WiCIP

Wireless Communications and Information Processing Research Laboratory

AODV Adaptation for Semi-Static Smart Grid Monitoring Systems

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thinking forward

Outline

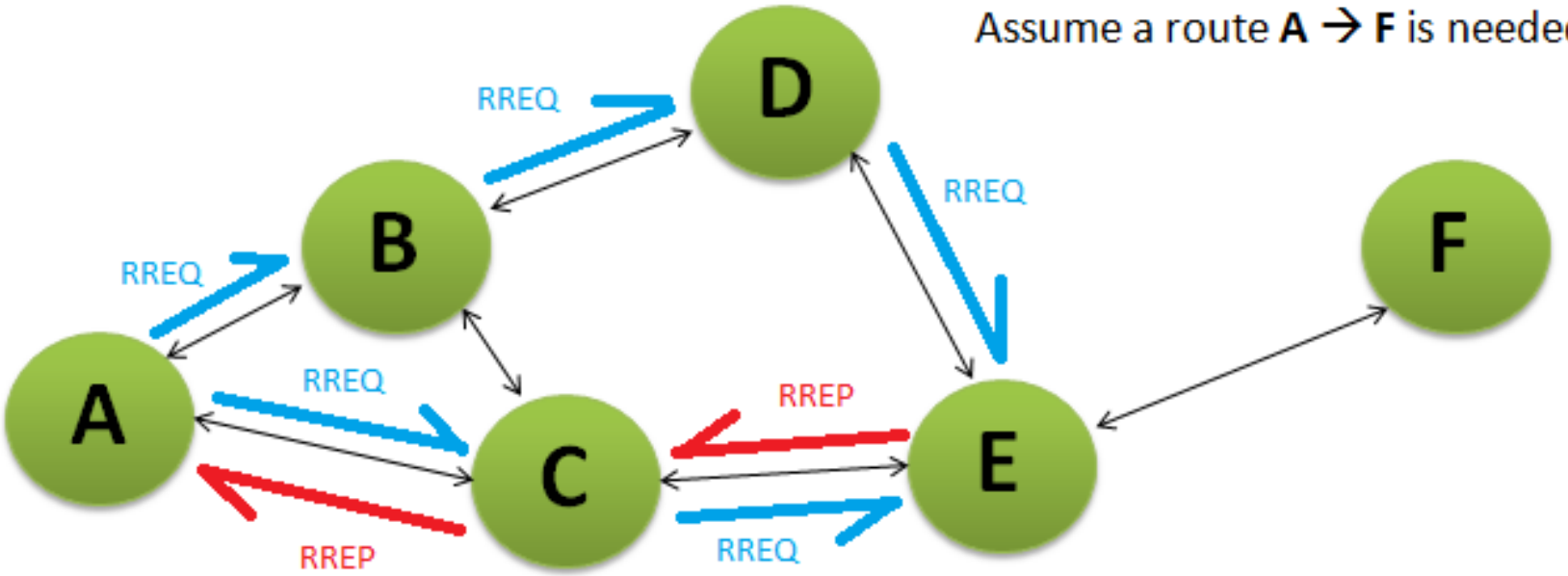
- AODV a quick overview of network routing protocol
- AODV problems in smart grid applications
- AODV modifications tailored for smart grid networks
- Results
- Questions?

AODV Overview

- Route created only when requested
- Neighbor maintenance
- UDP maintenance packets
- Limited route request by expanding ring search

AODV Overview

How does AODV establish a route?



Proposed Work

- Decrease network traffic while preserving reliability of the protocol
- Increase throughput
- Decrease latency

Proposed work

- AODV as per the RFC3561, will send periodic Hello messages.
- These messages are required to keep track of neighboring nodes in range.
- Since the nodes will not be mobile, the hello messages can be throttled down without loss of generality.

