Comparison of Wimax and Wi-Fi: A Review

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ABSTRACT
WiMax and Wi-fi have emerged as promising broadband access solutions for the latest generation of wireless MANs and LANs respectively. Both the networks can support connection oriented transmissions and quality of services. This paper represents the comparison between WiMax(802.16) and Wi-fi(802.11) on the basis of various parameters such as Official release, Network architecture, Technologies employed, Benefits of WiMax and Wi-fi, Communication range, Operating frequency and Data security risks. This paper helps to determine the expected upcoming changes in the wireless technologies.

KEYWORDS: *WiMax, Wi-fi, Adhoc Devices, Wireless Networks.*

I. INTRODUCTION

Telecommunication has grown at tremendous rate in the last ten to twenty years. Improved semiconductor and electronics manufacturing technology of the internet and mobile telecommunication have been some of the factors which have fueled this growth in telecommunication [1].

1.1WiMax

WiMax earned an important seal of approval when the radio communication sector of international telecommunication union (ITU-R) certified it as 3G mobile data technology. It mainly works on 802.16 IEEE standard [2].

1.2WiFi

Wi-fi enable computers send and receive data indoors and outdoors anywhere within the range of base station. The best in Wi- fi is that it is fast. Wi-fi certification comes from the Wi-fi-alliance. It is an non profit international trade organization that tests 802.11 based wireless equipment to make sure that it could work with all other Wi-fi equipment on the market. Now, section II describes the comparison between WiMax and Wi-fi. Section III gives the application of both the technologies and Section IV summarizes the paper[2].

II. COMPARISON BETWEEN WIMAX AND WI-FI

Table 1[2, 4].

Sr.no.	Parameters	WiMax	Wi-fi
1.	Official Release	• WiMax came into the picture in the year 2004.	• Wi-fi was officially launched in the year 1997.
2.	Network Architecture	• Flexible Architecture. • End to end networks based on ip platforms and packet technology. • IEEE Standard 802.16. • It forms mesh topologies and hierarchal structures. • It has flexible bandwidth range from 1.25MHz to 20MHz.	• No fixed points, every node is able to communicate with other node. • It is based upon two different ways to configure a network i.eadhoc and infrastructure. • IEEE Standard 802.11. • Several algorithms are used to prevent this from being chaos. • It has channel bandwidth of 20 MHz.

3.	Technologies employed by WiMax and Wi-fi	• **Technologies implied are:** • Scalable orthogonal frequency multiple access(SOFDMA). • Mobile in mobile output(MIMO). • Internet protocol(IP). • Adaptive modulation schemes. • Advanced encryption standard(AES).	• **Technologies implied are:** • 802.11a: Provides data rate to 54Mbps in 5GHz of frequency range. • 802.11b: Commercially trade marked in 1999 by wireless ethernet alliance. • 802.11g: It offers higher data rates upto 22 Mbps at 2.4 GHz of frequency range by using ofdm.
4.	Benefits of Wi-fi and Wi Max	• **Benefits are:** • **High Bandwidth**: Provides data rate upto 70Mbps. • It can support thousand homes at 1Mbps. • **Flexible Architecture**: It works on point to point, point to multipoint coverages. • **High Security**: It provides strong security measures to prevent security threats.	• **Benefits are:** • **Mobility and Portability**: They can connect anytime anywhere. • **Immediate Utility**: Ability to create direct connections within the Wi-fi. • **Ease of use**: Allows users to identify available devices before establishing connections. • **Simple secure connections**: It makes simple to create security protected connection between devices.
5.	Communication range	• upto 40kms.	• upto 100 meters.
6.	Opreating frequency	• **Fixed WiMax(802.16):** 2-11GHz. • **Mobile WiMax(802.16e):** 2-6GHz.	• It reffered to as 2.4GHz band. • The 5GHz and 5.8GHz provides additional bandwidth and higher frequency.
7.	Data security risks	• Privacy sublayer was defined to handle the encryption of packets and key management. • **Two schemes for data encryption are used:** • Advanced encryption standard(AES) • Triple data encryption standard(3DES) • Jamming and packet scrambling that effect WiMax physical layer.	• Wired equivalency privacy(WEP) was the first encryption method used for Wi-fi. • It uses RC4 cipher for encryption and 128or 256 bit keys are standard today. • Wi-fi protected access(WPA) method implements strongerencryption algorithm and provide two usage level. • It has long been battered by security attacks from all sides.

III. APPLICATIONS

BothWi-fi and WiMax can be integrated and overlay. If they can be integrated, it means that WiMax and Wi-fi will support each other. Both of them will be synergized to serve bigger and many more subscribers. WiMax and Wi-fi can offer some potentially significant cost savings for mobile network operators by providing an alternate means to backhaul BS traffic from cell site to the BS controllers. Mobile network operators typically utilize some type of wired infrastructure that they must buy from

an incumbent operator. A Wi-fi or WiMax mesh can offer a much more cost-effective backhaul capability for BS in metropolitan environments. Using Wi-fi and WiMax open broadband wireless standards and implementing mobile computing, governments and partners can quickly and cost-effectively deploy broadband to areas not currently served, with little or no disruption to existing infrastructures [3, 5].

IV. CONCLUSION

Broadband wireless is a significant growth market place for the telecom industry to deliver a variety of applications and services to both mobile and fixed users. The strength of WiMax lie in its ability to address the requirements of modern telecommunication networks and the commitment that has been shown to its development and wide acceptance by number of leading equipment vendors and service providers. Whereas concluding the results on Wi-fi there are real and measurable benefits of using a wireless networks verses a standard wired network. Greatest benefit is that there are no wires needed. The Wi-fi alliance is active with many industrial organizations and is working with manufacturers to make sure that existing Wi-fi gear is compatible wireless technologies developed in the future.

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