

ENSC 427: Communication Networks

Spring 2014

Final Project Presentation

Performance of Mobile Ad-Hoc Network Routing Protocols

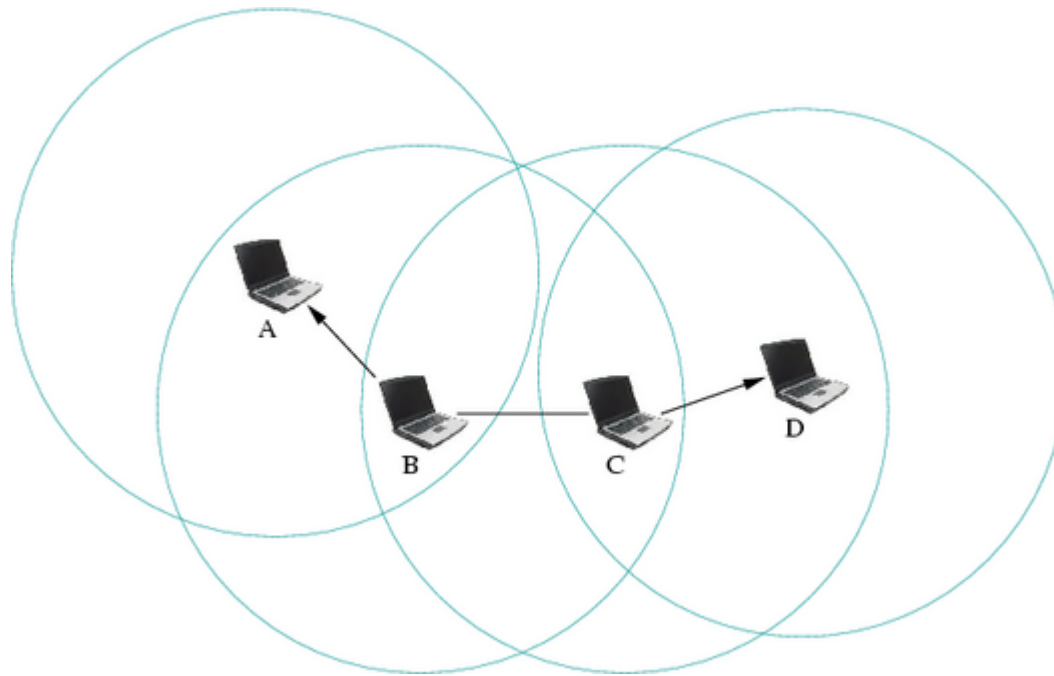
Project website: <http://www.sfu.ca/~rtariq/proj.html>

