Investigation of Energy Consumption MANET

D. V. Biradar, Praful P. Maktedar

Abstract — In Mobile Ad hoc network (MANET) numerous mobile sensor nodes are indiscriminately situated in given system. The working of MANET is based upon collaboration of all nodes for promoting data packets and consistent route detection. A selfish node is a node who does not forward data packets to other nodes. Instead it reserves its resources and energy. Selfish node detection and elimination is an important concern issue. Energy is one of the significant qualities of service constraint in MANET. In this paper, we think about a range of means of growing reliability of system with less energy usage. Here by altering packet size, we evaluate packet Delivery Ratio, Packet loss Ratio as well as throughput, control overheads and Energy Consumption of a system.

Index Terms—Wireless Sensor Network; Reliability; Reporting rate, Packet Delivery ratio; Energy.

I. INTRODUCTION

In Mobile Ad hoc network diverse group's self-governing mobile sensor nodes are present. In the absence of network infrastructure they are connected with each other with a communication links. As these nodes are organizing themselves for efficient data communication they are continuously moving which results in change in topology of network. Mobile nodes are acts as routers and they forward the data packets to the other nodes. So the routes between nodes may potentially contain multiple hops. Due to node mobility in MANET route may changes very frequently. As mobile routers are connected with wireless link which form random topology of a network. If MANET is tied with Internet or any other private network then it is called as Hybrid MANET [1].

MANET will provide full network flexibility which makes it useful for natural disasters like tsunami, Earthquake; in military applications, in extreme medical situations and so on MANET has many advantages like low cost, Easy and speed of deployment, flexible and minimizes dependency on network infrastructure. There may be chance of node misbehaving means a node is agree to join the route but it does not forward the packet to next hop node. It is doing so because it wants to conserve its energy or due to launch a denial of service attack or may be overload of data packets. To minimize this, we use a Watchdog Timer Approach.

In this approach, each node governs that whether a node is forwarded a packet or not, in same way, each node try to monitor its forwarded node for efficient data packet transmission process. Path rater is run by each node. Each node assign rating to its known node such that previously unknown nodes are assigns as neutral nodes with rating 0.5. The suspected misbehaving nodes are rated with negative value while other nodes having positive rating between 0 to 0.8 value. Each node wills successfully forwarded data packets must sent an acknowledgement to its previous node [2]. In case of packet loss, node will send NACK means not acknowledgement message to its previous node so that retransmission of lost packet took placed. Fig.1 illustrate Mobile Ad hoc network. It involves of 9 mobiles nodes. From node A data transmission route is present to convey packets to node C. All nodes are present in each other's range.

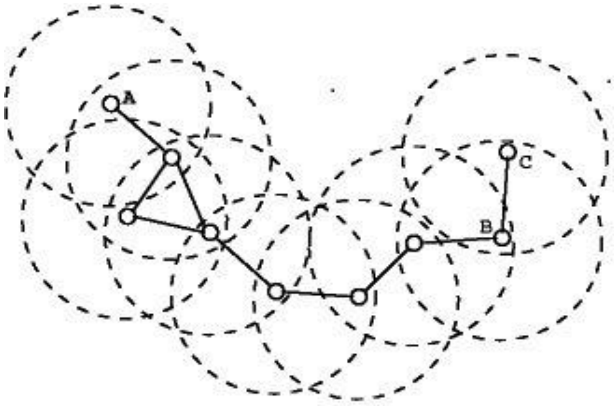

Fig. 1- Mobile Ad hoc Network

All the nodes are symmetrical hence they communicate with each other. Energy of sensor nodes is noteworthy aspect once they scattered in particular network. It is not possible to afford additional energy supply to sensor nodes. So we must considerate energy usage of nodes by avoiding unnecessary energy consumptions [3]. Energy is used for data transmission as well as reception processes. Excess energy usage will adversely influence on network lifetime. Buffer scheduling, data transmission, dropping delay, are assured surplus elements which side effect energy feedings.

II. LITERATURE SURVEY

X. Xiang et al [4] proposed that multicast is proficient technique in group communication in MANET. But it is problematic to advancing multicast packet and group membership management since of dynamic topology. We planned a novel Efficient Geographic Multicast Protocol (EGMP).

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It is self-contained, unassuming, well-organized protocol. EGMP practices virtual zone based structure that is bidirectional trace is built to attain extra proficient membership management and multicast distribution [5]. It resourcefully diminishes overheads for route examining and tree structure maintenance. As a replacement for addressing only precise portion of problem, it comprises zone based scheme to professionally switch group membership management and competently trace locations of all group members without resorting to external server location [6]. Zone is space somewhere mobile nodes are existent and location derivation.

