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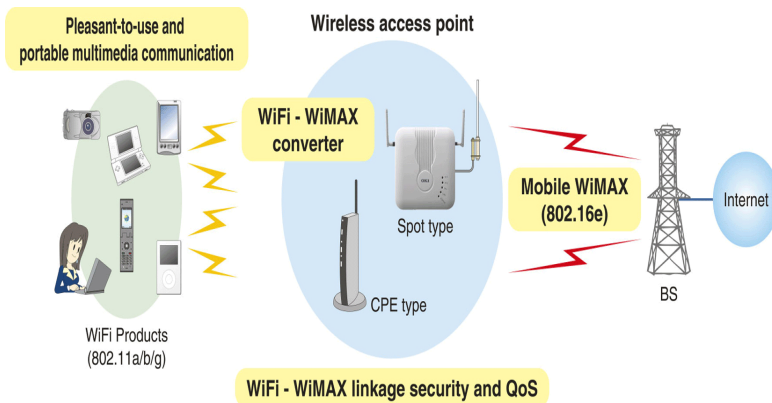
WiMAX COVERAGE IN MALAYSIA

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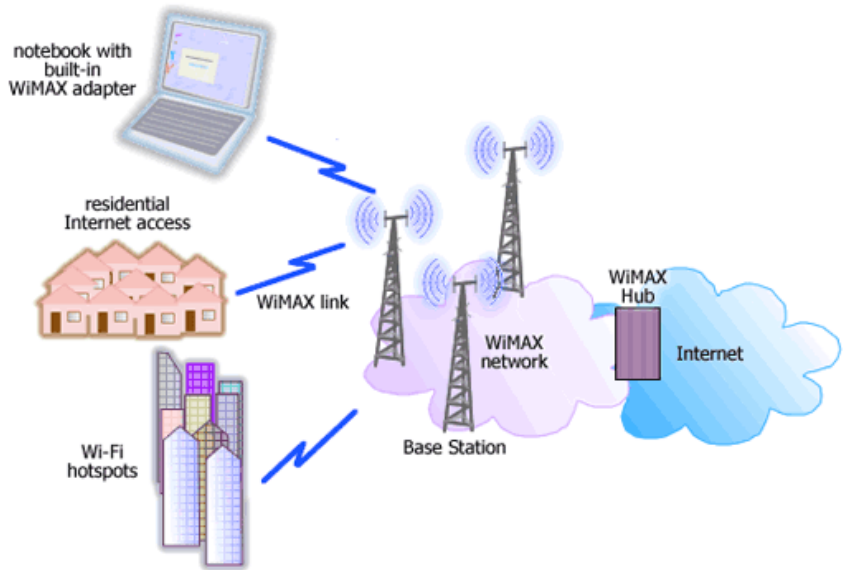
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15.1 INTRODUCTION

In the beginning there was – WiFi



Then came WiMAX



WiMAX is a wireless digital communications system, also known as IEEE 802.16, that is intended for wireless "metropolitan area networks". WiMAX can provide broadband wireless access (BWA) up to 30 miles (50 km) for fixed stations, and 3 - 10 miles (5 - 15 km) for mobile stations. In contrast, the WiFi/802.11 wireless local area network standard is limited in most cases to only 100 - 300 feet (30 - 100m)[1].

WiMAX is one of the hottest broadband wireless technologies around today. WiMAX systems are expected to deliver broadband access services to residential and enterprise customers in an economical way.

