ENSC 427 Communication Network Spring 2015

Simulation and Analysis of WI-FI Performance in Campus Network

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Roadmap

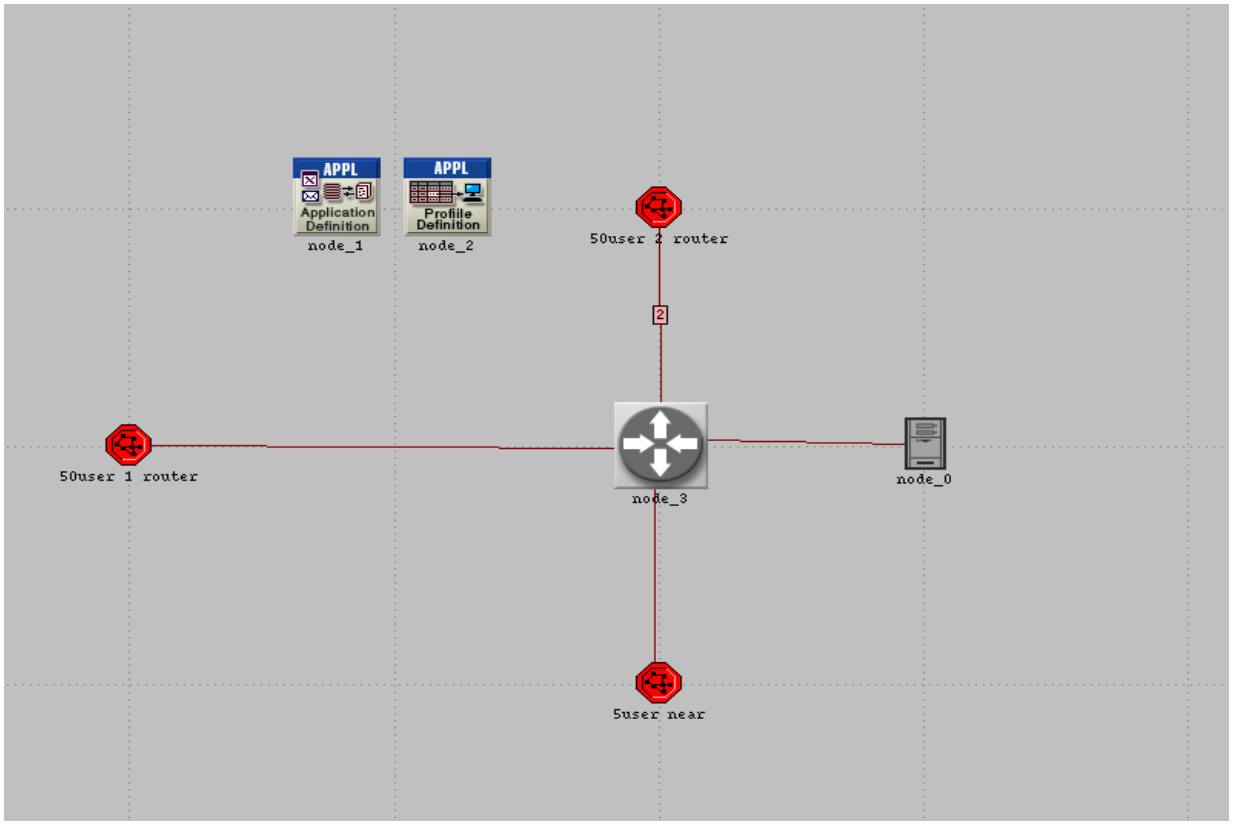
- Introduction
- OPNET model
- Simulation & Analysis
  - Throughput
  - Traffic received
  - Retransmission
- Conclusion
- References

