

ENSC 427 - Communication Networks
Final Project Presentation
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Evaluation and Comparison between WiMAX and Wi-Fi

Group 11

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<http://www.sfu.ca/~tlan/ENSC427Webpage.html>



Brief Overview

- ◆ The Goals and Expectations
- ◆ Introduction to Wi-Fi and WiMAX
- ◆ Implementation and Simulation Results
- ◆ Comparison and Analyze
- ◆ Conclusions
- ◆ References



The Goals and Expectations



- ◆ To compare the behavior of Wi-Fi and WiMAX under different situation
 - ◆ WiMAX should be less sensitive to distance change and have better performance in long distance information exchange
 - ◆ Wi-Fi should have higher transmission speed in close range information exchange

RoadMap

- ◆ The Goals and Expectations
- ◆ **Introduction to Wi-Fi and WiMAX**
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Wi-Fi Information

- ◆ Wi-Fi (IEEE 802.11)
 - ◆ Wireless LAN (WLAN) technology to allow devices to connect to the internet without any wires
 - ◆ Using an access point or hotspot, wireless devices connect to these access points through radio waves
 - ◆ Limited range
 - ◆ up to 250m
 - ◆ Transmits up to speeds of 72.2 Mbps over a 20MHz channel



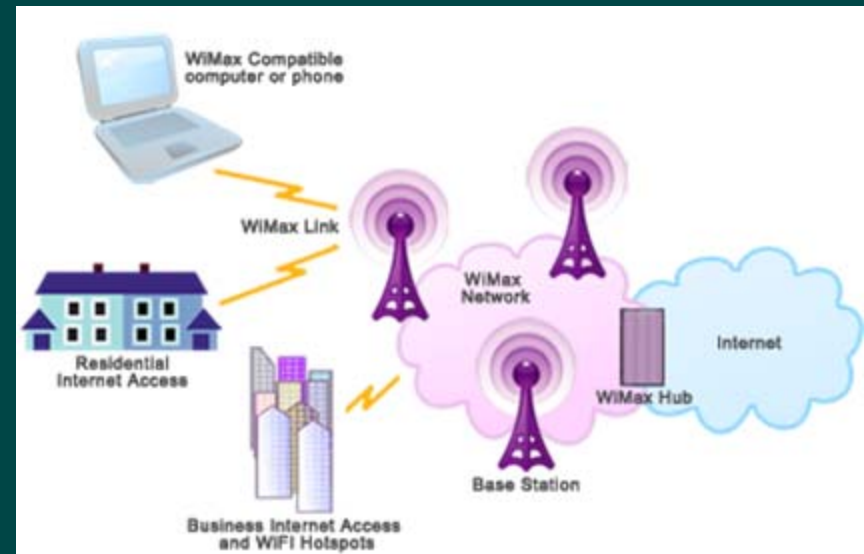
Wi-Fi Technology



- ◆ Features
 - ◆ Large Throughput
 - ◆ Handles large file transfers
 - ◆ Available in most areas

WiMAX Information

- ◆ Less commonly known comparing to 3G/4G, or Wi-Fi
- ◆ First proposed in 2001
- ◆ Based on standard 802.16
 - ◆ Channel range 10 GHz to 66 GHz
- ◆ 802.16e is now one of the two 4G standard
 - ◆ Channel improved with an extension of 2 GHz to 11 GHz
 - ◆ Speed up to 75 Mbps
 - ◆ Maximum distance of 50 km



WiMAX Advantages

- ◆ More signal coverage
- ◆ Better frequency utilization and bandwidth efficiency
- ◆ Lower energy usage
- ◆ Wide transmission range and distance
- ◆ Stable and relatively high transmission speed
- ◆ Low delay even in long distance transmission



The Idea

- ◆ To simulate Wi-Fi and WiMAX under the following environments
 - ◆ Single client to see the features of the WiMAX and Wi-Fi.
 - ◆ Different client with different distance away from the base station. Test out how distance affects the transmission effect.

