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Simulation Based Performance in Terms of Node Energy for Different Proactive and Reactive Routing Protocols of MANET

Ashish Srivastava
Information Technology, Department, Rajkiya Engineering College, Azamgarh, India

Abstract— Mobile Ad hoc network always has a challenge of curbing nodes energy during transmission and in other modes as nodes in the network runs with limited battery power which ultimately plays a keen role during entire transmission. In this paper, we have shown the simulation result of Nodes Energy after transmission and other key parameters that plays important role during transmission for Mobile Ad-hoc Network. Simulation result shows that performance of DSR is best in most of the cases and OLSR outperform DSR in 3-4 cases. Result of DSR is much better in our simulation and has surpassed OLSR in terms of nodes value increment.
Keywords-Manet, DSR, OLSR, Nodes Energy, Energy Efficient

I. INTRODUCTION

In MANET [11, 13] the mobile nodes are usually battery powered and multiple attacks [14] because of unreservedness affect entire network. Therefore, power failure of a mobile node does not only influence the node itself but also its capability to forward packets on behalf of others and results in the decrease of overall network lifetime [1]. This is the reason why research efforts have been constant to make longer the mobile node battery capacity at different manner. These points include communication energy consumption and Non communication energy consumption. Layout and model of a lesser amount of energy consume components of mobile nodes such as processors, memory and OS power management strategies [4, 5, 6], is used to decrease non communication energy consumption. Throughout communication, energy is engrossed in both in active state and active communication states. The energy consumption of active communication is additionally significant than the others for excessive traffic atmosphere. Energy efficient active communications is to stretch out the network life time. The network life time is defined as the time when a node runs out of its own battery power for the first time [7, 8]. The energy efficient routing protocols should consider the power consumption from the viewpoints of both the network and other node.

II. MANET ROUTING PROTOCOLS

Ad hoc network Protocols are of three types in classification of MANET routing protocols.

A. Table driven routing protocol (proactive).[3,13]
B. On – demand routing protocol (reactive).[3,13]
C. Hybrid routing protocol.[3]

III. SIMULATION TABLE

Simulator Parameters	
Mac Type	IEEE 802.11
Protocols for observation	DSR,OLSR
Transmission Range	250m
Traffic type	CBR
Antenna	Omni directional
Node Speed	Min-0.5m/s, Max-1.5m/s
Propagation Model	Shadowing, Two Ray Ground
Channel Type	Wireless channel
Mobility Model	Static

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Number of Nodes	5 to 25
Topology Area	600*600
Placement Model	Random
Simulation Time	200 seconds
Performance Metrics	PDR, , Throughput, End to End Delay etc.

IV. DYNAMIC SOURCE ROUTING

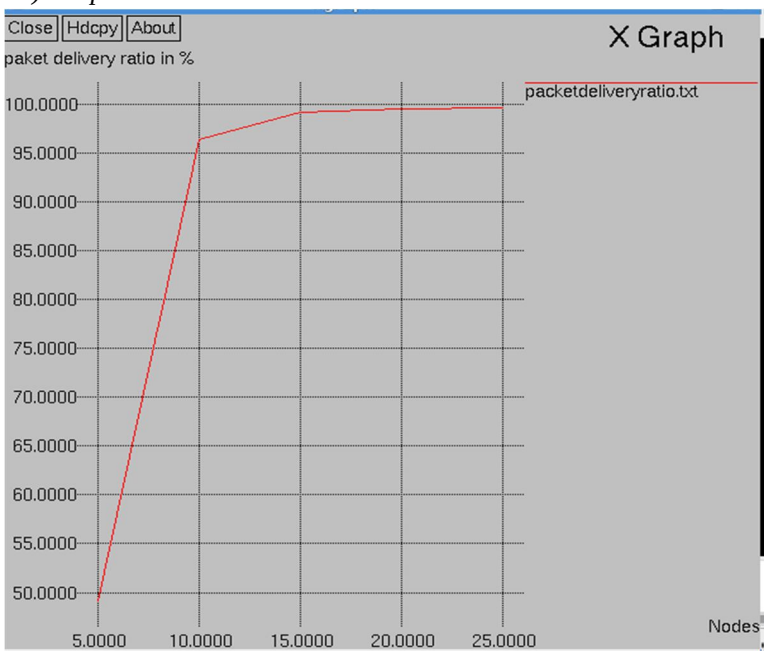
DSR [9, 10] is an on-demand routing protocol, based on the idea of source routing. Each packet take the full address and data packet follows the source route stored in its header, giving the address of each node through which the packet should be delivered in order to reach its final destination. DSR has lot of advantages over routing protocols such as AODV, LMR and TORA. Performance of DSR is superior in small to moderately size networks (it could be up to a few hundred nodes) and bank on the MAC layer support for the noticing of link failures.DSR operates in two modes viz. route discovery and route maintenance. DSR has advantage that nodes can save multiple routes in its route cache, i.e. source node can inspect its route cache for a reasonable route before initiating route discovery, and if valid route is found then there is no need of route discovery. Another advantage is that it does not demand any periodic beaconing therefore nodes can go into sleep node to conserve their power.

