ENSC 427: Communication Networks
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Performance Analysis of a Wireless Home Network

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Team 4

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Overview

- Introduction
- Implementation
- Results
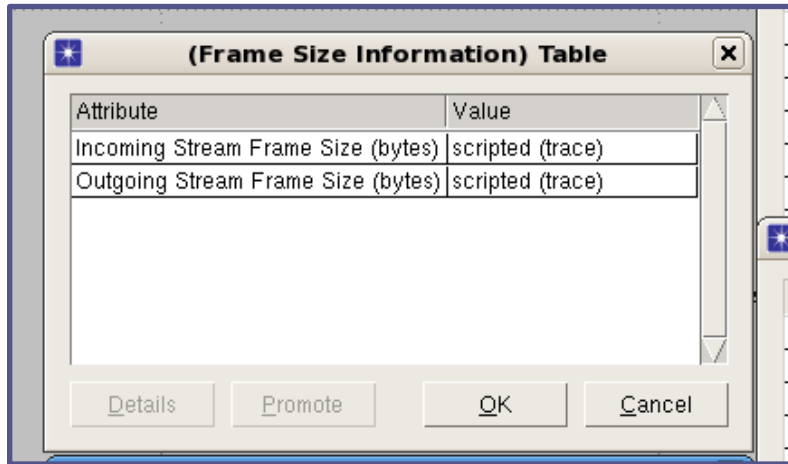- Discussion
- Future work
- References

Introduction

- Wireless Home Network
- IEEE 802.11
- Multiple Users simultaneously contend for network resources
- Each User will have unique applications with QoS
- **Goal:** Evaluate QoS and determine the optimal configuration and wireless standard
- OPNET 16.0

Implementation
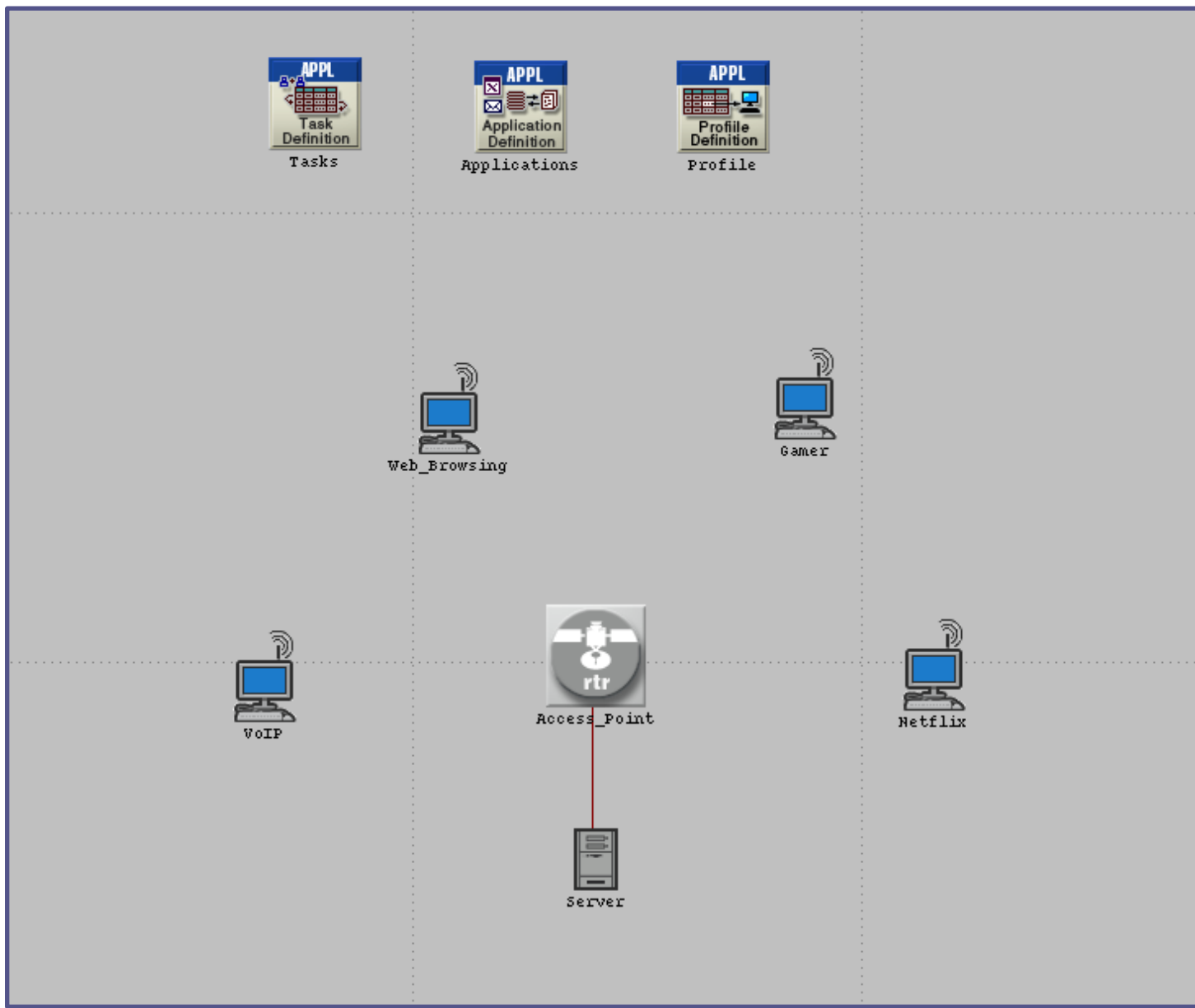
Custom Applications – Video Stream

