SCTE Conference on Broadband Learnin
Development

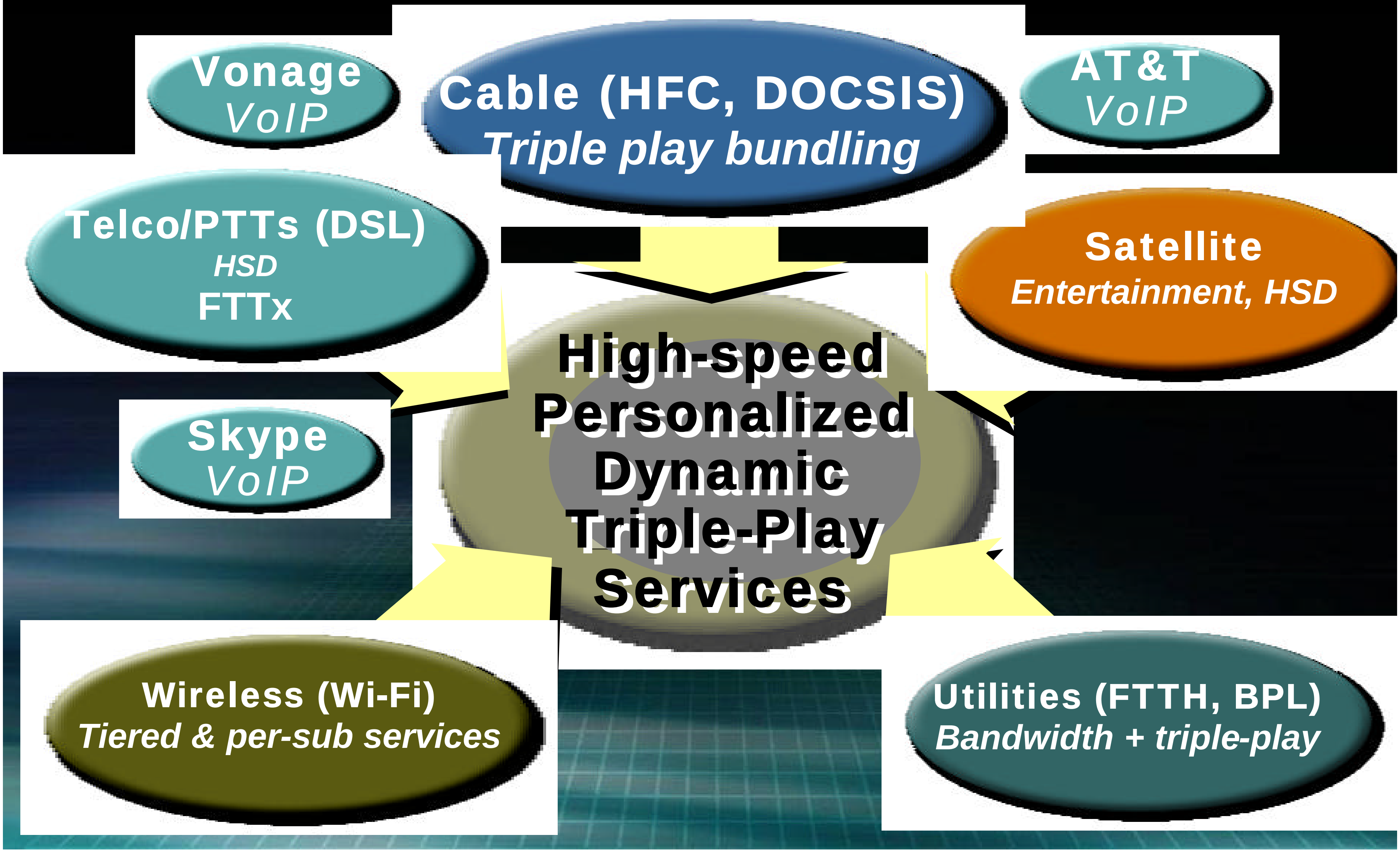
Cable’s Triple Play: VoIP is Here!