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Team 14

Performance of Mobile Ad-Hoc Network Routing Protocols

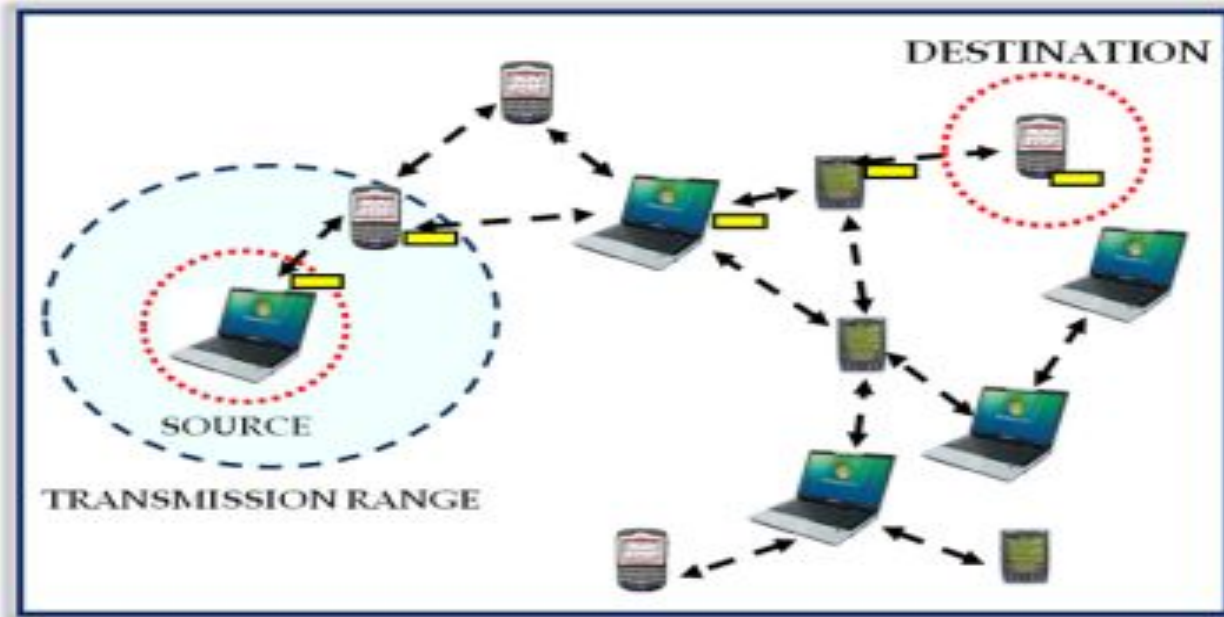


Outline

- Introduction
- Design Requirements of Routing Protocol
- Design Requirements of Mobile Ad Hoc Routing Protocol
- Classification of Routing Protocols
- Routing Protocols To Be Tested
- Performance Metrics
- Network Parameter, Layout and Scenarios
- Simulation Results
- Conclusion

What is a Mobile Ad Hoc Network?

- Decentralized network
- “Infrastructure less” : no routers and switches
- Self-organizing
- Adaptive to Dynamic Topology
- Based on packet switched technology :Internet Protocol (IP)
- Multiple network hops



Routing

- Mechanism for determining the set of best paths for routing packets
- Part and parcel of packet switched network

Design requirements:

- 1. Responsiveness to changes**
- 2. Optimality**
- 3. Robustness**
- 4. Implementation**

Mobile Ad Hoc Routing Protocols

Wired networks Routing Protocols cannot be directly applied to ad hoc wireless networks

Why the need of specific Mobile Routing Protocols?

More Specific Design Requirements

- **Exceedingly dynamic topology**
- **Bandwidth Limitations**
- **Channel Quality**
- **Limited Resources**

Desirable characteristics of Mobile Routing Protocols

- Ability to function in wholly distributed and decentralized setting
- Adaptive to repeated topology deformation
- Limited bandwidth utilization
- Convergence to the most efficient route quickly

Classification of Routing Protocols

- Proactive or table-driven Routing Protocols - Maintain comprehensive routing information in the routing table
- Reactive Routing Protocols - Also called on-demand protocol - Procure routing path while needed
- Hybrid Routing – Combination – Partition of Network into Zones

Routing Protocols To Be Tested

- **Dynamic Source Routing (DSR)**
 - Source Routing
 - On-demand (Reactive) protocol
- **Ad Hoc On-Demand Distance Vector (AODV)**
 - Optimized distance vector routing
 - On-demand (Reactive) protocol
- **Optimized Link State Routing (OLSR)**
 - Table-driven (proactive)
 - Link state information is sent periodically in their control packets

How do we know which one is better ?

