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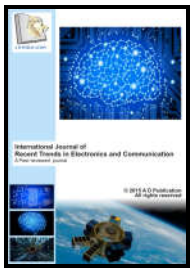

Coexistence between Wi-Fi and WiMax

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A B S T R A C T : Wireless networks square measure highly regarded today. Wireless native space Network (WLAN) that uses the IEEE 802.11 customary and WiMAX (Worldwide ability for Microwave Access) that uses the IEEE 802.16 customary square measure networks that we would like to explore. WiMAX has been developed over ten years; however it's still unknown to the majority. But compared to wireless local area network, it's several benefits in transmission speed and coverage space. This paper can introduce these 2 technologies and build comparisons between WiMAX and local area network. Additionally, wireless network being of wireless local area network and WiMAX are explored through simulation. in conclusion we would like to debate the longer term of WiMAX in relevance local area network.

Keywords: WiMax, Wi-Fi, Network simulation, Wireless coexistence

1. Introduction

With the event of transmission communication, individuals want wireless broadband access with higher speed, larger coverage and quality. The emergence of WiMAX (Worldwide ability for Microwave Access) technology met the people's demand for wireless web to some extent. If wireless computer network technology (WLAN) solves the access downside of the "last 100 meters", then WiMAX technology is that the best access resolution of the "last mile". although WiMAX is associate degree rising and very competitive wireless broadband access technology, the event prospects of its market continues to be unknown. Hybrid networks as a supplement to cell based mostly} or information science packet based services, will absolutely replicate the characteristics of wide network coverage. It means that creating a wireless being of Wireless native space Network (WLAN or local area network - a proprietary phrase meaning IEEE 802.11x) and WiMAX for devices on completely different technology segments to speak with one another. during this paper the {wifi|wireless local square measurea network|WLAN|wireless fidelity|WiFi|local area network|LAN} and WiMAX technologies are introduced at first, and so their own characteristics square measure compared. Next, the being of local area network and WiMAX is analyzed. By victimization the OPNET creator computer code, the wireless being readying is evaluated with output graphs. Finally, the paper concludes by discussing the longer term of WiMAX in relevance local area network.

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Nomenclature

Wi-Fi	Wireless Fidelity
Wi-Max	Worldwide Interoperability for microwave access
OPNET	Optimized Network Engineering Tool
LAN	Local area network

2. Overview of WIFI and WiMAX

2.1. Wi-Fi Introduction

Wifi stands for a proprietary phrase which implies IEEE 802.11 xs, and could be a short-range wireless transmission technology. local area network could be a technology victimization wireless means that to interconnect personal computers, hand-held devices (such as personal organizer, sensible phone etc.) And different terminals. It's a complete of wireless network communication technology that is control by the local area network Alliance. the aim is to enhance the ability between wireless network merchandise supported the IEEE802.11 standards. Generally, to line up a wireless network, associate degree access purpose (AP) and wireless network adapters' square measure the fundamental necessity. This manner it will use the wireless medium and coordinate with the structure of the prevailing wired network to share network resources. As a result the value of the created and also the complexness square measure way below the standard wired network.

2.2. Wi-Max introduction

WiMAX that stands for World ability for Microwave Access could be a customary supported IEEE 802.16 broadband wireless access metropolitan space technology, associate degreed it's an air-interface customary for microwave and millimeter-wave band. WiMAX additionally called IEEE Wireless MAN (Metropolitan space Network), will give a good ability broadband wireless access technique below the person of some extent to multipoint multi-vendor surroundings.

The signal coverage of WiMAX technology ups to 50km, this technology will operate digital communication among the vary of 50km at a really quick speed. Through the development of alittle range of base stations, the town is able to bring home the bacon full coverage. This makes the wireless network expand the vary of applications, providing access speed ups to seventy Mb/s (with fourteen MHz carrier).

