Extending GSTAR to support Multicast and Inter-Domain Routing

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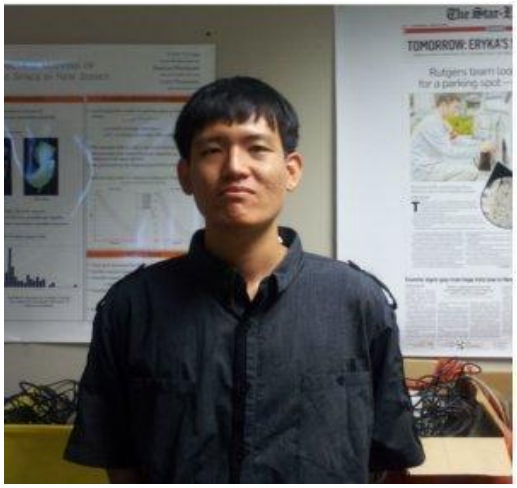

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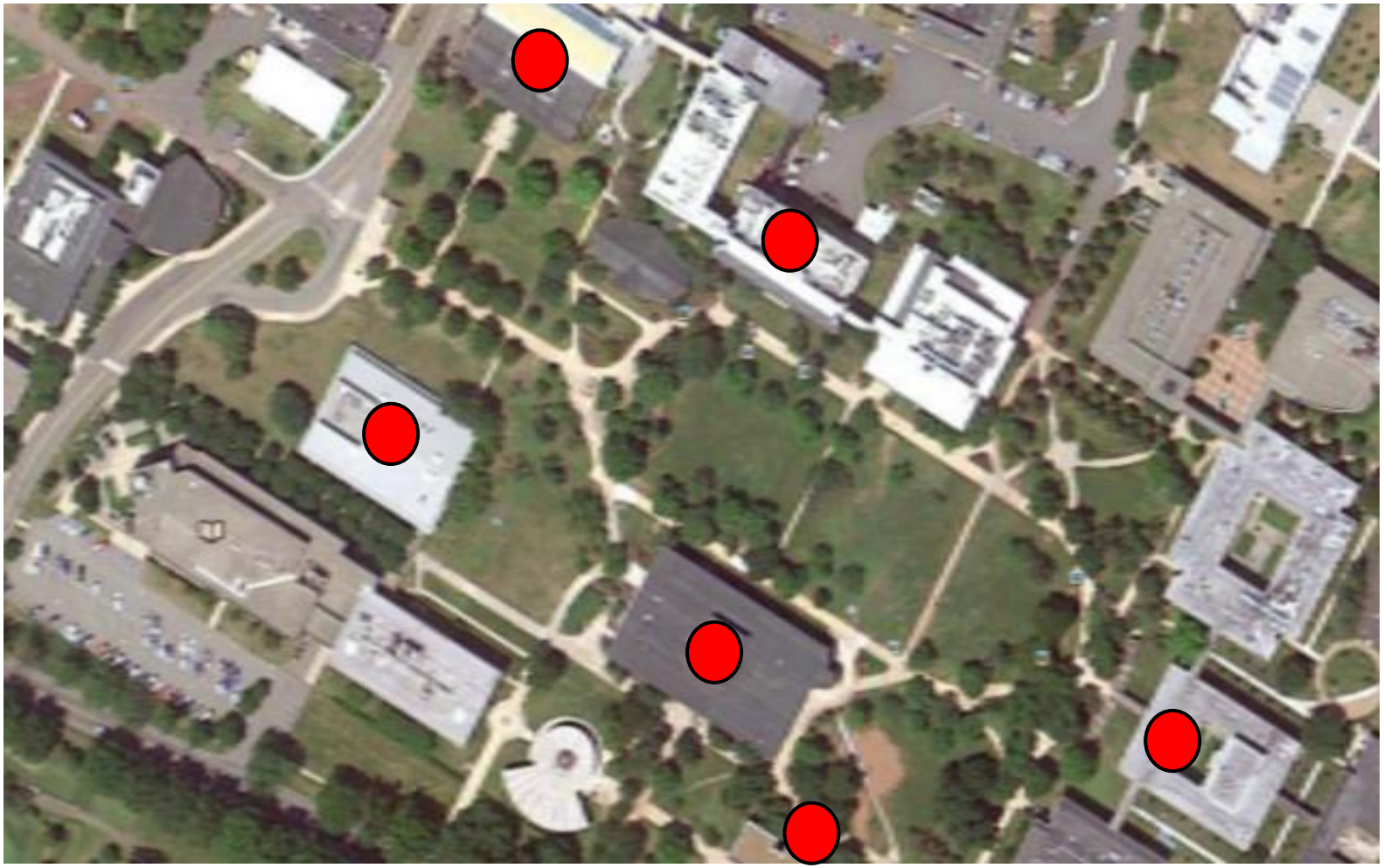
Long Term Goals

