

Scalability in Mobile AdHoc Networks(MANETs) with Query Localization in TORA

D. Dharmaraju, M.Impett /S. Corson

1

Mobile AdHoc Networks

- Wireless links
- Multiple hops
- Mobile nodes
- Dynamically changing topology

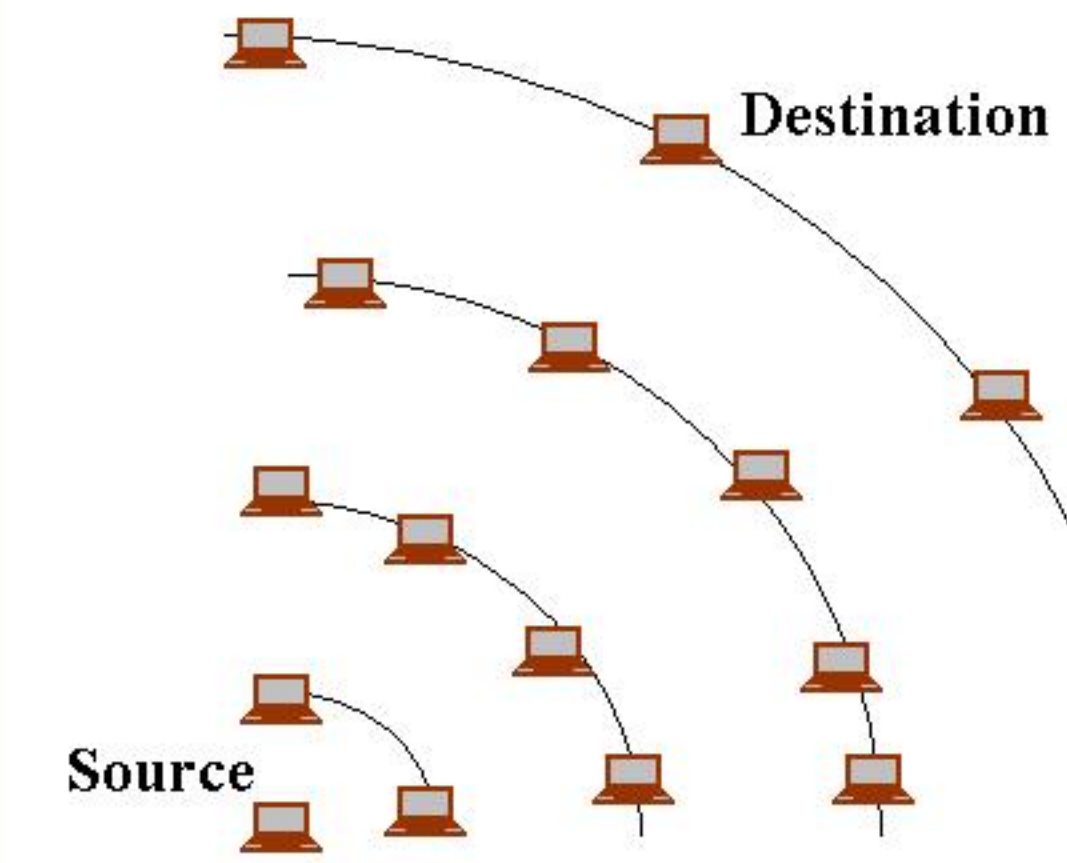
Temporally Ordered Routing Algorithm (TORA)

- Highly Adaptive
- Loop-free
- Distributed
- Link-reversal Algorithm
- Localized Reaction

Query Localization

- Scoped Queries with increasing hop counts
 - Good for more localized communication patterns.
 - Scalable- We don't want to flood a very large network with queries!
- Soft state Route Requested (RR) flags
 - We don't want to build routes unless we have to.
 - Each new query renews a source node's request for route.
 - We don't allow RPYs for very old queries to build routes.
- Sequence numbering
 - A mobile node should propagate only the most recent query.

Scoped Querying Search



Choice of Parameters

- Hop-Count- Depends on the density of the nodes in the network. For uniform density, additive increments will suffice.
- Query Timer:

$$QT(i+1) > RTT(i)$$

$$QT(i+1) = k_q RTT(i)$$

$$k_q > 1$$

$$k_q \text{ must be small enough to minimize delay in finding routes.}$$
- RR Timer:

$$RT(i+1) > RTT(i)$$

$$RT(i+1) = k_r RTT(i)$$

$$k_r > 1$$
- k_r must be small enough such that we don't have the RR flag for a long time.

Choice of Timer values

- We don't estimate RTT values in our protocol.
- We use the observation in simulations that under heavily loaded networks, the RTT~100s of ms and RTT~10s of ms in a lightly loaded network.
- For a 50 node 1500x500m network with max speed = 40ms⁻¹ and a maximum of 5 connections, we conducted experiments in ns. We found that the packet loss, delay and routing over head are relatively insensitive to the RR Timer and Query Timer values. We had the network breaking down with the source repeatedly sending queries for a Query-Timeout value of 7ms. At this point, we attain the threshold described.
- Similar experiments with the RR Timer values showed that the network breaks down when the RR Timer is reduced to below 5 ms.

Performance of Query-Localized TORA