Ron Hranac

Technical Leader

Broadband Competitive Landscape

Cisco.com



A Changing Cable Industry Model

Changing Models	Blurring Services	New Requirements

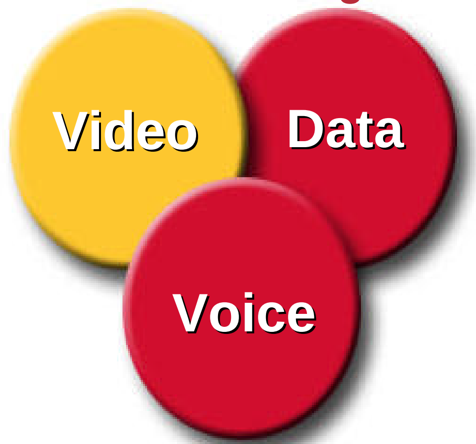
Old Model

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

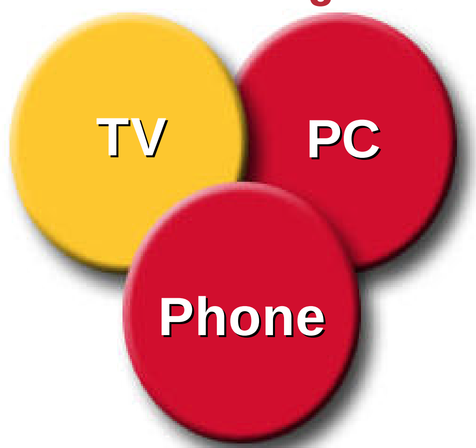
New Model

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

Service Convergence



Device Convergence



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

↓

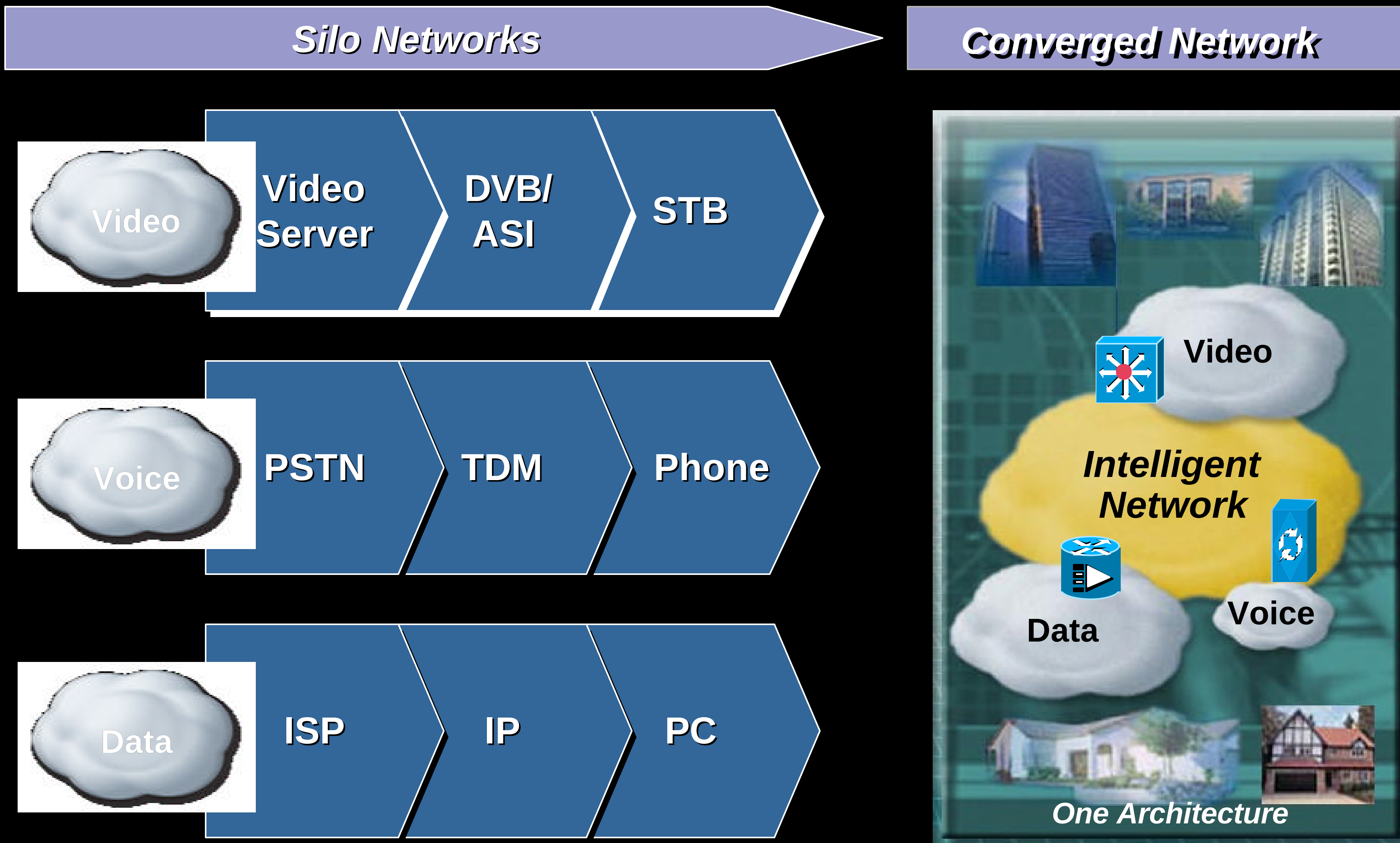
VoIP

VoIP: Voice Over Internet Protocol

Cable: An Industry In Transition

	Past	Present	
Competitive Context	Competition from DBS, FW and DSL	Increasing Competition from DBS, LECs & VDSL	Full Competition from DBS, FTTH, LRE, Mobility
Service Mix	Video Broadcast Service	Video, HSD & Some Voice	IP service-based, On-Demand & Interactive
Supplier Solutions	Purpose-Built , Analog Networks	Parallel Silo Hybrid Analog & Digital network	Converged Digital Infrastructure
Subscriber Profile	One-way Video home Only service	Triple play with TDM residential Service	Mobile subs with bundled dynamic IP-based services

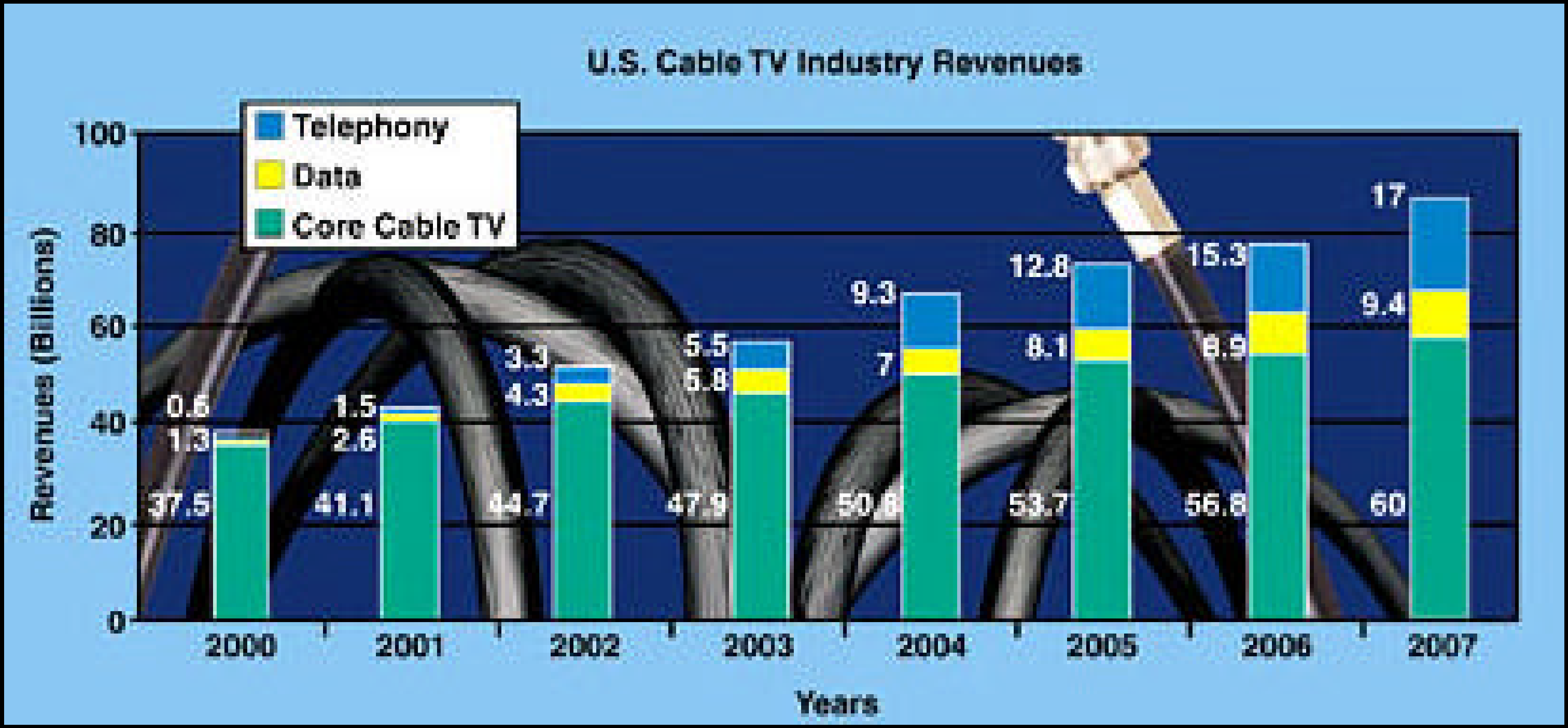
Evolving Cable Network from Analog to Digital