Robert J. Hall et al [7] projected that Geographic addressing of packets (geoaddressing) is completed via geocast protocol where nodes are selectively retransmit packets founded on local decision Guidelines. It has 2 kinds as a) Flooding Approach- It is generating high load so its unsalable b) Scalable Approach- It has deficiency in adequate intellect nearby essential directionality of packets movement [8]. Hence we recommended "Center distance with priority (CD-P)" It considerably develops scalability and Reliability of a system. It is established upon three significant concepts as first a node retransmits if it is closer to the center of geocast region than all other duplicates it has perceived communicated. Second it is attends to all other retransmissions uninterruptedly former to its individual retransmission & withdraws its own if it catches another node transmits closer to the center first [9]. Third Scalability depend on each node ranking its send queue to send soonest to those packets that mark it post development near center of geocast regions.

Zhenzhen Ye et al [10] estimated that. Each node essentials to withstand its location information by Normally updating its location information within its neighboring region ,Which is called as "Neighborhood Update(NV)".And Sometimes updating its information of location to definite distributed location server in the N/W which is called "Location Server Updates (LSU)". The cost of operation in Location updates is primary problematic so to sidestep this we advance "Markov Decision Process (MDP)" In which we first explores NU & LSU properties with respect to location impreciseness under the overall cast situations. As in MENET all nodes are movable so we cannot expect precise locality of any node within given space. MDP supports us to ensure this [11].

III. PERFORMANCE ANALYSIS

We use Network Simulator (NS2) tool for simulation of nodes present in a given network area. We take 50 nodes as one of them is sink node. Reporting rate of packets is 10 packets per second. We use random topology. IEEE 802.11 Medium Access Control (MAC) protocol is used and Ad Hoc on Demand Routing Protocol (AODV) routing protocol is used. On the basis of this scenario we can draw the following graphs.

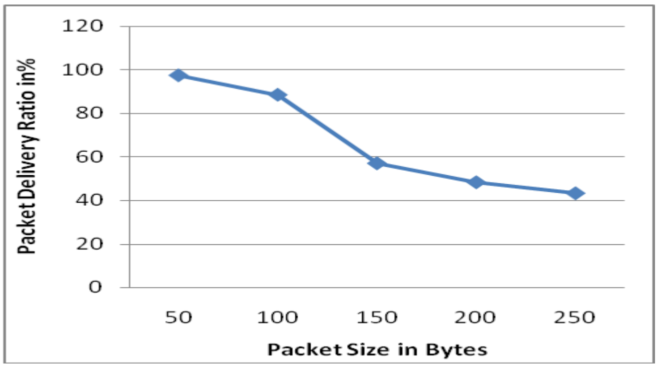

Fig. 2- PDR in % as a function of Packet Size in bytes

Fig. 2 shows the graph of packet delivery ratio (PDR) in percentage (%) as a function of packet size in bytes. At the creation, when packet size is 50, PDR is high. But as packet size increases; PDR decreases. Since due to rise in packet size, congestion in given network may upturns so packets does not catch an accurate path to reach to destination. Nodes that are added in given network go in starvation mode. They neither transmitting data packets nor receiving data packets which results in decreasing PDR rate of a given network.

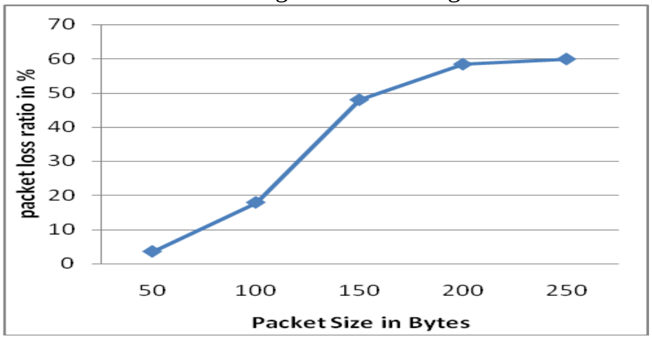

Fig. 3- PLR in % as a function of Packet Size in bytes

Fig. 3 indicate that the graph of packet loss ratio (PLR) in percentage (%) as a function of packet size in bytes. At the launch, when packet size is 50, PLR is low. But as the packet size increases, PLR also increase for the reason that of increase in packet size congestion occurred in network so that nodes might not capable to reach to sink node. Each node encloses huge expanse of information. So loss of any one data packet will cause large information loss. Therefore, PLR increases.