Proposed work

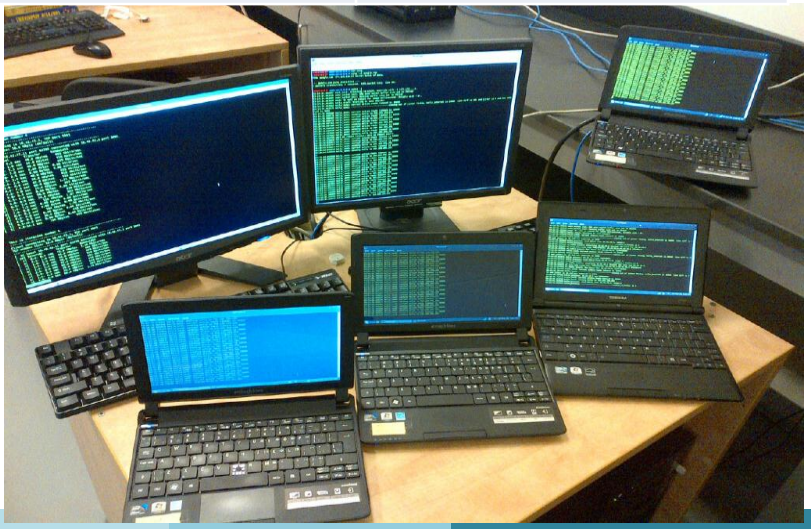
- Since AODV is an on demand protocol, routes are only created when requested.
- Routes are also kept up briefly after they are used, then invalidated.
- This creates a delay with longer routes to a control-center, that will be used repeatedly .
- Therefore extending the active route timeout, for longer than the reporting period [10 from paper], will keep the important route alive.

Proposed work

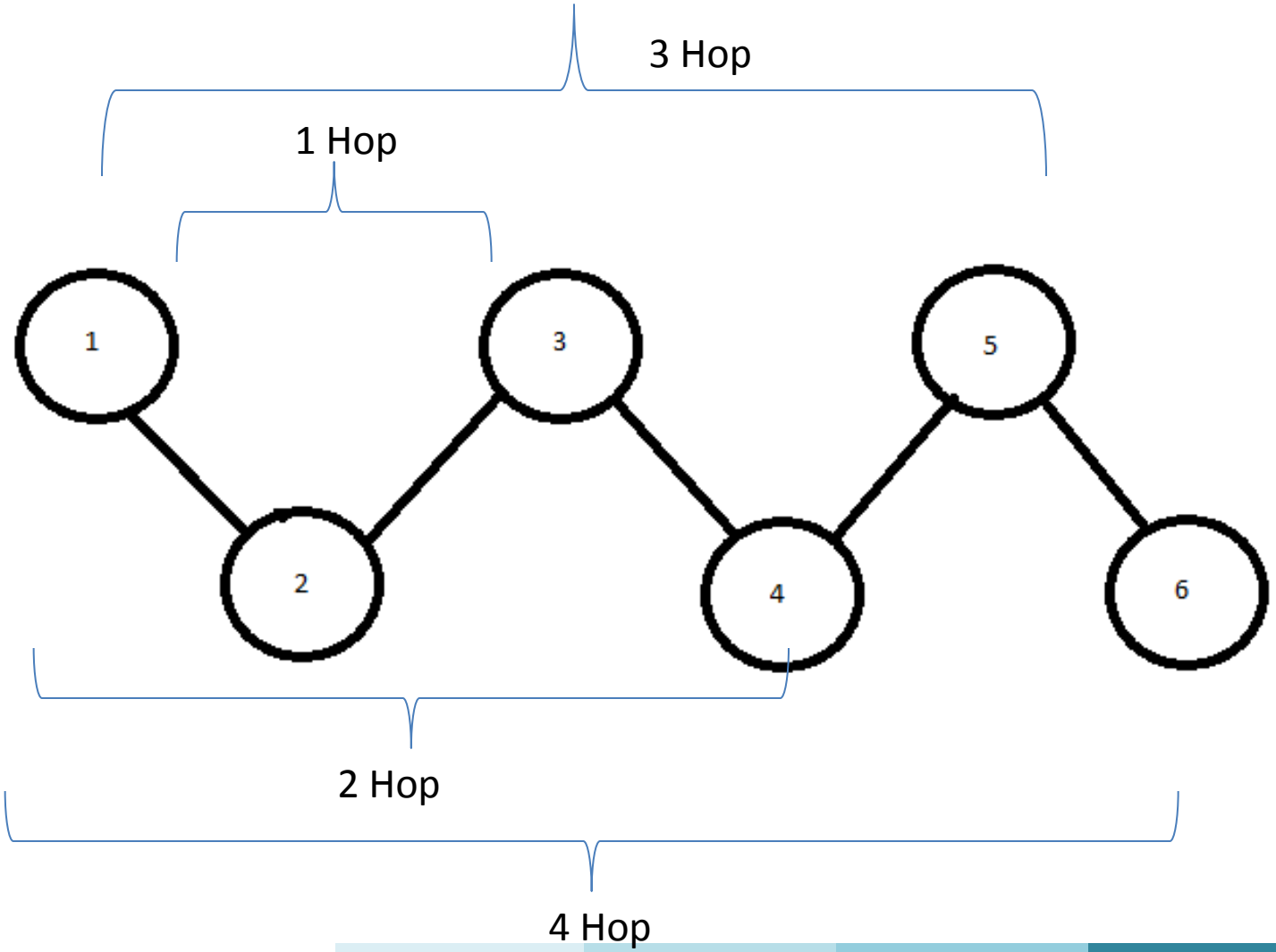
- Transparent routing table, no interruptions.
- Should act like a manually set up kernel routing table, with minimum dropped packets.