- Understanding Generalized Storage Aware Routing (GSTAR) protocol
- Implementing multicasting in intra-domain using the Global Name Resolution Service (GNRS)
- Extending GSTAR to support inter-domain routing

Simulating GSTAR over Sample Topology

Basic Topology: Engineering Lawn (Busch Campus)



Population

-8 nodes positioned randomly in a grid (50m-200m, 50m-200m)

-Nodes move at a randomly assigned constant speed between (0 m/s - 5 m/s)

-Nodes pause at a random interval (0 s - 20 s)

Sample Simulation (NetAnim)

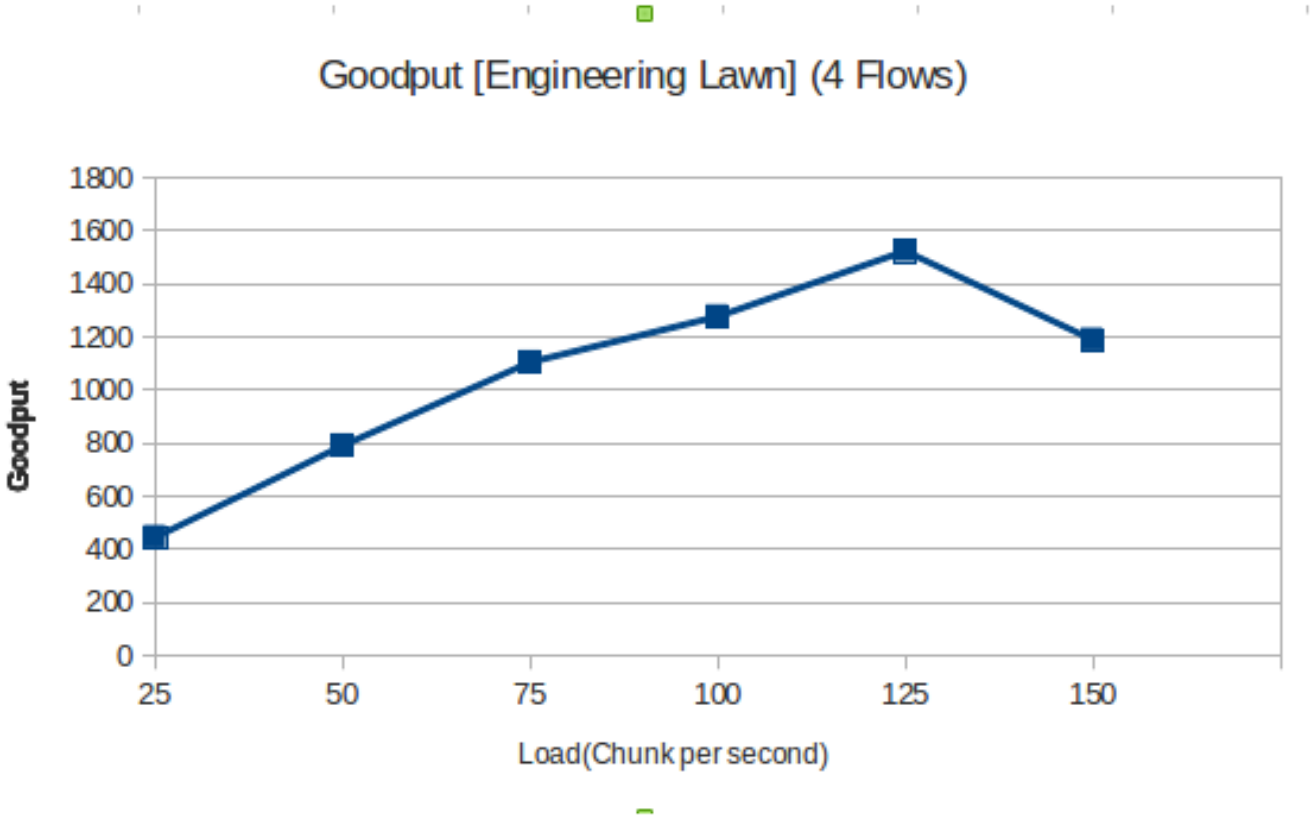