Introduction

WIFI

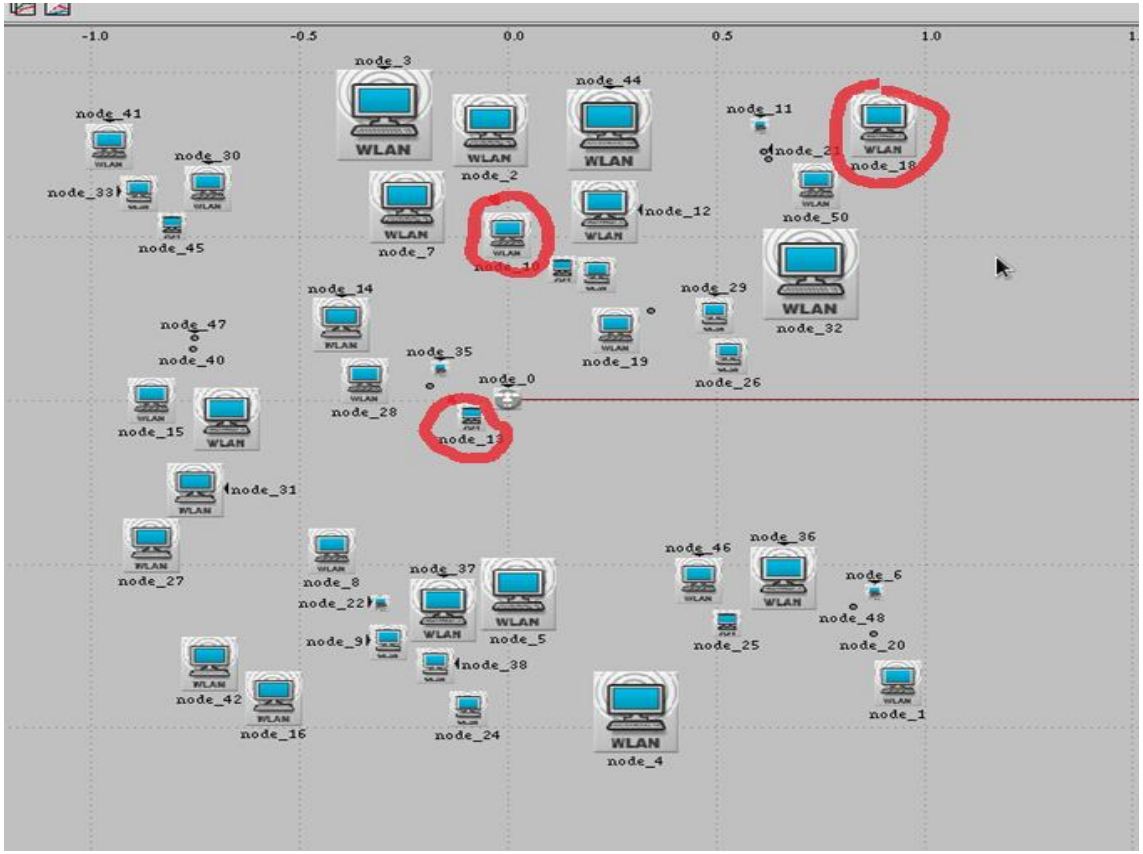
- Stands for Wireless Fidelity
- Base on the IEEE 802.11 standard
- Transmission speed: 54Mb/s
- Range: 50m-100m

