

Fixed and mobile applications of WiMAX
THE WIRELESS ACCESSIBILITY WORKSHOP at CTIA

Monica Paolini

Senza Fili Consulting

Wednesday April 5, 2006



Senza Fili Consulting

experience in wireless data

Technology focus

- Wireless data technologies and services:
- Wi-Fi, WiMAX, proprietary BWA, cellular (GSM, WCDMA, EV-DO, HSDPA) technologies
 - Data and VoIP services

Approach

- Provide a bridge between technologies and services, assisting vendors and service providers
- Quantitative analysis, with an international perspective
- Carrier, enterprise and residential markets

Services

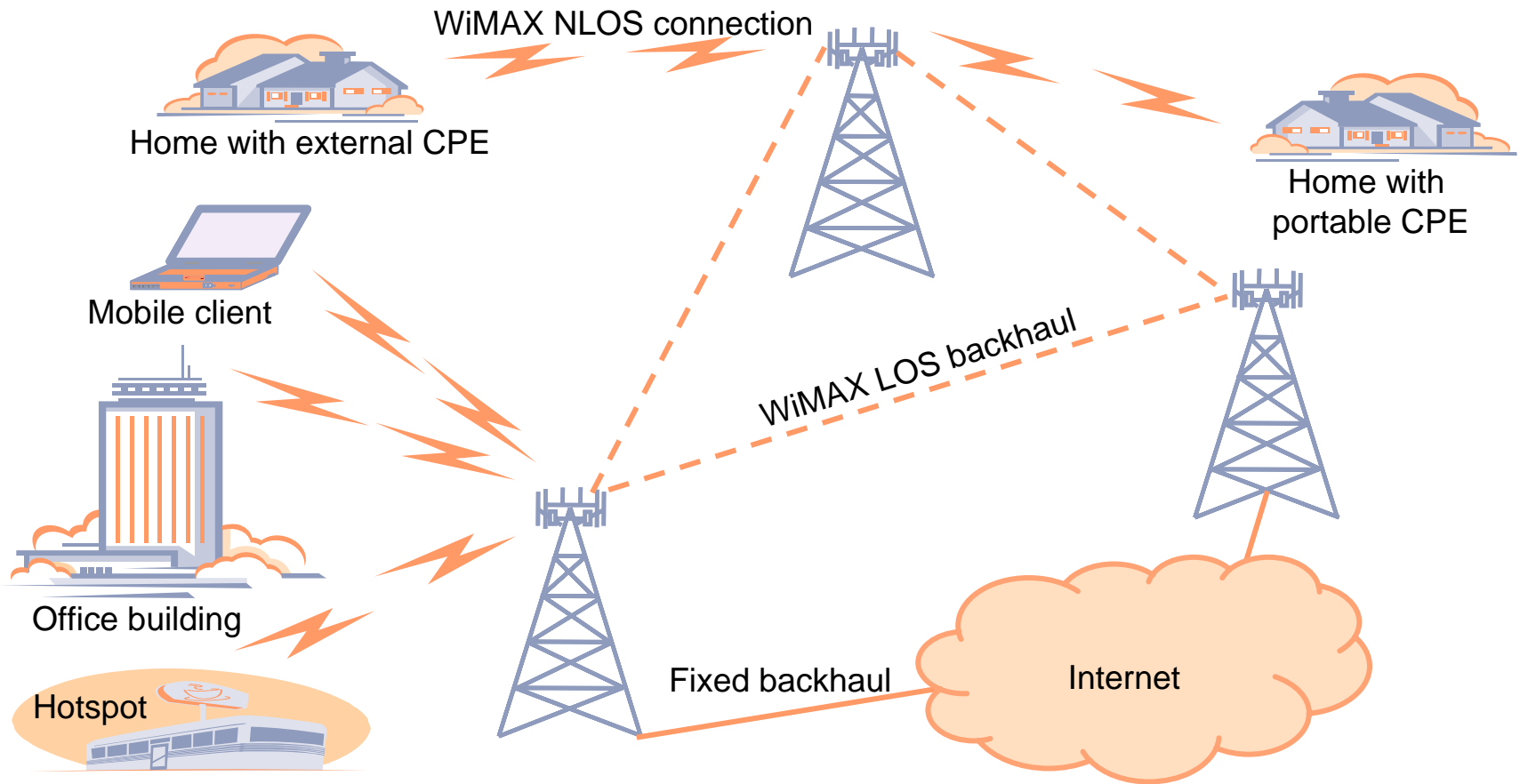
- Business plans and financial modeling
- Business development and strategy
- Market research and forecast
- Due diligence
- Publications and training

What is WiMAX?

