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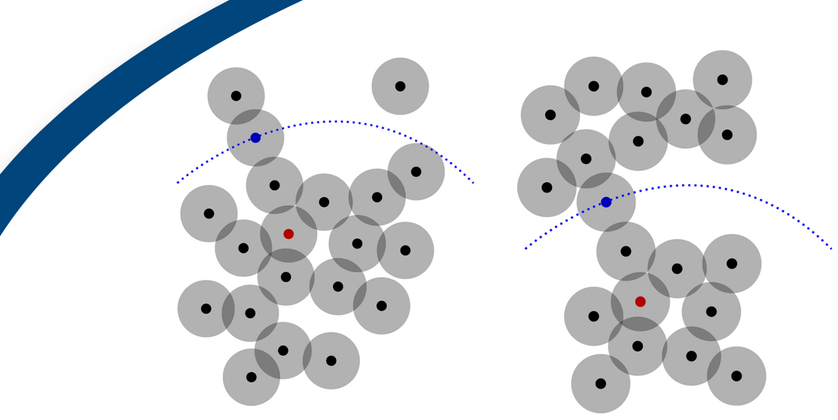
A NOVEL SOLUTION FOR OUT OF RANGE PROBLEMS IN MANETS

INTRODUCTION



Red node is the sink,
Blue node is the voyager, blue dotted line can be predefined or random

A highly efficient case of the solutio

Mobile ad hoc networks are networks that have decentralized infrastructure. Routing should be done in each node, so, each node is also a router. Some simulation environments such as; Riverbed, Netsim, ns help to improve manet technology in an easy way.

Routing protocols have significant effect on network performance in manets because they directly determine throughput, delay adaptability scalability…Some of the routing protocols are; AODV, OLSR, DSR, TORA, GeoRouting

Problem: Out of Range Nodes
Ineffective use of a fully functional node due to its position.

Proposed Solution: The Voyager
A special node traversing randomly or predefined route acts as a bridge between an out of range node and in range nodes.

Purpose: Connecting out of range nodes to destination hence, expanding covered area

SIMULATION ENVIRONMENT

- **Riverbed Modeler**
  - Formerly known as OPNET
- **Node Model**
  - IP + IEEE 802.11
  - 700 metres range
- **Network Traffic**
  - Raw IP Packets
  - Interarrival time : Poisson (ƛ = 1 packet per second)
  - Packet size : 1024 bits

Scenario I: Without the solution

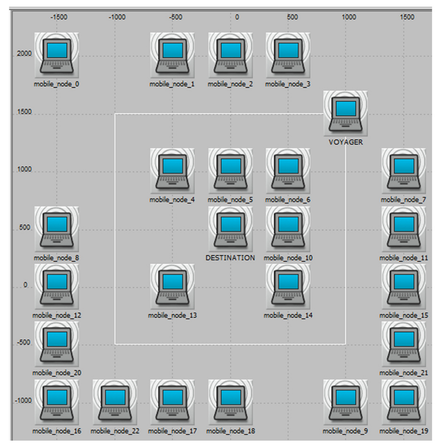
Purpose: To see out of range nodes

Scenario II: With the primitive solution

Purpose: To see the effect of the voyager

Scenario III: With the full solution

Purpose: To see the effect of stop feature of the voyager



Topology of the three scenarios

EXPERIMENTAL RESULTS

Throughput Results

	Generated Traffic [Mb]	Received Traffic [Mb]	Throughput [kbps]
Scenario I	85	22	6
Scenario II	85	40	11
Scenario III	85	40	11

- **Increase in sum of received traffic: 82%**
- **Increase in throughput: 83%**

Delay Results

- **End-to-end delay of manet packets in seconds for the entire network**
  - Scenario I neglected because of poor throughput performance

	Delay [s] (average)
Scenario II	0.74
Scenario III	0.09

- **Decrease in average of delay: 88%**

Integration & Interoperability Results

	Generated Traffic [Mb]	Received Traffic [Mb]	Throughput [kbps]	Delay [s] (average)
AODV	85	40	11	0.1
DSR	85	40	11	0.03
OLSR	85	38	11	~0.01
TORA	85	38	11	0.05
GRP	85	22	6	~0.01

- **Integration & Interoperability Results**
  - Not working with GRP
  - Same throughput with all protocols other than GRP
  - Minimum delay with OLSR

CONCLUSION

- **The solution works best with OLSR**
  - But, predefined route + static environment
- **AODV has average results**
- **Future of the project**
  - A module which determines to stop or not dynamically
  - In the case of a stop, another module which calculates stop duration using dynamic programming