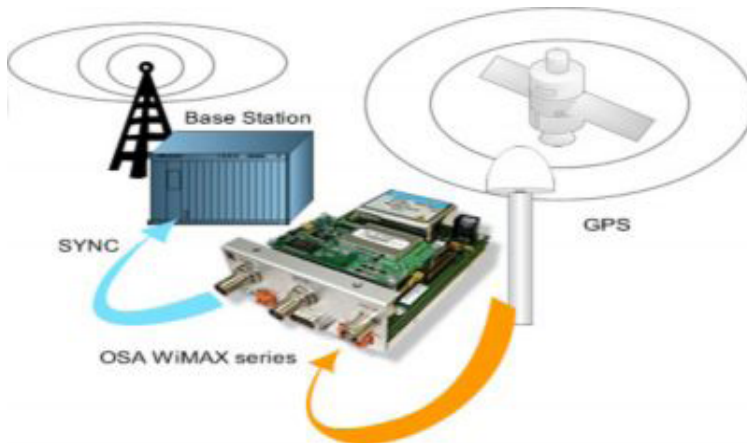
With WiMAX, WiFi-like data rates are easily supported, but the issue of interference is lessened. WiMAX operates on both licensed and non-licensed frequencies, providing a regulated environment and viable economic model for wireless carriers.

WiMAX can be used for wireless networking in much the same way as the more common WiFi protocol. WiMAX is a second-

generation protocol that allows for more efficient bandwidth use, interference avoidance, and is intended to allow higher data rates over longer distances.

The IEEE 802.16 standard defines the technical features of the communications protocol. The WiMAX Forum offers a means of testing manufacturer's equipment for compatibility, as well as an industry group dedicated to fostering the development and commercialization of the technology[1].

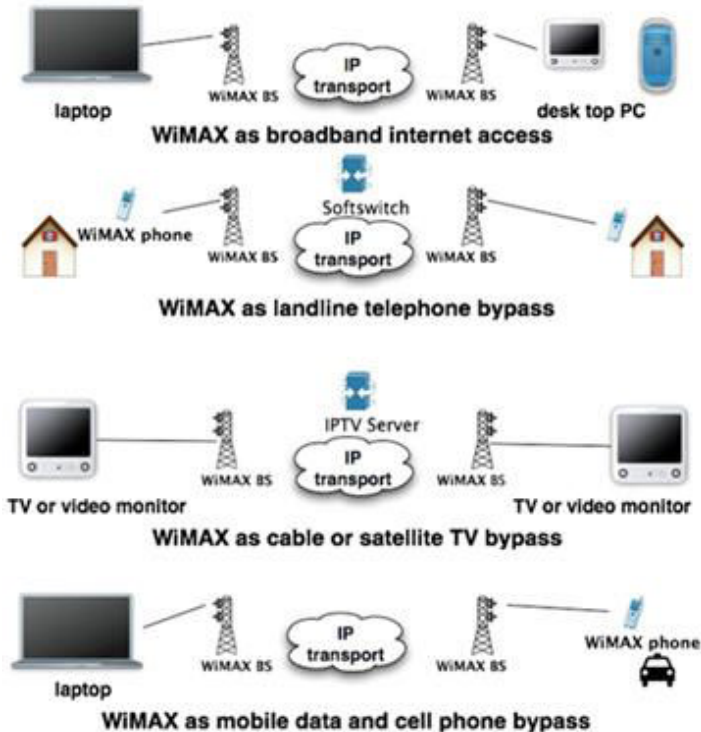
WiMax.com provides a focal point for consumers, service providers, manufacturers, analysts, and researchers who are interested in WiMAX technology, services, and products. Soon, WiMAX will be a very well recognized term to describe wireless Internet access throughout the world.



15.1.1 The potential to impact all forms of telecommunication

WiMAX has the potential to replace a number of existing telecommunications infrastructures. In a fixed wireless configuration it can replace the telephone company's copper wire networks, the cable TV's coaxial cable infrastructure while offering Internet Service Provider (ISP) services. In its mobile variant,

WiMAX has the potential to replace cellular networks. How do we get there?



What is WiMAX or Worldwide Interoperability for Microwave Access? WiMAX is an Institute of Electrical and Electronics Engineers (IEEE, see <http://www.ieee.org>) standard designated 802.16- 2004 (fixed wireless applications) and 802.16e-2005 (mobile wire-less). The industry trade group WiMAX ForumTM (<http://www.wimaxforum.org>) has defined WiMAX as a "last mile" broadband wireless access (BWA) alternative to cable modem service, telephone company Digital Subscriber Line (DSL) or T1/E1 service[2].