TABLE I [3]
COMPLEIXTY TABLE OF DSR ROUTING PROTOCOL

Protocol	TC[RD]	TC[RM]	CC[RD]	CC[RM]	Advantages	Disadvantages
DSR	O(2D)	O(2D)	O(2N)	O(2N)	Multiple route, Promiscuous overhearing	Scalability problems due to source routing and flooding, large delays

Where, TC is Time complexity, CC is communication complexity, RD is route discovery, RM is route maintenance, D is diameter of the network, N is the number of nodes in the network,

A. DSR: (Packet Delivery Ratio) Graph



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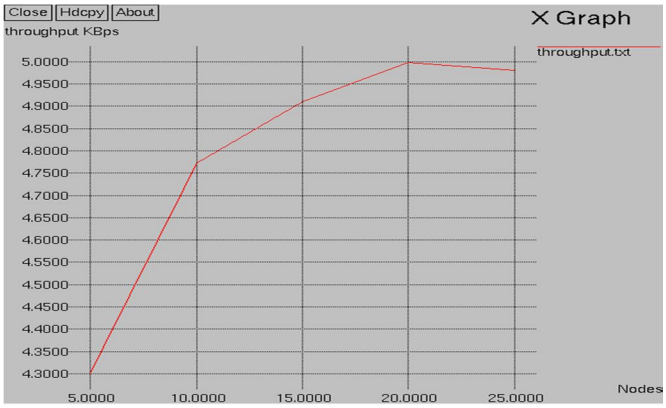
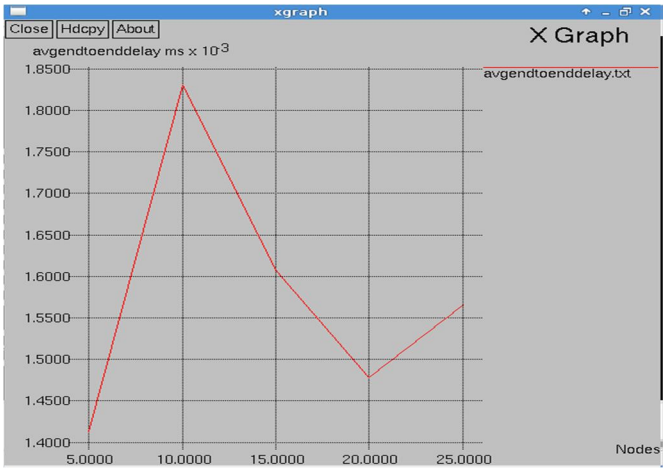
B. DSR: (Throughput) Graph



C. DSR: (EndtoEnd Delay) Graph



V. OPTIMIZED LINK STATE ROUTING

OLSR [2] protocol is point-to-point based routing protocol and is based on traditional link-state algorithm. Each node in OLSR maintains topology information of the network by periodically exchanging link-state messages. OLSR minimizes the size of control messages and number of rebroadcasting nodes during each route update by utilizing multipoint replaying (MPR) strategy. Every time the topology updates, node in the network selects group of neighboring nodes to retransmit its packets and the group of nodes is called multipoint relays of that node. Nodes which are not in group can only read and process all packets but cannot retransmit. In order to select MPR each node regularly broadcasts a list of its one hop neighbors' using hello messages. Amongst the list of nodes in the hello messages, each node selects a subset of one hop neighbors', which covers all of its two hop neighbors'. Each node decides an optimal route to each known destination by means of its topology information and stores it in routing table. In OLSR route to destinations are immediately available.