New Services: Increased $ and Reduced Churn

Exciting New Devices and Services Demand Intelligent Infrastructure

Triple Play Will Fuel Cable Growth

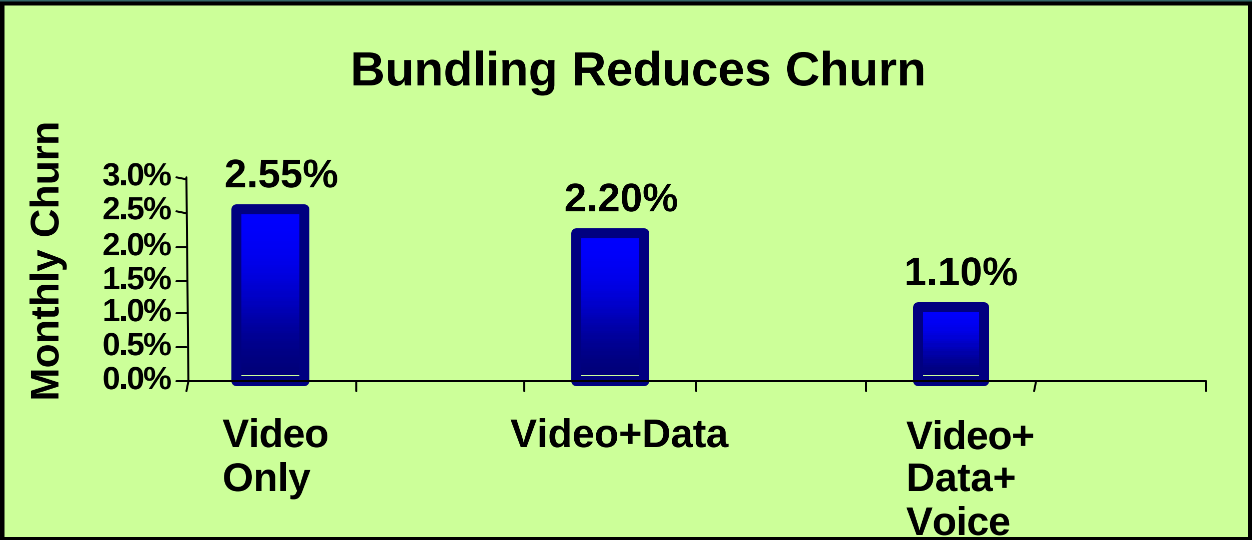


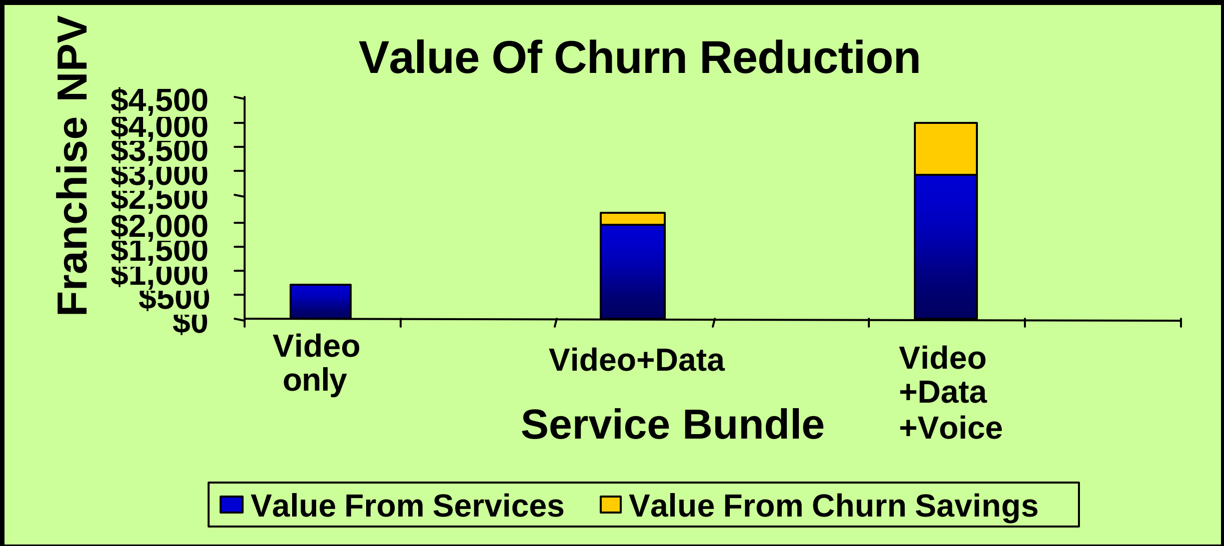
Goldman Sachs

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

Bundling and Churn

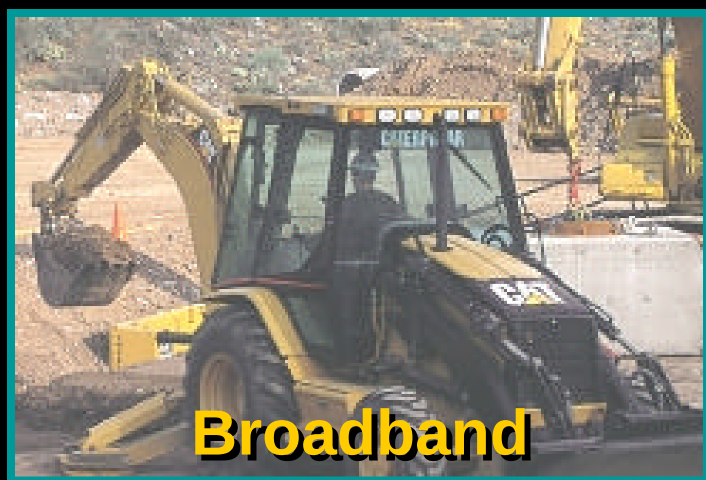
Voice Is Key Driver For Reducing Churn

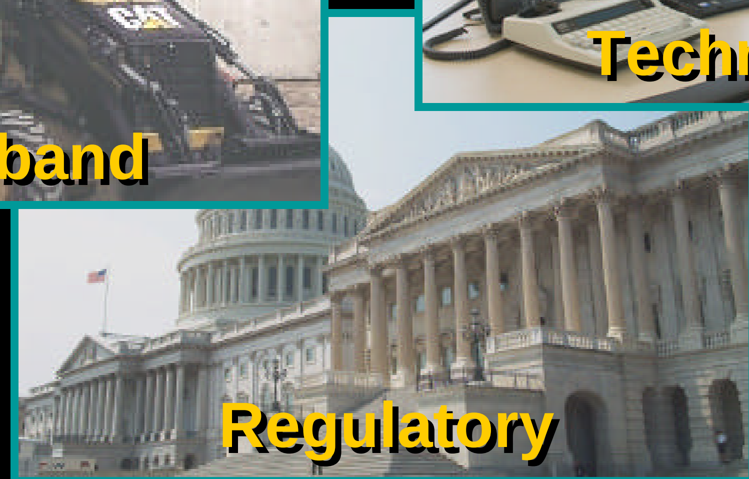




Source: Cisco Internal Modeling, Morgan Stanley 2003. Assumes 11.5% WACC

Is the Time Right?
The "Perfect Storm" for U.S. Public VoIP Services

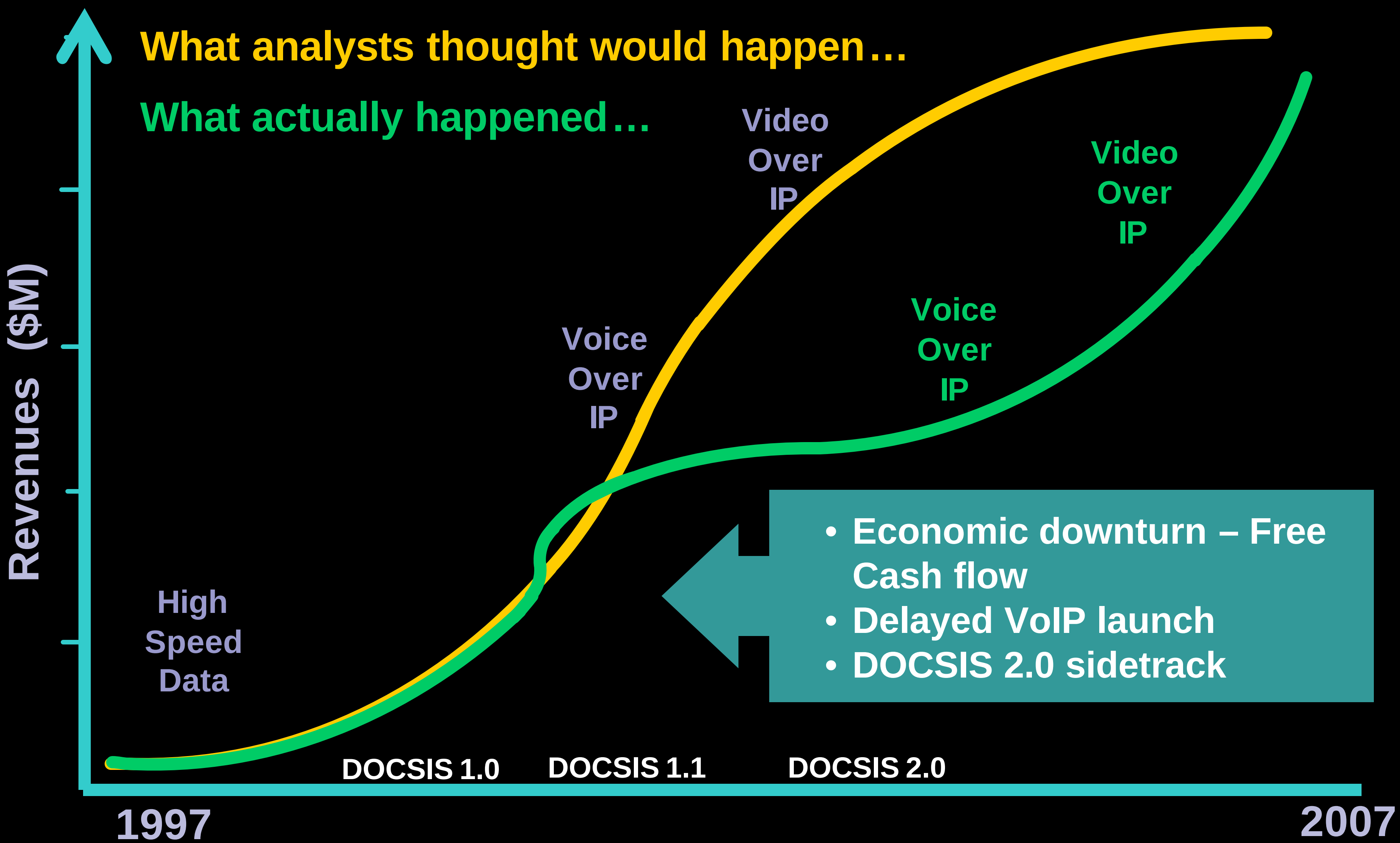




Increasing broadband penetration, a favorable regulatory environment, and significant advances in technology are creating a "perfect storm" for VoIP deployment.

