s unavailability contribution does not exceed 0.01% as described in the PacketCable™ Availability Reference Architecture
  www.packetcable.com/specifications
PacketCable™ Reference Architecture
VoIP-Over-Cable Solution

- SS7
- PSTN
- 911, Operator Services Access Tandem
- Gateway
- Media Gateway
- Aggregation Router
- Core Router
- Softswitch
- Cable Modem Termination System
- DOCSIS 1.1/HFC
- Cable Modem/EMTA
- OSS and Provisioning
- Record Keeper Server
- Announcement Server
- Lawful Intercept
- Voice Mail
- OSS and Media Servers

Billing, Provisioning & Media Servers
Time Warner – VoIP Service

Service Model
- Unlimited calls for $39.95/month
- Full featured
- One bill
- 18.9M HHP: VoIP across footprint
- MCI & Sprint PSTN access partners
- ‘04 - 31 markets in 27 states
- Adding 1200 subs per day

First Commercial PacketCable™-based VoIP Solution in World

Cisco PacketCable™ VoIP Solution Portfolio
- uBR7246VXR CMTS
- 10200 BTS Softswitch
- MGX Voice Gateway
Cablecom – **Triple Play + Commercial**

**Triple-Play in Action**

**Consumer Services**
- Data: tiered (5) HSD
- VoIP
- Video: digital television service

**Business Services**
- Internet connectivity, intranet, extranet, remote access, VPN, managed security, VoIP and messaging & hosting

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Cisco Triple Play Portfolio
- uBR10012 CMTS, Cisco VPN, 7200 router, GSR 12000, MGX8850

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Largest cable operator in Switzerland
Cable VoIP Deployment Update

- Comcast: (40M HHP)
  - 3 initial VoIP rollouts in 2004
  - Expand availability to 40M HHP by 2006
  - Transitioning 1.5M TDM customers by end of ‘05
- Charter (11.9M HHP):
  - VoIP deployments in 3 markets in 2004
  - Local phone: ($9/mo); Local + ($17.95/mo); Unl/ Local + LD ($45mo)
- Cox Communications (10.5M HHP):
  - Expanding 4 VoIP rollouts in ’04
  - Emphasis on commercial services
- Adelphia (10.2M HHP): Preparing for launch

Source: VoIP Monitor (7/04)
Cable VoIP Deployment Update (cont’d)

• Cablevision (4.4M HHP)
  – Offering VoIP across entire footprint
    - Launched at $35/mo (no E-911); “free” for triple-play customers
    - Partner with Sprint and MCI

• Mediacom (2.8M HHP)
  – Trials in 2004

• Insight (2.3M HHP)
  – Under study - 2005 launch
    - Circuit-switched migration to Comcast VoIP support

- Bright House Networks (2.1M HHP)
  - VoIP deployments in 2 markets in 2004

Source: VoIP Monitor (7/04)
Cable VoIP Deployment Update (cont’d)

• Tier 2 and 3 cable operators
  - Smaller operators are closely watching, although some have deployed voice (e.g., Midcontinent Communications)
  - Many lack resources, pursuing alternative strategies:
    - Net2Phone, AT&T CallVantage, Vonage, Skype

• Business models in these cases are highly variable
  - Revenue Sharing partnerships
  - Loosely affiliated Joint Reference Sales
  - Direct Competition

• International cable operators are showing interest
  – Embracing PacketCable™ architecture and strong interest in SIP
  - beginning market trials
VoIP Service Challenges for Cable

• Subscriber perceptions
  – Cable equates to video, not telecommunications services
  – Cable service support quality is poor
  – VoIP is not reliable or has poor quality

• Subscriber Awareness/Acceptance
  – Only 27% of U.S. online users have heard of VoIP service – *Pew Research*
VoIP Service Challenges for Cable (cont’d)

• Regulatory
  – Should VoIP be taxed as a regulated voice service?
  – What about 911 (emergency) and lawful intercept?

• Technology/Service infrastructure
  – VoIP requires robust network architecture
  – Existing service and support models must be updated
  – VoIP adds complexity to service and network management
  – Subscribers must have a broadband connection

• The competition
  – AT&T will have 1M VoIP subs by the end of ’05
  – Vonage and Skype continue to gain momentum
Cable VoIP Service Strategies

• Pricing
  – Aggressive pricing - bundle with high-speed data/video
  – Package with full features and unlimited calling
  – Leverage TCO and business model advantage

• Services
  – Stay under regulatory radar – non-lifeline
  – Co-marketing with Vonage, etc. – Advanced and Armstrong

• Markets – target residential and commercial subs
  – Comcast - 40M HHP and 711,000 SOHO/SMB subs
  – Compete on ILECs’ turf
  – Utilize third party broadband resellers

• Networks
  – Migrate all services and networks to a single IP-based solution
  – Circuit-switched to VoIP by end of 2005
Wrapping Up

- Cable VoIP solutions are real and being deployed
- Cable operators have triple play advantage
- Subscribers are embracing new services in record numbers
- Cable infrastructures are VoIP-capable and ready
- Technology is maturing quickly
- Cable operators are successfully changing perceptions
- Increased penetration will follow as systems are scaled
- U.S. cable operators have a substantial lead over telcos in delivering the triple play

“Triple play is no longer just a revenue enhancer, but a must for long-term survival….”

_Lightreading Telco Triple Play Imperative Report_
Empowering the Internet Generation
Questions
References

- DOCSIS®: www.cablemodem.com/specifications
- PacketCable™: www.packetcable.com
- CED magazine: www.cedmagazine.com
- Communications Technology magazine: www.broadband-pbimedia.com/ct/
- Federal Communications Commission: www.fcc.gov/voip/
Full Cable Voice Service Offering - PCMM

Residential/SOHO Voice Services

STB Integration (Call ID, Vmail Mgt)

IM and Presence Applications

Commercial Voice/Managed Voice

Secure, QoS Enabled Broadband Network

Packet Core

PacketCable™ CMTS

UM/App Server

PSTN Gateway

Softswitch

PCMM Policy Server

Media Server

PSTN

Internet

Video Telephony/Interactive Video
Complete Cable Modem/MTA Power-On Flow

Source: SCTE Live Learning—“PacketCable™: Provisioning the Service and Guaranteeing Quality”
Cable Modem Registration Process

Source: SCTE Live Learning—“PacketCable™: Provisioning the Service and Guaranteeing Quality”
Call Flow

Source: SCTE Live Learning—“PacketCable™: Provisioning the Service and Guaranteeing Quality”
Call Flow (cont’d)

Source: SCTE Live Learning—“PacketCable™: Provisioning the Service and Guaranteeing Quality”