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Throughput Performance of Wifi and WiMax using OPNET

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Abstract

Wierless Fidelity (WiFi) network will be based upon the IEEE 802.14 standard. Worldwide Interoperability for Microwave Access (WiMAX), based upon IEEE 802. 16, is a standard with similar principles. The main good thing about WiMAX over WiFi is that it covers greater areas and has higher data rates. WiMAX network employees provide WiMAX subscriber products that permit link with the metropolitan WiMAX network while WiFi units are being used to touch base local devices within homes or businesses. Through this paper, we use OPNET Modeler to simulate and compare WiFi and WiMAX in a tiny area network and compare their performance in conditions of range of motion. Simulation results indicate that WiMAX may carry greater load and has better throughput.

Keywords: *WiFi, wimax, simulation, OPNET and strap width.*

1. Introduction

Wireless Fidelity (WiFi) and Worldwide Interoperability for Micro wave Access (WiMAX) are Cordless Neighborhood Network (WLANs) technology. WiFi is based on the IEEE standard 802. 11 while WIMAX works based on IEEE 802. 16. Both standards are suitable for the Internet process applications. WiFi is enhanced for a very high speed WLAN while WiMAX is intended for a top speed Wireless Wide Location Network (WWAN). WiFi comes with an operating range of handful feet with rates of speed up to 54 Mbps while WiMAX may operate in the number of up to 40 miles with speeds of 70 Mbps and beyond. WiFi may cover an office or a campus area while WiMAX covers a complete city. Through this paper, we describe a comparative performance analysis of WiFi and WiMAX technologies for a tiny area network. Two cases were made to carry weight and compare the throughput. Section 2 show wimax, methodology has in Section 3. Results and discussed in Section 3, we conclude with Section 4.

2. WiMax

WiMAX [6] supports fixed and mobile Access to the internet. It can be linked with a web Process (IP) based core network, which is chosen by operators that act as internet Service Providers (ISPs). 802. 16e uses Scalable Orthogonal Frequency- Division Multiple Access (SOFDM A) rather than orthogonal Frequency-Division Multiplexing (OFDM). This employs two multiple Duplexing schemes: Time Division Duplexing (TDD) and Frequency Section Duplexing (FDD). WiMAX bottom station uses T1 (1. 544 Mbps), which may provide bandwidth to hundreds of Internet subscribers with frequency band frame 15 GHz to 66 Gigahertz [7].

