

ENSC 427

Communication Networks

Final Project Demo

Spring 2012

Group 9

**Comparison of QoS between WiFi, WiMAX, and
Ethernet LAN for Online Gaming Traffic**



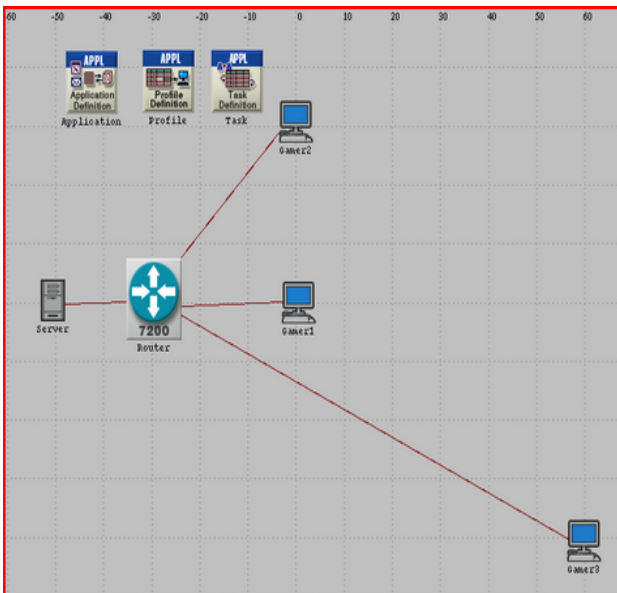
Darren Tong, Vincent Guan, and Barry Zou

{dta15, vqa, lfz3}@sfu.ca

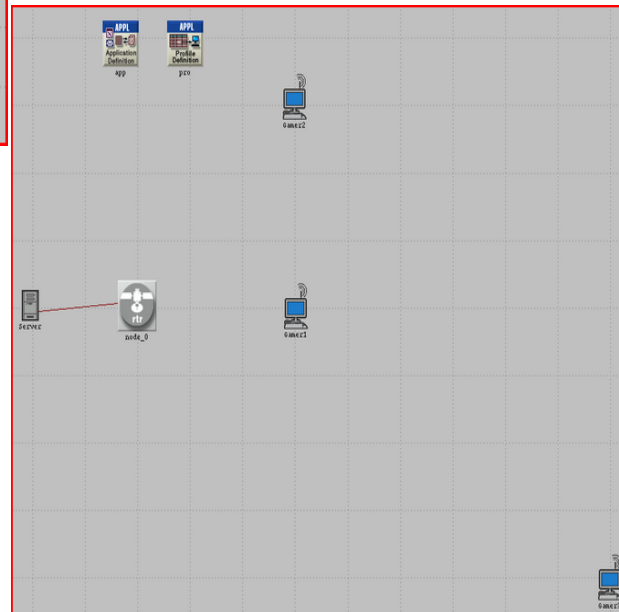
Simon Fraser University

Vancouver, BC, Canada

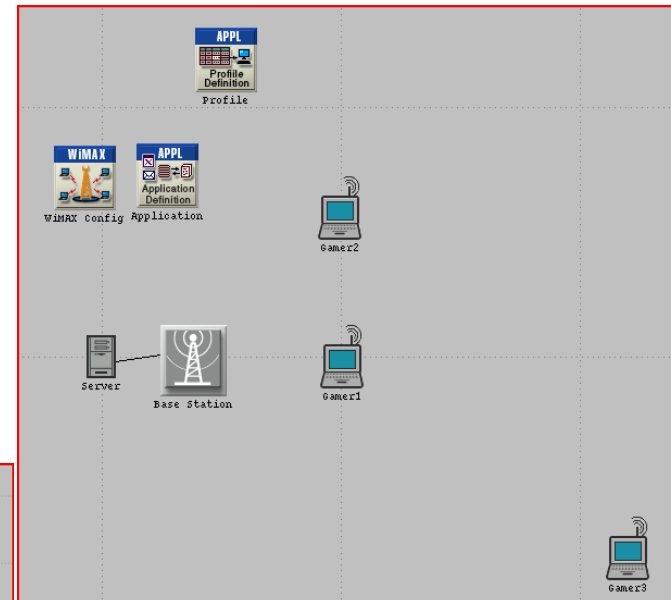
Topologies



Ethernet Topology



WiFi Topology



WiMAX Topology

Implementation

Attribute	Value
Incoming Stream Interarrival Time (s...	constant (0.04)
Outgoing Stream Interarrival Time (s...	extreme (0.055, 0.006)

