INTERCAI MONDIALE

Intercai Briefing

The WiMAX Opportunity

"The future is here. It's just not widely distributed yet"
– William Gibson

What is WiMAX? – The Technology

WiMAX is a data access technology, designed to be relatively simple with low latency. It can operate in multiple frequency bands and currently comes in two main versions: Fixed WiMAX (802.16-2004 aka 802.16d), which deals with fixed wireless access, and Mobile WiMAX (802.16e aka 802.16e-2005), dealing with mobile / nomadic wireless access.

Fixed WiMAX is predominately used as a fixed wireless access (FWA) or Broadband Wireless Access (BWA) solution, whereas Mobile WiMAX, with its enhanced range and mobility features denotes it as a '4G' technology in the converged fixed-mobile services space.

The former was, as its name suggests, standardised in 2004 while the latter was largely complete by the end of 2005. Equipment conforming to the 802.16-2004 standard has been commercially available for a little over a year and the 802.16e standard is now firm enough to allow suppliers to start delivering equipment.

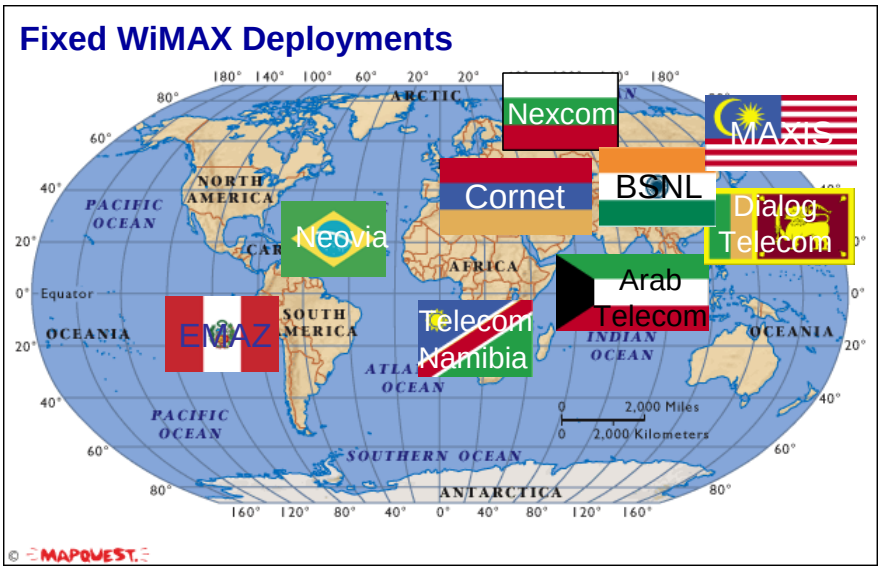
Current WiMAX Market

Currently there are more than 40 commercial WiMAX deployments worldwide.

Due to the nature of the available technology (i.e. Fixed WiMAX), these have been predominately in developing markets, where wireless local loop technologies have traditionally made most sense. The figure below gives a sample of operators from around the globe deploying WiMAX networks.

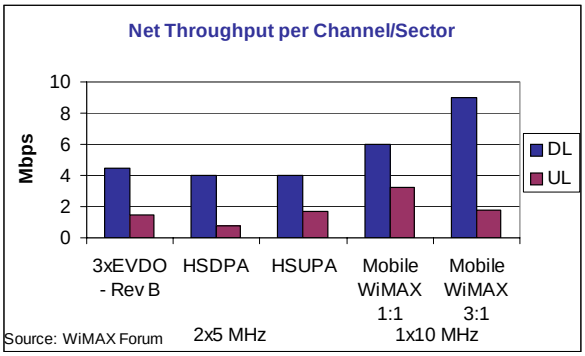
Within developed markets the interest is in Mobile WiMAX, with current deployments largely limited to trials due to availability of equipment. This year, and 2008, will see the first commercial deployments as technology becomes available and appropriate spectrum is made available, principally in the 2.5 and 3.5 GHz bands. For example, awards have already taken place in Germany and France within the 3.5 GHz band, and the UK will follow with technology neutral auctions of the 2.5 GHz band in late 2007. In the US, Sprint has already embarked on its WiMAX deployment, in place of 3G technologies adopted by other mobile operators.

Fixed WiMAX Deployments



WiMAX – 3G Comparison

The critical success factor for Mobile WiMAX will be how it compares against existing and evolving 3.5G mobile technologies. The chart below (from the WiMAX forum's simulations) shows comparable throughputs for WiMAX and mobile 3G evolution standards.



As shown, WiMAX offers the potential to double the net throughput compared with current 3.5G technologies, but as always, everything is down to timing.

Currently, WiMAX does offer improved spectral efficiency (the amount of usable data that can be transmitted over a given spectrum bandwidth), but as ever, competing developments are waiting in the wings. In particular, the 3GPP's Long Term Evolution (LTE) development of WCDMA will raise the bar still further.

However, the ace up WiMAX's sleeve is the support of Intel, and their commitment to incorporate WiMAX in every laptop as part of their Centrino strategy. Expected as a commercial reality from the start of 2009, this will enable a ready supply of 'free' terminals into the market place, which will prove a significant advantage to network operators using WiMAX, particularly in markets where handset subsidies are still commonplace.

Competitor or Complement?

In short – it can be both! Of course, the strategy of different operators with respect to WiMAX will vary depending on their background and aspirations. An established fixed network operator may see mobile WiMAX as a good way of entering the mobile data market. With established operators in the mobile market focussed on maximising their established revenues (e.g. from text messaging), the high bandwidth and rapid deployment of WiMAX is attractive. The table below summarises some of the likely operator strategies and motivations.

Established Operator	Market Entrant
• Provision of Nomadic Services, particularly once WiMAX is embedded in PCs • An option for backhaul for WiFi hotspots (giving immediate access to nomadic PC services) • Diversification of investment in technology (e.g. minimising risk in 3G rollout)	• Provision of Fixed services: o Broadband access comparable to DSL (particularly in developing markets) o Voice services (through high quality VoIP) • Provision of mobile service , effectively leapfrogging established mobile operators to deliver 4G service • Rapid deployment as an alternative service provider in newly liberalised markets

The Business Opportunity

We foresee the future provision of service to be a deployment of different access technologies which are selected on the basis of a number of factors including usage profiles, device, content and location. The winners will be the network operators who deploy the most appropriate solution for the relevant, customer and time-specific, situation.

Intercai's view, based on our experience with operators deploying WiMAX, is that it has undoubted attributes and should continue to demonstrate significant growth. It is unlikely to become the dominant mobile technology in the short to mid term, but it has a clear niche and can, if used correctly, provide the basis for sustainable and profitable networks.