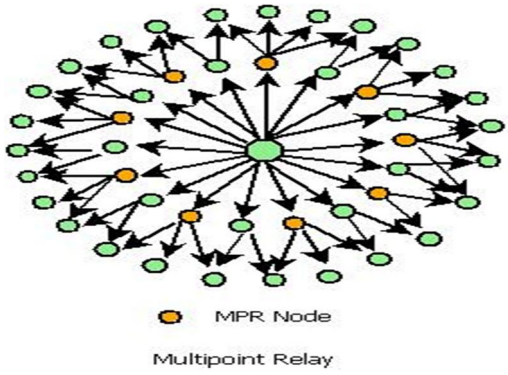


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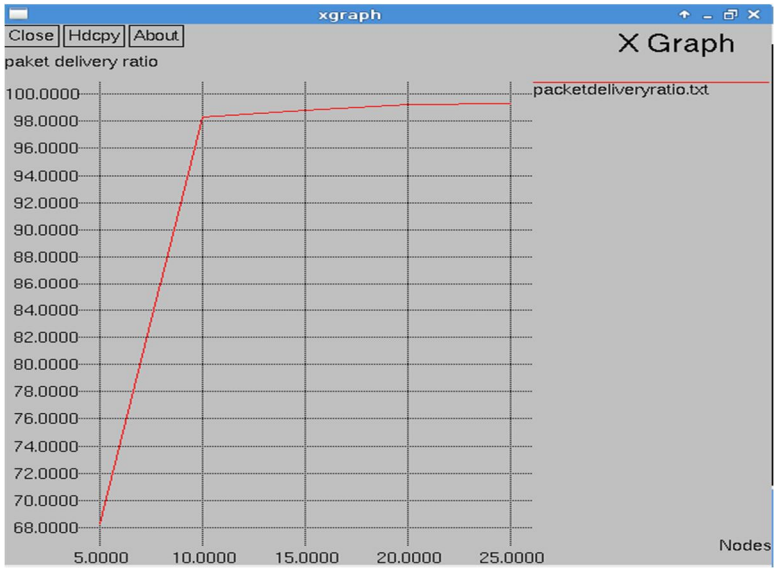
TABLE II [3]
COMPLEIXTY TABLE OF OLSR ROUTING PROTOCOL

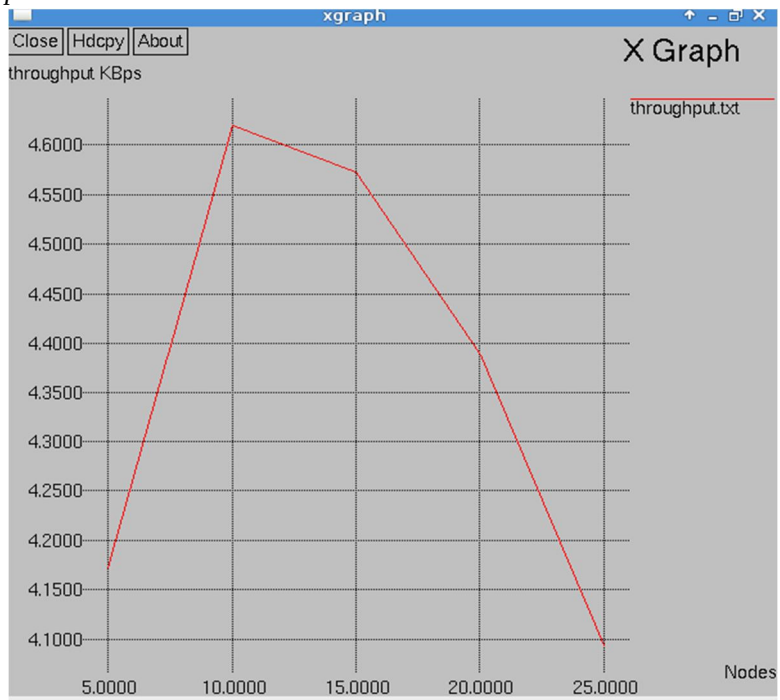
Protocol	Convergence Time (CT)	Memory Overhead (MO)	Control Overhead (CO)	Advantages/	Disadvantages
OLSR	**O(D*I)**	**$O(N^2)$**	**$O(N^2)$**	**Reduced CO and contention**	**2 hop neighbour knowledge required**

Where; D is diameter, I is average update interval, N is number of nodes in the interval.

D. OLSR: (Packet Delivery Ratio) Graph



E. OLSR: (Throughput) Graph



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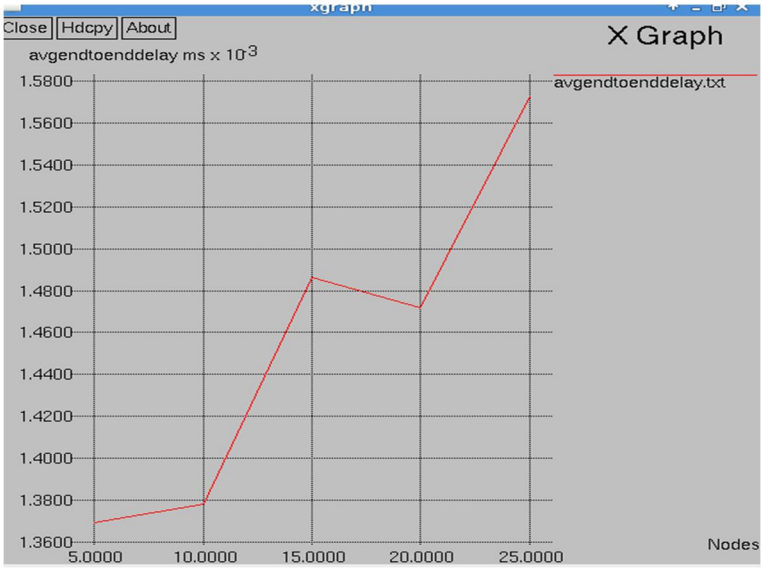
F. OLSR: (End to End Delay) Graph