Test Bed Setup

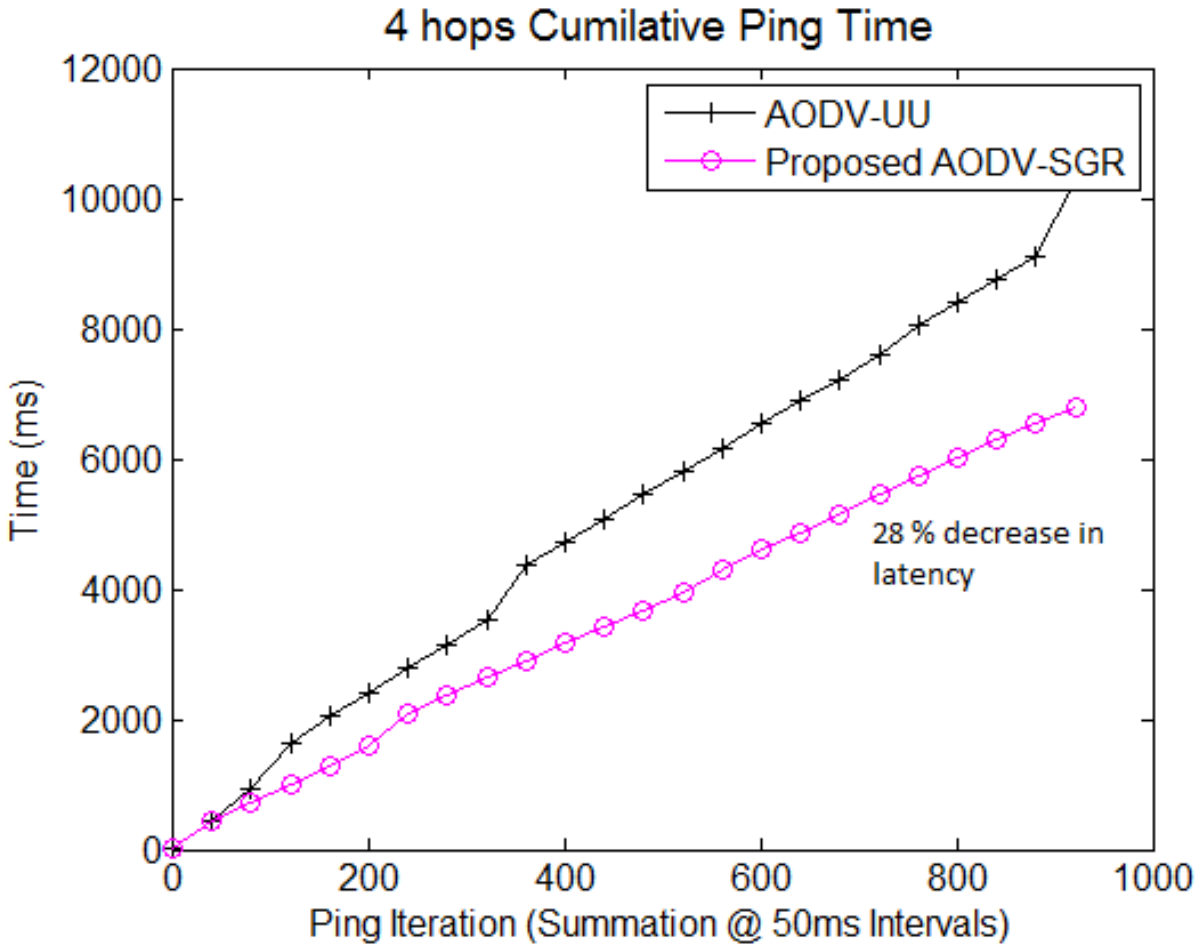
Computer	Wifi Card	Processor	Kernel
1	b/g/n	2.0 Ghz Dual core	2.6.35
2	b/g/n	2.0 Ghz Dual core	2.6.35
3	b/g/n	1.6 Ghz Single core	2.6.35
4	b/g/n	1.6 Ghz Single core	2.6.35
5	b/g/n	1.6 Ghz Single core	2.6.35
6	b/g/n	1.6 Ghz Single core	2.6.35