- Created a custom video conference application
- Incorporated trace file for a more realistic video model
- Variable frame size
- MPEG 4 compression

Video Stream Throughput
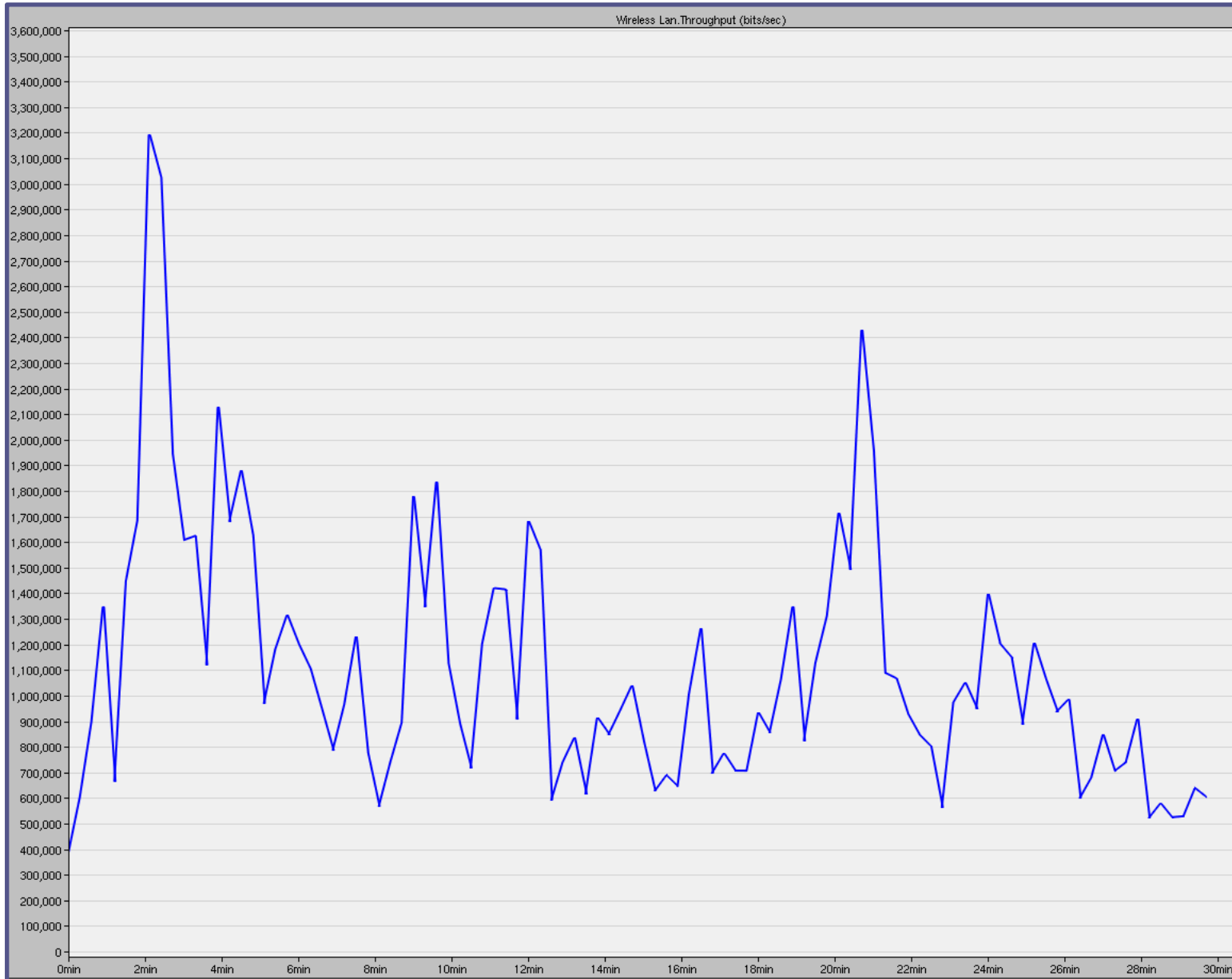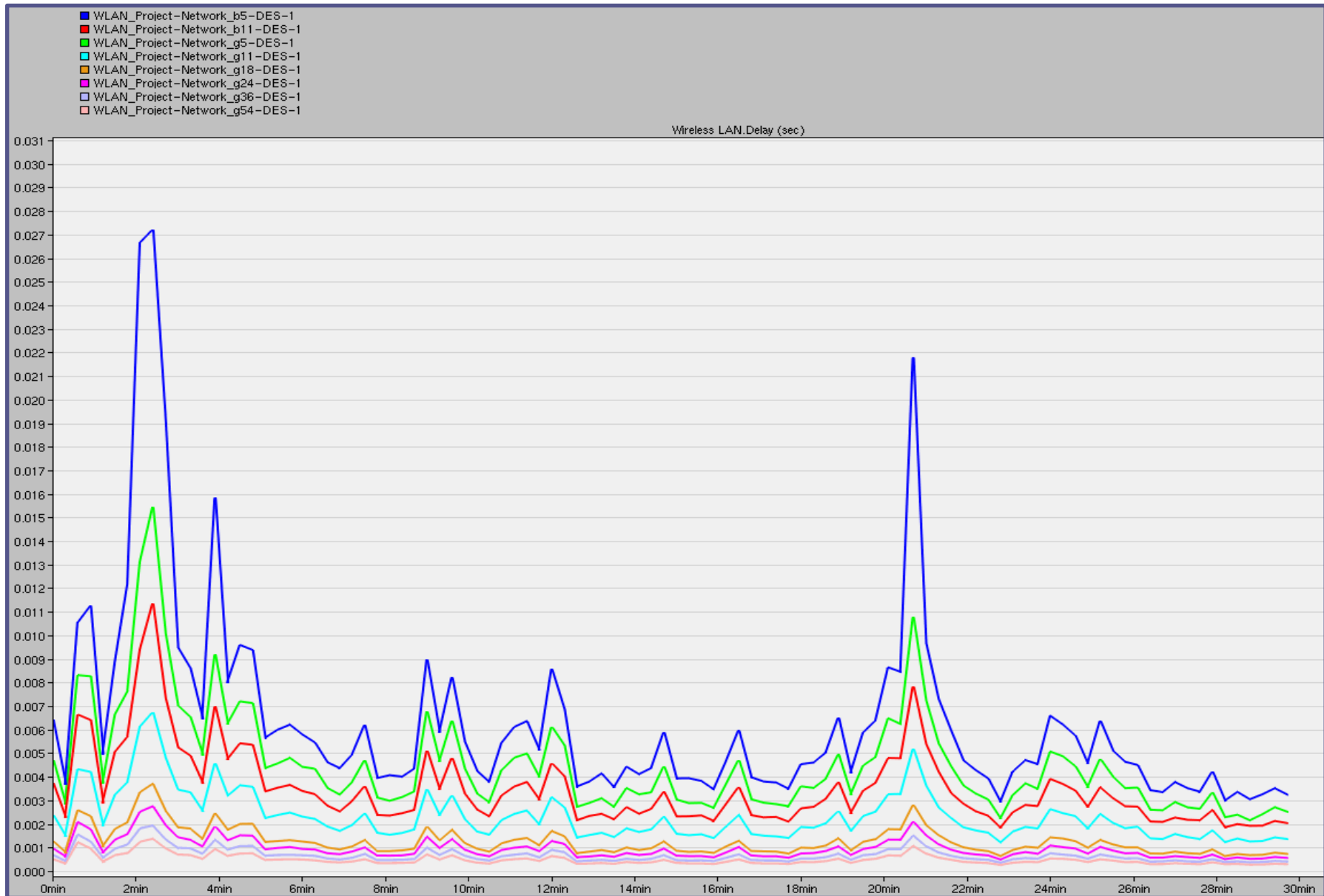
Custom Applications - Game