OPNET Topology



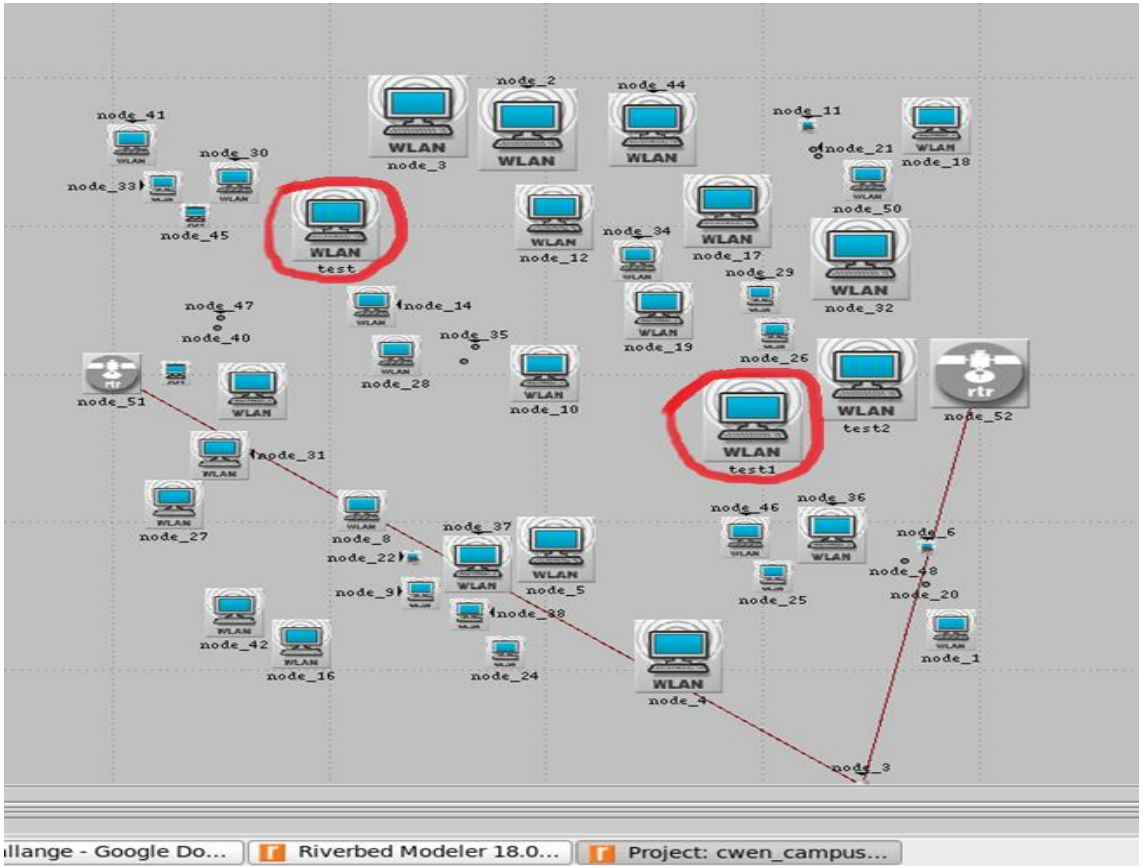
Subnet setup

- 50 Workstations with 1 Access Point



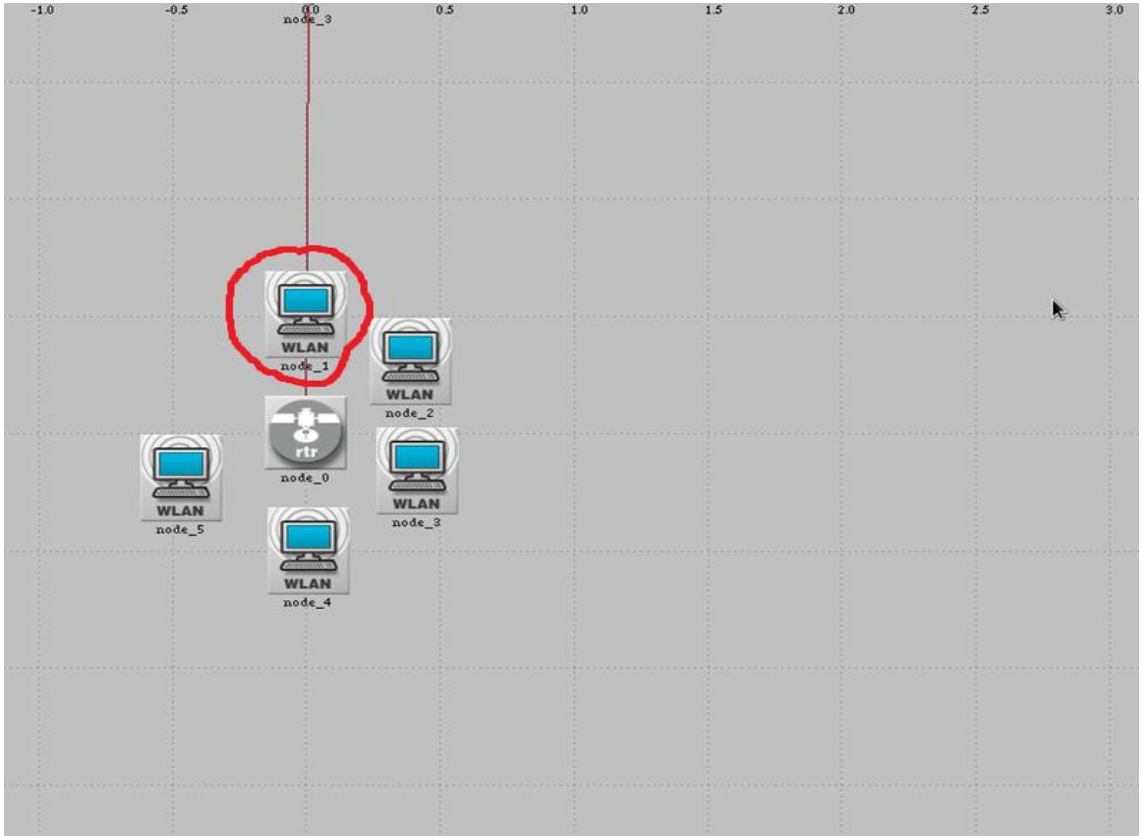
Subnet setup

