



## WiMAX@2.3GHz and its DNA for wireless broadband

Michael Lai explains where the WiMAX technology fits into the wireless landscape

**T**he Internet landscape in Malaysia has certainly come a long way from the very beginnings, when dial-up Internet access was first made available in the mid-1990s. Dial-up Internet access rides on existing telephone systems, and gave speeds of up to a then zippy 56 kilobits per second – though for we used to subsist on slightly under or over half of that (28.8 Kbps and 33.6 Kbps was common).

(Yes, I bet you still remember that chirpy dialing tone that your dial-up modem makes when you've successfully connected to the Internet.)

For the uninitiated and the young (or those who simply have trouble recalling), the shape and form of the Internet back then was – yes, you guessed it right – primarily text and low-resolution graphics.

I remember using the Internet primarily for email, surfing text-based websites, with a smattering of pictures, chatting via IRC and ICQ as well as going on discussion bulletin board systems (popularly referred to as BBS) to exchange thoughts and opinions on various topics of interest.

As the 1990s flashed by, the Internet began to grow by leaps and bounds. Text and graphic gave way to more interactive forms of displaying content. Flash-driven websites started popping up, and everyone was touting video-conferencing as the way forward in enhancing business efficiency and competitiveness. E-commerce literally exploded – Amazon and eBay became the poster boys (or rather, men?) of the Internet.

And all of a sudden, dial-up speeds just could not cut it, especially when you have so much shopping, selling, networking and learning to do.



**Samsung WiMAX Devices**

When broadband services were first announced in the early 2000s here, Malaysian Internet users heralded a new era in becoming digital natives. Never mind the restriction it had – you had to be in specific areas to enjoy 256 Kbps to 1.0 MBps download speeds – everyone was clamouring to be on the information superhighway, on what was then the fastest ride around.

## The wireless revolution begins

By the mid-2000s, Malaysians had begun to experience “untethered” Internet access in the form of WiFi. WiFi is a short range radio frequency system that uses unlicensed spectrum to provide access to a network. It typically covers only the network operator’s own property. WiFi is used by an end user to access to Internet or a peer-to-peer network.

Since the beginning of WiFi, users are required to sit at a restaurant and start surfing after they paid for their food. Short coverage distance, insecure online and slow surfing experiences can sometimes be frustrating and annoying. The introduction of WiMAX, the next generation technology, appeared to address these issues and offered a better alternative to the users.

WiMAX, short for Worldwide Interoperability for Microwave Access, is a standards-based technology for providing last mile wireless broadband access as an alternative to wired broadband such as cable and DSL.

There are three variants that WiMAX 802.16e can offer: fixed, nomadic and mobile. Fixed WiMAX serves users at one location or stationary users at different places, nomadic WiMAX allow users to get connected in a portable way and mobile WiMAX which supports easy hand-off between base stations just like mobile phones. The latter is thus highly suitable for users on the move.

Development of the technology and interoperability between different vendor’s WiMAX equipment is governed by the global WiMAX Forum ([www.WiMAXforum.org/home](http://www.WiMAXforum.org/home)).

To delve deeper into the nitty-gritty, WiMAX is a long-range system, covering many kilometers that typically uses licensed spectrum (although it is also possible to use unlicensed spectrum) to deliver a point-to-point connection to

the Internet from an Internet Service Provider (ISP) to an end user.

## The WiMAX DNA – How it all fits

The arrival of wireless broadband had in recent years revolutionised communications. Now, the next big wave, WiMAX, is set to change the broadband landscape even more, making it mobile and personal. One of the key factors to ensure this happens is the emergence of a vibrant and cohesive ecosystem which will ultimately determine WiMAX’s success on the world stage.

The WiMAX DNA (Device, Network and Application) is eminently better-suited for widespread adoption than 3G was at its inception, derived from a suitable infrastructure which will maximise access and adoption.

WiMAX is set to define the next wireless frontier by virtue of it being IP-based and the vast amount of content people can tap into immediately.

When we talk about the WiMAX ecosystem, it is important to remember that WiMAX itself forms a crucial part of the ecosystem for many other industries, including businesses, entertainment and scores of others. That the WiMAX ecosystem becomes invariably intertwined with any industry that will benefit from reliable, high-speed and pervasive connectivity is beyond question. The question is how these other industries are geared for the global connectivity revolution (as the Yankee Group calls it) and what they are doing to support the WiMAX ecosystem. We are entering a brave new world of telecommunications and the firms that will thrive will be those who embrace it.

Thus, we must remember that the WiMAX ecosystem consists of more than the sum of its parts and exists not only for and in itself but is a key catalyst to move the industries of the future. This is the real WiMAX ecosystem. In expanding the WiMAX ecosystem, the worldwide deployment of WiMAX must take place as planned in order to capitalise on the momentum afforded by its time-to-market advantage in terms of standards and commercial availability.