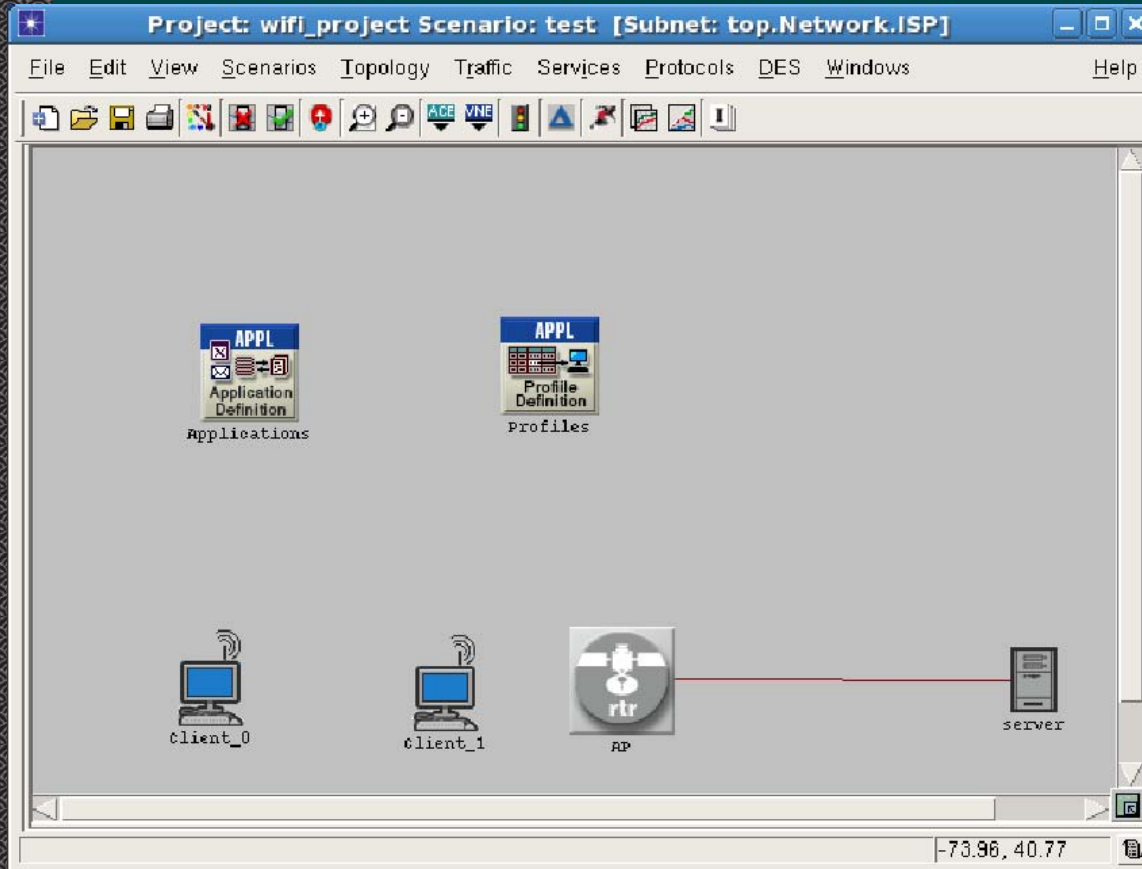


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OPNET Implementation – Wi-Fi