- Utilized S. Chiu & J. Farber game traffic model
- Modeled Counter Strike 1.6
- Traffic is bursty in nature
- Important to model game traffic properly as experience is susceptible to delay and jitter

	Server	Client
Interarrival Time (ms)	Extreme (55,6)	Constant (40)
Packet Size (ms)	Extreme (120,36)	Extreme(80,5.7)

Results - Game Throughput
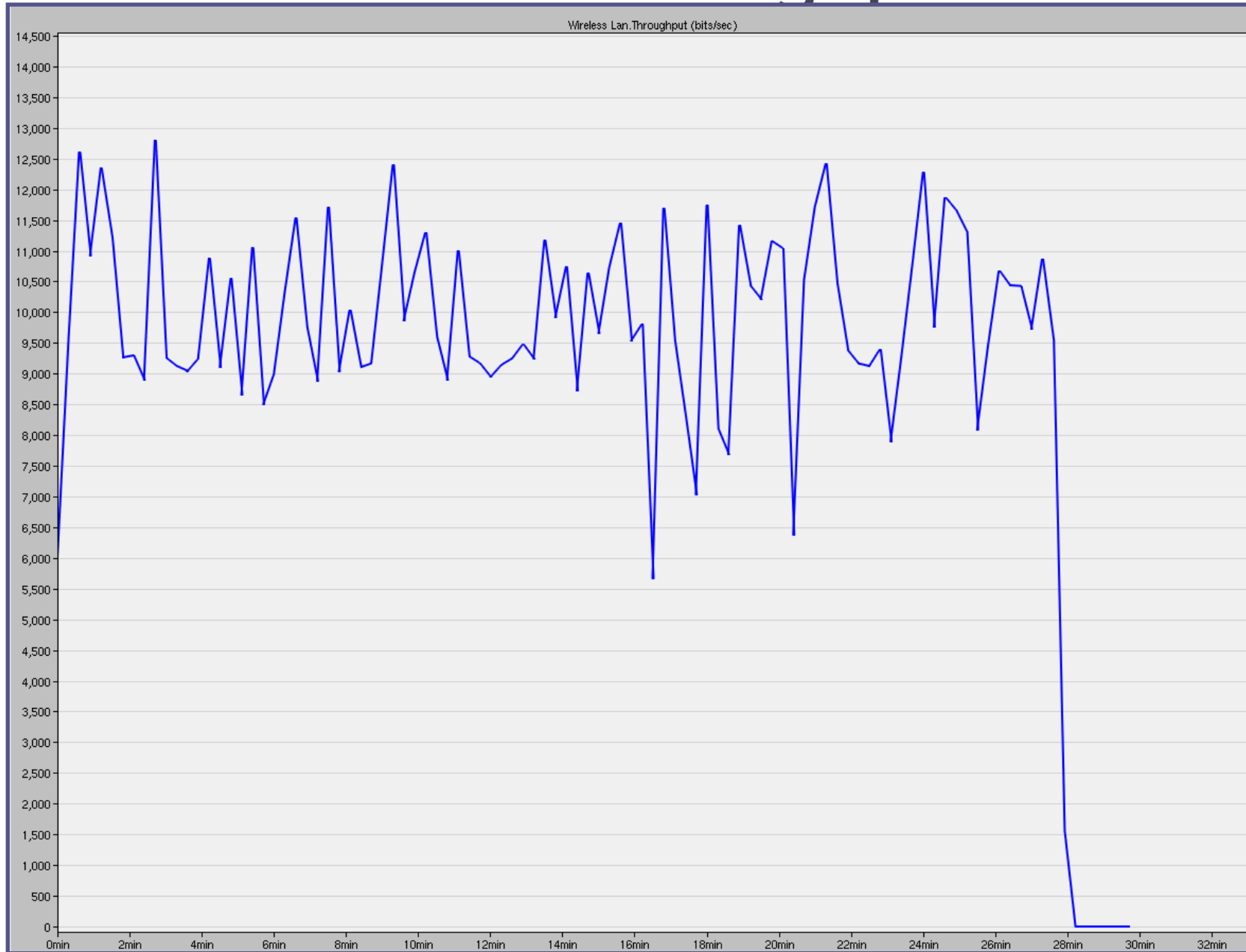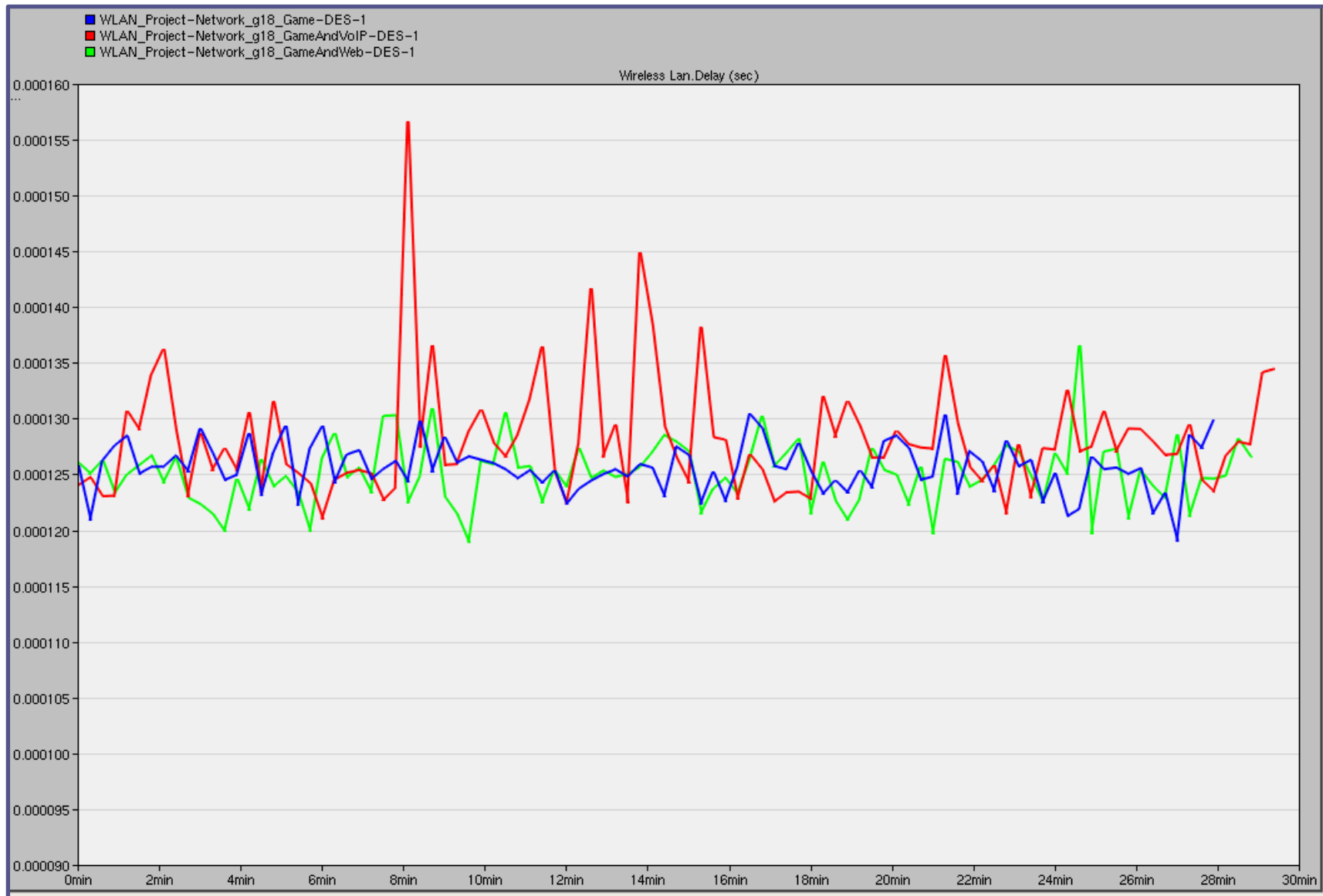