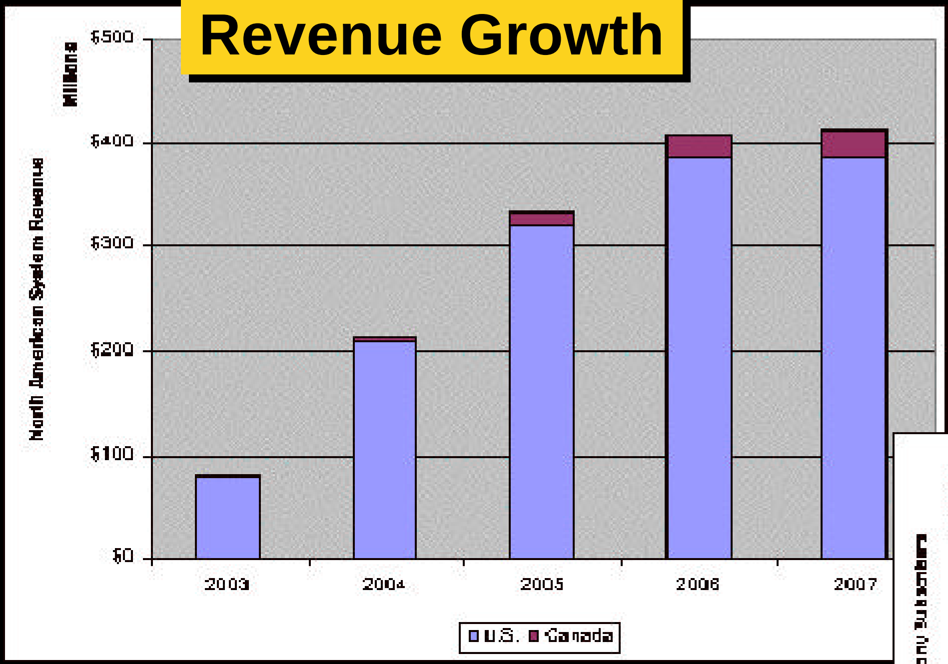
U.S. Cable IP Services Market Trends

Cisco.com



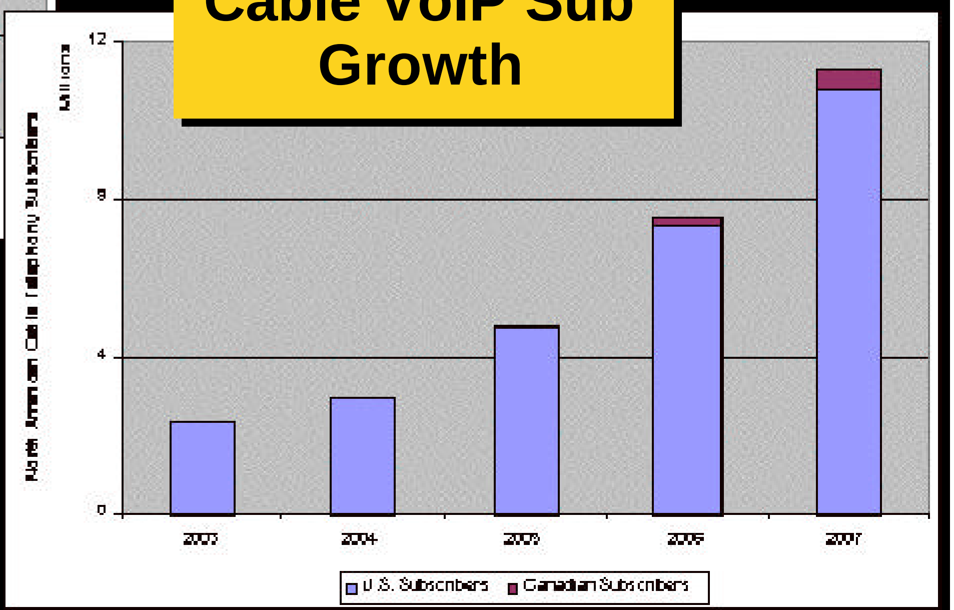
Cable VoIP Subscriber/Revenue Growth

Cable VoIP Revenue Growth

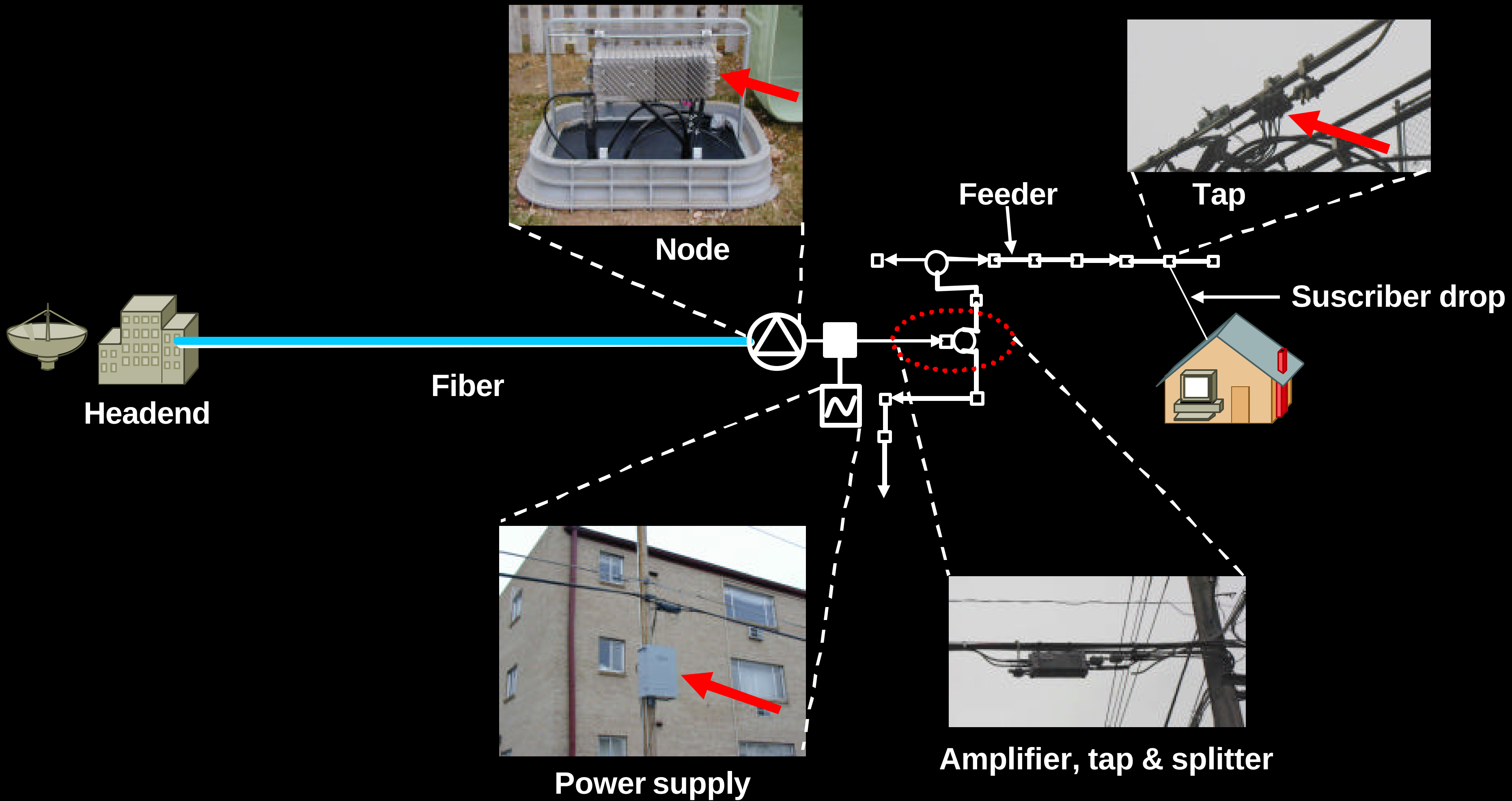


Source: MRG, Inc.