3. Methodology

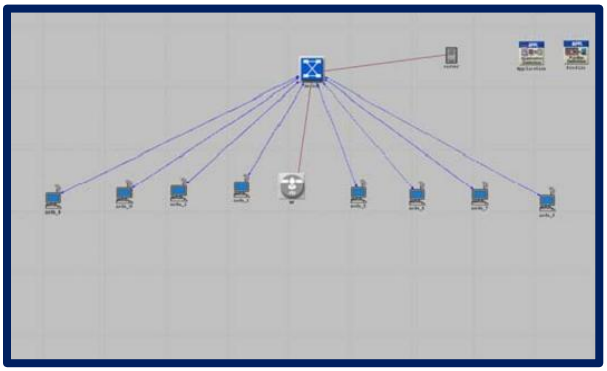

Figure 1: WiFi Scenario with Stationary Workstations

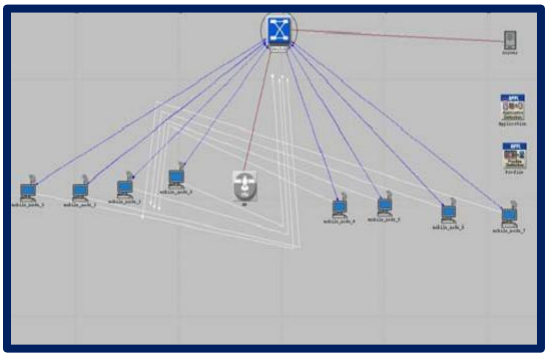

Figure 2: WiFi Scenario with Randomly Located Mobile Stations

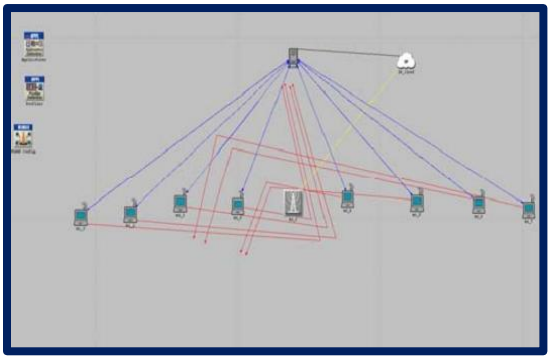

Figure 3: WiMAX Scenarios with Randomly Located Mobile Stations

4. Results and Discussion

Four applications are being used in three situations to compare the network load and queuing wait. HTTP traffic sent and received is shown in Figures 4 and 5, respectively. The traffic dispatched by both mobile and fixed WiFi is similar to the traffic received, which implies no reduction. There is also no loss in case of mobile WiMAX traffic dispatched and received. No reduction occurring due to handoff because the WiFi network has only one AP and the WiMAX network has only one BULL CRAP in each simulation situation The typical and overlaid point-to-point throughput of the back to the inside hyperlink to the server and outward link from the server are shown in Figures 4 and 5, respectively. Point-to-point throughputs for fixed and mobile Wi-fi are as predicted. Wireless with moving stations has better throughput than set WiFi, which is credited to the stations moving closer to the AP. WiMAX has higher throughput when compared with WiFi scenarios. The throughput of inward link to the server is much smaller in comparison to the outward website link from the server, as seen in Figure 5. In WiFi mobile and WiMAX scenarios, the throughput of the WiMAX network link that carries fill from the server has higher point-to-point throughput WiMAX has better throughput because it is based on a broadband service.

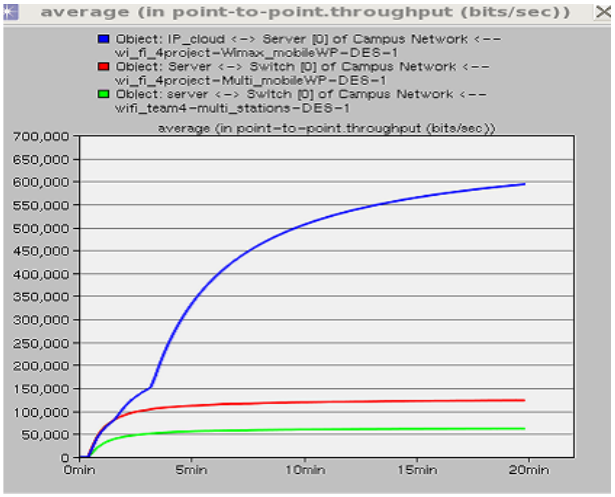

Figure 4: Throughput of the Inward Link to the Server

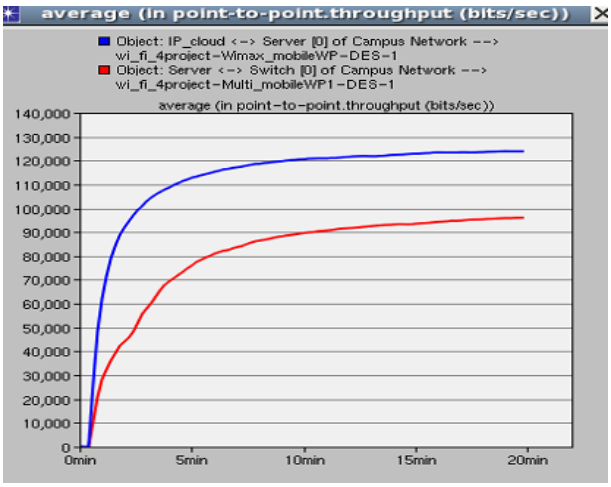

Figure 5: Throughput of the Outward Link from the Server

5. Conclusions

From this paper, we simulated two WiFi and one WiMAX scenarios and in comparison their throughput. WiMAX throughput is higher in circumstance of heavier traffic and wide area range. WiMAX may handle heavier load when compared to WiFi. The simulation results show that the WiMAX queuing delay is smaller because WiMAX provides internet connection service to carry bulkier traffic load over the network. Queuing delays for both WiFi scenarios are identical.

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[7] W. Hrudey and Lj. Trajkovic, "Mobile WiMAX MAC and PHY layer optimization for IPTV," Mathematical and Computer Modelling, Elsevier, vol. 53, pp. 2119–2135, Mar. 2011. Figure 16: Average queuing delay of the server to switch link in WiFi and the IP cloud to server link in WiMAX.

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