Test Bed Topology

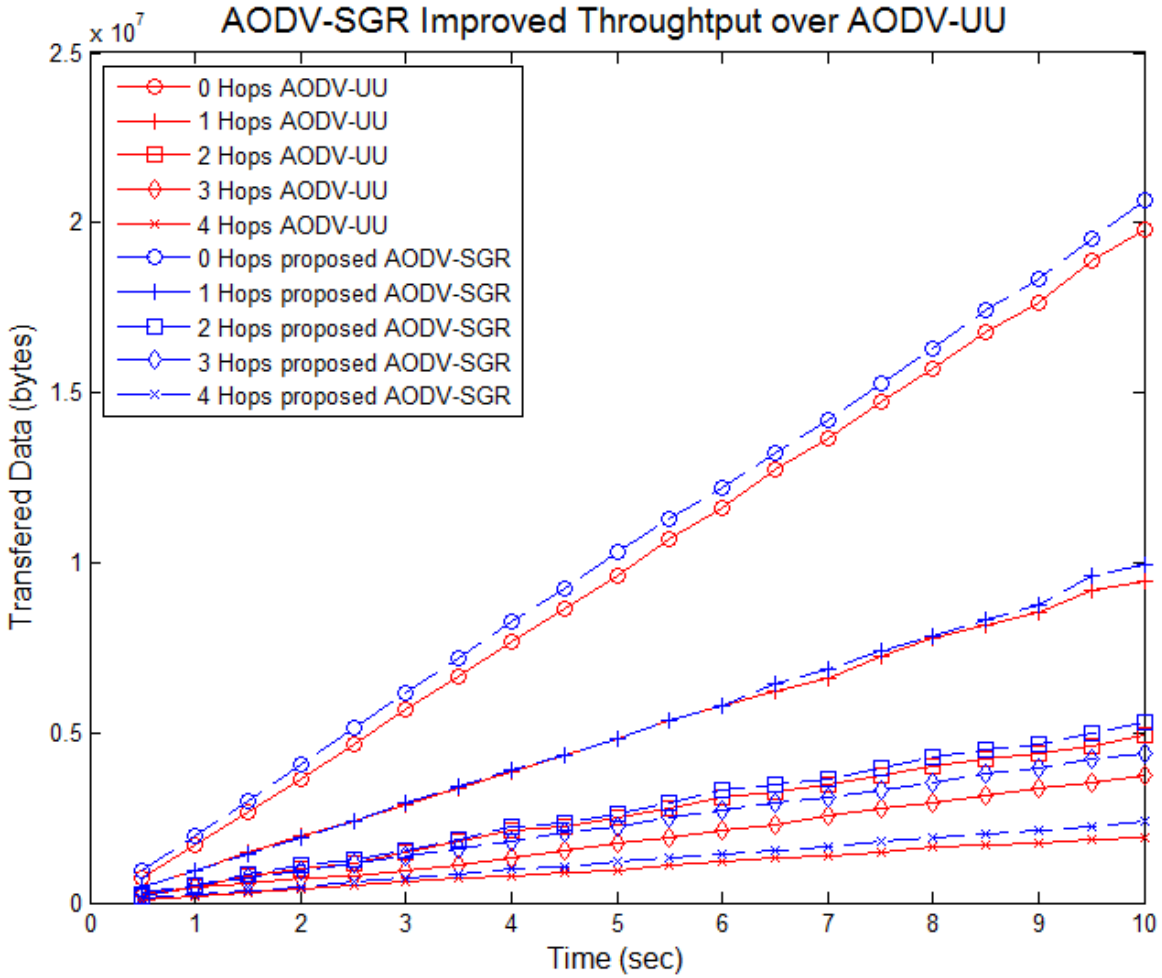


Test Bed Results (Latency)