3. Comparison between WIFI and WiMAX

Some variations between local area network and WiMAX may be found within the following table. It's quite clear that these 2 square measure terribly differing kinds of technologies with the employment of various IEEE standards.

Table1. Coexistence between Wi-fi and WiMax

Sr.No.	Feature	WiFi	WiMAX
1	Standard	802.11a/b/g/n	802.16d/e
2	Data rate (MAX)	300 Mbps	70Mbps
3	Transmission distance (MAX)	300m	50Km
4	Operating Frequency	2.4 GHz and 5GHz	2-11 GHz

5	Channel Bandwidth	20 to 25MHz	Ranging from 1.25 to 20 MHz

4. Coexistence between WIFI and WiMAX

Refer to fig one on being network of cellular, WiMAX and local area network technologies. The cellular technologies (like 3G, as 4G isn't that well lined now) lack the information measure of local area network however has higher quality, whereas local area network has higher information measure with lesser quality.

These square measure the shortcomings of local area network technology once we think about the big wireless coverage:

(1) The characteristics of local area network verify that APs ought to have their own channels in a locality, or it'll cause interference. Among multiple operators, asking and roaming became a limiting consider the event.

(2) By the little transmission distance limitation, every local area network access purpose becomes a network island. So it's troublesome to hide the complete town.

(3) It can't be employed by itself with a high speed moving vehicle like the railway, railway and bus transit system. That the network would fail to really support the dream of a mobile town.

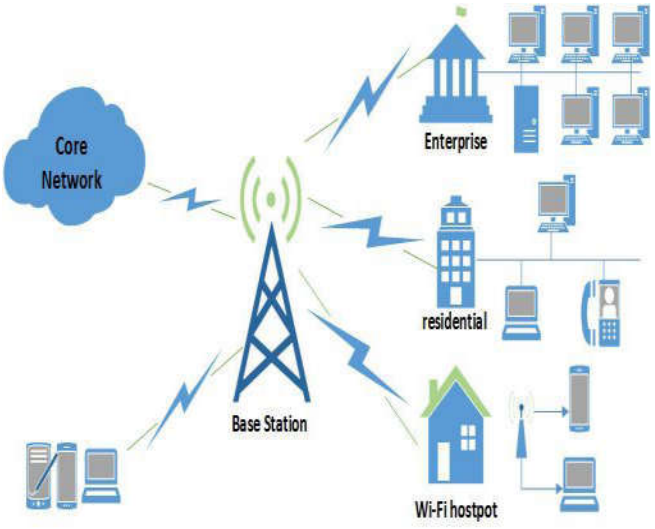

Fig. 1. Wireless coexistence (WiFi, WiMAX and 2G/3G) [1]

The most constructive approach is that WiMAX and wifi|wireless local square measurea network is strongest once operating collaboratively. So multi-mode cards (for multi-mode devices) can revolutionize the roaming hotspot user's expertise. Additionally, the technologies can exist in an exceedingly inventive approach. Being of WiMAX and local area network, will solve the mentioned issues of local area network as in figure four. The event of WiMAX and local area network could be a complementary trend. Within the recent times they need coexisted with one another, and coordinated well with 3G technology. WiMAX, local area network and 3G joint network build use of a unified management platform to share user's info. Meanwhile, the performance of the prevailing networks may be greatly improved.

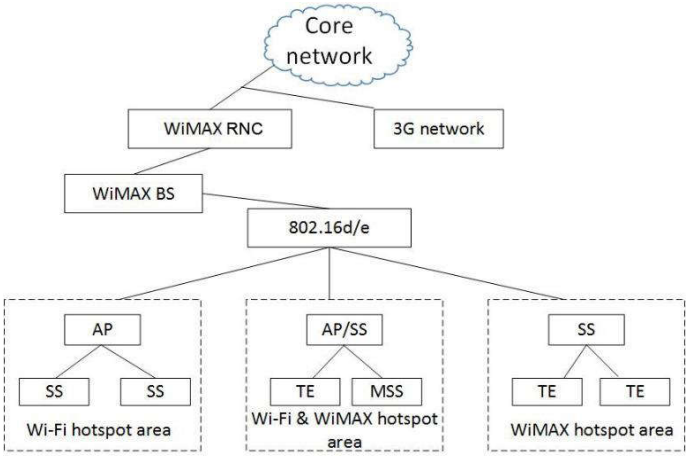

Fig2. Hybrid network (WiFi and WiMAX) [1]