- A broadband wireless access (BWA) technology based on two standards:
 - IEEE 802.16
 - ETSI HiperMAN
- It supports both data and voice (VoIP) services, in fixed and mobile usage models
- It offers up to 4-6 Mbps per user with
 - Base station range of few kilometer
 - Non line of sight (NLOS)
- WiMAX products are certified for compliance and interoperability by the WiMAX Forum
 - First certified products were announced in early 2006



WiMAX can support both fixed and mobile access



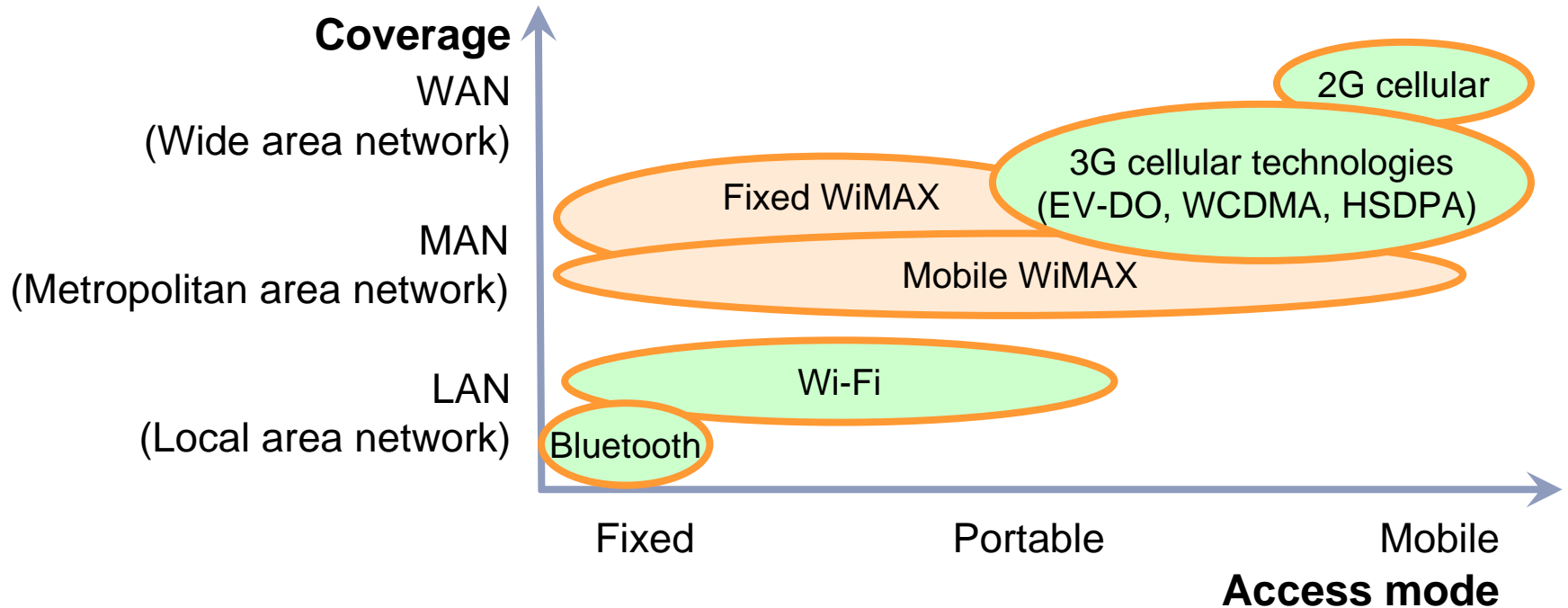
Why WiMAX?

Key features

- Supports NLOS in urban and suburban environments
- Good coverage (up to several miles, but with near-LOS or LOS)
- Support for VoIP and quality of service (QoS)
- Licensed and license-exempt spectrum
- IP-based

Powerful ecosystem

- Effective standardization process
- Strong industry support, with a commitment from almost all BWA vendors and strong push from Intel
- WiMAX Forum has been a driving force towards interoperability
- Interoperability will mean lower prices and less dependence on a single vendor



