Abstract

Mobile Ad hoc Networks are the heart of mobile communications in hostile environments. In ad hoc networks, nodes are mostly battery powered devices. So, is the tendency for the mobile nodes to drain out its power due to energy limitations. This leads to various problems such as network partitioning, node failure etc. Designing an energy efficient routing protocol is an important aspect in MANET so that the network can sustain to maximum time without affecting the performance.

The approach described in this dissertation is to achieve energy efficiency in a Mobile Ad hoc Network to increase the network lifetime by reducing energy consumption in delivering data. Network lifetime increment is achieved by trying to utilize the mobile nodes evenly when mobile nodes act as relay nodes to route the data. An attempt to decrease the energy consumption when delivering data is also made by transmitting the data at the required power and not wasting it by transmitting at high power. Selection of the protocol is made by making a thorough simulation using Network Simulator (NS-2) of the common MANET protocols AODV, DSDV and DSR. Various metrics are taken into consideration such as throughput, energy consumption and number of nodes left in the network with percentage of residual battery power and found out to be AODV as the best one considering most of our network scenario. An Energy Efficient Routing Protocol is designed by extending the AODV protocol. Nodes are evenly selected during the Route Request phase of the protocol by extracting the node cost in terms of residual battery power. The node cost table is maintained by each node. The destination node selects the low cost route by checking whichever path has got the minimal cost value. Energy efficiency is also obtained by transmitting the data at low power. This power is calculated by each node after the RREQ is received from the previous node. The RREQ received power is sensed by the receiving node and the difference of both transmission power (same for all nodes) and received power is found out. The receiver threshold power value is used along with the difference obtained, for the computation of the optimal transmission power value. This optimal power is put into an added extra field in the RREP message and is also transmitted at that obtained optimal power to its previous node. This procedure is repeated by each nodes till RREP is received by the source.