5. OPNET modeller

5.1. OPNET Modeller Introduction

OPNET (Optimized Network Engineering Tool) Company originated in Massachusetts Institute of Technology, and it absolutely was established in 1986. In 1987, OPNET Company discharged its initial industrial network performance simulation package that provided a very important network performance improvement tool that revolutionized network simulation. Creating powerful prognostic ative network performance management through simulation has therefore become doable. OPNET has developed different product besides modeller, and it conjointly includes OPNET Development Kit, WDM Guru etc.

This package uses Associate in Nursing object-oriented modeling and graphical editors. It reflects the structure of actual networks and network elements. It provides comprehensive support communication systems and distributed systems development setting. Versatile stratified modeling methodology of OPNET modeller will support all network analysis connected communications, devices and protocols.

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5.2. Wireless Network Coexistence deployment

This experiment was conducted victimization the OPNET modeler with existing OPNET simulation models and situations. We tend to analyzed them as follows with a straightforward topology that enclosed a mix of LAN and WIMAX elements. Figure half dozen shows the topology used with use of WiMAX technology because the backbone network of a LAN hotspot.

In a tiny space, each WiMAX base station (BS) and WLAN-WiMAX access purpose (AP) are gift. Wireless local area network nodes (clients) on the left are connected to the network servers victimization WiMAX connections.

Some of WiMax normal utilized in simulation

Table 2.WiMax Standard [1]

1	Antenna gain	14 to 15 dbi
2	Maximum transmission power	0.5 to 3w
3	Receiver sensitivity	-200 dbm
4	Maximum number of nodes	100
5	PHY profile/ characteristic	OFDM

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5.3 Simulation results and discussion

The simulation ran for half-hour (1800 seconds). The networks used RIP for routing. We tend to measured traffic on the shopper and server sides. Fig 7, 8 and 9 demonstrates the traffic received by wireless users that contains Background Work Server, Instant Text Communication Server and Interactive Audio/Video Server. Time is depicted on coordinate axis of graphs in seconds.

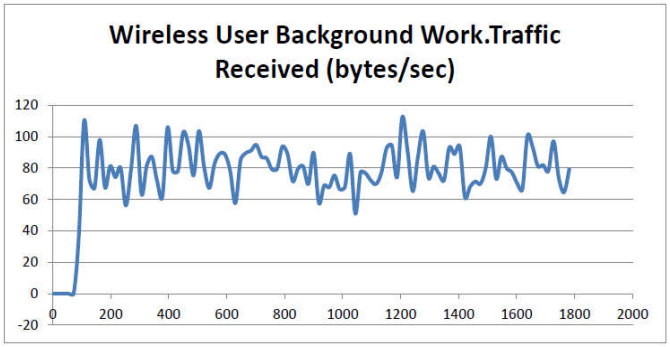

Fig. 3. Wireless user background Work traffic [1]

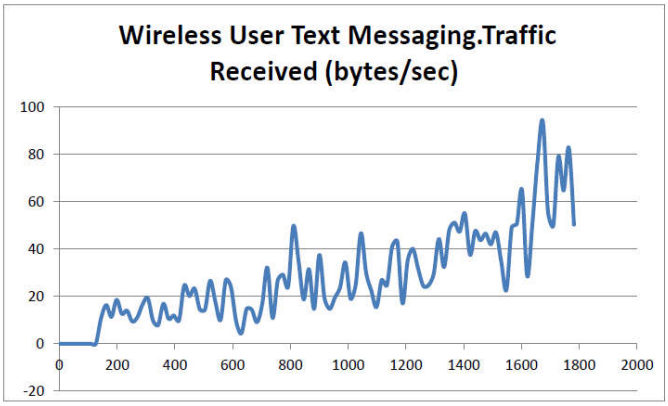

Fig. 4. Wireless user instant text traffic [1]

