Next – Generation Networks
Challenges and Opportunities of Convergence

Dennis Weller
Chief Economist - Verizon
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Verizon Overview - Nationwide Presence in a Fragmented US Market

- Local telephone services in 29 states and the District of Columbia
- Wireless service nationwide
- Long Distance
- Broadband
- Data services
- Directories
Transforming Verizon Through Investment in Next-Generation Networks and Services

- **Wireline: Fiber to the premise**
  - 3 million homes passed by end of 2005
  - Now in 14 states

- **Wireless: 3G broadband**

- **Services and Integration**
  - To deliver the greatest possible value to consumers

- **In rural areas**
  - WiMax In Grundy, Virginia and other communities
  - Partnership between Verizon Avenue, local government, and Alvarion
FTTP Full Build & Overlay Architectures

- FTTP Full Build
- FTTP Overlay
- Residential
- Small Businesses
- Office Parks

Components:
- OLT
- ONT
- Copper Feeder
- Copper Distribution
- Splitter Hub
- Connected Communities
- 2-4 POTS, Enet, Video
FTTP: The Perfect Broadband Platform

Bandwidths & Services

Upstream 1310 nm

Voice and Data @ 155 to 622 Mbps

Data / Telephony / VOD

FTTP Network

Broadcast Video

HFC Network

Downstream 1490 nm

Voice and Data @ 622 Mbps

Video

Broadcast Video

Data / Telephony / VOD

42 MHz 550 MHz 860 MHz

Analog TV Digital TV HD/VOD
Verizon Fios
Wireline Broadband Access

Package Price

Revolutionize your world
with a new kind of high-speed Internet.
Verizon Fios Internet Service
with MSN® Premium

- Experience the Web at lightning speed
  Surf the Web faster than ever before!
- Click and connect in an instant
  No more busy signals, like with dial-up!
- Connect multiple computers
  Multiple PCs connected to a single high-speed connection over your home network at no additional monthly fee.

Order Verizon Fios Internet Service today!
Take advantage of our exclusive online offer - First 30 days FREE!

<table>
<thead>
<tr>
<th>Maximum Connection Speed</th>
<th>Installation Charge</th>
<th>First 30 Days</th>
<th>Monthly Fee Thereafter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5 Mbps/2 Mbps*</td>
<td>Waived</td>
<td>FREE</td>
<td>$39.95/mo</td>
</tr>
<tr>
<td>Up to 15 Mbps/2 Mbps*</td>
<td>Waived</td>
<td>FREE</td>
<td>$49.95/mo</td>
</tr>
<tr>
<td>Up to 30 Mbps/5 Mbps*</td>
<td>Waived</td>
<td>FREE</td>
<td>$199.95/mo</td>
</tr>
</tbody>
</table>

*Actual (throughput) speeds will vary. Learn more about service speeds.

Leapfrogs Cable Modem & DSL!
Totally Spies

Set Reminder

Record Now

Record Series

4:00 - 5:00pm

Fans of Ricky Mathis, the famous rock star, are somehow being turned into zombies that obey his every command and it's up to the spies to go undercover as his back-up band called The Spies!
Fios TV

♦ Rollout later in 2005

♦ Will begin with:
  ▶ 200 channels of video
  ▶ 1800 choices for video on demand
  ▶ Easy interface
  ▶ Parental control

♦ Will add:
  ▶ Full interactivity
  ▶ Two-way video
  ▶ Integrated shopping (T-commerce)
Verizon Wireless
High-Speed Internet Access

**MOBILITY**  VZAccess gives you the freedom to stay productive and connected to your business critical data and applications whether you’re on the road or in a meeting across town.

**SPEED**  NationalAccess is Verizon Wireless’ nationwide wireless Internet service, available in thousands of cities and towns across the United States. BroadbandAccess is Verizon Wireless’ premier Internet service, offering users one of the fastest, fully mobile wireless Internet data solutions available today.

**SIMPLICITY**  Easy set up and maintenance that requires little to no changes to your company’s current infrastructure and systems.

**Security**  Uses CDMA technology, which provides authentication and data protection and works with most VPN solutions.
Verizon 3G Wireless Broadband

- Verizon is US market leader in 3G rollout
- Available today to 75 million people in 32 cities
  - 150 million people by end of 2005
- CDMA technology – EV-DO
- Card for laptop provides BB Internet access
  - Unlimited nationwide usage $79.95 per month
Pricing of VCAST Service

V CAST VPak $15 per Month

- Unlimited Basic Video Clips
  - News
  - Sports
  - Entertainment
  - Weather

- Unlimited Data Transport
  - Get It Now services
    - Get Games**
    - Get Tones**
    - Get Wallpaper**
    - Get Going**

- Mobile Web 2.0
  - VZW Today
  - Unlimited Browsing

Access to Premium Content

- Partners include Comedy Central, MTV, News Corp, 20th Century Fox
- NBC News tailored for mobile
- Exclusive mini-episodes of popular TV shows
- More than 300 clips updated daily
**VoiceWing Personal Account Manager**

- **Great international calling rates.**
  - UK: 4p
  - India: 21p
  - Philippines: 25p
  - Jamaica: 17p
  - Italy: 4p
  - Germany: 4p
  - El Salvador: 15p
  - Israel: 6p
  - Venezuela: 9p
  - Pakistan: 33p
  - Japan: 9p