Performance Metrics

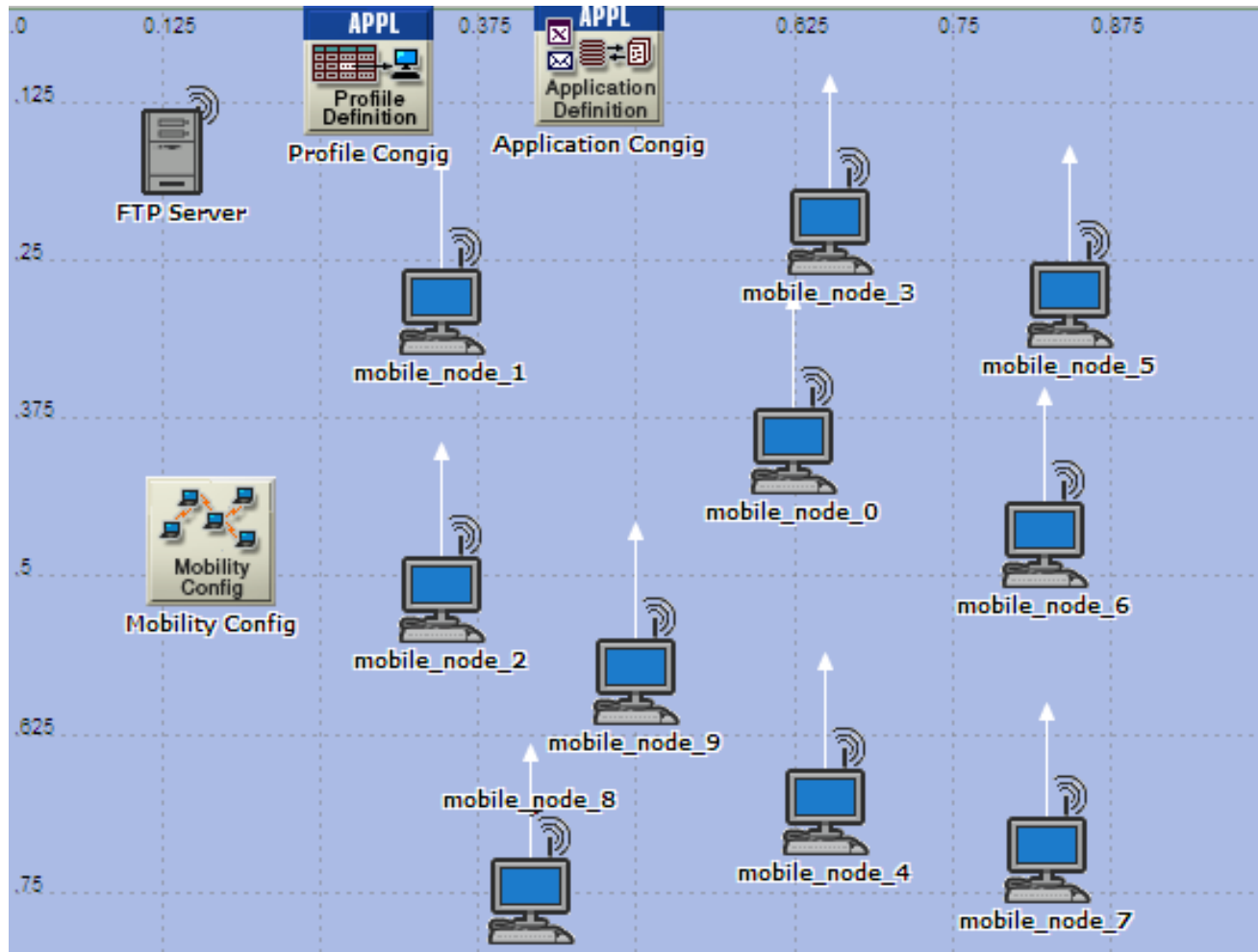
- Throughput Rate
- Traffic Overhead
- Delay



Network parameters

Parameter	Value
Number of nodes	10
Size of sub network	1Km x 1Km
Network Standards	IEEE 802.11b
Power	5mW
Data bit rate	11Mbps
Traffic	FTP (Heavy , Low)
Node Mobility Speed	10m/s , 30 m/s