Attribute	Value
Incoming Stream Frame Size (bytes)	extreme (80, 5.7)
Outgoing Stream Frame Size (bytes)	extreme (120, 36)

Attribute	Value
Frame Interarrival Time Information	(...)
Frame Size Information (bytes)	(...)
Symbolic Destination Name	Video Destination
Type of Service	Best Effort (0)
RSVP Parameters	None
Traffic Mix (%)	All Discrete

Details Promote OK Cancel

Office Network: 100m x 100m

Gaming Workstations

Distances from the router/access point/
base station

Gamer 1 = 30m

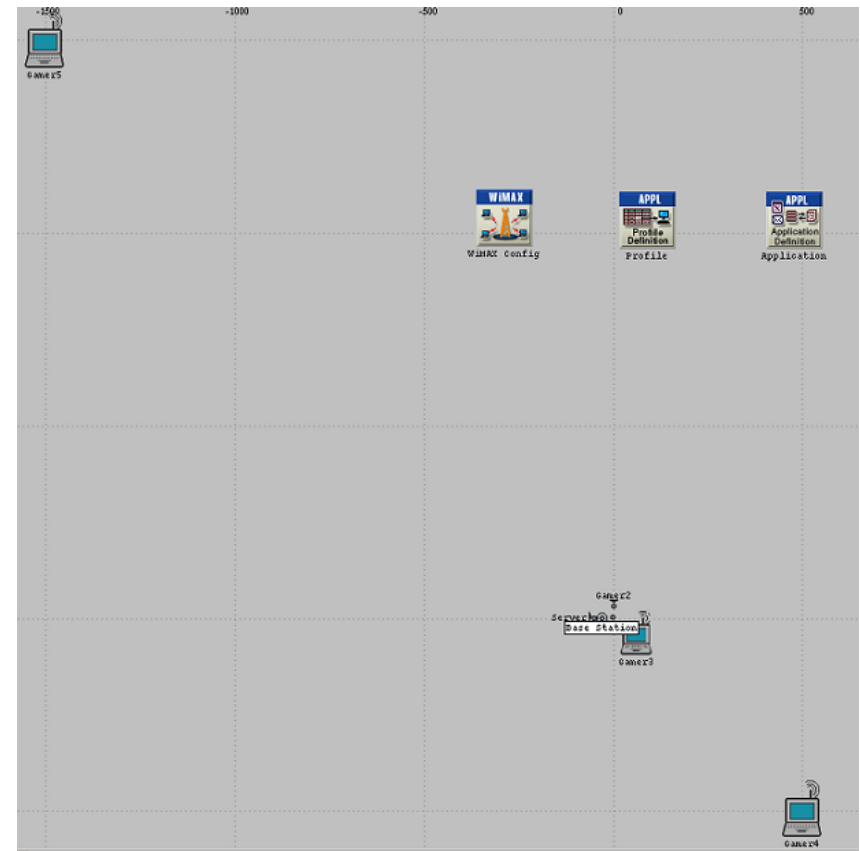
Gamer 2 = 42m

Gamer 3 = 98m

Improvements



Long Range Ethernet Topology



Long Range WiMAX Topology

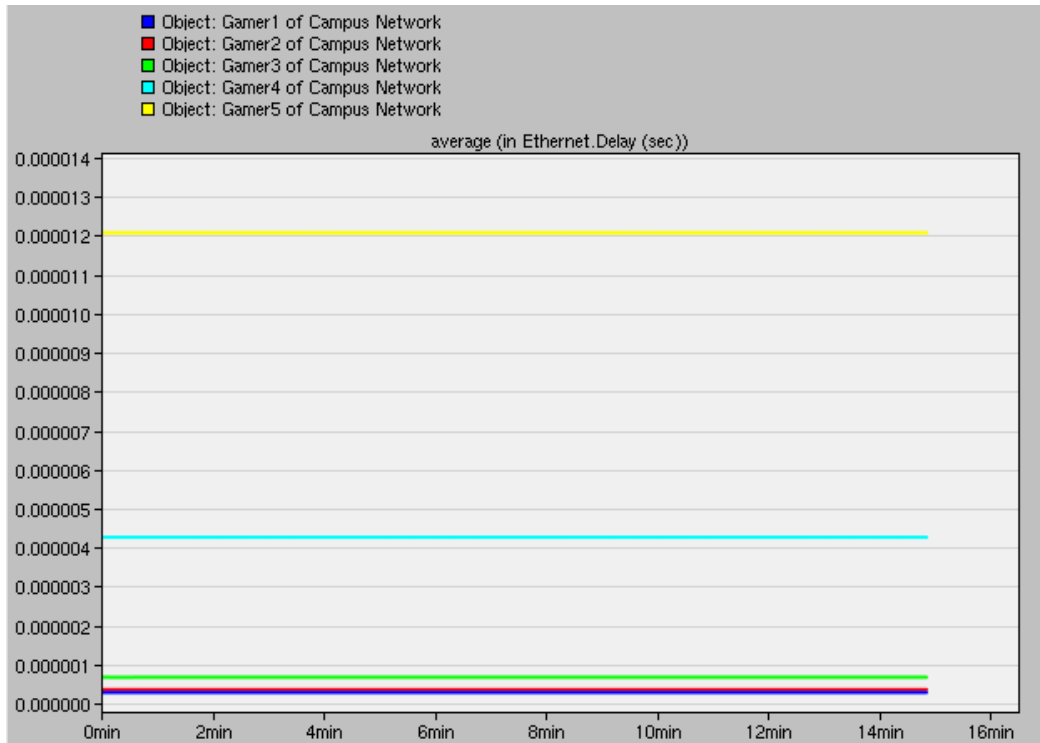
Improvements Implementation

☞ Office Network: 10km x 10km

☞ Gaming Workstations

- Distances from the router/access point/ base station
 - Gamer 1 = 30m
 - Gamer 2 = 42m
 - **Gamer 3 = 98m**
 - **Gamer 4 = 729m**
 - **Gamer 5 = 2100m**