- 50 Workstations with 2 Access Points



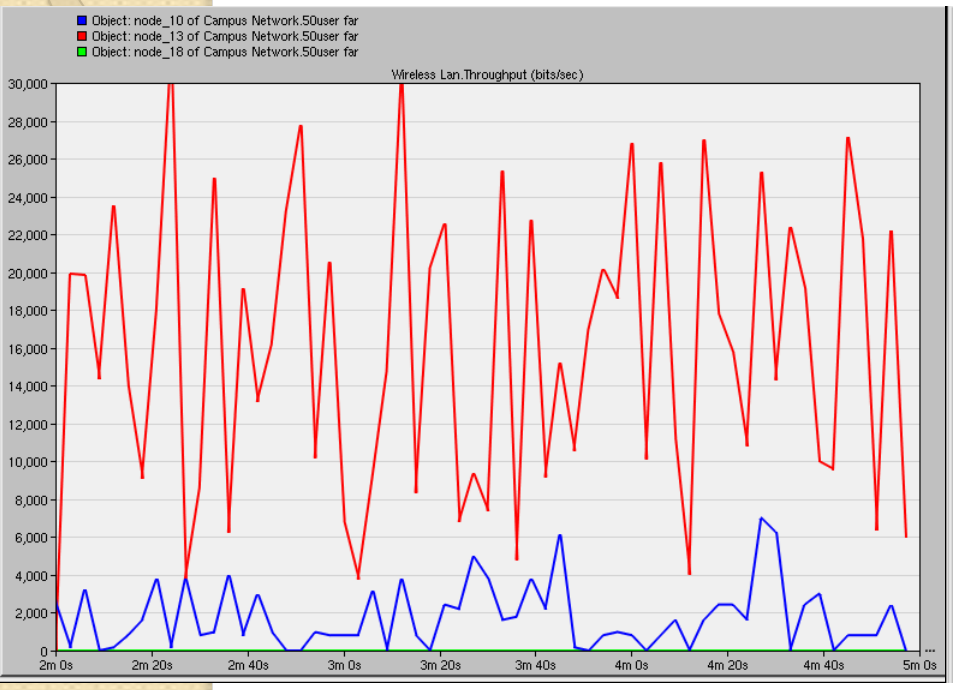
Subnet setup

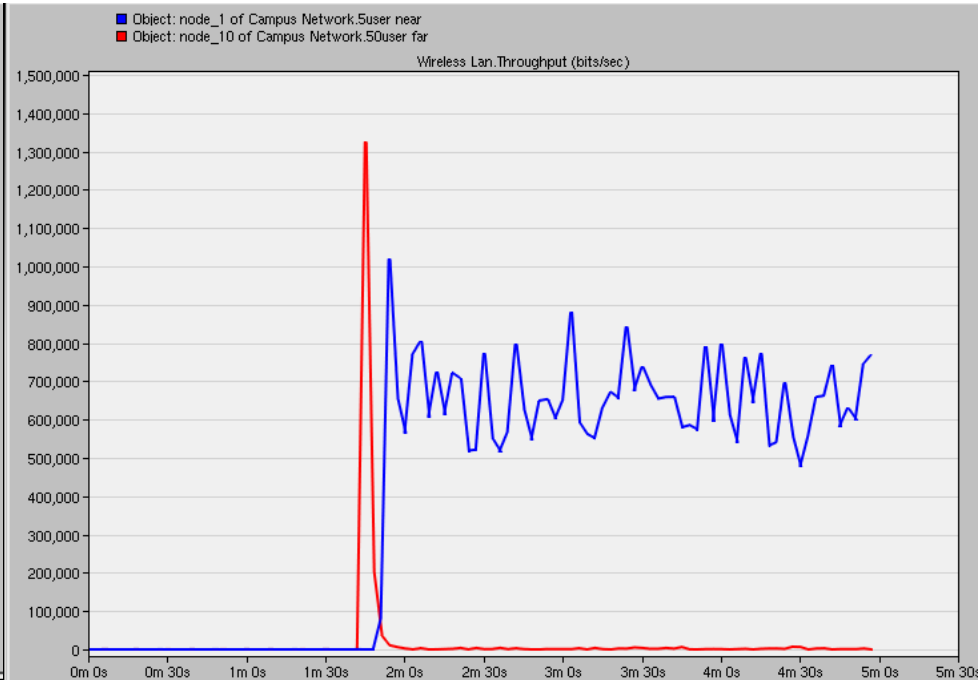
- 5 Workstations with 1 Access Point



Simulation result

Throughput