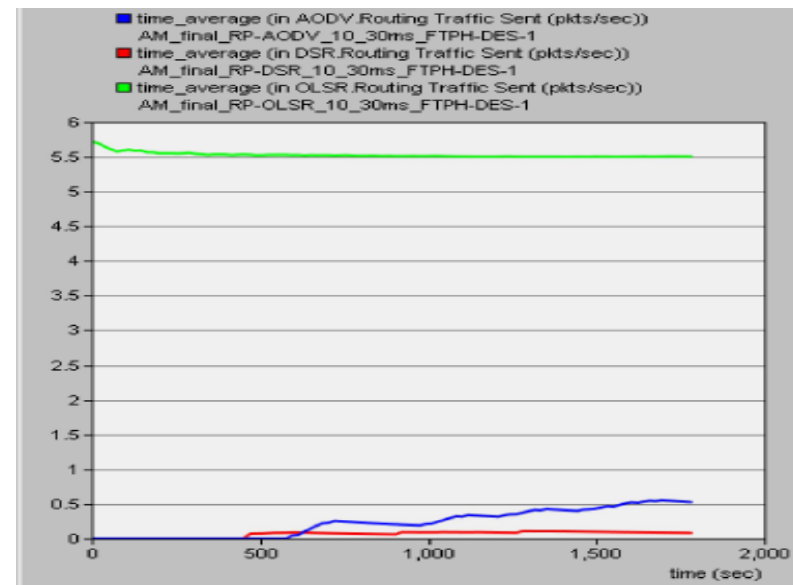
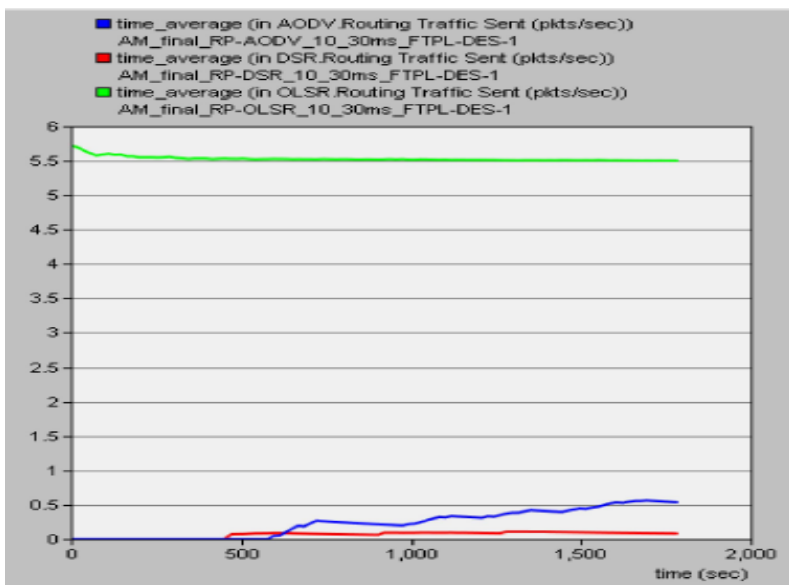
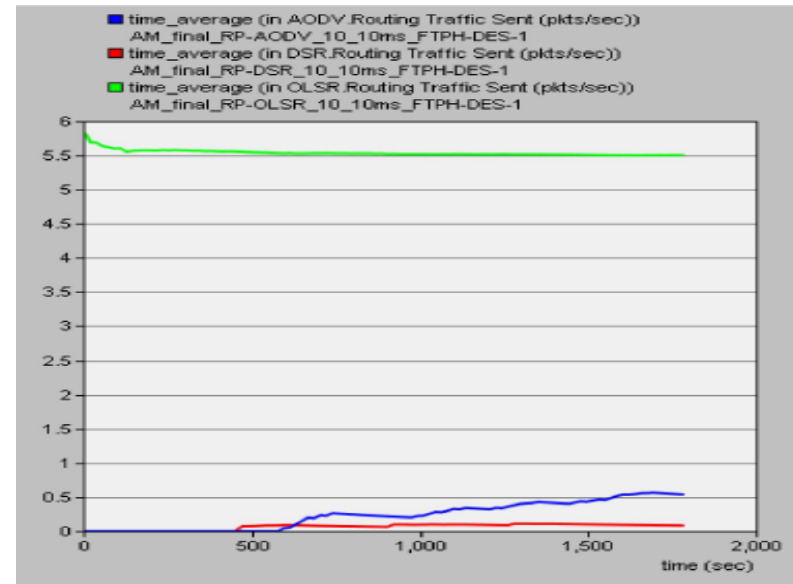
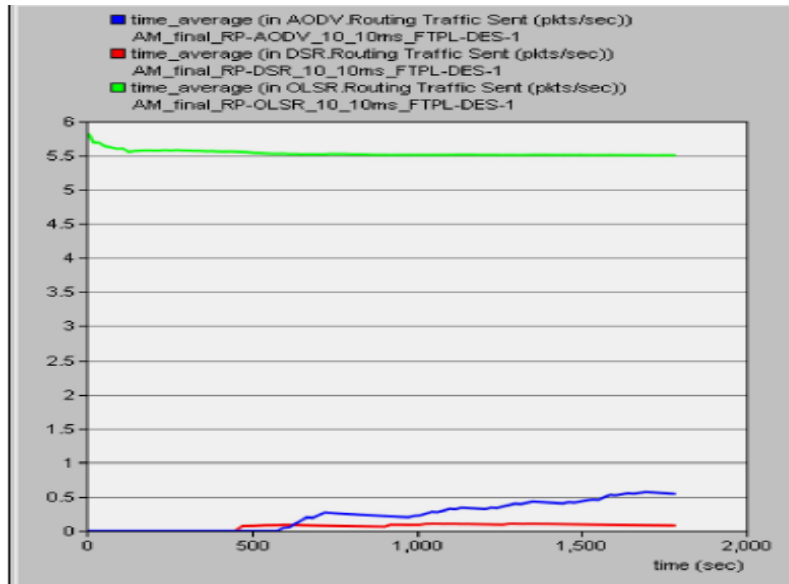
Network Layout