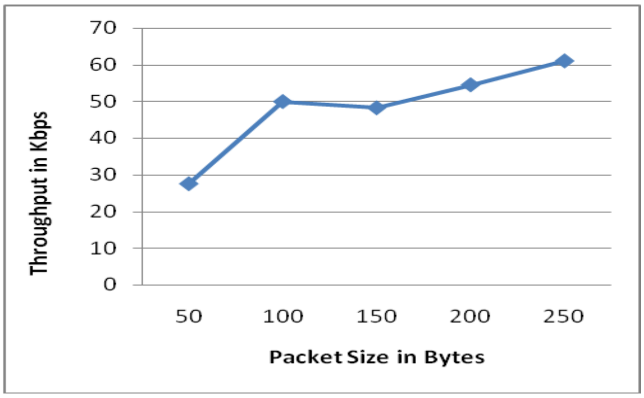

Fig. 4- Throughput in kbps as a function of Packet Size in bytes

Fig. 4 shows the graph of Throughput in kbps as a function of packet size in bytes. At commencement, when packet size is 50 then throughput is short. But as the packet size surges throughput also upsurges since data packets may perhaps develop a perfect track to reach to end.

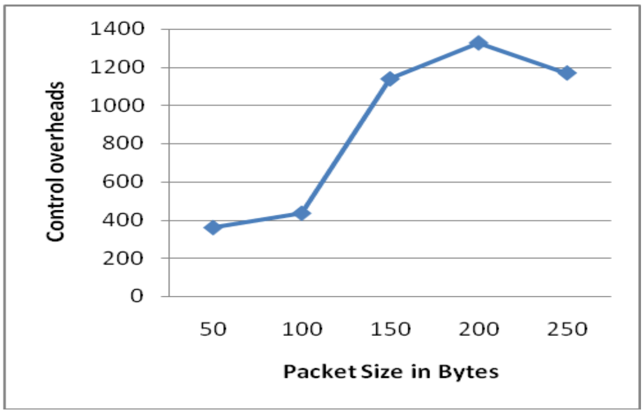

Fig. 5- Control Overheads as a function of Packet Size in bytes

Fig. 5 demonstrate that the graph of Control Overheads as a function of packet size in bytes. At first, when packet size is 50 then Control Overheads is small. But as the packet size further increases Control Overheads also increases because with handshaking process the connection is established between source node and sink node and data transmission process is ongoing successfully.

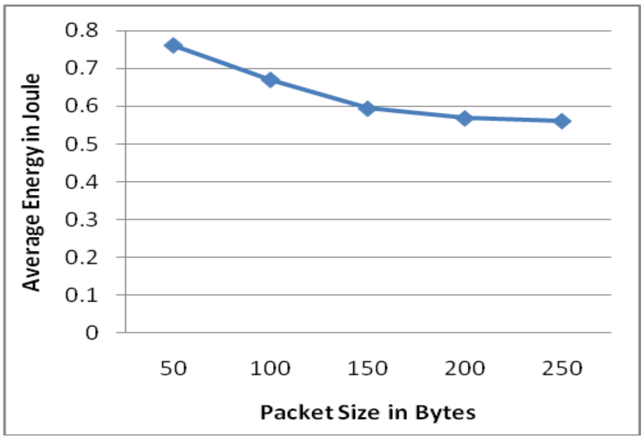

Fig. 6- Average Energy in joule as a function of Packet Size in bytes

Fig. 6 appearances the graph of Average Energy in joule as a function of packet size in bytes. At the opening, when packet size is 50 then Average Energy is high. But as the packet size supplementary growths then Average Energy reduced because primarily energy is used for handshaking process as well as determining route for data transmission process.

IV. CONCLUSION

In this paper, subsequently investigation of five graphs we accomplish that throughout the data transmission procedure we illustrate precious fluctuations. From fig. 2 we had grasped that as packet size of data upturns PDR rate is falls. Likewise from fig. 3 notice that as packet size raises PLR rate growths. From Fig. 4 we approximately note down that Throughput is reliant on upon packet size of data. Fig. 5 shows that control overheads are increases with increase in packet size. Fig.6 displays average energy consumption is reduced .It contributes enhanced results to the user. Hence it is demonstrate that packet size affects on number of packets received at destination end through data transmission procedure.

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