Simulation Settings

-Constant 54Mbps Wireless with added propagation loss (Maximum Range of 100m)

-Max Number of Flows = 4

-Simulation Time = 90s

Simulation Results



Upcoming Work

-Test GSTAR on a more realistic environment

-Compare GSTAR with other routing protocol (Possibly on a larger topology)

Performance Analysis on GSTAR

- Multihop wireless network of nine nodes
- Two 5 hop flows:

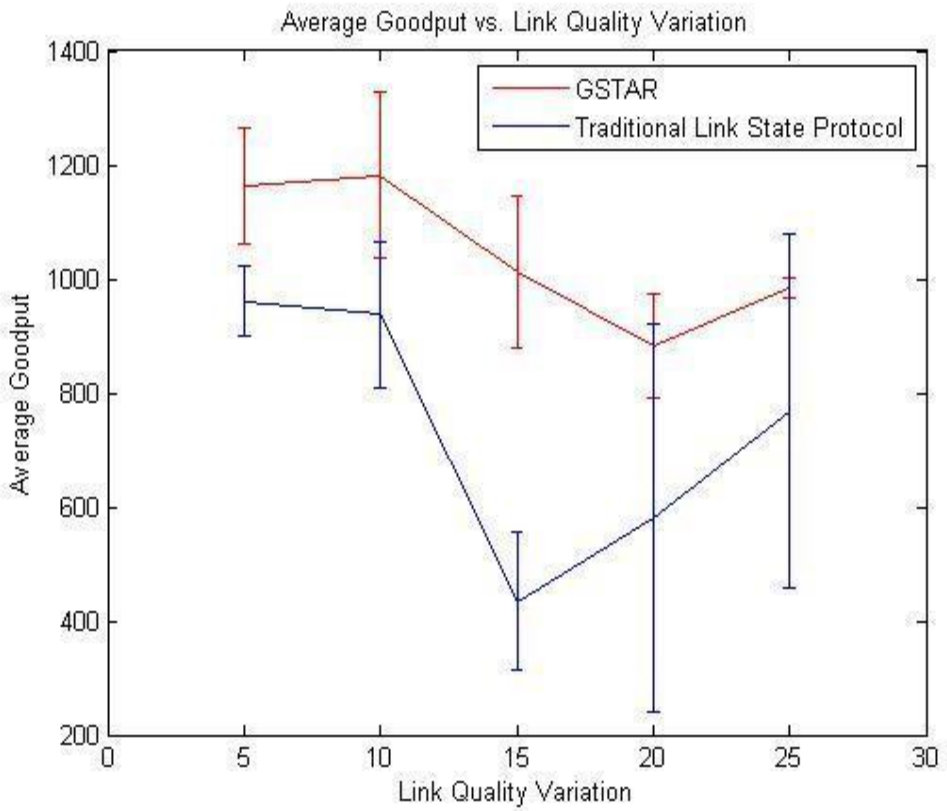
1. Node 1 to Node 8
2. Node 2 to Node 9

- Link quality of Node6-Node-8 is periodically fluctuated from 54Mbps-6Mbps to simulate congestion