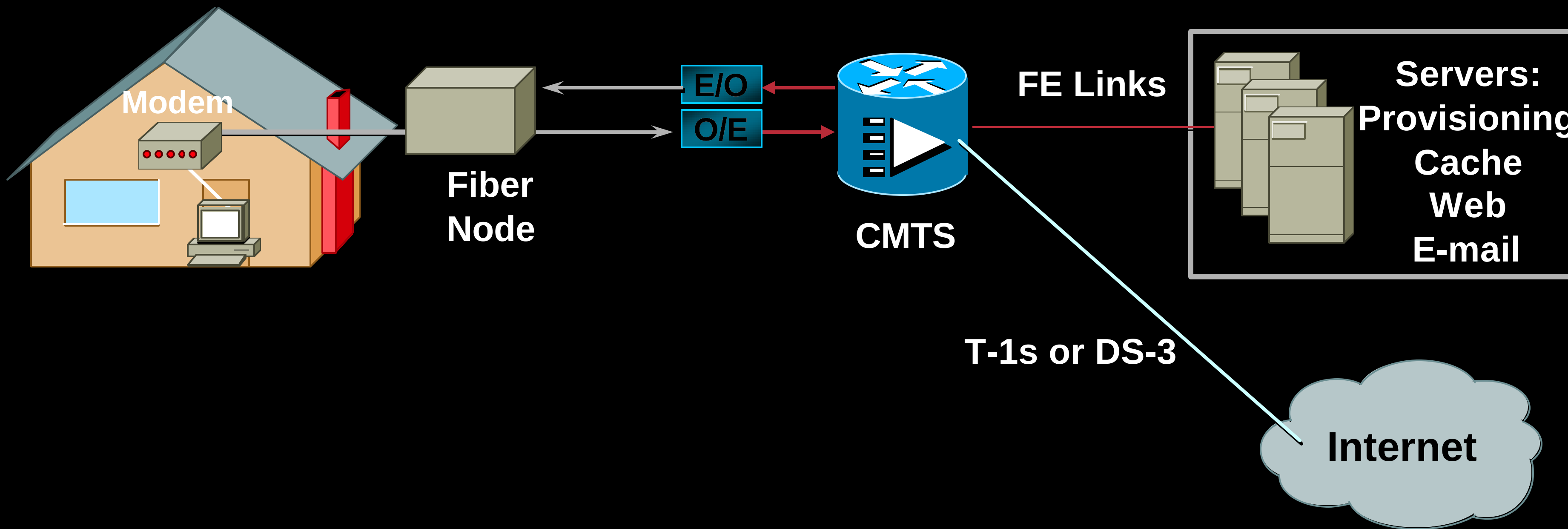
Cable VoIP Sub Growth



HFC Architecture: A Broadband Pipe



Cable System Topology for High-Speed Data



VoIP—Voice Over Internet Protocol

Cisco.com

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

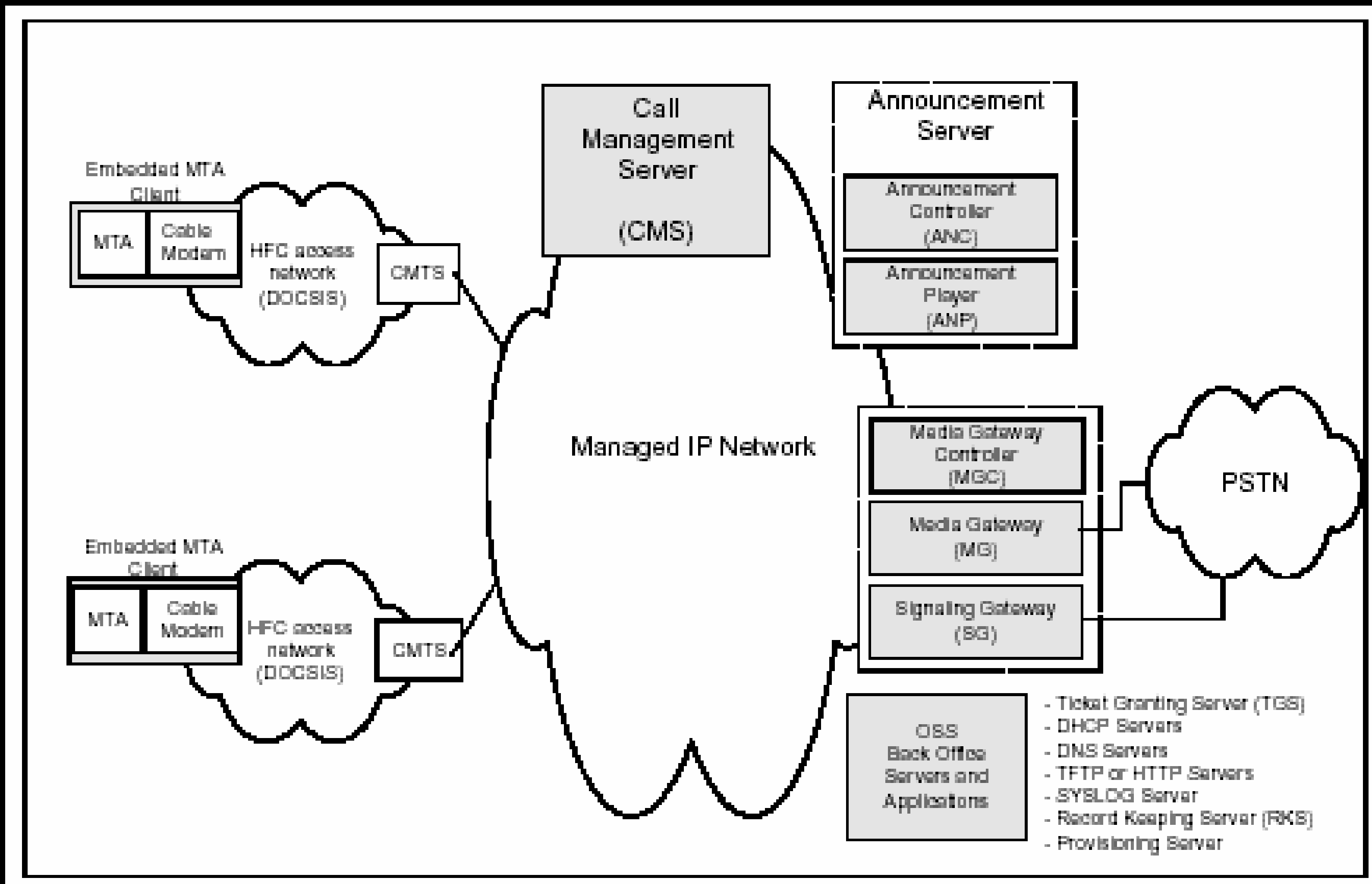
  www.cablemodem.com/specifications

- The third is ensuring the HFC plant's unavailability contribution does not exceed 0.01% as described in the PacketCable™ Availability Reference Architecture