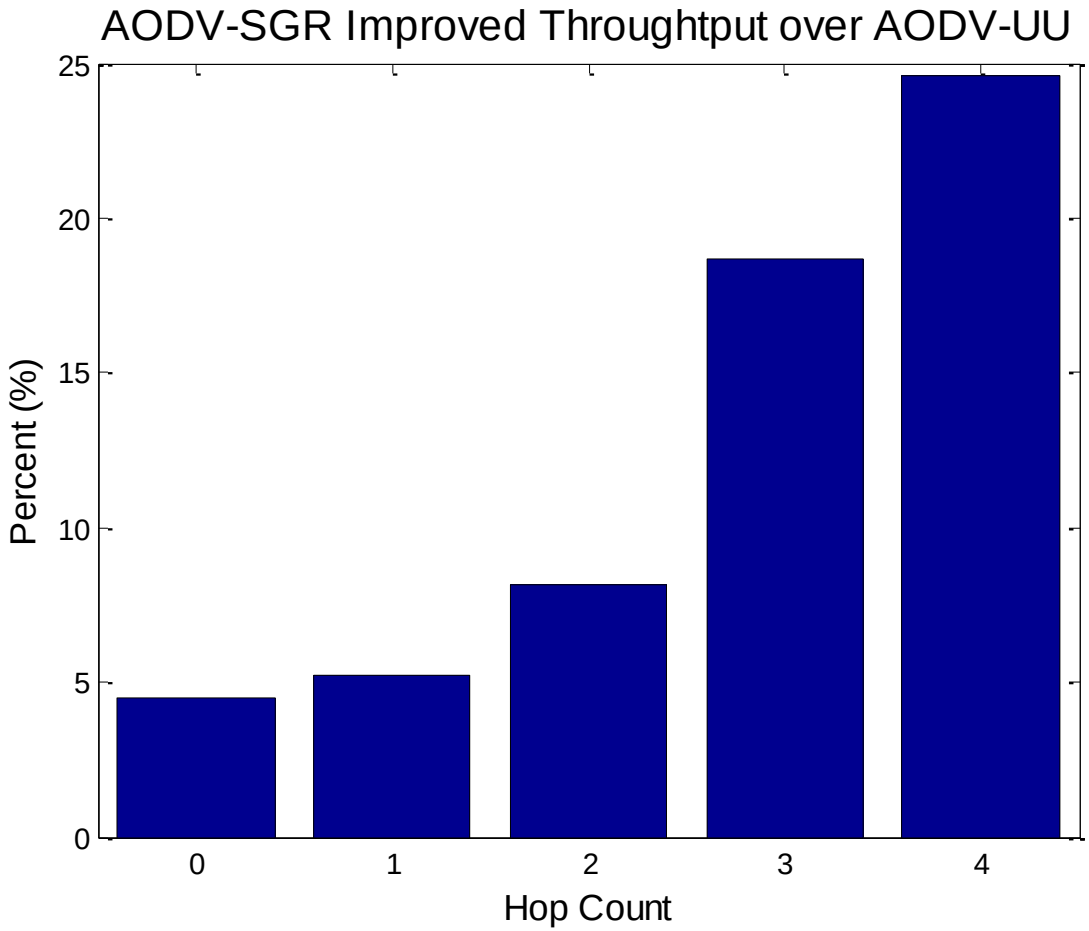


28 % improvement

Test Bed Results (Throughput)



Test Bed Results



Conclusions

- Optimizated AODV for smart grids.
- Improved delay performance up to 28 %.
- Obtained better or equal throughput.
- Improved overhead and battery life.
- Implemented adaptive HELLO messaging scheme.
- Still needs: Better QoS, Packet priorities, Emergency message handling

Questions?