Who’s on First? What’s on Second. I don’t know is on Third.

The evolving networks of the telephone, cable, and wireless companies and the pursuit of the ultimate goal to provide the Grand Slam of services:

   Phone, Video, Internet, and Wireless

Oscar Libed, Clearwire
Optimize or Overlay?

Optimize *existing* network or overlay *new* network?
What is a network?
What is the Grand Slam?

• A home run with runners on all the bases.
• Voice
• Video
• Internet
• Wireless
Telephone Network

- Internet
- Voice
- Wireless
- IPTV
Wireless Cellular Network

- Cellular Voice
- Internet (3G and 4G)
- Wireless
- Mobile TV (DVB-H/Media Flo)

Separate networks from cellular network
Building a new house

Is there a single network that can provide the Grand Slam?
What is WiMax?

- **Worldwide Interoperability for Microwave Access**
- IEEE 802.16 standards based
- Like Wi-Fi, but faster speeds, greater distances, and highly secured.
72 Quadrillion codes

• 1 quadrillion = 1 followed by 15 zeroes (million, billion, trillion, quadrillion)
• Pick a number between 1 and 10.
• Pick a number between 1 and 72 quadrillion.
• 72 quadrillion seconds is 2 billion years.
• In June 2003, the US Government announced that AES (Advanced Encryption System) may be used for classified information.
What is WiMax?

• Laptops to be “built-in” with WiMax chip like Wi-Fi chip; maybe cameras?

• “All IP” network; single platform network

• The “Third Pipe” (vs. cable and DSL modems)
WiMax Network
WiMax Network

Internet

VOIP
(fixed and mobile)

Wireless

IPTV
WiMax: A disruptive technology

Bandwidth

Conventional Wisdom

Fiber Optic cable
Coaxial cable
Copper pairs
Air

Local Loop
WiMax demo in Chicago

Your Speed Test Result

SPEEDTEST.NET

9/26/2007
12:14 PM GMT

DOWNLOAD
3229 kb/s

UPLOAD
1500 kb/s

ISP: Motorola MNIC

Server:
Chicago, IL

Ping:
70 ms

Distance:
< 50 mi
WiMax: Hype or Reality?

• Will wireless Internet replace landline Internet like how cellular phones replaced landline phones?

• Will wireless TV replace landline TV?

• Will mobile VOIP phones replace cellular phones?
WiMax: Hype or Reality?

• What is the speed of WiMax?

• Is it everywhere?

• Is it priced competitively?

• When will it be available?

• Who is providing it?
Mobile IPTV
Broadband Evolution

- Wi-Fi Hotspots (availability, uneven speed, low security)
- 3G Wireless (600 Kbps to 1.4 Mbps)
- WiMax (future)
- Fixed Broadband (lack of mobility)
Form Factors

We Have Just Begun....

Residential Gateway  PC Card  Embedded WiMAX  Mobile Devices

Today  Q3/Q4’07  2008  ‘08/’09
Wi-Fi vs. Clearwire

- We did 3 tests in room 309 at the Capitol this afternoon. Here are the results in Kb/s.

  - Built-in WiFi
    
    | Test  | Download | Upload |
    |-------|----------|--------|
    | Test 1| 170      | 23     |
    | Test 2| 234      | 54     |
    | Test 3| 139      | 88     |

  - Clearwire card
    
    | Test  | Download | Upload |
    |-------|----------|--------|
    | Test 1| 1576     | 112    |
    | Test 2| 1214     | 140    |
    | Test 3| 1145     | 133    |