From here, we know that WiMax is :

- Acronym for Worldwide Interoperability for Microwave Access.
- Based on Wireless MAN technology.
- A wireless technology optimized for the delivery of IP centric services over a wide area.
- A scaleable wireless platform for constructing alternative and complementary broadband networks.
- A certification that denotes interoperability of equipment built to the IEEE 802.16 or compatible standard. The IEEE 802.16 Working Group develops standards that address two types of usage models:
 - A fixed usage model (IEEE 802.16-2004).
 - A portable usage model (IEEE 802.16e)[3].

15.1.2 What is 802.16a ?

WiMAX is such an easy term that people tend to use it for the 802.16 standards and technology themselves, although strictly it applies only to systems that meet specific conformance criteria laid down by the WiMAX Forum.

The 802.16a standard for 2-11 GHz is a wireless metropolitan area network (MAN) technology that will provide broadband wireless connectivity to Fixed, Portable and Nomadic devices [3].

It can be used to connect 802.11 hot spots to the Internet, provide campus connectivity, and provide a wireless alternative to cable and DSL for last mile broadband access.

15.1.3 How WiMax works

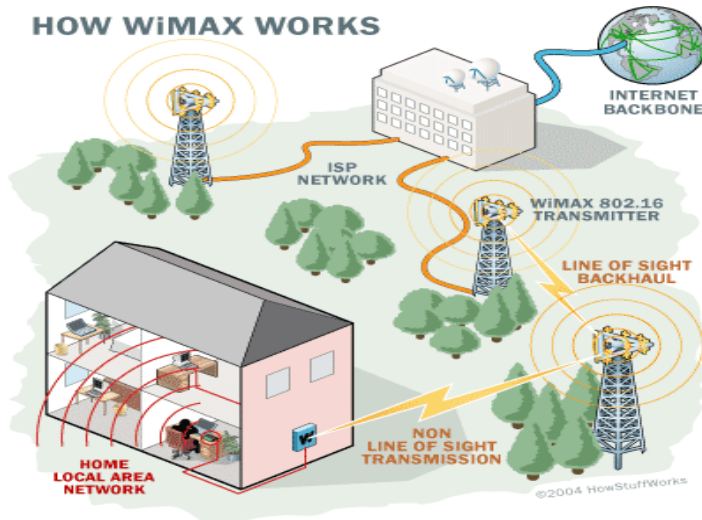
In practical terms, WiMAX would operate similar to WiFi but at higher speeds, over greater distances and for a greater number of users. WiMAX could potentially erase the suburban and rural

blackout areas that currently have no broadband Internet access because phone and cable companies have not yet run the necessary wires to those remote locations.

A WiMAX system consists of two parts:

- A **WiMAX tower**, similar in concept to a cell-phone tower - A single WiMAX tower can provide coverage to a very large area -- as big as 3,000 square miles (~8,000 square km)[4].
- A **WiMAX receiver** - The receiver and antenna could be a small box or PCMCIA card, or they could be built into a laptop the way WiFi access is today[4].

A WiMAX tower station can connect directly to the Internet using a high-bandwidth, wired connection (for example, a T3 line). It can also connect to another WiMAX tower using a line-of-sight, microwave link. This connection to a second tower (often referred to as a **backhaul**), along with the ability of a single tower to cover up to 3,000 square miles, is what allows WiMAX to provide coverage to remote rural areas [4].



What this points out is that WiMAX actually can provide two forms of wireless service:

- There is the **non-line-of-sight**, WiFi sort of service, where a small antenna on your computer connects to the tower. In this mode, WiMAX uses a **lower frequency range** -- 2 GHz to 11 GHz (similar to WiFi)[4]. Lower-wavelength transmissions are not as easily disrupted by physical obstructions -- they are better able to diffract, or bend, around obstacles.
- There is **line-of-sight** service, where a fixed dish antenna points straight at the WiMAX tower from a rooftop or pole. The line-of-sight connection is stronger and more stable, so it's able to send a lot of data with fewer errors. Line-of-sight transmissions use **higher frequencies**, with ranges reaching a possible 66 GHz[4]. At higher frequencies, there is less interference and lots more bandwidth.