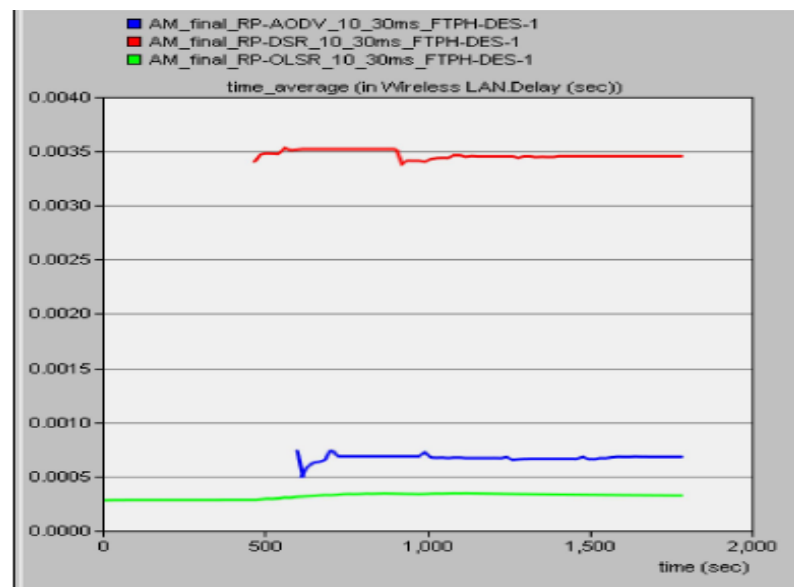
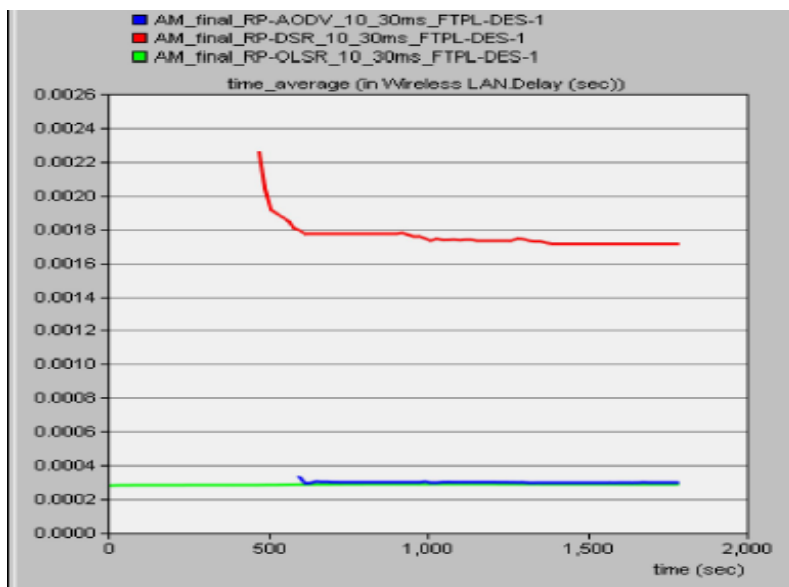