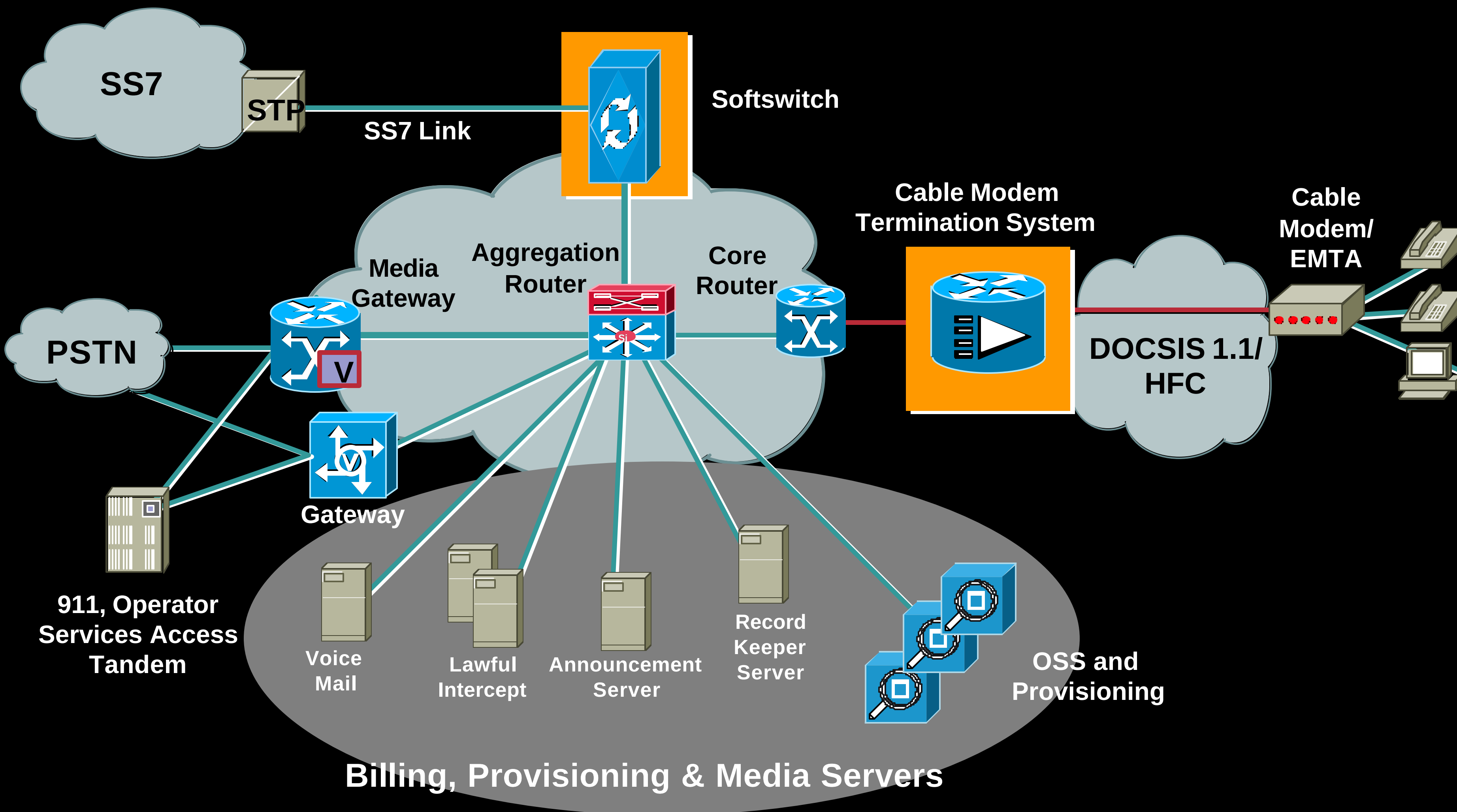
  www.packetcable.com/specifications

PacketCable™ Reference Architecture

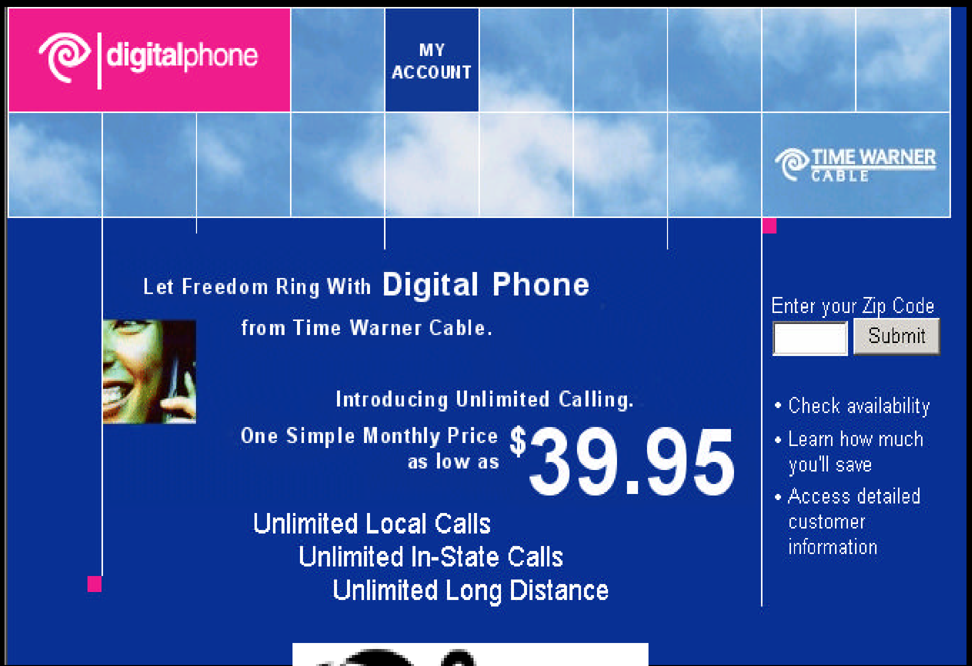
Cisco.com



VoIP-Over-Cable Solution



Time Warner – *VoIP Service*



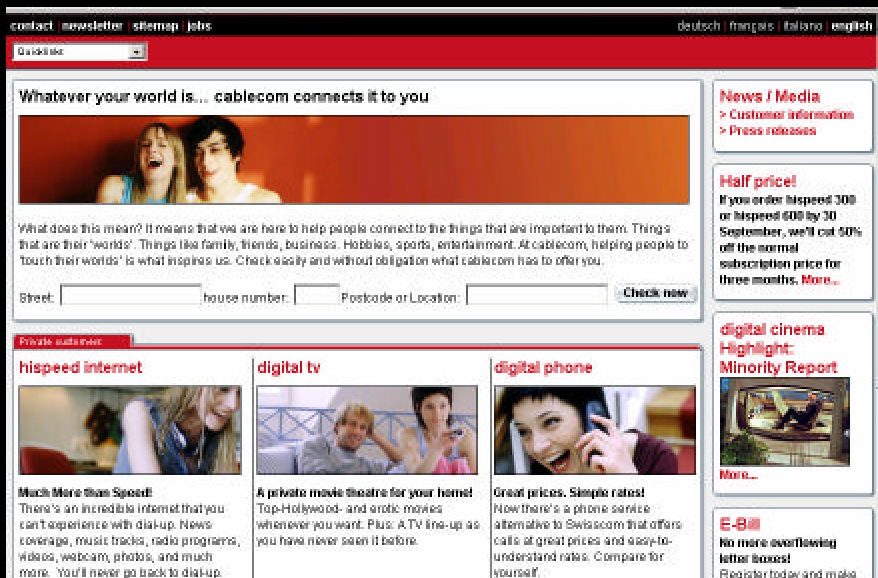
First Commercial PacketCable™-based VoIP Solution in World

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

Cisco PacketCable™ VoIP Solution Portfolio
- **uBR7246VXR CMTS**
- **10200 BTS Softswitch**
- **MGX Voice Gateway**

Cablecom – *Triple Play + Commercial*



Largest cable operator in Switzerland

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

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

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)

Cisco.com

- 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

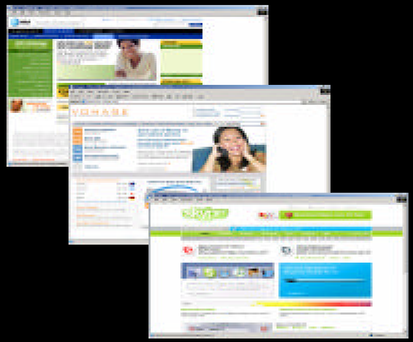
VoIP Service Challenges for Cable

- 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)