WiFi-style access will be limited to a 4-to-6 mile radius (perhaps 25 square miles or 65 square km of coverage, which is similar in range to a cell-phone zone). Through the stronger line-of-sight antennas, the WiMAX transmitting station would send data to WiMAX-enabled computers or routers set up within the transmitter's 30-mile radius (2,800 square miles or 9,300 square km of coverage). This is what allows WiMAX to achieve its maximum range[4].

15.3 CONTENTS

15.3.1 WiMax in Malaysia

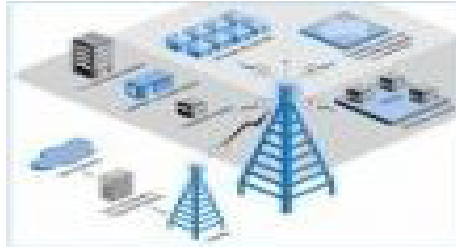
Recently a reader commented on our earlier piece on Clearwire that WiMax will probably meet with greater success in developing countries than in developed ones. We thought it was an intriguing

comment so for this piece, we decided to look into Malaysia's WiMax efforts.

Malaysia's telecom regulator, the Malaysian Communication and Multimedia Commission (MCMC), recently awarded Wimax wireless high speed internet licenses to four companies. While the awarding of the licenses is not ground breaking in itself, the regulator's motivation in choosing these 4 companies out of a field of 17 deserves a closer look.

The four firms chosen were all smaller firms while among the losers were some of the largest companies in Malaysia, including the largest mobile operator in the country, Maxis Communications. At first blush, this decision may seem to be an odd one. Wouldn't the larger, more established firms have an easier time rolling out a nationwide network? Wouldn't granting licenses to the market leaders be a less risky choice.

But MCMC's choice does makes sense if we look at the situation through the lens of disruptive innovation. The theory of disruptive innovation says that established firms have a tougher time taking advantage of disruptive innovations than smaller start-ups do [5]. This happens because, over time, established firms optimize their processes, resources, and values, to succeed in their current environments. When faced with a truly disruptive innovation, these firms have difficulty changing their entire business models to take advantage of the new innovation. So, for example, instead of offering a quad-play package (traditional wireline voice, wireless, video, and internet) over the new WiMax network, these incumbents would be more inclined to try to use their existing infrastructure to leverage their existing investments as much as possible and only sparingly use WiMax to augment their offerings. Of course, this makes sense for the incumbent firms given their large investments in their current infrastructure but it also has the affect of slowing down innovation by keeping the market from realizing the full potential of the new network.



Smaller start-ups, on the other hand, have none of the historical baggage of the incumbents and are free to enter the market in a truly disruptive way. Since the MCMC's goal was to disrupt the market and increase competition and choice for the consumer, it made the right decision when it chose to award the licenses to smaller, more nimble firms instead of the market leaders with established processes [5].

15.3.2 Packet One Malaysia Calls on Alcatel-Lucent for 2.3 GHz WiMAX Network

Phase one of contract calls for integration and deployment of US\$71 million, turnkey 802.16e-2005 solution [6]

Packet One Networks of Malaysia (P1) has selected Alcatel-Lucent to deploy and manage a commercial WiMAX network in the 2.3 gigahertz (GHz) spectrum band, a deal valued at USD71 million for Phase 1 of deployment[6]. A successful deployment of WiMAX services will help establish Malaysia as one of Asia-Pacific's wireless broadband leaders.

Under the agreement, Alcatel-Lucent will supply WiMAX license-holder P1, a subsidiary of Green Packet Berhad, with a complete, turn-key, end-to-end integrated WiMAX wireless broadband solution, including base stations, wireless access controllers, and an operation and maintenance center. Alcatel-Lucent also will be responsible for designing, supplying, constructing, installing, testing, commissioning, integrating, optimizing and maintaining P1's WiMAX network [6].