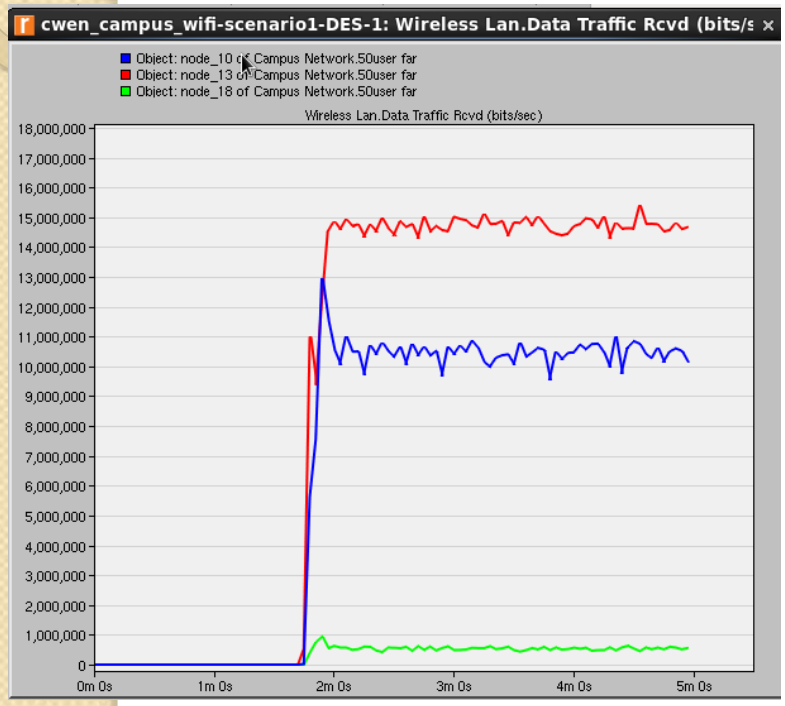


- further workstation
- workstation in between
- closer workstation

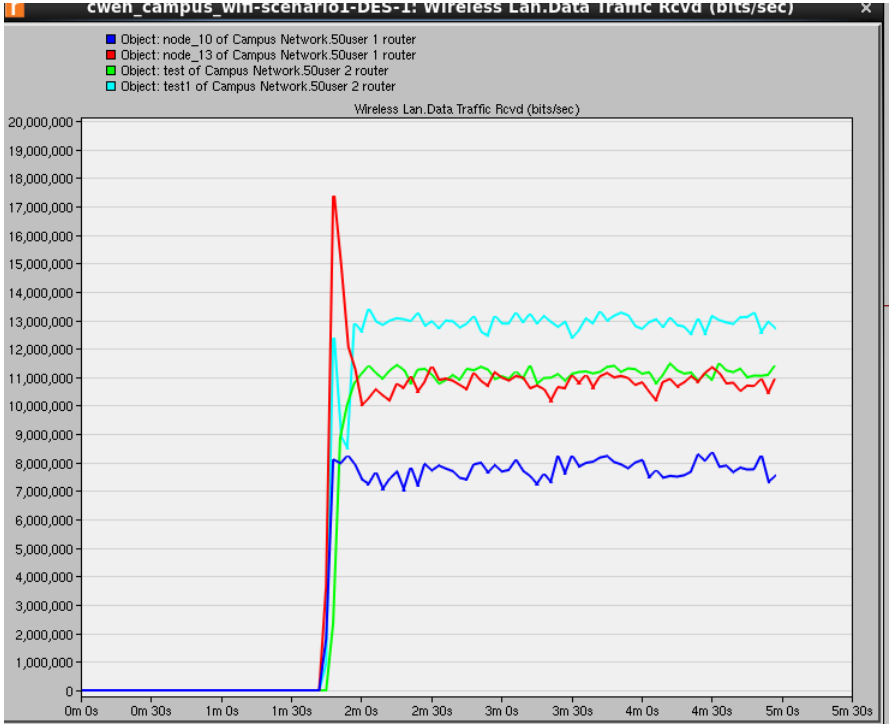
- workstation in subnet with 1 AP