Cisco.com

- 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

CISCO SYSTEMS

EMPOWERING THE INTERNET GENERATION

Questions

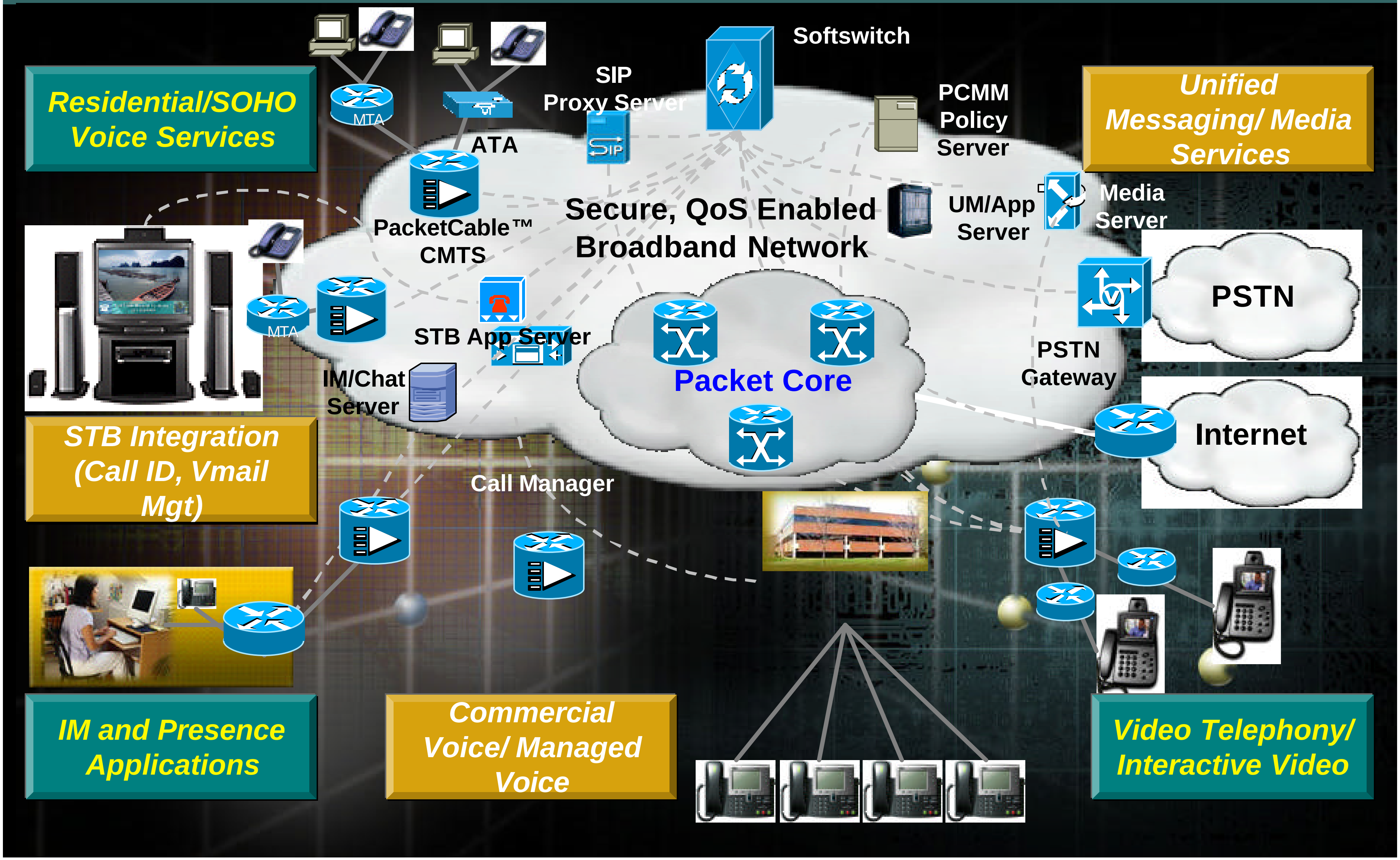
References

Cisco.com

- 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/
- voip-info.org: http://www.voip-info.org/tiki-index.php
- Cisco cable voice solutions, white papers, etc.: www.cisco.com/en/US/netsol/ns341/ns396/ns289/ns4/networking_solutions_package.html
- Cisco Press IP communications/VoIP books: http://www.ciscopress.com/bookstore/browse.asp?st=42106