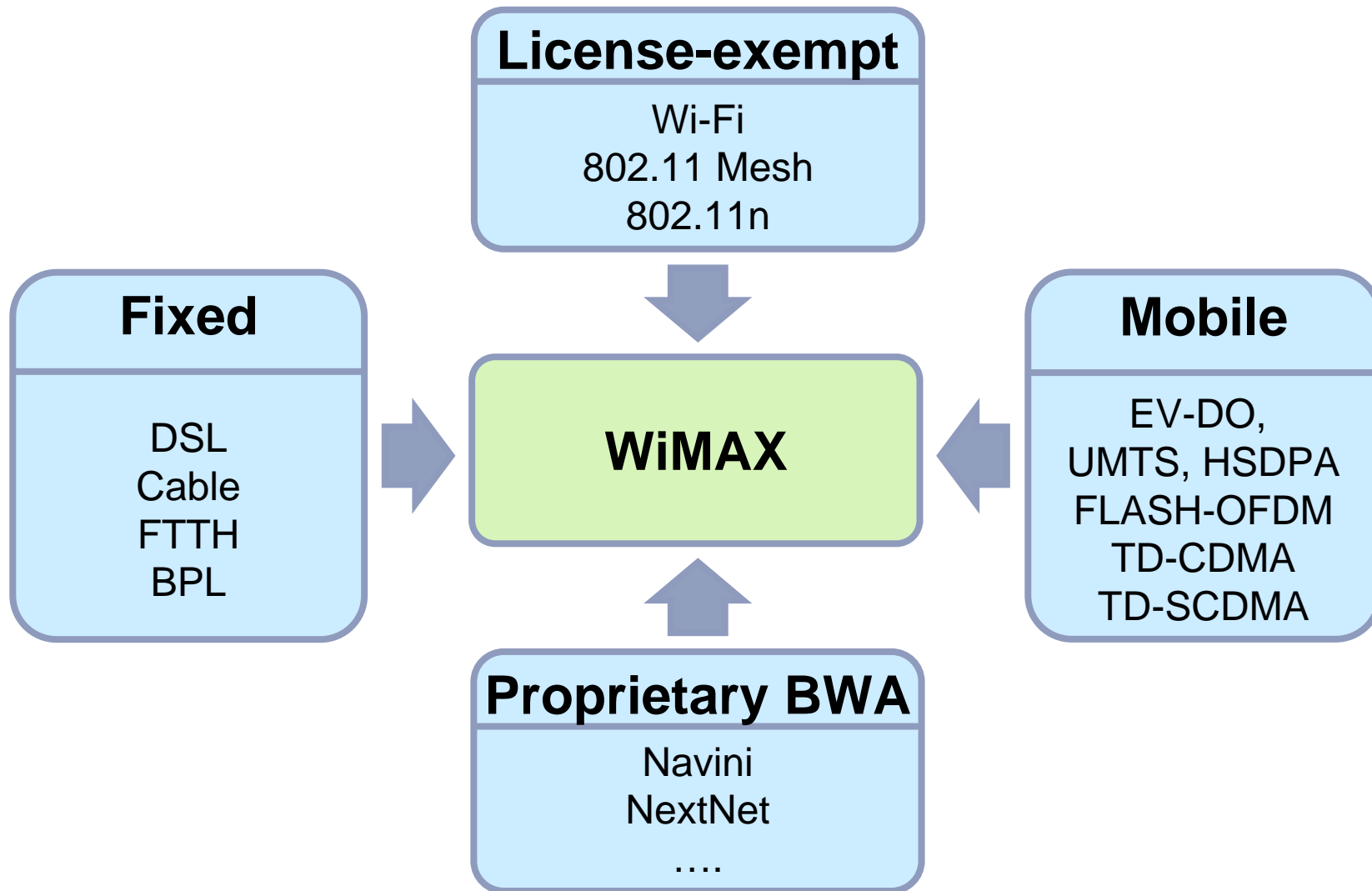
Several service providers are trialing or plan to deploy WiMAX



Fixed and mobile WiMAX: two different markets

	802.16-2004 WiMAX	802.16e WiMAX
Standard	802.16-2004 (June 2004)	802.16e (a.k.a. 802.16-2005) (December 2005)
Access	Fixed, nomadic	Fixed, nomadic, portable and mobile
Modulation	OFDM	OFDMA
Service providers targeted	DSL and cable modem service providers, wireless and wired ISPs	Mobile operators, DSL and cable modem service providers, wireless and wired ISPs
Subscriber unit	Outdoor or indoor CPE, eventually PCMCIA card	Indoor CPE, PCMCIA card, mini-card built in laptops
Certification start	July 2005	2H2006
Certified products	January 2006	1H2007 (Expected)
Commercial availability	1H2006	2007 (Expected)

WiMAX faces tough competition from wired and wireless technologies



Network operators will focus on different areas in the target market



Central city areas **(high density)**

- High density of base stations
- High capacity
- Good coverage
- Indoor CPEs for residential users
- Support for mobile users