- workstation in subnet with 2 APs

Simulation result

Traffic received



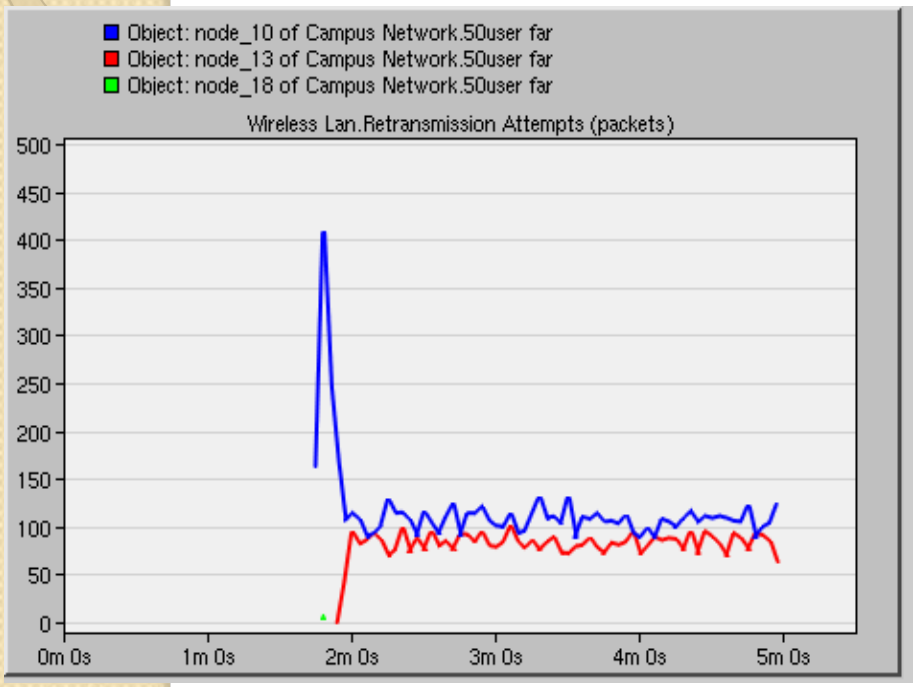
- further workstation
- workstation in between
- closer workstation