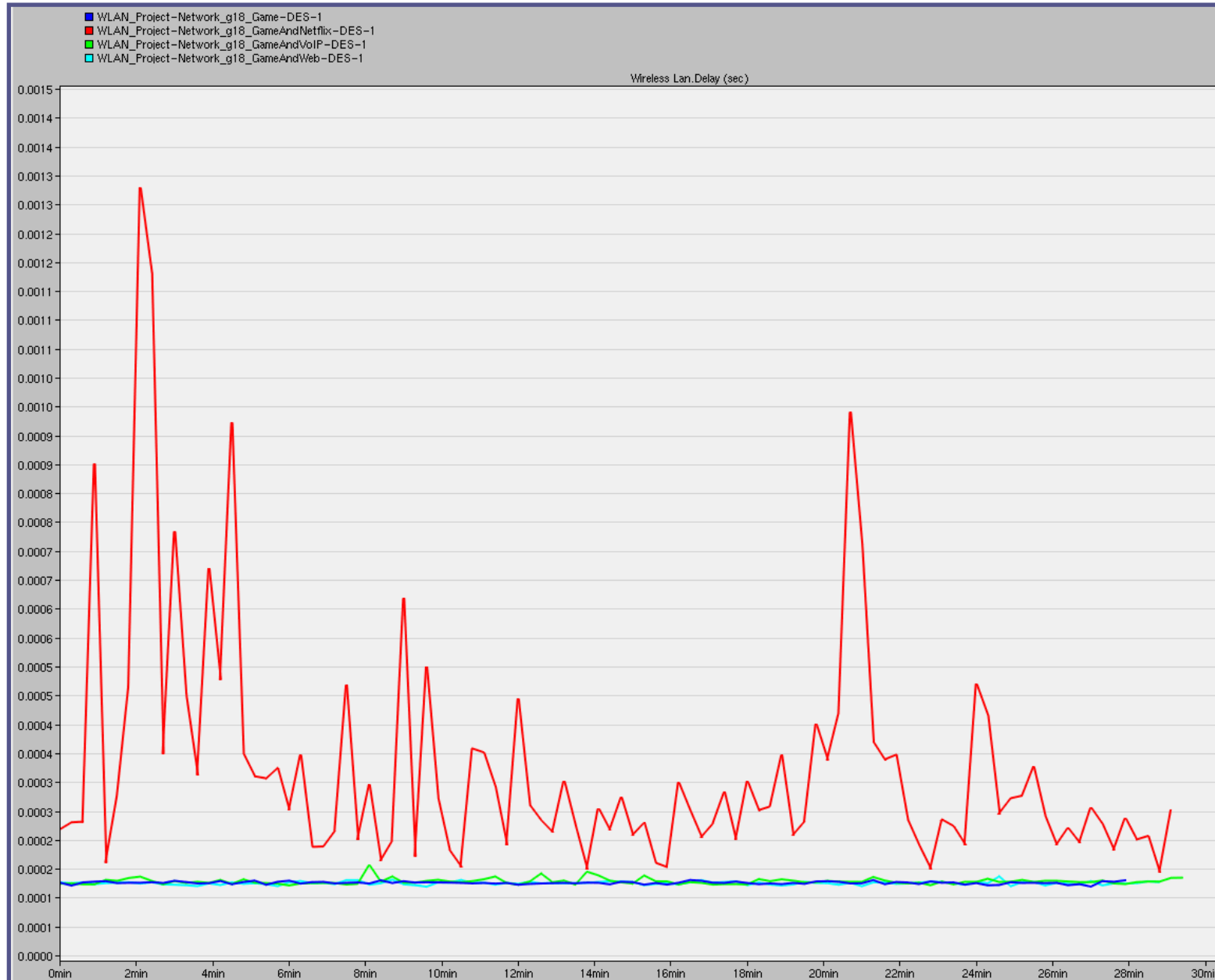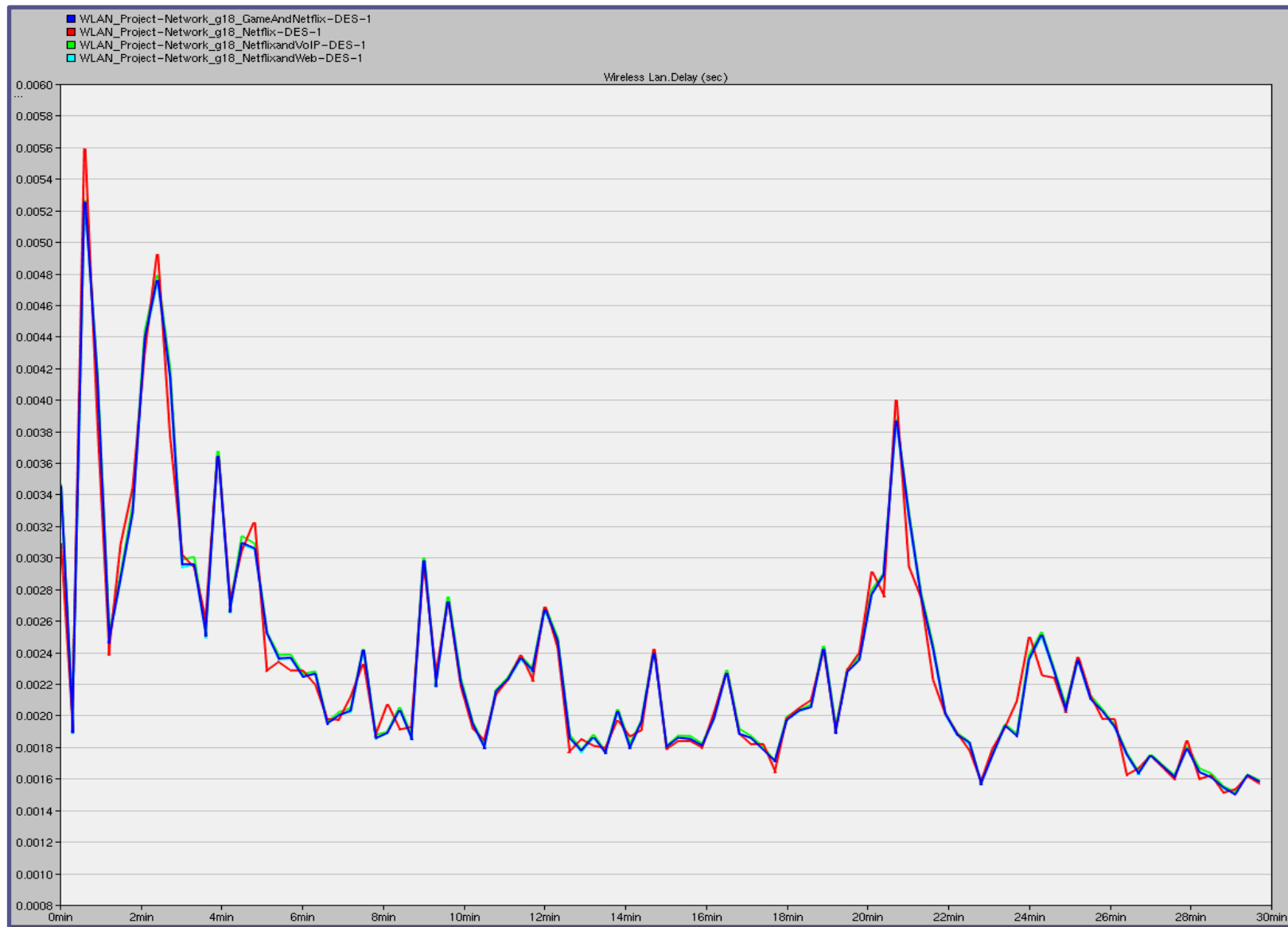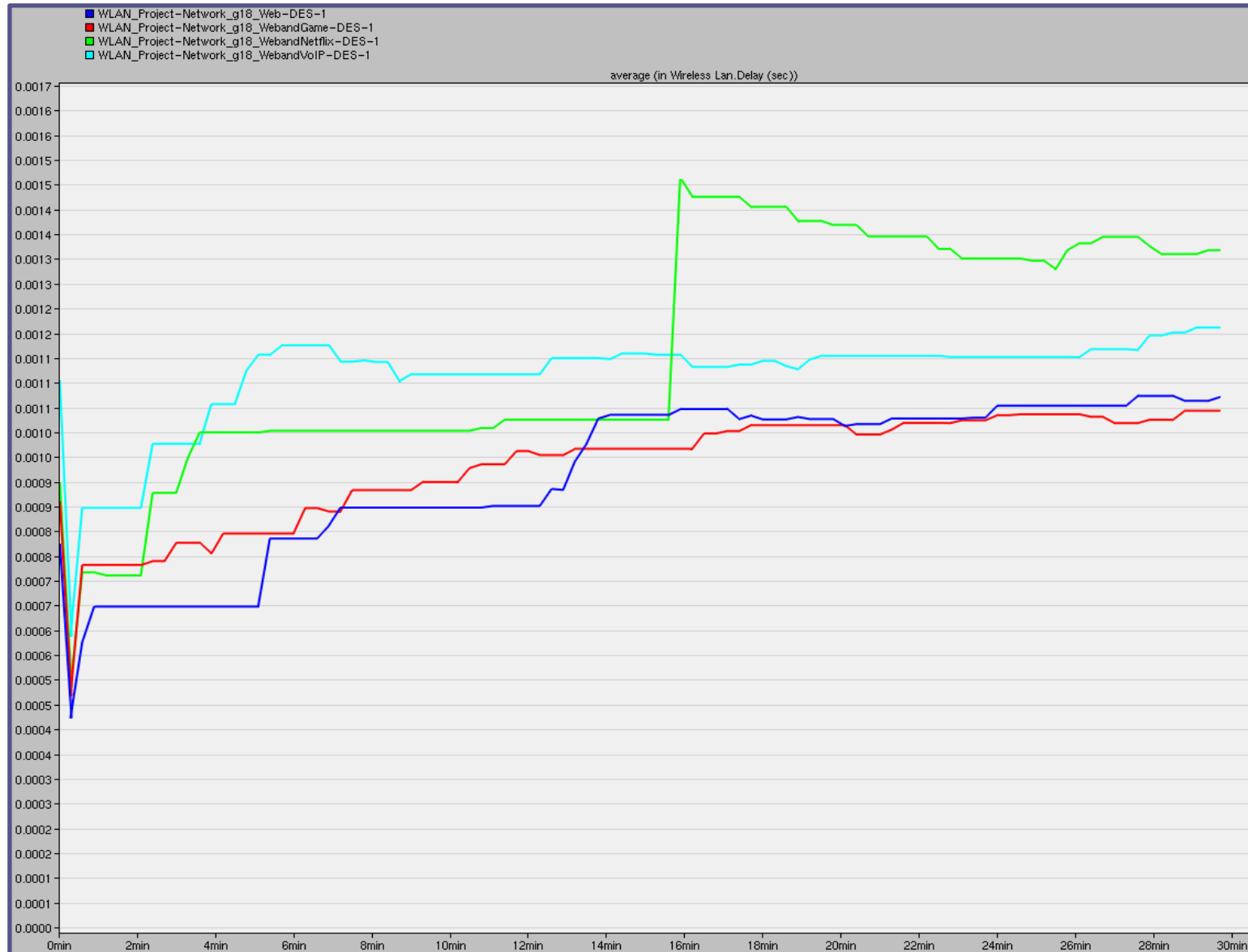
WLAN Global Delay