Full Cable Voice Service Offering - PCMM

Cisco.com



Complete Cable Modem/MTA Power-On Flow

Cisco.com

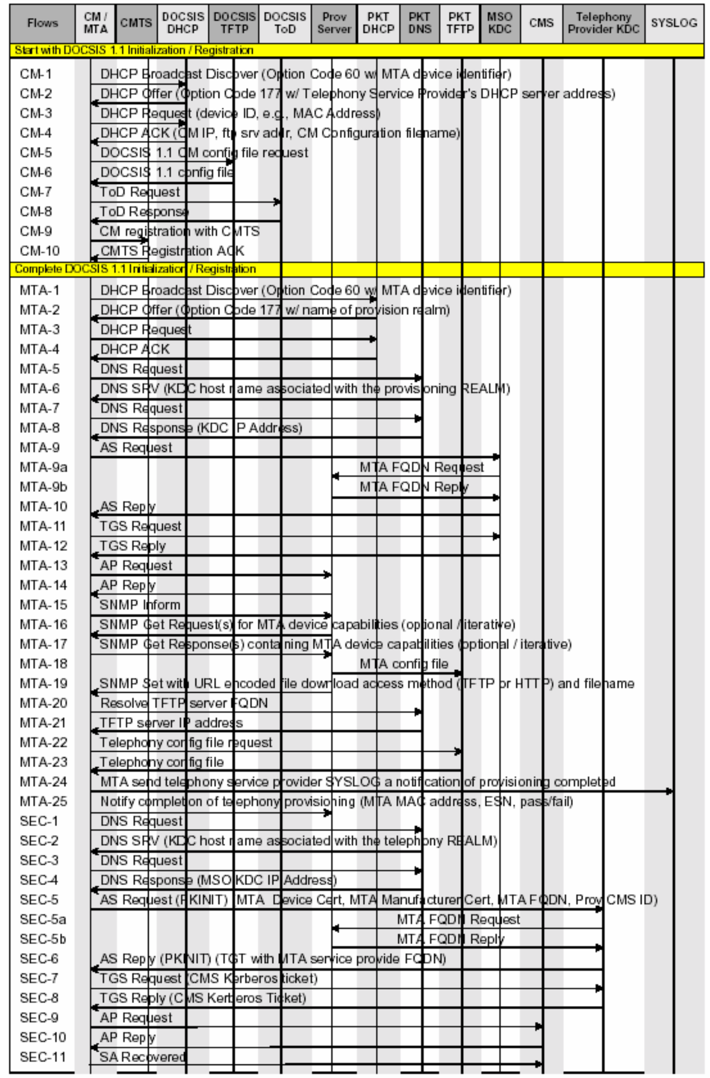


Figure 11. PacketCable Provisioning Flows

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

Cable Modem Registration Process

Cisco.com

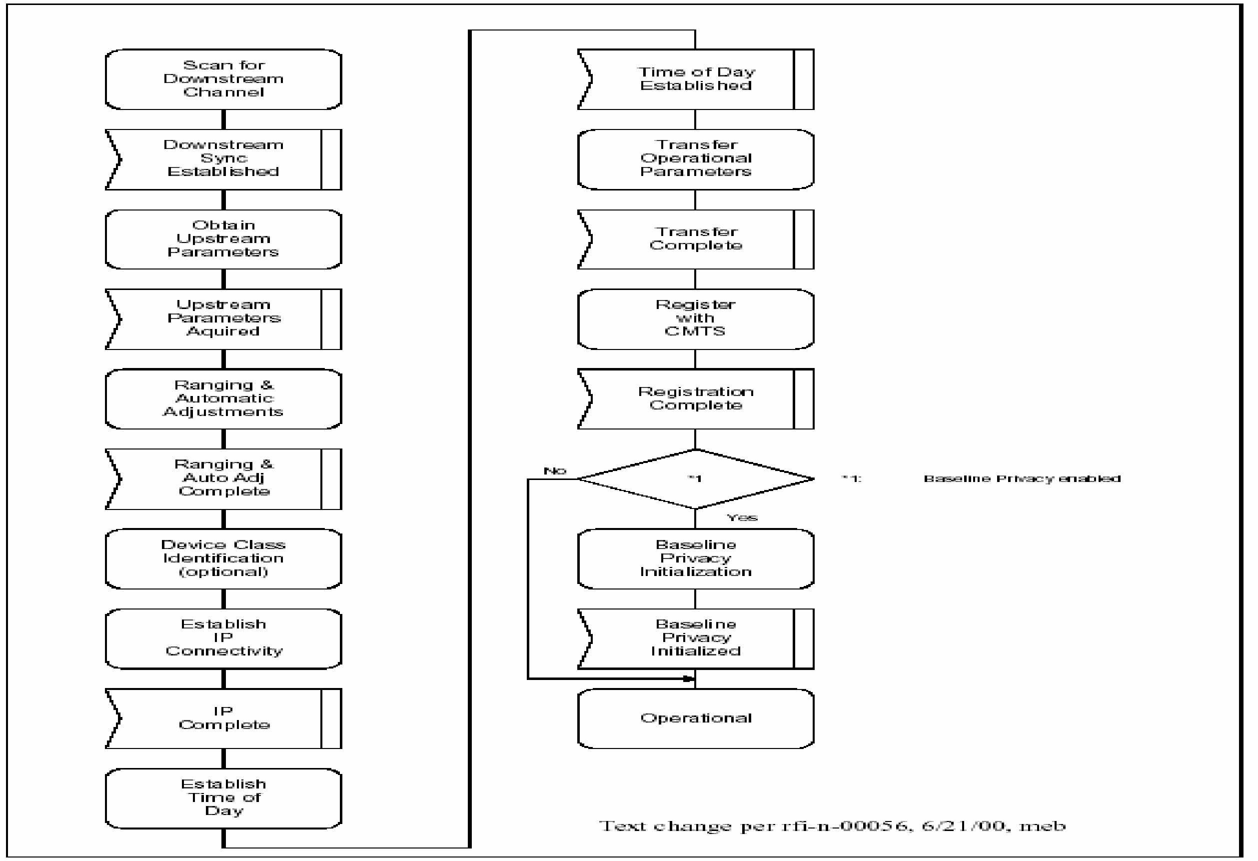
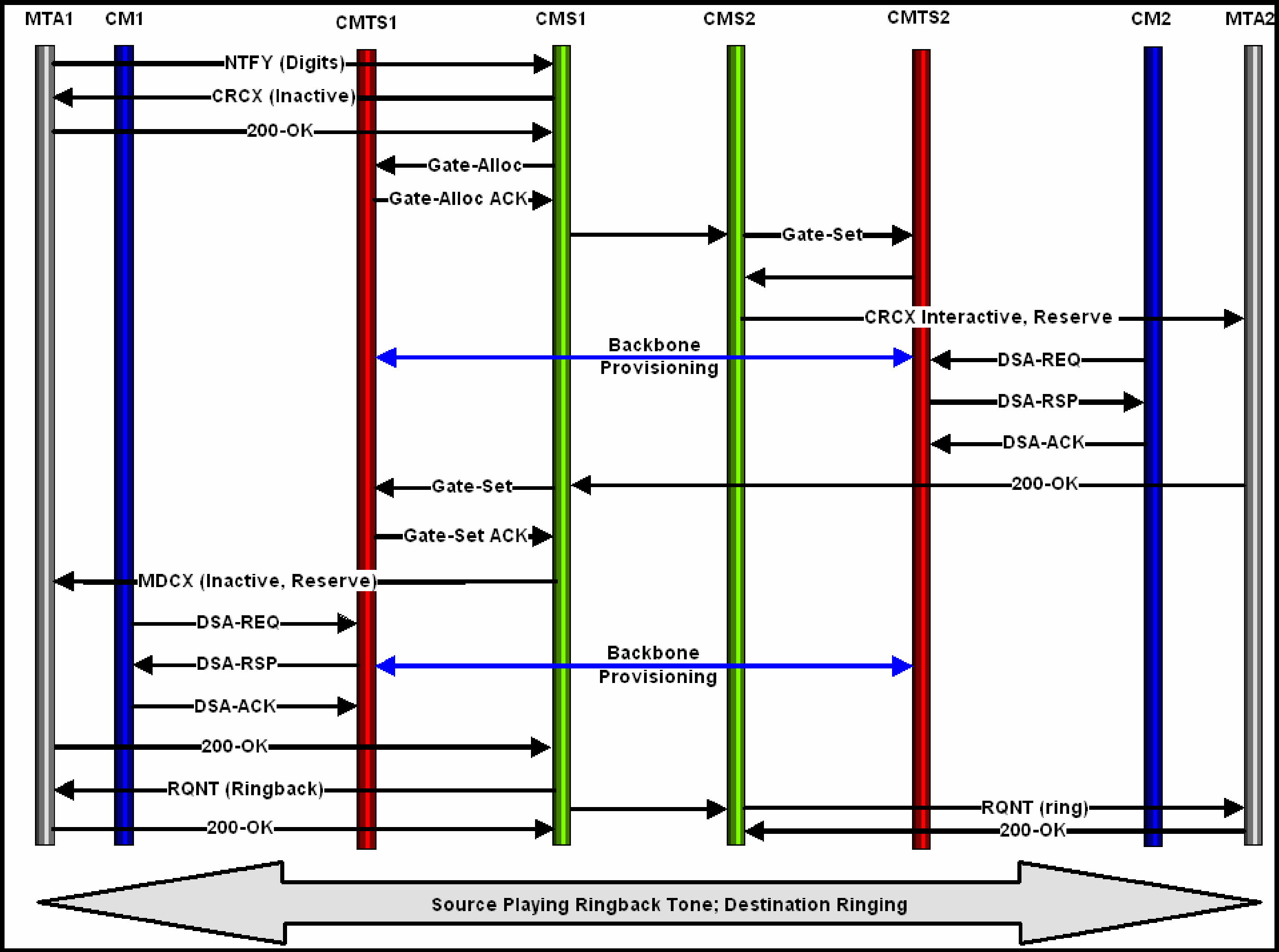


Figure 9-1. CM Initialization Overview

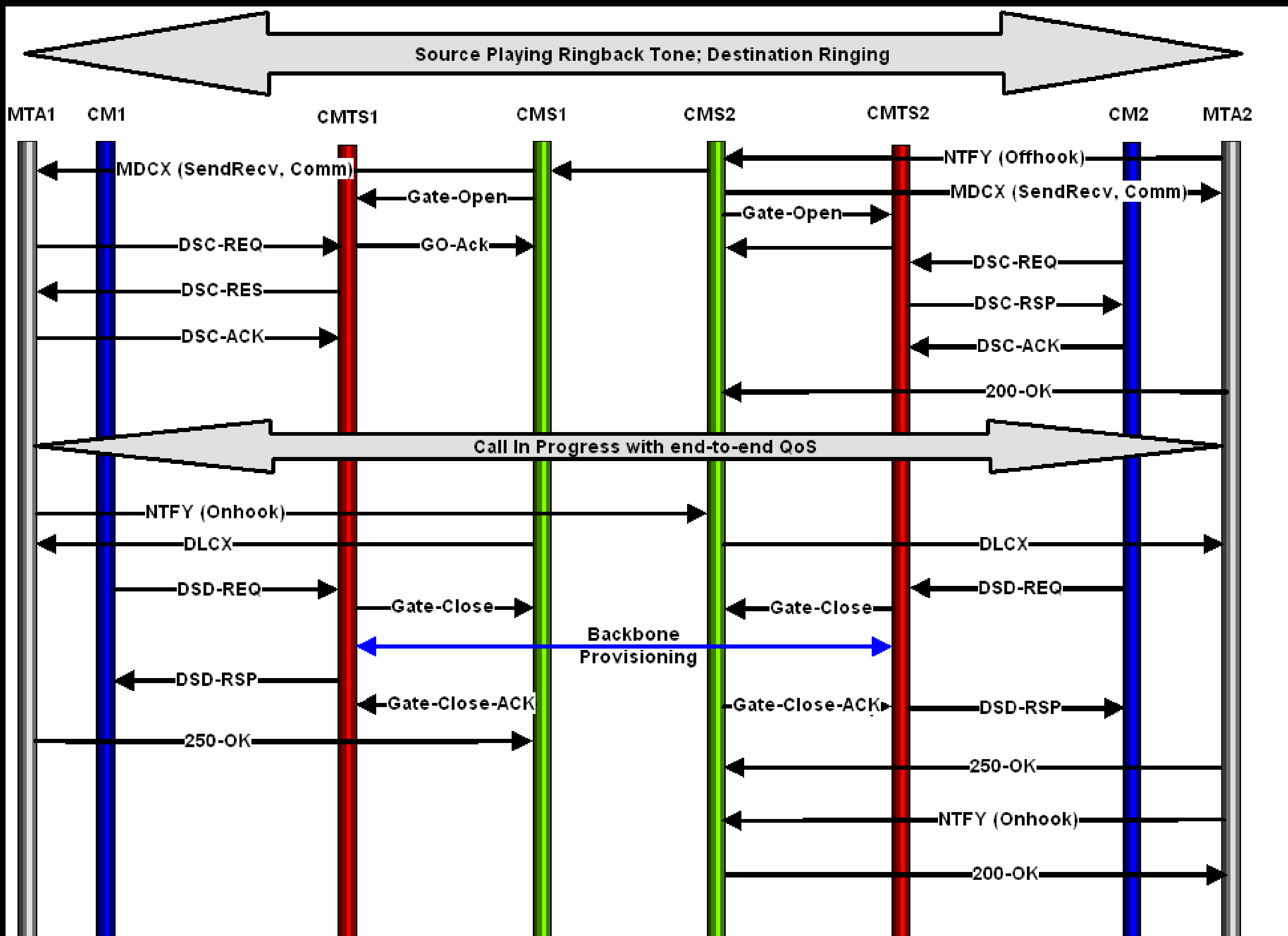
Source: SCTE Live Learning—
“PacketCable™: Provisioning the Service and Guaranteeing Quality”

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"