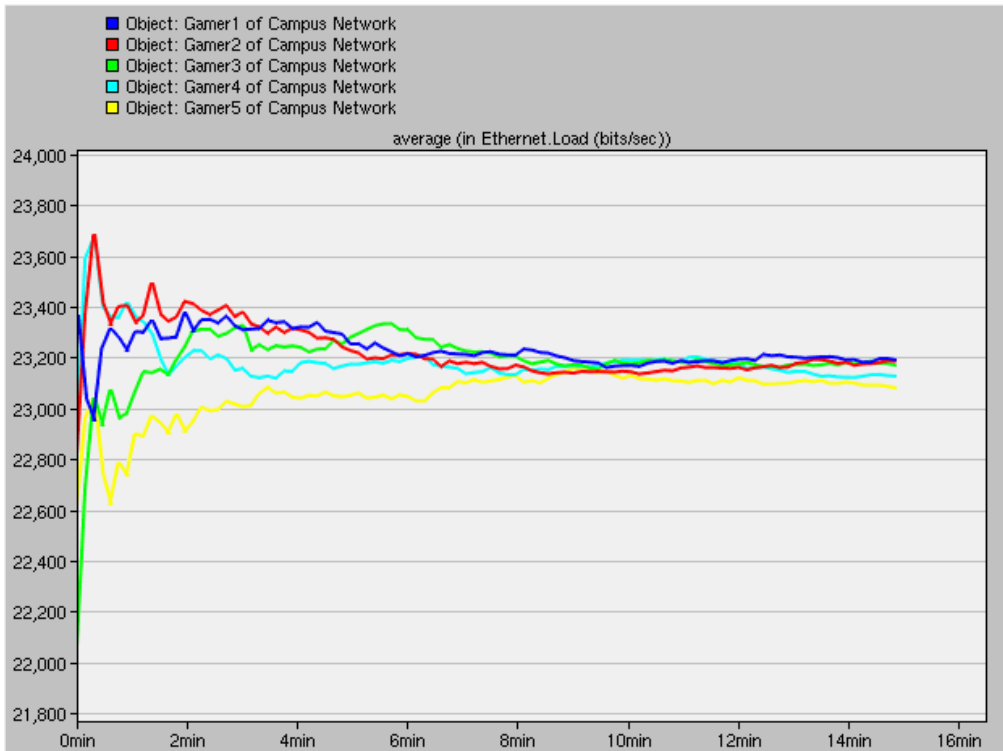
Improvement Results



	Ethernet Avg. Delay (sec)
Gamer3	0.67 μ s
Gamer4	4.26 μ s
Gamer5	12.08 μ s

10 Gigabit Ethernet Delay (sec)

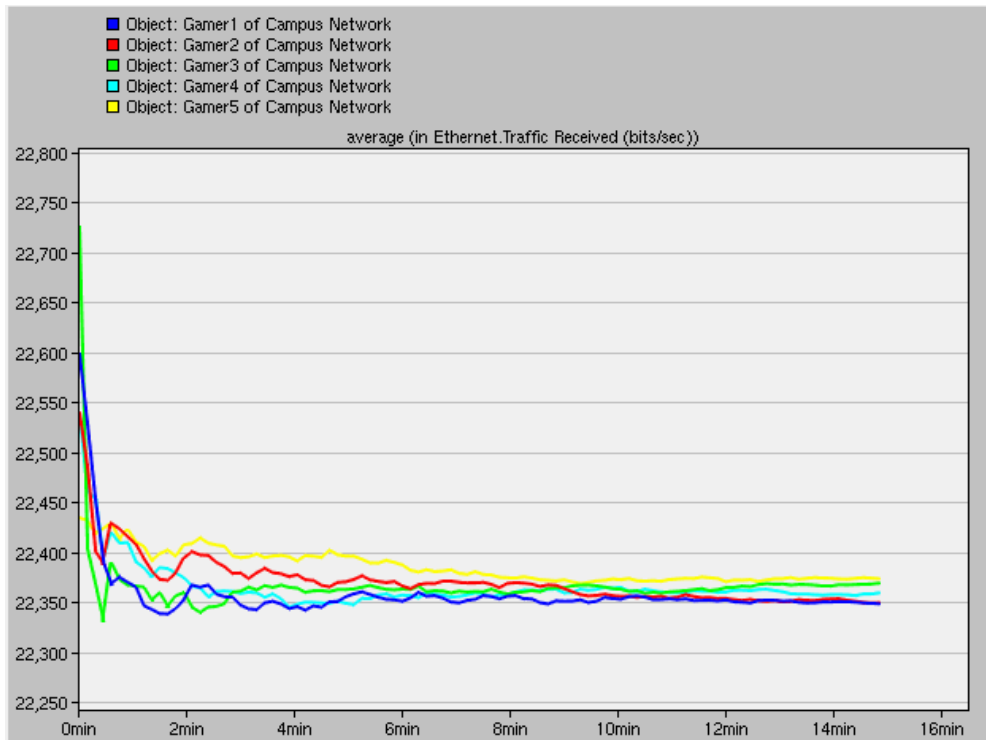
Improvement Results



	Ethernet Avg. Load (bps)
Gamer3	23,170 (bits/sec)
Gamer4	23,127 (bits/sec)
Gamer5	23,081 (bits/sec)

