

“WIMAX” THE FUTURE OF WIRELESS COMMUNICATION

ABSTRACT

The new era of communication, currently employed in some parts of the world, is Worldwide Interoperability for Microwave Access (WIMAX). It is the latest technology which is approved by IEEE 802.16 group, which is a standard for point-to-multipoint wireless networking. Wimax vision is to deliver “last mile” broadband connectivity to home or business locations, also its data rates are comparable with Cable and Digital Subscriber line (DSL) rates. It has the capability which connects to the ISP (Internet Service Provider) even when you are roaming outside home or office. The Wimax technology is becoming the way to avert the impending crisis of rural connectivity i.e. it will be accessible till the last mile. This paper explains about the purpose of Wimax, the study of Wimax systems, its implications and applications and its wireless capabilities.

KEYWORDS

Wimax, DSL, ISP.

1. INTRODUCTION - “The Road to WIMAX”

Imagine a technology that can reach even into the remote areas or the suburbs where the access to power plants is even difficult. This innovation technology will provide transfer rates of multiple Megabits to the users within a range of several kilometers. As we know the demand for wireless has raised rapidly from 5.7 million in 2002 to 200 million in 2006. The global Wimax market is growing at the rate of 30% per year and is expected to touch \$2.8 billion by 2009 from the present \$ 600 million. The number of Wimax users is forecasted to reach 14.9 million in 2009. Wimax based solutions are more flexible and secured. They provide an outstanding service and are very much cost effective. Topologies of urban and suburban areas can be controlled by this technology. Wimax technology is 30 times faster than the third generation and 100 times faster than the wireless data rates.[1]

In the context of this paper Wimax is a name given to the IEEE 802.16 standard, which was developed to standardize the “last mile” wireless distribution technology. It has several working groups like 802.11a, 802.11d and 802.11e. This technology will provide fixed, nomadic, portable and mobile wireless broadband connectivity without the need for a direct line - of - sight. Wimax promises wireless broadband access at 31 miles in comparison to Wi Fi’s 300 feet.

The two main applications of Wimax are Fixed Wimax, which are point to multipoint enabling broadband access to homes and offices, and Mobile Wimax, which offers the full mobility of cellular networks at true speeds. Also the emergence of next generation wireless technology is going to enhance the effectiveness of the existing methods used by public safety.

Wimax has the potential or capability to provide India with widespread and unimaginable Internet access that can usher in economic growth. Better education and health care, and improved entertainment services. Wimax can provide Internet access to residential customers in suburban and “really” rural areas - the window to a whole new world that the now - obsolete cabled broadband could not offer. Everybody who appreciates freedom from the shackles of cables would love Wimax and what more when the new wireless connection offers convenient communication, cheap phone calls, fast downloads and smooth video streaming.[1,2]

2. BACKGROUND

The demand for wireless is increasing day by day. Presently, the networks are only available in commercial buildings, homes etc. But people want wireless internet access wherever they go like shopping malls, airport, roaming around the city etc. They want to have all the facilities that a cable broadband provides like surfing the web, downloading files, video conferencing etc. with higher data rates. In the context Wimax is positioned as an excellent option. Moreover, the possibility of offering broadband services in combination with voice services will gradually lead to narrow band WLL substitution. Mobile

companies are on the verge of developing new, faster 4G technology:

- CHEJU, South Korea - Global mobile operators and device makers are betting that the next level of transmission technology will ramp up mobile phone usage in a way that the third generation technology has so far failed to do.
- So-called fourth generation (4G) mobile technology, now being developed, would allow two-way communication in voice, video and data on a scale that was previously impossible, companies said at Samsung 4G Forum mobile conference.
- "4G is to deliver high-speed broadband for data and visual centric information. Everything before 4G is voice-centric", said Ali Tabassi, Sprint Nextel Corp. vice president for innovative technology.
- "3G was too much technology driven," said Hong Won-pyo, executive vice president for South Korea-based KT Corp.'s mobile Internet business. "From now on, we need to see demand from users grow together (with technology).
- Sprint Nextel said earlier this year it would spend up to \$3 billion over two years to build a 4G network using Wimax technology, along with Samsung, Motorola Inc, and Intel Corp.
- "After 2010, 4G will become the mobile service that embraces everything," Lee Ki-tae, president of Samsung's telecommunication networks business, told reporters.

The International Telecommunication Union (ITU) defines 4G as a wireless technology that transfers data at 100 megabits per second while the user is moving and 1 gigabit per second when stationary. Wimax equipment promise to be reasonably priced - and therefore a possible great fit for rural areas and smaller communities where DSL and cable modem services aren't available as well as for extending the range of current public Wi-Fi services (you won't have to sit inside the café to download your email and surf the Web!). Intel has already started manufacturing Wimax versions of its Centrino chip and Nokia is slated to have a Wimax available cell phone by next year hopefully.

The major advantage of Wimax is it covers a huge area as compared to the already existing Wi-Fi networks. A single Wimax main station can serve hundreds of users. The full connection can be installed in days rather than weeks which were required for wired connections. Data rates are as high as 280Mbps and distances of 30 miles are possible. Mobile can be operated within 3-5 miles of the base station with data rates of up to 75Mbps. Also, no FCC radio licensing is required for the connection. The possibilities are endless. As we become more mobile and reliant on electronic information and devices, this type of network becomes essential. Wimax is going to bring scale to the market and ideally create a larger market along the way. Wimax is not a new technology, but rather a more innovative and commercially viable adaptation of a proven technology that is delivering broadband services around the globe.[22,23]

2.2 Application & Forum

Wimax is a moniker for IEEE 802.16 interface specifications promoted by the industry trade organization "Forum for Worldwide Interoperability for Microwave Access". Members of the Wimax forum include operators, equipment & component makers. The Wimax forum has introduced a new standard for wireless broadband access. Wimax forum has adopted certain profiles based on the 802.16 standard for interoperability testing and Wimax certification which operates in the frequency bands of 2.5GHz, 3.5GHz, 5.8GHz and also which are licensed by various government authorities. The purpose of The Wimax Forum is to gather together the industry participants and form and communicate a clear vision for where Wimax is heading, what stages and market development focus the standards, regulatory actions and systems development will take and how these things will occur. Wimax is a standard base technology which will serve as a wireless extension or alternative to cable and DSL for broadband access.

Wimax is built on open standards and is widely accepted by regulatory agencies and standard groups around the globe. One of the most notable applications advanced applications for WIMAX is *Telegeoprocessing*, which is a combination of Geographical Information Systems (GIS) and Global Positioning Systems (GPS) working in concert over a high capacity wireless mobile system. Another major application is *Virtual navigation*, where one can