Gamer Perspective - Delay

Gamer Perspective – Delay Cont'd

Netflix Perspective - Delay

Web Browsing Perspective - Delay
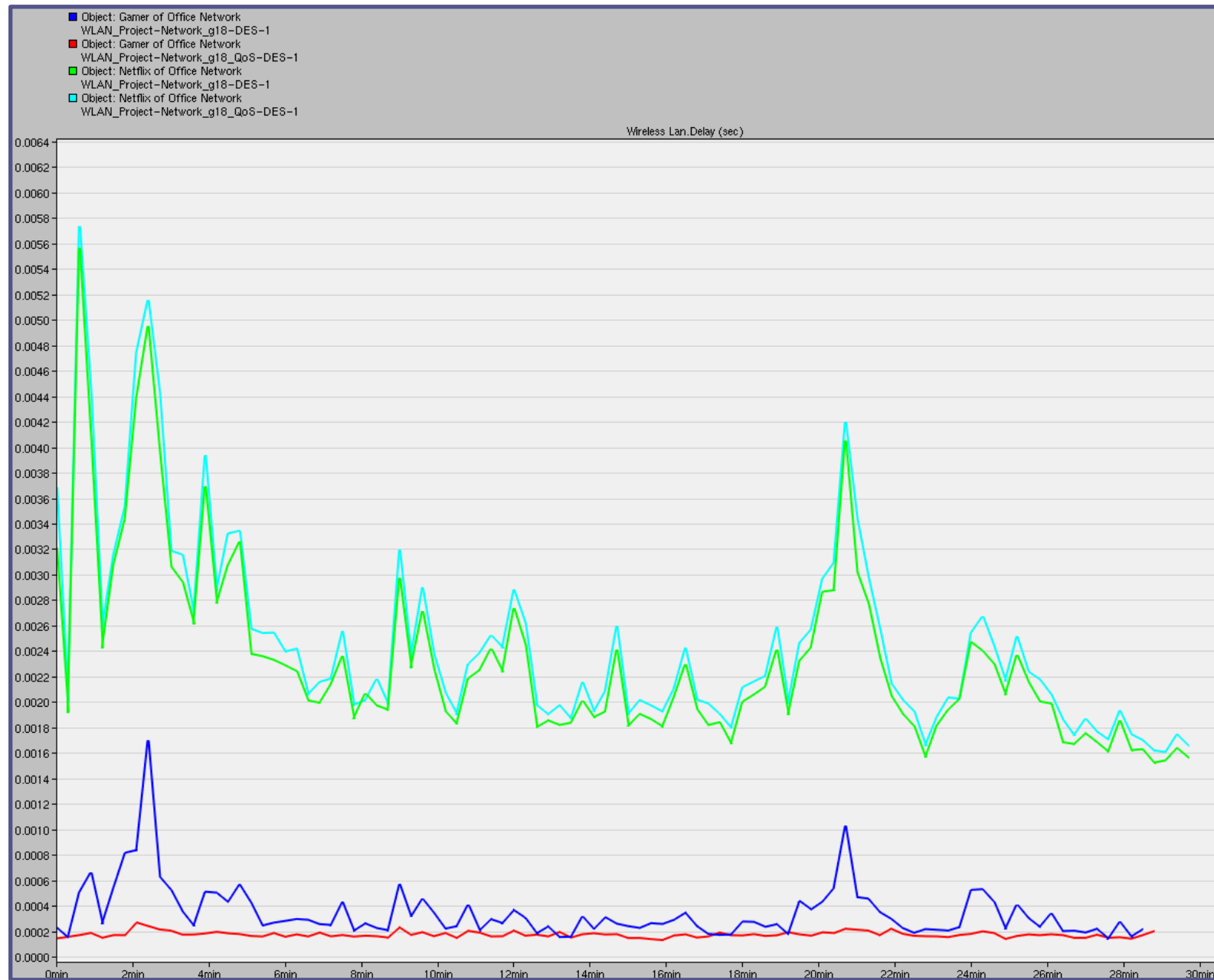
VoIP Perspective - Delay
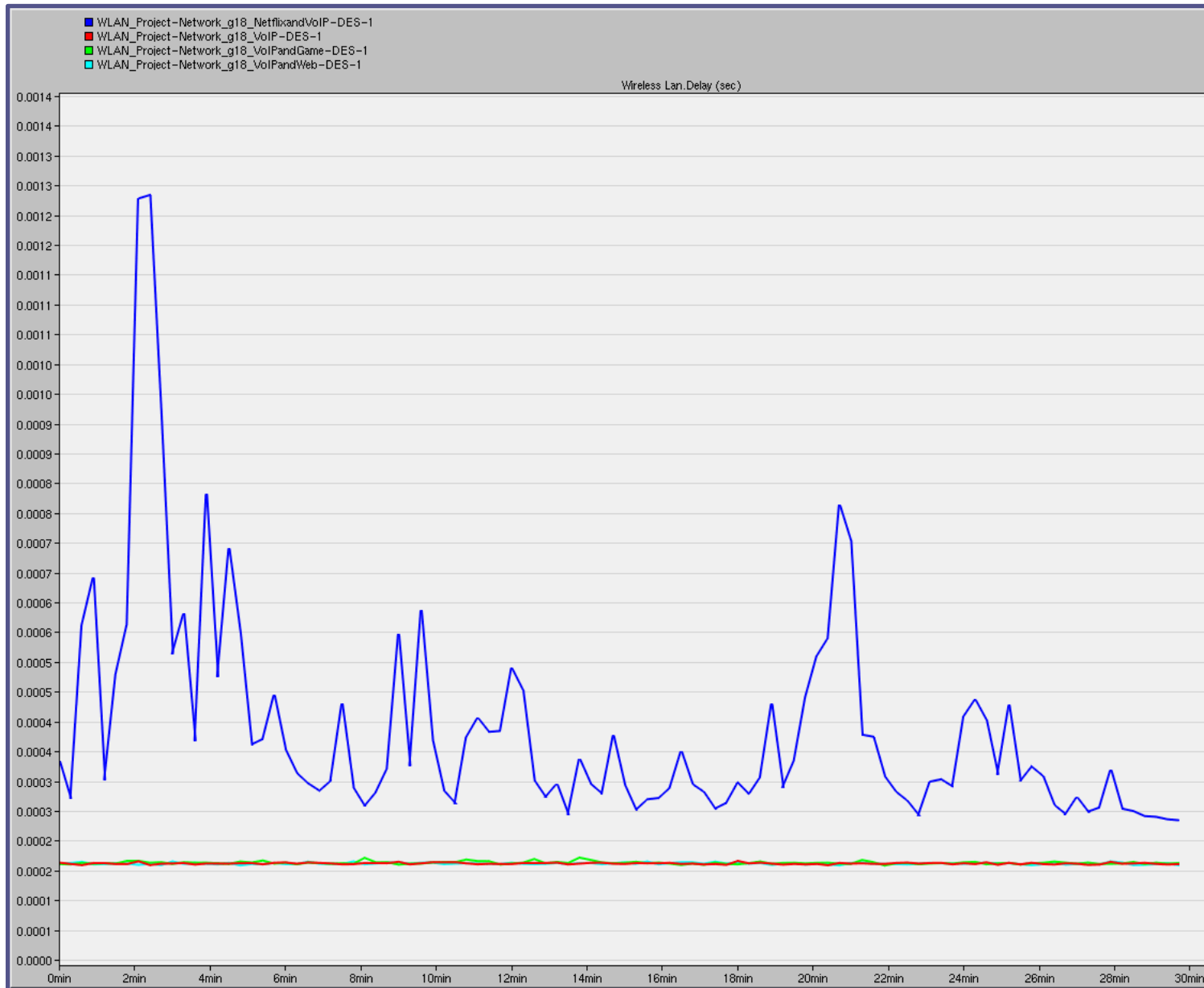
802.11e (with QoS)

Discussion

- 802.11e is optimal for gaming applications due to its QoS properties
- Application with highest throughput has the greatest impact on the other users' QoS
- 802.11g reduces the delay at the same data rate because of its different modulation scheme
- Generally increasing protocol data rate will decrease delay of all applications

Future work

- Adding mobile users to the network
- Experimenting with different server to access point distances
- Test newer 802.11 standards such as 802.11ac
- Determine optimal amount of users per access point

References

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- [3] Johannes Farber, Network game traffic modeling, Proceedings of the 1st workshop on Network and system support for games, p.53-57, Apr 16-17, 2002, Braunschweig, Germany.

- [4] G. Auwera, P. David, and M. Reisslein. Traffic characteristics of H.264/AVC variable bit rate video. [Online]. Available: http://trace.eas.asu.edu/h264/index.html (Apr. 2014).

- [5] I. Gupta and P. Kaur, "Comparative Throughput of WiFi and Ethernet LANs using OPNET MODELER," International Journal of Computer Applications, vol. 1, no. 2, December 2010. Available: http://www.ijcaonline.org/volume8/number6/pxc3871753.pdf