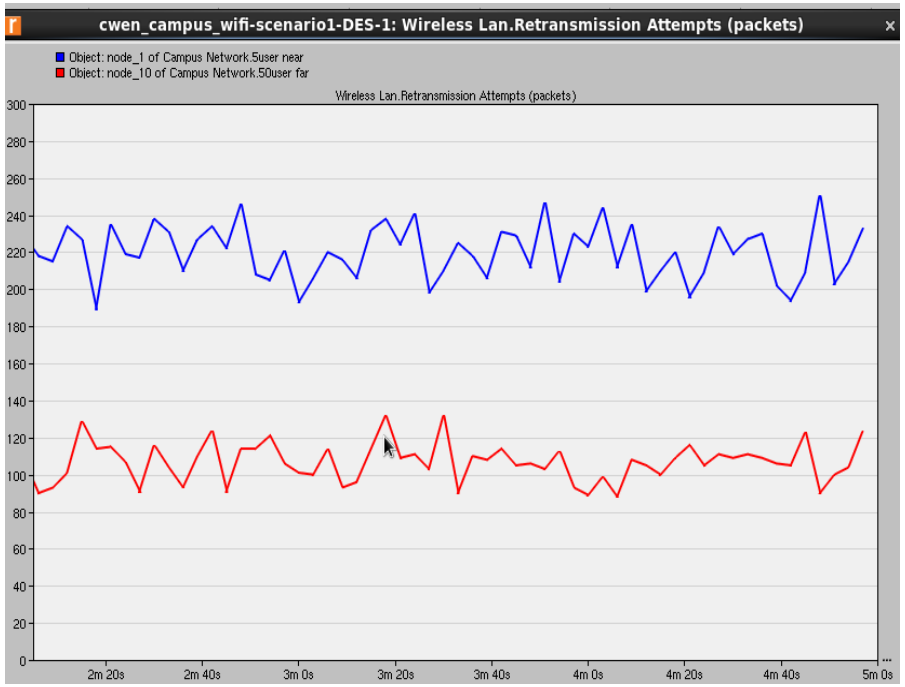


- further worksation with 1 AP
- closer workstation with 1 AP
- further worksation with 2 APs
- closer workstation with 2 APs

Simulation result

Retransmission





closer workstation

further workstation

workstation in subnet has 50

workstation in subnet has 5 workstations

Compare Table

Throughput	high	medium	low
Distance between Access Point	closer	middle	further
Number of APs	1		2

traffic received	High	medium	low
Distance between Access Point	closer	middle	further
Number of workstation	5		50

Retransmission	high	low	none
Distance between Access Point	closer	middle	further
Number of workstation	5	50	

Conclusion

- **Throughput**
  - The throughput decrease when the distance between workstation and access point increased
  - The throughput increase when the numbers of access point in a subnet increased
- **Traffic received**
  - The traffic received of a workstation is proportional to the distance between workstation and access point
  - More access points resulted in increase the traffic received of a workstation
- **Retransmission**
  - The distance of workstation does not significantly affect the retransmission rate
  - Higher bandwidth of access point increase the retransmission rate of a workstation

References

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