

DOCUMENTATION

Background study:

Routing in Mobile Ad-hoc networks is being carried extensively because of its significance. An RFC has been drafted regarding Routing in MANET. RFC 2501 - Mobile Ad hoc Networking (MANET): Routing Protocol Performance Issues and Evaluation Considerations. We have read this RFC and understood some of the prime features. There are various algorithms for routing and one of the most important and efficient strategy is "cluster based routing strategy".

Implementation idea:

In this approach a group of nodes which are in close proximity form a cluster. Each node in the cluster maintains a routing table with entries corresponding to all other nodes in the same cluster. Every cluster chooses a leader (head) based on some election algorithm. The cluster head is responsible for broadcasting packets to the neighboring clusters.

To find a route to another node:

The node first checks if it has some cached entry for that destination. If it is present and has not yet expired then that route is taken and packet is transmitted successfully.

If no cached entry exists then the node broadcasts the desired packet to all nodes within the same cluster. If the destination node is in the same group then the packet is delivered successfully.

If the destination node is not present in the same cluster then the cluster head forwards that packet to the neighboring clusters. This way the packet is forwarded until it reaches the destination.

The most important thing is that all along the way as the packets are being forwarded, the intermediate nodes add its identity in the packet so that the destination packet can find route to acknowledge back to the sender after receiving the packet.

This algorithm is better than most of the distance vector routing algorithms in the way that it uses a sequence number so that looping is avoided.

The most striking feature of this strategy is that of delivering high priority packets. The concept that we have planned to implement is: The source node sets the priority field in the packet and broadcasts the packet with high energy so that nodes outside its cluster also receive that packet directly. This fastens the process of establishing route to the destination. But this cannot be used often because of the low energy availability in small mobile nodes.

Difference b/w mobile networks and TCP/IP based fixed networks:

In fixed networks, when packets get lost the traffic is reduced assuming high traffic density. But in Mobile networks it's just the reverse strategy. The assumption made is that the medium is more error prone. So the traffic density is increased.

Demonstration:

To accomplish visualization of all the ideas implemented we have planned to use a simulation tool called "Omnetpp". It is an object oriented discrete event simulation tool. Using this simulation tool we can demonstrate all the routing actions with various levels of control on various parameters. We can also show visually the loss of packets, traffic congestion, the path taken during routing, etc.