Deployment is already underway in Klang Valley, Penang and Johor. P1 plans to provide WiMAX coverage for:

- 25% of the population in Malaysia (6.5 million people) by the end of 2008 [6]
- 40% of the population in Malaysia (10 million people) by the end of 2010 [6]
- 60% of the nation's population – including urban, suburban and rural areas by 2013[6]

Services offerings on the P1 network are anticipated to include: voice over IP (VoIP), high-speed Internet access and other mobile data services.

The new WiMAX 2.3 GHz service supports the government's National Broadband Plan to foster economic progress through the establishment of a knowledge-based economy[8]. P1 is the first out of the four Malaysian WiMAX 2.3 GHz license-holders to deliver on its commitment to deploy WiMAX in an effort to help the Malaysian government realize its aspiration to enrich the lives of Malaysians and bridge digital divide [6].

15.3.3 Spectrum is precious: Deploy WiMAX or else,says Malaysia authority

WiMAX licensees reminded to deploy services soon or face penalties



The Malaysian National News Agency, Bernama, reports that the four WiMAX licensed companies are facing the possibility of a fine and having their licenses revoked if their services do not commence in a year's time. The comments came from Malaysia's Minister of Energy, Water and Communications Datuk Seri Dr Lim Keng Yaik. The ministry has previously informed the companies of desires to see commercial services in place by March 2008 [6].

The four license holders are: Asiaspace Dotcom, REDtone-CNX Broadband, Bizsurf and Packet One Networks. A three-month extension will be granted to those not readied by March. "In six months if they do not start, they will be fined and if by one year they do not start their service, their licenses will be revoked," Dr. Lim told reporters [6].

On Tuesday, Packet One Networks announced that it had selected Alcatel-Lucent to manage and deploy the operator's WiMAX equipment. The Packet One network is anticipated to reach 25% of the nation's population by the end of this year [6].

WiMAX operators are expected to deliver services to both rural communities and urban centers of Malaysia. 80% coverage of the country and reaching 99% of the population are the targets

for deploying Mobile WiMAX services. Dr. Lim estimated that 5,000 communication towers and broadcast locations will be needed over the next two years to achieve country-wide WiMAX coverage [6]. Radio frequency spectrum is a precious real estate in all parts of the world. Regulators are taken aggressive positions to make sure that license holders deliver valuable services using WiMAX and other contemporary wireless protocols and do not become spectrum squatters [6].

15.3.4 Alcatel-lucent Wins Malaysian Wimax Contract

Malaysia's Packet One Networks has awarded a WiMAX contract to Alcatel-Lucent worth an initial US\$71 million [7]. Under the agreement, Alcatel-Lucent will supply P1, a subsidiary of Green Packet Berhad and WiMAX 2.3GHz license-holder, with a complete, turn-key, end-to-end integrated WiMAX wireless broadband solution, including base stations, wireless access controllers, and an operation and maintenance center. Alcatel-Lucent also will be responsible for designing, supplying, constructing, installing, testing, commissioning, integrating, optimizing and maintaining P1's WiMAX network [7].

Deployment is already underway in Klang Valley, Penang and Johor and will expand rapidly throughout West Malaysia. P1 plans to provide WiMAX coverage for 25 percent of the population in Malaysia (6.5 million people) by the end of 2008 and 40 percent of the population in Malaysia (10 million people) by the end of 2010. P1 expects to provide WiMAX coverage to 60 percent of the nation's population - including urban, suburban and rural areas - within five years [7].

Dato' Sri Dr Lim Keng Yaik, Minister of Energy, Water and Communications, expressed delight that P1 is leading the pack by becoming one of the first to commercially deploy mobile WiMAX in the 2.3GHz band in Asia-Pacific and to establish one of the world's largest mobile WiMAX 2.3Ghz network [7]. "With the solid foundation established today by P1 together with Alcatel-

Lucent, Malaysia's vision to offer the best communications and wireless broadband infrastructure is now within our grasp [7]."

P1 is one of the four Malaysian WiMAX 2.3Ghz license-holders.

15.4 CONCLUSION

From here we know that WiMax Technology has more advantages that will make we move forward. But as we know, this technology is very new to our country so we still have more than one steps to get WiMax full benefit, but this not mean we are imposible to grap it, this all just about time and effort.

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