10 Gigabit Ethernet Load (bits/sec)

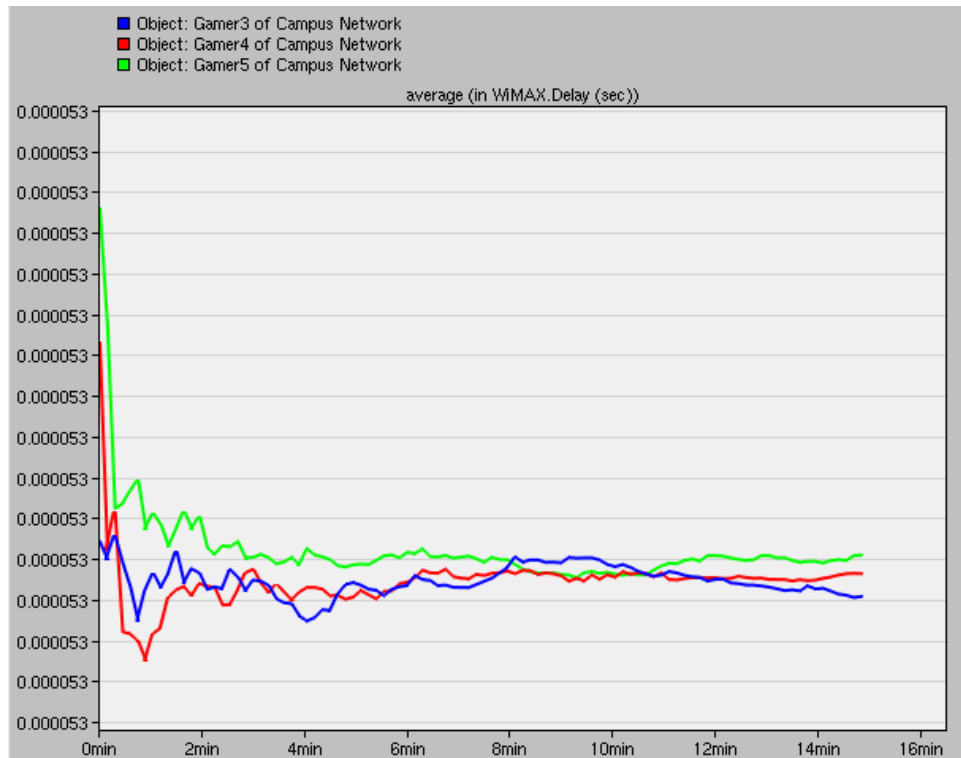
Improvement Results



	Ethernet Avg. Throughput (bps)
Gamer3	22,359 (bits/sec)
Gamer4	22,369 (bits/sec)
Gamer5	22,373 (bits/sec)

10 Gigabit Ethernet Throughput (bits/sec)

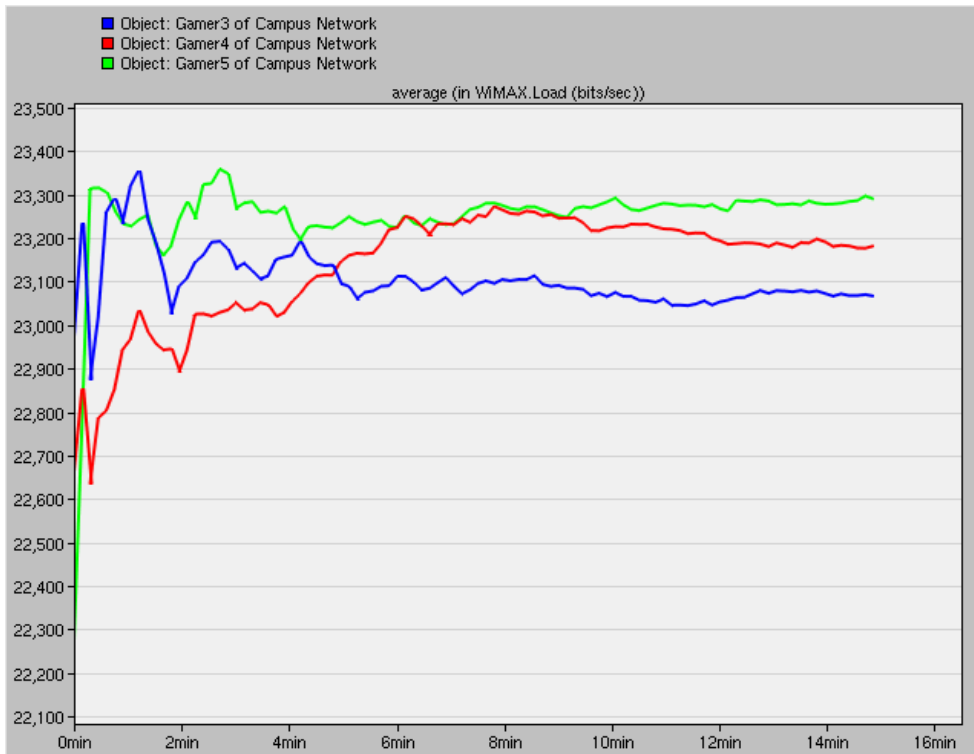
Improvement Results



WiMAX Delay (sec)