- **_call Forwarding**
  - (214) 123-1234 is not forwarded

- **My Account**
  - Account number: 50342154
  - Main number: (214) 123-1234
  - Alternate phones: (972) 685-5555, (469) 232-5932
  - Alternate Number Fee: $19.95
  - Calling plan fee: $34.95
  - Local and LD calls: Unlimited
  - International calls: Per minute
  - Country rates
  - In-network calls: Free
  - International Call ON Blocking:

- **Extra Services Account**
  - Current Balance Amount: $10.00
  - Bonus Deposit: $10.00
  - Auto Re-charge Amount: $25.00
  - Re-Charge if balance falls below: $25.00

- **Important Links**
  - Frequently Asked Questions
  - See if you qualify for an extra $5 discount
  - Add Alternate Telephone Numbers
  - Add Speed Dial 10 Numbers

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**Verizon VoiceWing**

- **Address Book**
  - My Phone
  - Directory
  - My Account
  - Help

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**VoiceWing**

- **Broadband Phone Service**

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**VoiceWing**

- **Home**
  - Address Book
  - My Phone
  - Directory
  - My Account
  - Help

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Verizon iobi Home
IP Enabled Telephone Service

When Your Phone and PC Get Together, Anything's Possible.

iobi brings it all together giving you complete control over your communications and helps you manage all of your day-to-day activities with one simple tool.

You can access iobi from your home PC, any telephone or the Web. Staying connected is a breeze.

Check Order Status
Check your iobi Home order status.

Haven't Ordered Yet?
View a demo and find out how to bring it all together.
Order iobi Home now.

* Available now in MA, RI, NH, ME, & VT. Additional areas coming soon.

Inside iobi
- Manage Life From Afar
- Getting a Message Across
- Home Office Transformed
- Fire Your Wedding Planner
VerizonOne Concept
2-way Multimedia Communication
Access Point - Client

- **iobi desktop client** allows users to manage their communications from their PC.
- Most convenient access point from your office or home PC.
- Send SMS or e-mails with a mouse click.
- View your weather information.
Service Control

IM
SMS
Messaging
VM Alert
VM Retrieval

iobi
End User
Portal

Broadsoft
Application
Server

PSTN/VoIP
Call Control

Addr book
Calendar
Content
Directories

Outlook
Conferencing
And
Collaboration
Web Sharing

L1 Gateway
EPG
Policies For Next-Generation Infrastructure

♦ United States: Platform competition
  ▪ Competition among wireline, cable, 3G wireless, others
    ➔ Product differentiation
  ▪ Elimination of unbundling for new networks
  ▪ Elimination of line sharing
  ▪ Tradeoffs in policy between market opening and investment – one wire or many?
  ▪ Connectivity principles to ensure that third-party applications can compete
Connectivity Principles

- Developed by a coalition of high-tech companies
  - Proposed to FCC in 2003
  - Adopted by FCC as principles
  - No ex ante regulation to enforce principles

- Ensure that bits are not blocked
  - Broadband customer can access any site, run any application

- In world where applications are not tied to networks, principles ensure open market for service applications

- Market for Integration
  - Customer chooses how much integration to buy, and from whom
Policy Challenge: Franchising

- In the US market, each platform has developed a legal basis for the placement of facilities:
  - Wireless: Cell towers
  - Telephone: State franchising, compensation to municipalities for local rights-of-way
  - Cable: Local franchising
  - Satellite: Has never required local franchise

- As fiber platform provides video, will new franchising requirements apply?

- Potentially significant barrier to entry
  - More than 30,000 local franchising authorities
Policy Challenge: Rights to Content

- In the US market, only 13% of households obtain their video via broadcast
- “Balance of terror”
  - Cable and broadcast need one another
  - “Must carry” vs re-transmission
  - Terrestrial vs satellite
- Commercial negotiation is working
  - Verizon has been able to negotiate for video rights
- Other content: music, games, and more
  - Opportunities for new business models
Policy Challenge: Rights to Content

Verizon has already signed agreements with many rights holders, including:
- NBC Universal Cable (10 networks, including HDTV)
- Showtime (11 networks)
- Starz (13 networks)
- Discovery (14 networks)
- A&E (7 networks)
- NFL Network (24 hour American football)
- Goal/TV (Bilingual soccer)
- Varsity TV (programming for teenagers)
- Gospel Music Channel
- Soundtrack Channel
- SiTV (Latino community)
Policy Challenge: Commercial agreements among networks

- Legacy markets:
  - One-dimensional
  - In many cases, regulated

- Next-generation markets:
  - Multi-dimensional
    - Circuit-switched interconnection
    - IP interconnection
    - Coordination at service layer
    - Content
    - Reach, customers
    - Capabilities
  - Less market power, more opportunities for gains from trade

- Current Internet agreements provide example
  - No supervision, functioning market, universal connectivity
Policy Challenges of Convergence

♦ Competition among newly substitutable platforms, services

♦ Need for symmetry across platforms
  3 Example: In US, DSL contributes to USO, cable modem does not
  3 No economic regulation where convergence reduces market power

♦ Non-economic regulation
  3 Resist temptation to regulate up for the sake of symmetry
  3 Circumstances that justified previous regulation may no longer apply
    ↪ Limited channels, use of airwaves
  3 Where legacy regulation persists, may need to tolerate some asymmetry
  3 Importance of investment, innovation
  3 Targeted, symmetric requirements to meet social policy goals
    ↪ Emergency services, security, universal service

♦ If it quacks like a duck, it may be a canard