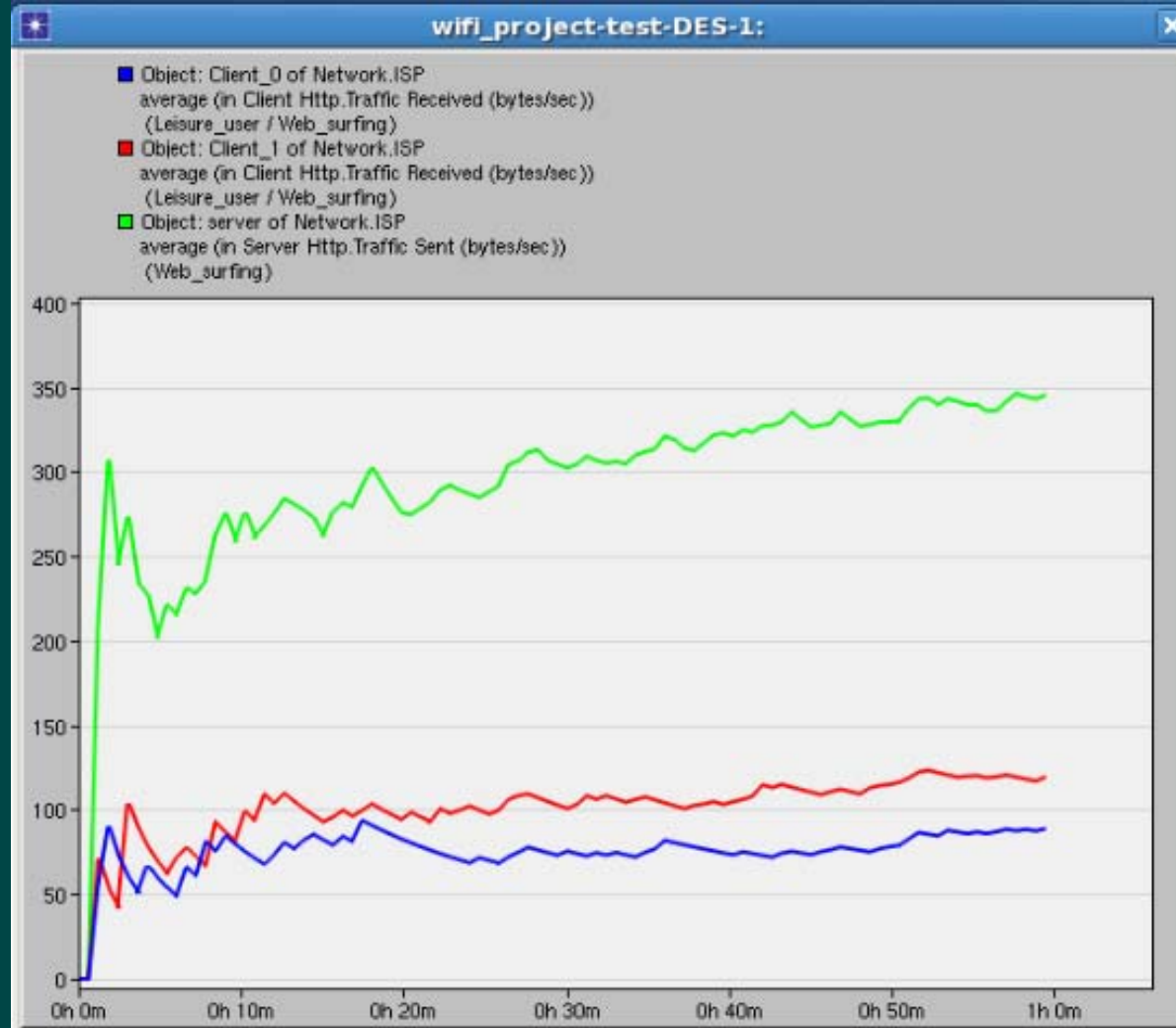
Wi-Fi Topology

- 1 Ethernet Server
- 1 Access Point
- 2 Client Workstations
- Application, Profile Definition

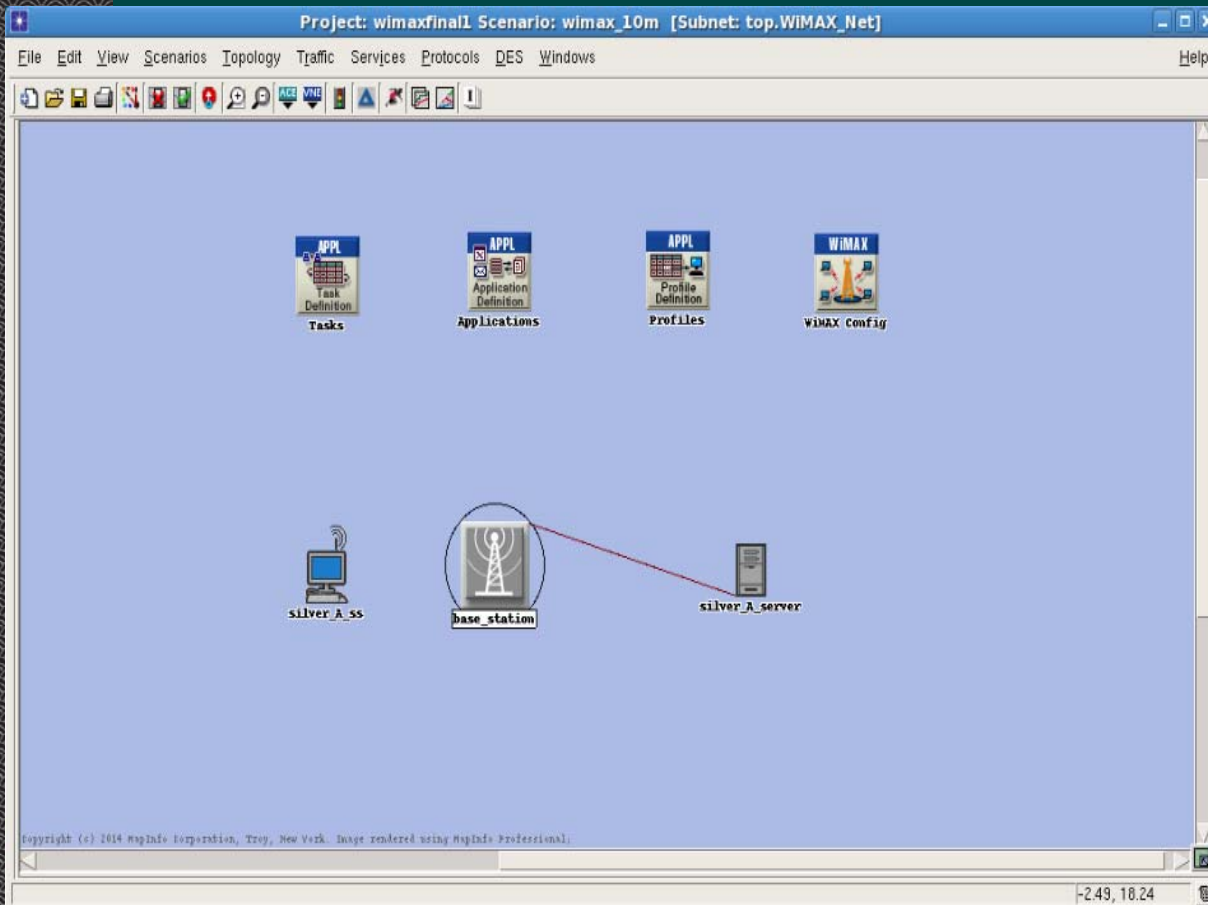
Simulation Results-Wi-Fi



Difference of receive speed between two clients and server:



OPNET Implementation - WiMAX



WiMAX Topology

- 1 Ethernet Server
 - 1 WiMAX Base Station
 - 1 Client Workstation
- Application, Profile and WiMAX Configuration Definition