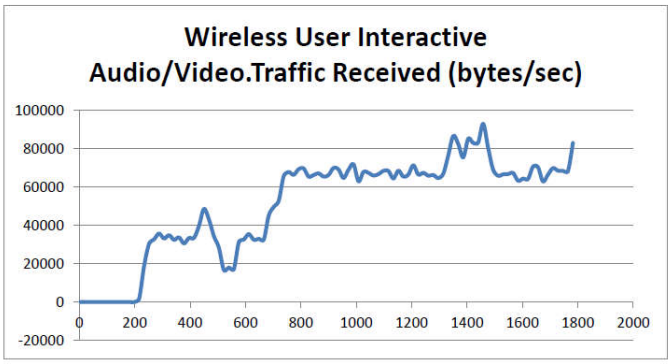

Fig. 5.Wireless user interactive audio/video traffic [1]

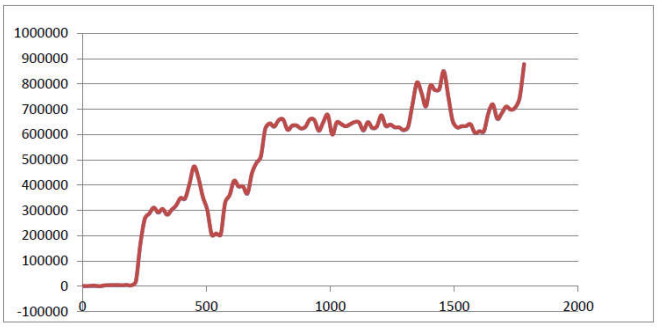

Fig. 6.WLAN and WiMax Throughput (bits/sec) [1]

In fig 7 and 8, the traffic delay time of WiMAX on server aspect is longer than LAN on shopper aspect. The LAN delay is lesser on the shopper aspect with lighter load on them; however it's slightly higher on the WiMAX aspect servers with higher load on them. The WiMAX tends to perform slightly below LAN once it involves latency or delay. The common worth of WiMAX is zero.05 seconds and also the most of LAN is regarding zero.0017 seconds.

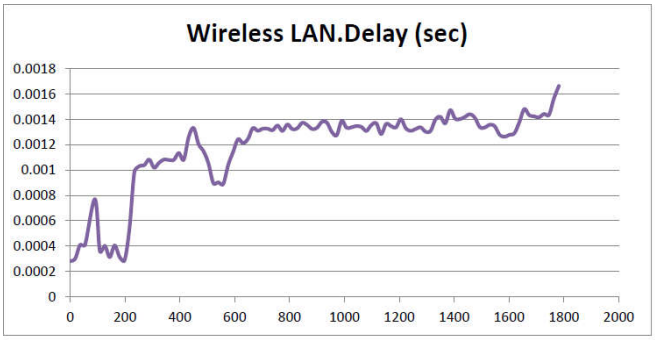

Fig 7. Wireless LAN .Delay on client side [1]

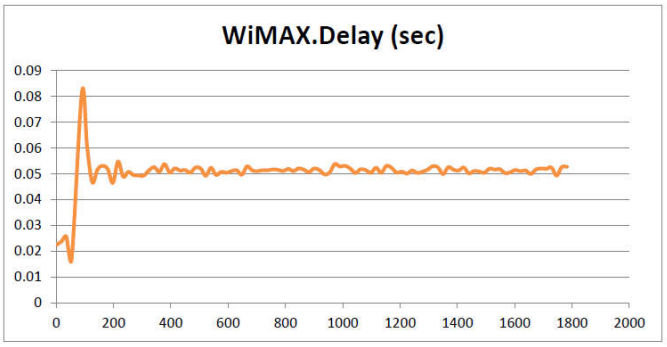

Fig 8. Average WiMax Delay on server side [1]