Results:

Simulation Parameters

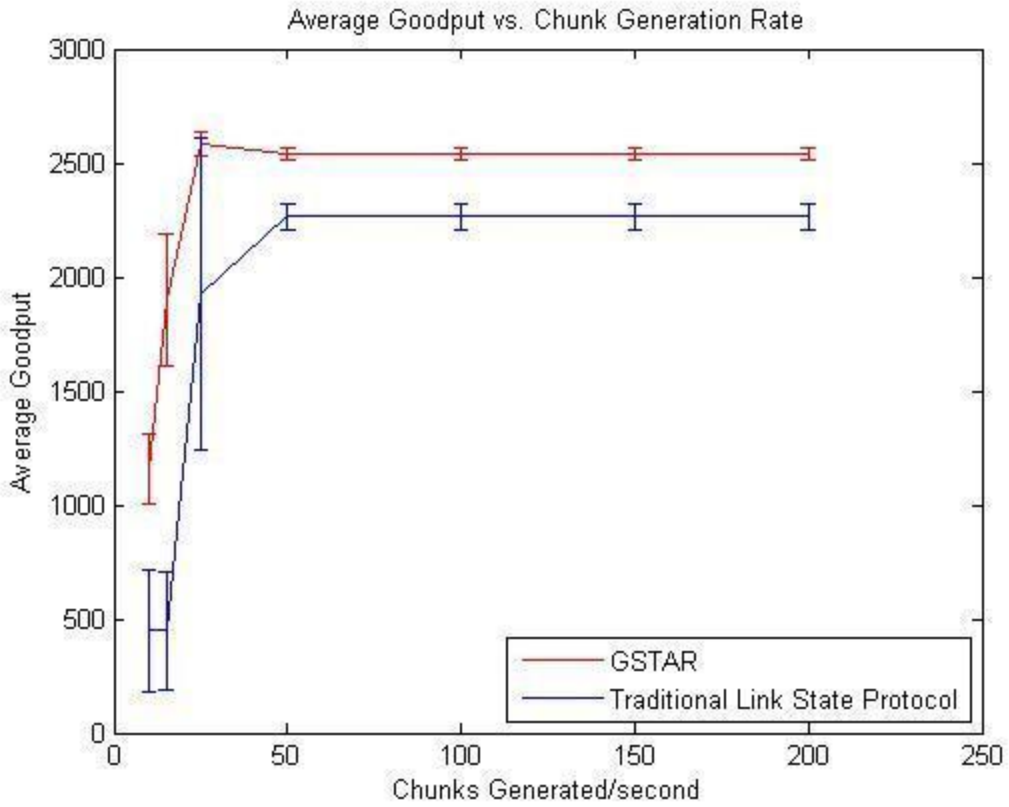
- Chunk Size: 25 packets
- Simulation Time: 90 sec
- Each data point is average of 10 runs
- LETT: average of past 10 ETTs
- Store-forward decision threshold: 1.1



Results:

Simulation Parameters

- Chunk Size: 10 packets
- Chunk generation rate varied from 10chunks/sec 200 chunks/sec
- Simulation Time: 90 sec
- Each data point is average of 10 runs
- LETT: average of past 10 ETTs
- Store-forward decision threshold: 1.1