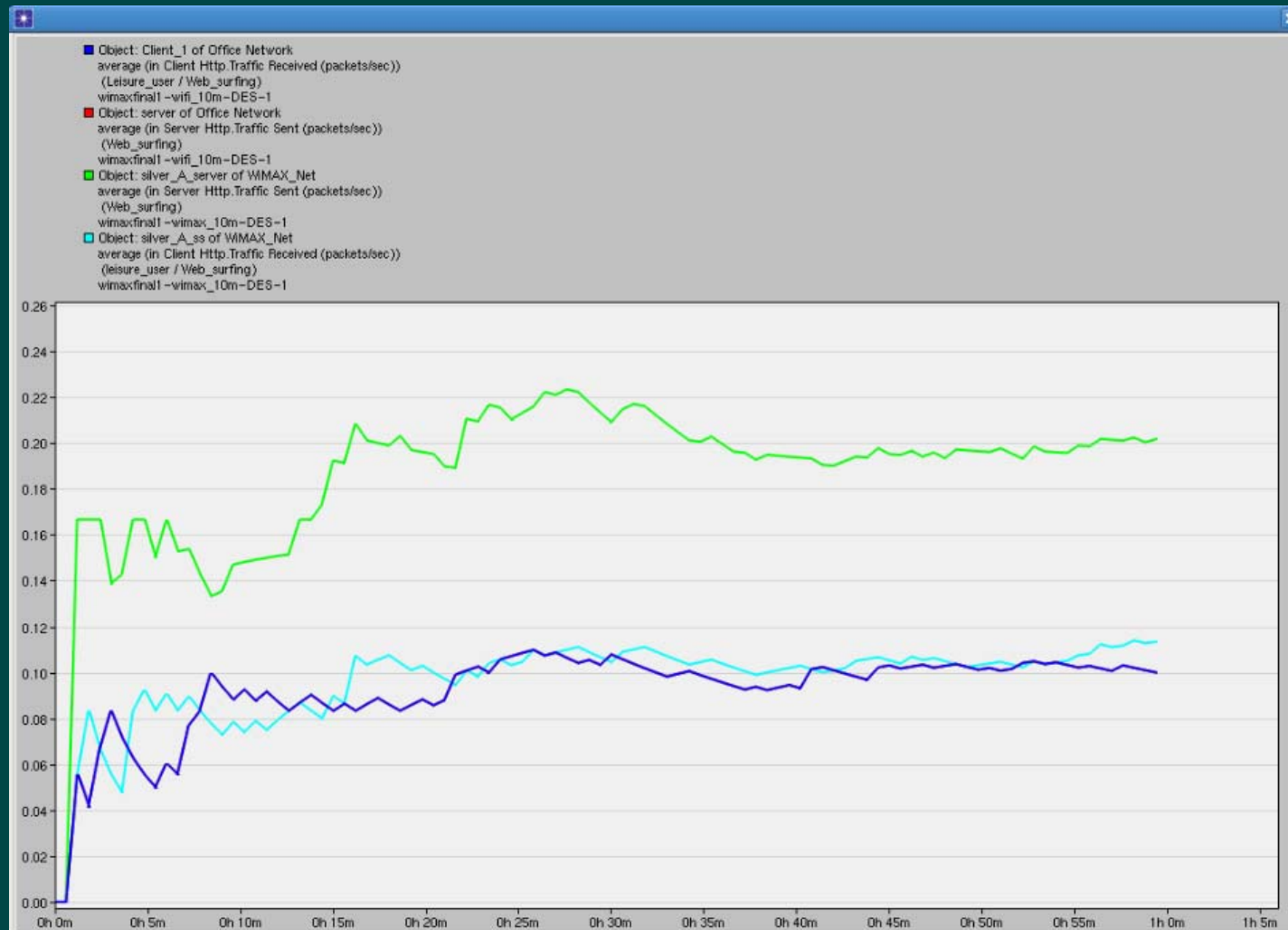
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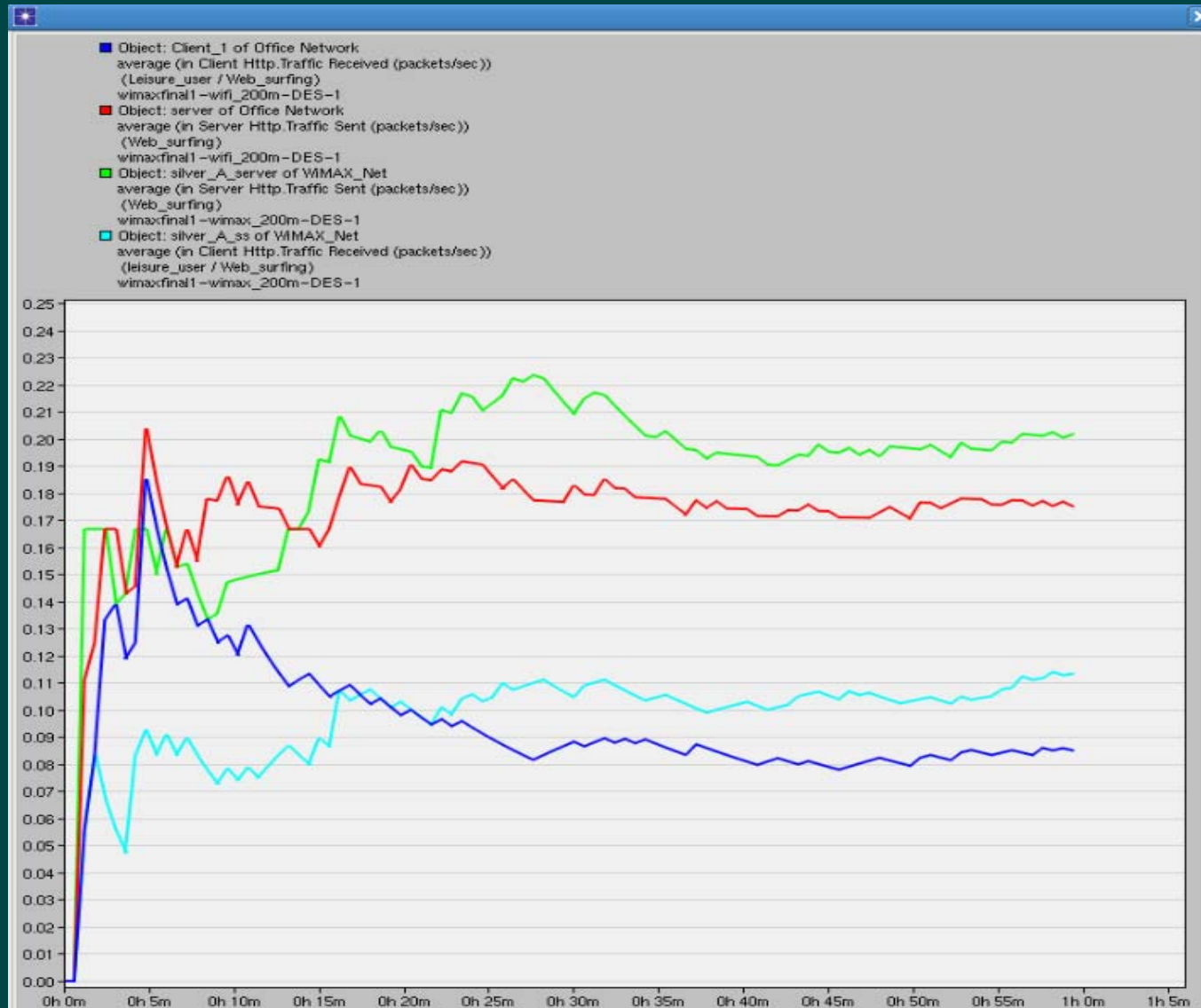
Comparison and Analyze