Suburban areas **(medium density)**

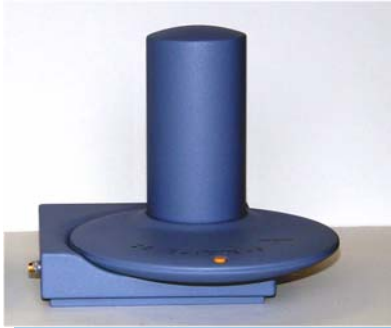
- Fewer base stations
- Good throughput
- Higher percentage of outdoor CPEs
- Satisfactory coverage
- Limited support for mobile users



Rural areas **(low density)**

- Ad hoc deployments in partnership with local government and businesses
- Micro base stations and hybrid WiMAX/Wi-Fi networks used to reduce costs
- Outdoor CPEs dominate
- WiMAX may bring first voice and data services

WiMAX can serve the business, residential and mobile segments



Residential users

- Basic voice services and low cost domestic and international calls
- Basic (dialup speed) to advanced (over 1Mbps) data connections
- Bundled voice and data services

Business users

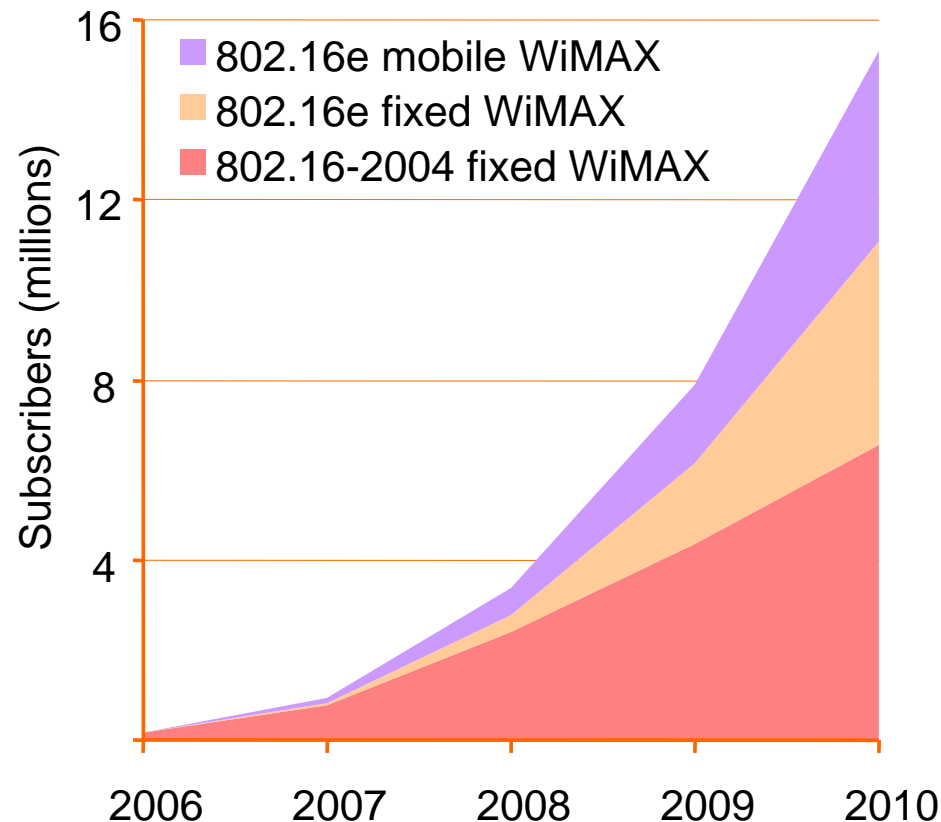
- Basic data connectivity (from dial-up to T1) for small businesses
- Advanced data services to medium and large businesses
- Feature-rich, low cost voice services (VoIP)

Mobile users (mobile WiMAX only)

- Data connectivity for mobile workforce
- Data connectivity for international visitors

We expect 15.4 million WiMAX subscribers worldwide by 2010

WiMAX worldwide subscribers



Source: Senza Fili Consulting, "Fixed or mobile WiMAX? Forecasts and assessment for the transition from 802.16-2004 to 802.16e WiMAX"

- 57% of WiMAX subscribers will be using 802.16-2004 by 2010
- US\$16.5 billion in service revenues
- Drivers to adoption are different in each market
- Asia-Pacific countries will be WiMAX largest market with 41% of subscribers
- The hottest markets:
 - Emerging countries like China and Mexico where WiMAX is a cost-effective last-mile solution
 - Countries like Korea with a high demand for portable and mobile services

**Senza Fili Consulting
+1 (425) 657 4991
www.senzafiliconsulting.com
monica.paolini@senzafiliconsulting.com**