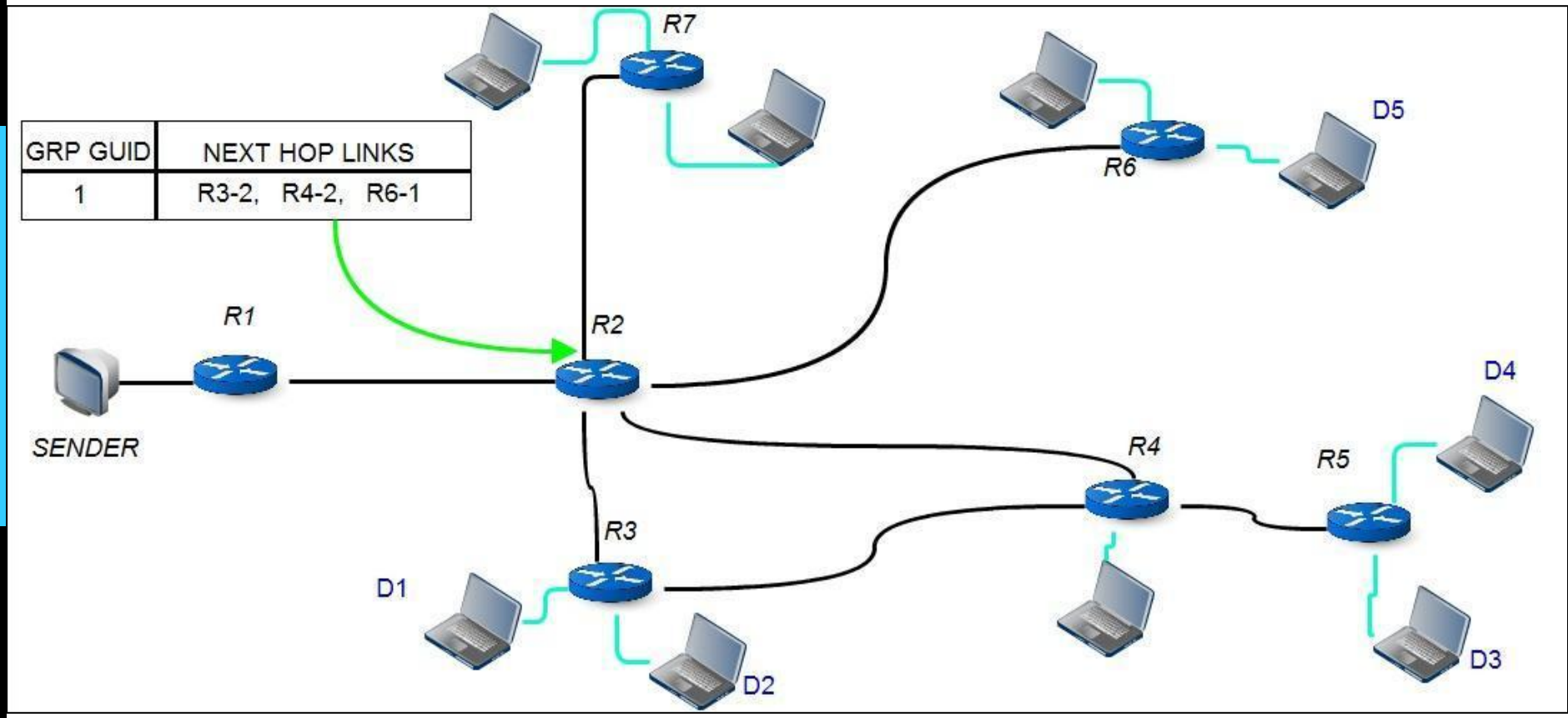


Design of Multicast protocol

Overview of algorithm

- Initial set-up requires GNRS lookup by every router
- Router stores the next hops for a particular group GUID with number of members
- At every split in path router creates a new subgroup to explicitly partition distribution and avoid duplication
- Changes in membership is managed by updates that can be used to modify the group GUID-next hop table

Example:


GRP GUID
NEXT HOP LINKS
1
R3-2, R4-2, R6-1
R7
R6
D5
R1
R2
SENDER
D4
R4
R5
R3
D1
D2
D3

Work to be done next week

- Considerations for router losing saved state
- Considerations for mobile destinations
- Scalability for large number of groups