Data receive rate at 10m



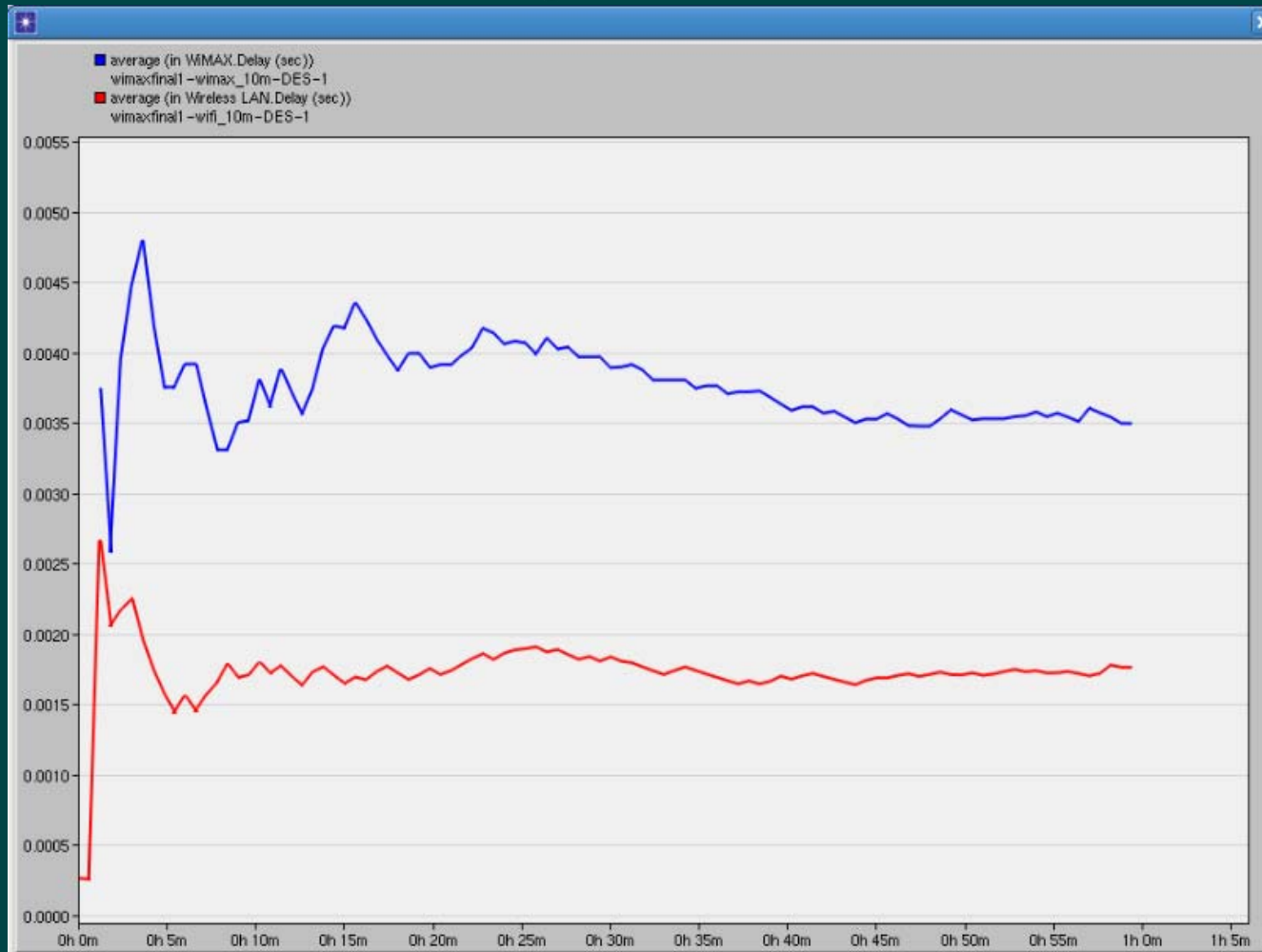
Comparison and Analyze

Data receive rate at 200m



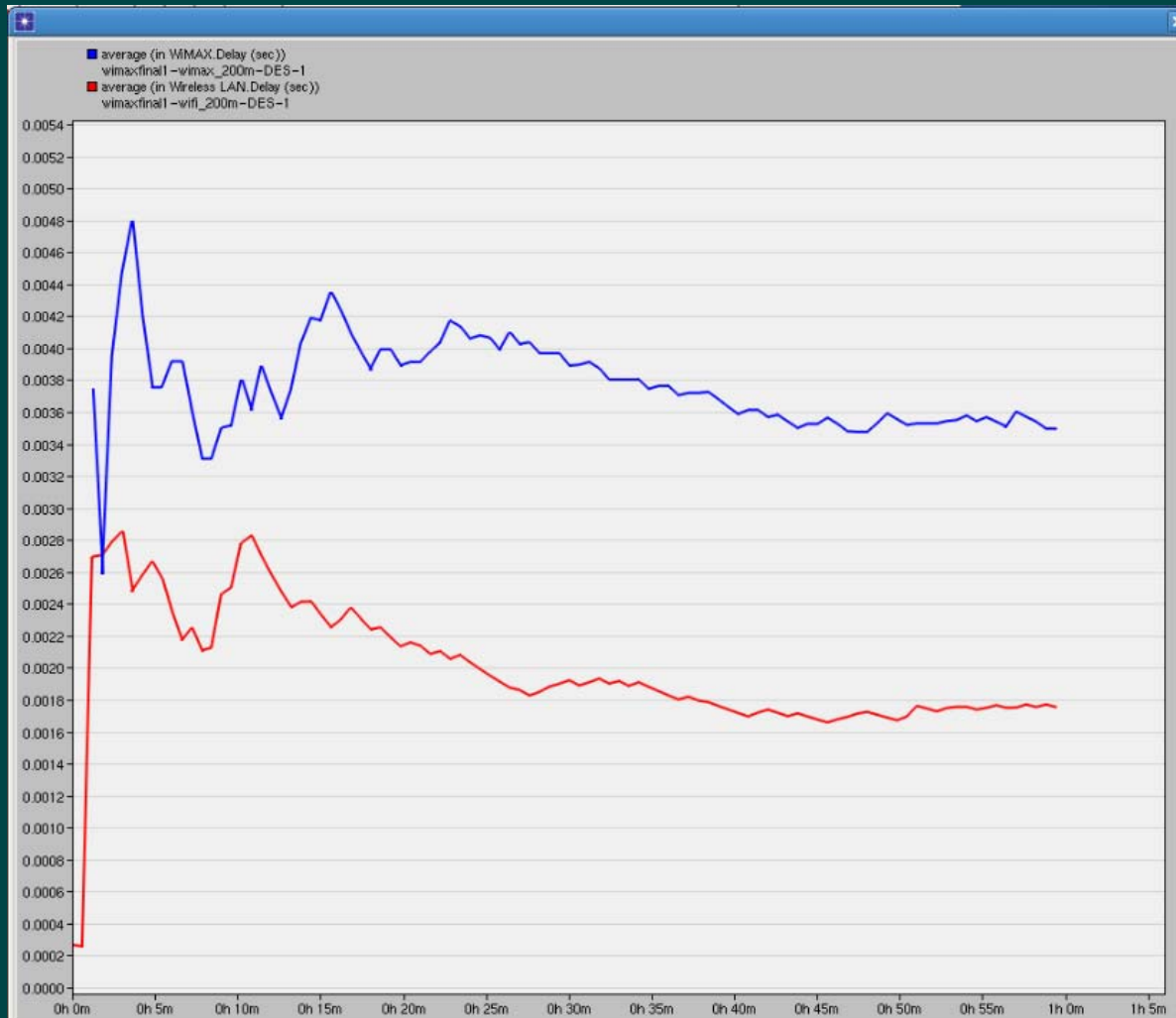
Comparison and Analyze

Delay at 10m



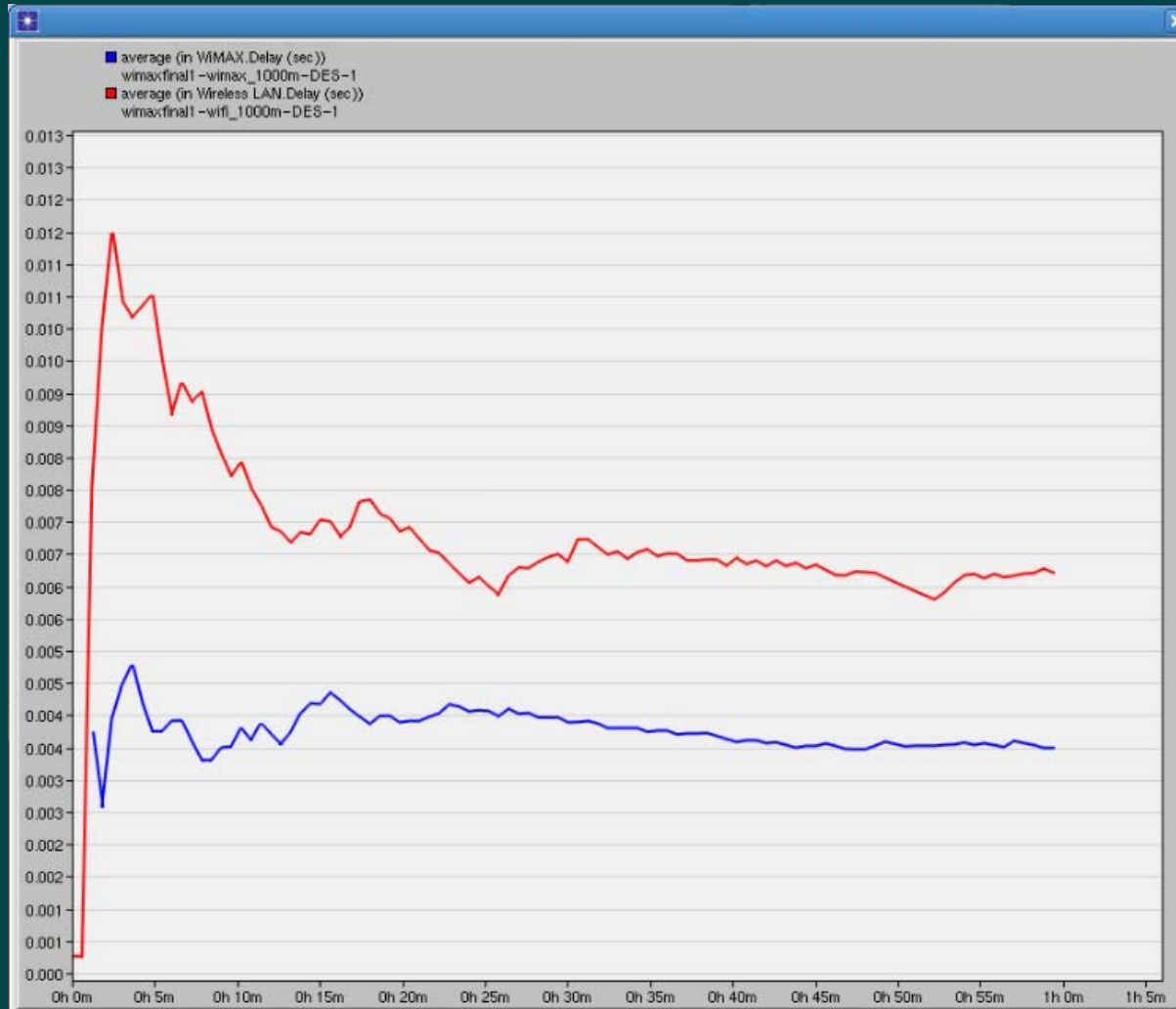
Comparison and Analyze

Delay at 200m

