

An Approach to Multicast Routing in AHNs

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Joint work with Gene Tsudik as part
of the NSF IMAHN project

Background

Project Goals:

1. Multicast in *Ad Hoc Networks*
2. Integrated multicast
3. Host migration and multicast adaptation

Multicast in Ad Hoc Networks

Main Goal: new multicast protocols
specifically for AHNs.

- * Support very high mobility
 - * no pre-set speed limit
 - * no direction constraints
 - * frequent outages
- * Balance robustness and efficiency.

Observations

- * Adapting *fixed* multicast not a good idea.
 - * state in routers
 - * frequent neighbor announcements
- * Flooding variations show some promise in very mobile nets.

Anticipated solution: no single solution

- * *Adaptive flooding* in small, very dynamic AHNs.
- * State-based in more static AHNs.
- * Link-state based (a la BBN's MMWS) among clusters.

Adaptive Flooding

- * Emphasis on:
 - * Reliable delivery.
 - * Minimal state retention.
- * Features:
 - * Packets assigned unique ID (src, grp, time, sequence #).
 - * Hosts keep (valid) received packets.
 - * (Valid) packets can be re-forwarded if host acquires at least one new neighbor.
 - * Packets with expired TTL are discarded.

Ongoing simulations: how good is flooding?

- * Evaluate the effect of mobility on pure flooding.
- * Higher mobility => higher packet loss?

Simulation Environment

- * UCLA's GloMoSim
- * Simulation parameters (some of many):
 - * mobility patterns,
 - * network size,
 - * group size, spread, dynamics.

Simulation environment (cont'd)

- * Number of nodes: 50
- * Field size: 1000x1000
- * Power range: 225m
- * Number packets xmitted by each node: 25
- * Propagation function: free space
- * Radio type: no capture effect
- * MAC protocol: CSMA

Mobility model

- * GloMoSim model:
 - * Mobility probability (set to 1)
 - * Mobility interval
 - * Mobility unit
 - * Pattern: “random walk”
- * Modified model:
 - * Node picks random direction and follows it,
 - * Until it reaches wall,
 - * Then picks random direction again.

Present and (near) future

- * Reproduce results with ns-2+(CMU mobility support).
- * Implement adaptive flooding in GloMoSim (new version?) and ns2+.
- * Comparison with other proposed multicast routing protocols, eg, UCLA's ODMRP.