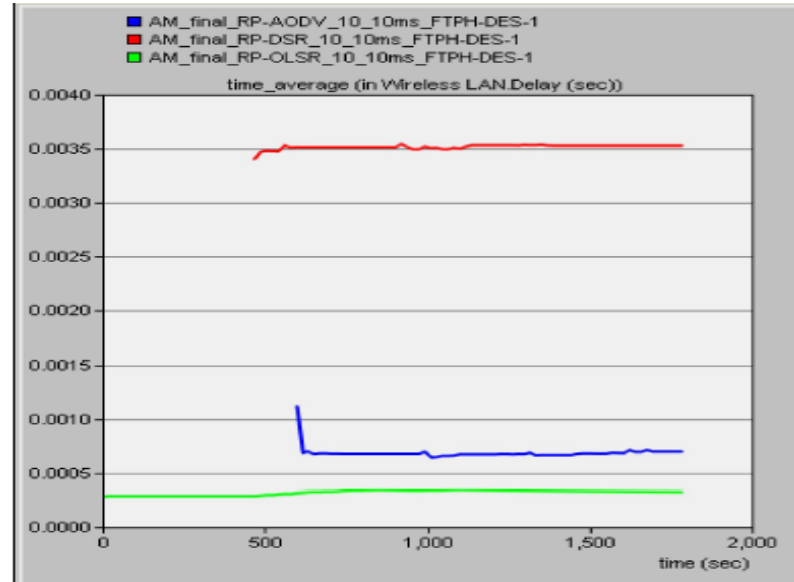
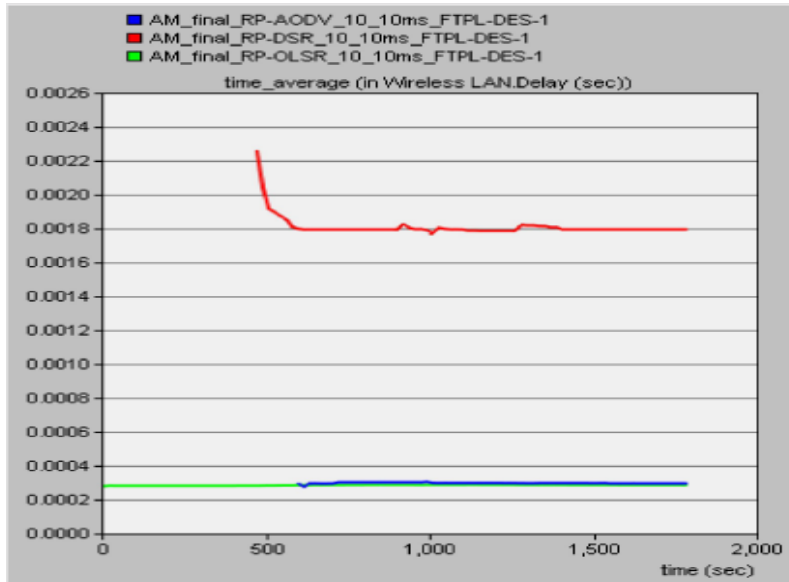
Scenarios