VI. CONCLUSION

As Mobile ad-hoc network runs on limited battery selection of protocol at times is upper hand .In this paper we have simulated DSR and OLSR routing protocols with (5, 10, 15, 20, and 25) nodes in NS-2 Simulator and the output of both the protocols vary in different scenarios. Both protocols DSR and OLSR have O routing overhead. Throughput of DSR performance is better than OLSR. This paper will prove to be an advantage while considering protocol for transmission mode [12] and other modes of the left over battery power of nodes present in network and selecting only those nodes whose battery power is more. So, that network performance doesn't degrade in slight worst conditions.

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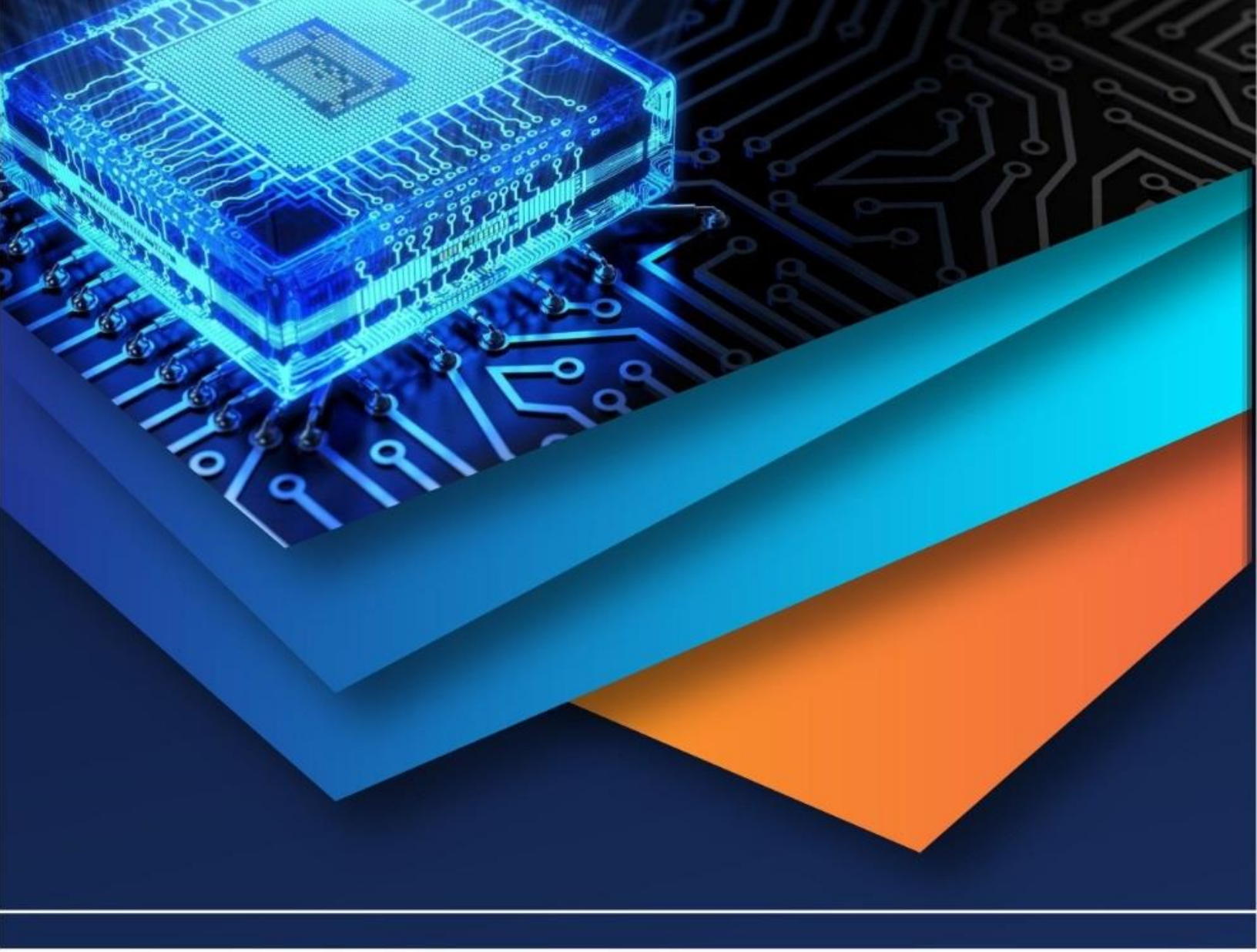

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