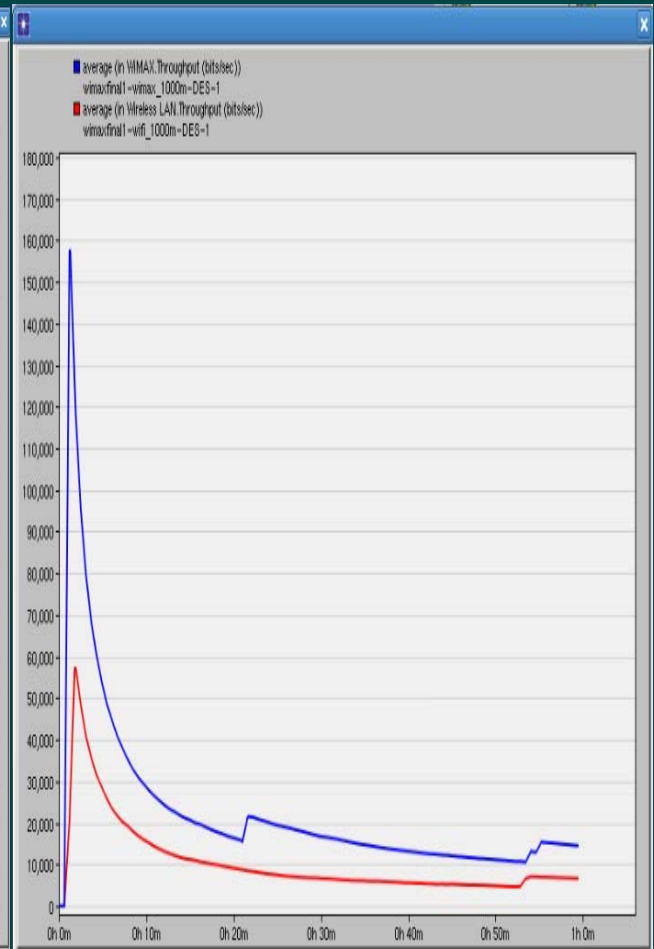
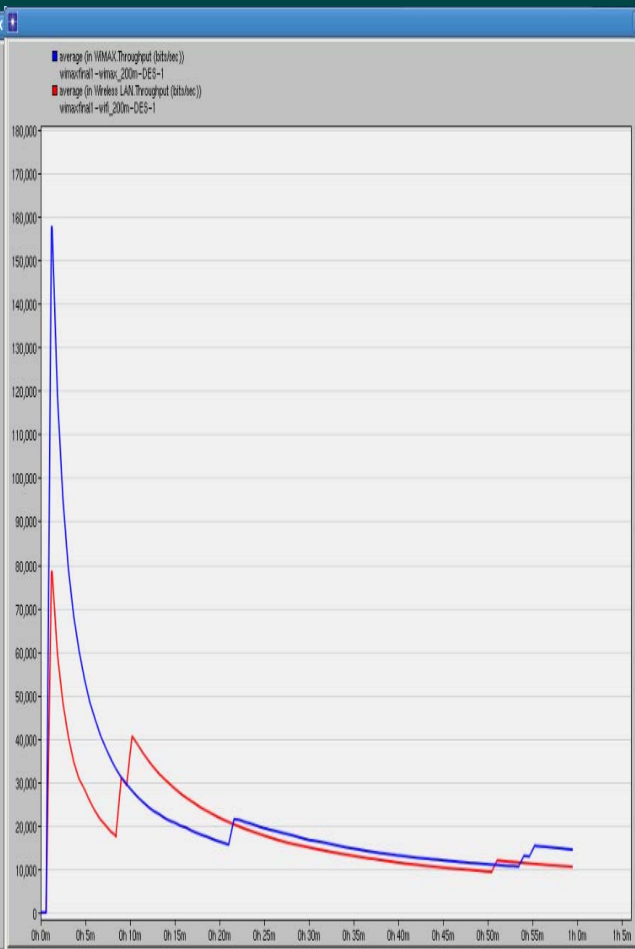
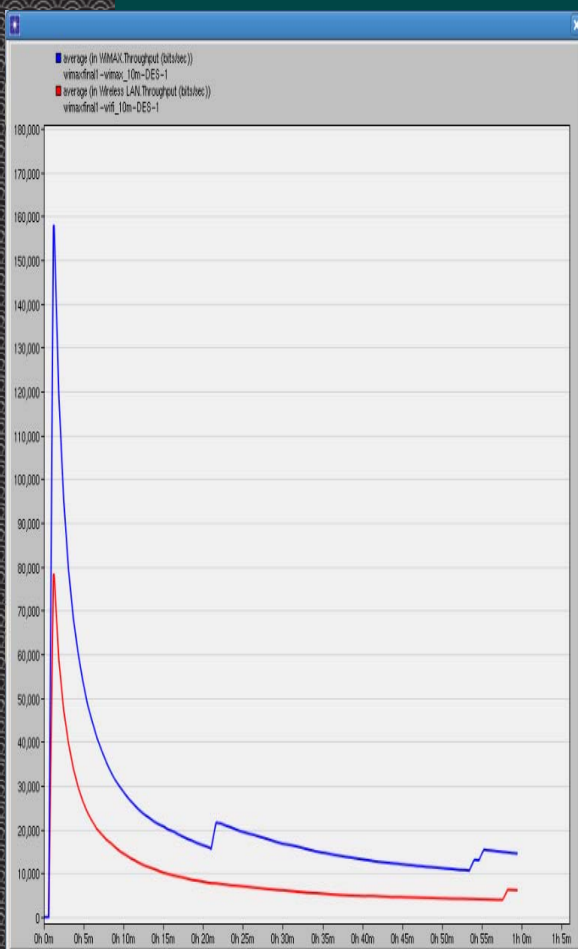


Comparison and Analyze

Delay at 1000m



Comparison and Analyze Throughput at 10m, 200m and 1000m



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Conclusion

- ◆ Wi-Fi have lower delays and better data receiving rate in shorter range
- ◆ WiMAX have relatively stable delay while Wi-Fi delay is greatly affected by the distance change
- ◆ WiMAX have overall higher throughput than Wi-Fi



Reference



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Thank You !