6. Vertical Handover

Although not being targeted on a similar use, a lot of recently WiMAX technology has many blessings compared to Wi-Fi. Such as: a much better reflection tolerance; a much better penetration of obstacles; Associate in Nursingd an exaggerated within the variety of interconnections (a few many instrumentality instead of some tens of apparatus for Wi-Fi). It's obvious that the WiMAX normal goal isn't to exchange Wi-Fi in its applications however rather to supplement it so as to create a wireless network net. Despite the similarity in instrumentality price, WiMAX technology needs a expensive infrastructure in distinction to Wi-Fi which may simply be put in victimization low price access points.

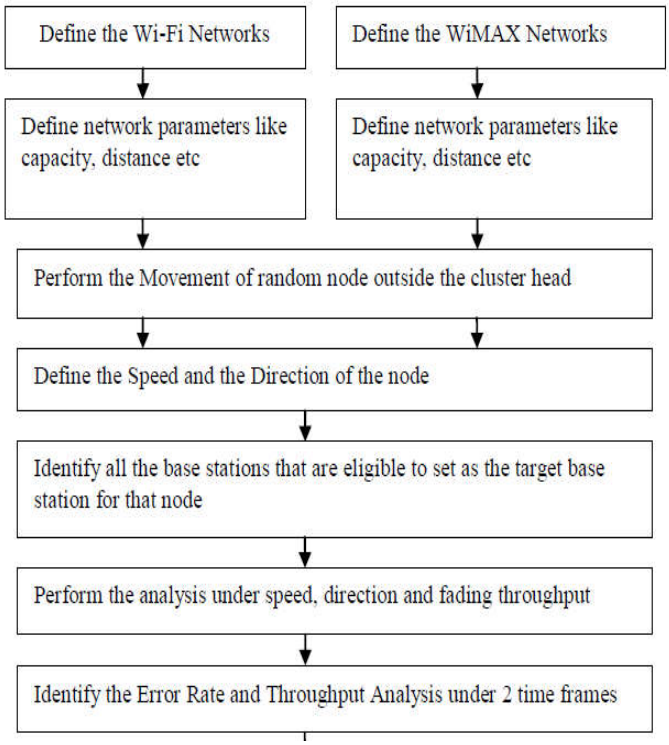

Fig. 9 Flow chart of vertical handover [2]

Conclusion

This paper has given a particular description of 2 of the foremost distinguished developing wireless access networks Associate in Nursingd even mentioned the tactic by that these technologies might collaborate along to create an alternatives for implementing last-mile wireless broadband services. careful technical comparative analysis between the 802.11 (Wi-Fi) and 802.16 (WiMAX) wireless networks that offer different answer to the matter of knowledge access in remote inaccessible areas wherever wired networks aren't price effective has been looked into. As we've studied on top of one amongst the key issues of the mobile networks is that the degradation of the output throughout the relinquishment mechanism. The given work provides the essential operation of a seamless vertical relinquishment method that may takes place below hybrid networks so as to scale back the error rate and improve output over the wireless communication.

We may analyze the performance of the co-existence network of WiMAX and wireless fidelity through existing OPNET simulation models and also the network was performing arts as anticipated. the information traffic received and delays were measured. WiMAX allows low price mobile access to the net and provides integrated wireless mounted and mobile services victimization single air interface and specification. however the place of wireless fidelity cannot be replaced within the recent years. Undeniably WiMAX has blessings in some areas; however it still faces the chance of being no inheritable. WiMAX ought to pinpoint its location, realize the suitable development of the market, and think about higher existence with wireless fidelity.

Acknowledgements

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