WiMAX is now at a level of consumer readiness which is very impressive and can scale to millions of users and beyond with inexpensive equipment, requiring no service provider subsidies and not economically burdensome if subsidised. In the long range plan, WiMAX is the technology to bridge the digital divide. The wide coverage of WiMAX base stations will eventually prove its capability in increasing the broadband penetration in Malaysia.

A virtually limitless amount of content on the Internet today is IP-based and this is exactly the technology on which WiMAX is based. It means that the Internet is a readily available resource pool for any WiMAX user and Web 2.0 will only accelerate this phenomenon. In essence, anything that is developed for the Internet is developed for WiMAX. Out of the eight largest telecommunications vendors, seven are supporting WiMAX deployment, including Alcatel-Lucent, Motorola, Nokia Siemens, etc. WiMAX devices will be relatively cheaper than other telecommunications equipment because of its open ecosystem from day one.



**Nokia N810**

Big players like Intel, Alcatel-Lucent, Nokia, Motorola, and many more have bet their company's future on WiMAX and many see WiMAX as the next frontier for wireless connectivity and communications. In terms of device vendors, where there were zero in 2007, there are now over 60 in 2008, with over 520 service providers rolling-out WiMAX services in various stages of deployment today. Soon, WiMAX chips will be embedded into every conceivable consumer electronic device - from mobile handsets, gaming consoles, PDAs, digital cameras, and home entertainment systems - which you can, and will buy. WiMAX will then achieve critical mass as prices fall and adoption skyrockets, making it truly ubiquitous in every facet of our lives.

WiMAX will enable us to download and upload data instantly on the move using WiMAX-enabled devices without being tied down by wires. It means impressive access speeds, reliability and rich features will enable even the most inexperienced user to quickly and accurately find the information they require. It also looks set to support many new applications not presently viable with today's access speeds. Just imagine, being able to upload instantly pictures you had just taken to your Facebook site for example, or being able to download and share MP3s with your friends wherever you are!

## The importance of the WiMAX ecosystem

So why is the WiMAX ecosystem so important? Consider the impact to a country: having high-speed broadband in Malaysia would create many job opportunities because it would help spur local digital-content creation and attract foreign direct investments. Korea is a good example, using broadband to dig itself out of recession. Foreign investors now always scrutinise a country's broadband speed when they decide on whether or not they want to do business with the nation and the benefits of having such a facility for the people and the nation are expected to be worth many times that investment. Another great example is the M-Taiwan project, a national programme to boost the nation's e-competitiveness where the entire country is gearing up to embrace WiMAX.

What do we need for all these to be effective? Firstly, a mindset change. For example, people have to start thinking

about not just working inside an office building but as working anywhere the Internet is -- which is now everywhere. The question for most people would no longer be "Where can I connect?" but "When do I want to disconnect?" In fact, it is unlikely that anyone will need or want to be disconnected in the future. The challenge is in getting people to get interested in WiMAX, adopt it and then to a point where they no longer even think about it because it would have become so ingrained in their lives.

At the heart of it, WiMAX is about life, not technology. The communities that develop it will mobilise the Internet and bring about a sea-change in the landscape of broadband. As WiMAX-embedded devices become more commonplace, people will not only adapt to WiMAX, but demand it in their daily lives. When WiMAX enabled gadgets do become available to the masses, the need for any form of wired communication would soon diminish and eventually we can truly live as a wireless society.

It is not far-fetched to say that we are on the crucible of a new wave of innovation, brought upon by a WiMAX-enabled future. Applications may be integrated with devices; imagine being able to access the iTunes store from wherever you are with your new WiMAX-enabled iPod. Why did a whole ecosystem spring up around the iPod? Simple, it was cool, easy to use, and ultimately ubiquitous. WiMAX needs to have the same qualities to advance its own ecosystem.

Thanks to the foresight of the Malaysian Government in issuing the WiMAX 2.3GHz spectrum license in early 2007, this has put Malaysia on the world map as one of the pioneers in WiMAX technology. Malaysians should take this opportunity and strive to make Malaysia a WiMAX hub in the region.

Thus, I am very hopeful of the future. My children are examples of digital natives. Digital natives are your typical Facebook-loving, photo-sharing and Web messaging folk. More and more Malaysians are transforming themselves into Web denizens - and I am certain that it will be a matter of time before the majority of Malaysians start living the same way, after realizing the many benefits of the Internet.

One thing is clear as borne out by history however; and that is change is inevitable, extinction is optional. [.my](#)

*"The future is here. It's just not widely distributed yet."*

*- William Gibson.*

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