	WiMAX Avg. Delay (sec)
Gamer3	52.85 μ s
Gamer4	52.88 μ s
Gamer5	52.90 μ s

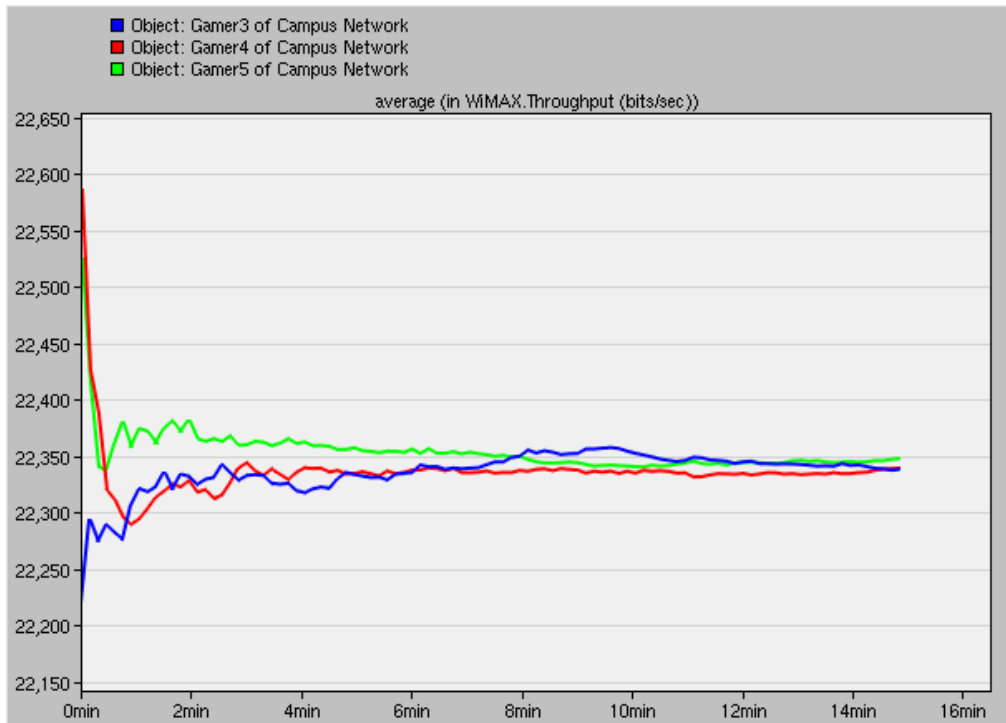
Improvement Results



WiMAX Load (bits/sec)

	WiMAX Avg. Load (bps)
Gamer3	23,066 (bits/sec)
Gamer4	23,182 (bits/sec)
Gamer5	23,290 (bits/sec)

Improvement Results



WiMAX Throughput (bits/sec)

	WiMAX Avg. Throughput (bps)
Gamer3	22,339 (bits/sec)
Gamer4	22,340 (bits/sec)
Gamer5	22,348 (bits/sec)

Improvement Summary Results

Table 1: Simulation Results for 10 Gigabit Ethernet

	Ethernet Avg. Load (bps)	Ethernet Avg. Throughput (bps)	Ethernet Channel Efficiency	Ethernet Avg. Delay (sec)
Gamer3	23,170 (bits/sec)	22,359 (bits/sec)	96.50%	0.67 μ s
Gamer4	23,127 (bits/sec)	22,369 (bits/sec)	96.72%	4.26 μ s
Gamer5	23,081 (bits/sec)	22,373 (bits/sec)	96.93%	12.08 μ s

Table 2: Simulation Results for WiMAX

	WiMAX Avg. Load (bps)	WiMAX Avg. Throughput (bps)	WiMAX Channel Efficiency	WiMAX Avg. Delay (sec)
Gamer3	23,066 (bits/sec)	22,339 (bits/sec)	96.85%	52.85 μ s
Gamer4	23,182 (bits/sec)	22,340 (bits/sec)	96.37%	52.88 μ s
Gamer5	23,290 (bits/sec)	22,348 (bits/sec)	95.56%	52.90 μ s

Conclusion

- ✎ For the long range topologies, the simulation results agree with our theory
 - WiMAX results stayed relatively constant throughout the simulation
 - We believe that the gaming clients did not reach the limits of the WiMAX topology
 - As distances from the server increases away from the server in the Gigabit Ethernet topology, delay increases