Protocol\ Parameter	Traffic	Mobility Speed
AODV	Low	10m/s
AODV	Low	30m/s
AODV	High	10m/s
AODV	High	30m/s
DSR	Low	10m/s
DSR	Low	30m/s
DSR	High	10m/s
DSR	High	30m/s
OLSR	Low	10m/s
OLSR	Low	30m/s
OLSR	High	10m/s
OLSR	High	30m/s

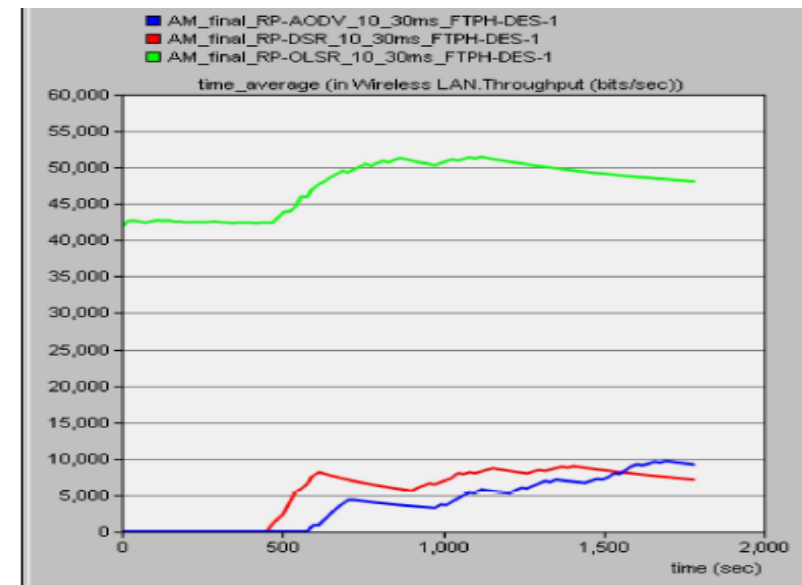
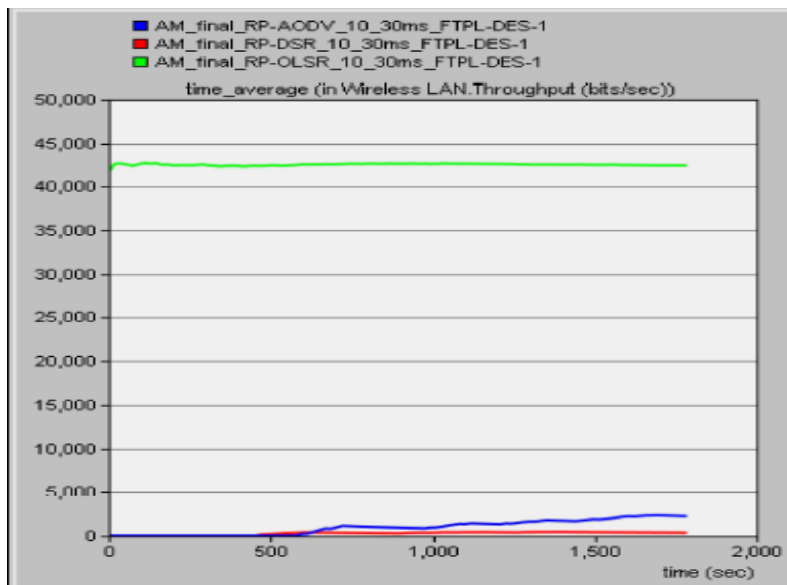
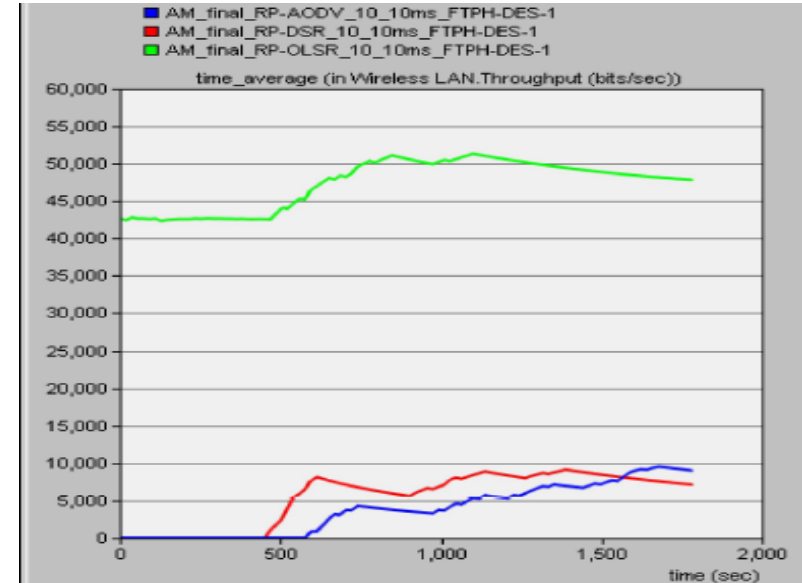
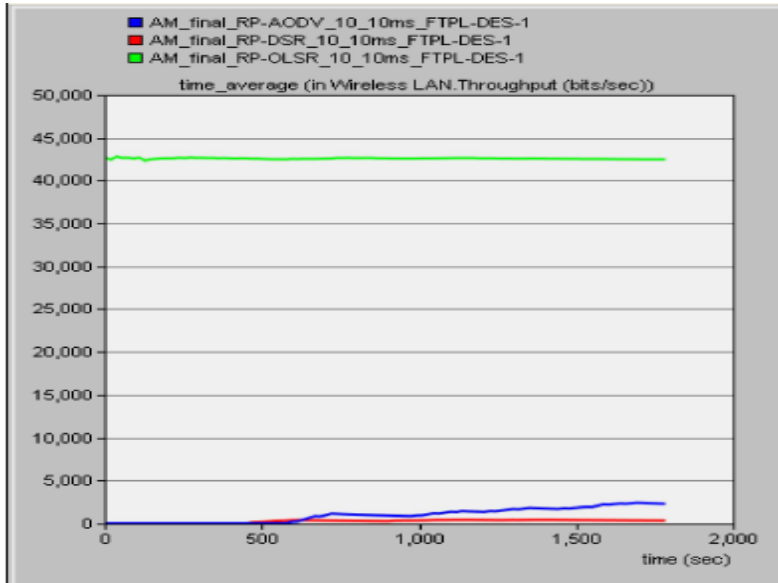
Overhead Simulation Results



End-To-End Delay Simulation Results



Throughput Simulation Results



Simulation Results

- OLSR has the best in Throughput rate and End-To-End delay, but the worst Overhead.
- DSR is the best in overhead rate.
- AODV has a better delay in low traffic and low mobility speed.

Conclusion

- Routing Protocol superiority depends on scenarios
- OLSR is superior in high capacity networks
- DSR is superior in low capacity networks
- Network load has a significant effect on network performance, whereas node speed (dynamic topology) did not have a big impact on the results
- Proactive protocols behave better in high capacity networks
- Reactive protocols are better in low capacity networks

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Thank you for your time

Questions ?