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ENHANCING THE QOS USING AODV AND DSDV PROTOCOLS IN MANETS BASED ON ENERGY CONSUMPTION

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ABSTRACT

Day to day advancements in Mobile Adhoc Networks (MANETS) are widely spread in the area of research and becomes as one of the top most area of research. MANETS are formed by collection of dynamically moving mobile nodes connect temporarily and connect each other without any architecture. It operates without any centralized administrator for connectivity. Nodes in MANETS are self repair which acts as router itself and independent with each other. Despite these advantages MANETS are suffering with problems like mobility, energy consumption at mobile nodes and effecting performance metrics in some of routing protocols. To overcome all these problems a new algorithm is developed and simulated with various traffic scenarios in different environments. AODV and DSDV protocols are studied in depth and simulated using NS2. The simulation was mainly focus on different parameters of (Quality Of Service) QOS like Average Energy Consumed at each node, Throughput, Network size, Bandwidth Utilization and Packet Delivery Fraction (PDF).

KEYWORDS : MANETS, AODV, DSDV, mobility, PDF and Energy consumed.

I. INTRODUCTION

MANETS are formed by the collection of different wireless mobile nodes which are dynamically exchanging the data packets among themselves without help of any central administrator or base station [1]. These network nodes are with router functions with limited energy in battery, high mobility and high performance [2]. Mobile Ad-hoc network are easier to organize than wired network are used in many applications such as military, surveillance, seismic detection etc [3].

It offers solution to keep stability between the sensors through the network operations, despite the movable nodes, with limited bandwidth and other resources constraints [4]. Various routing protocols have been proposed for MANETS which are of majorly three types:

1. Proactive routing protocols (or) Table driven approach
2. Reactive routing protocols (or) On-Demand approach
3. Hybrid routing protocols

In our study we focus only on the first two categories. Proactive routing protocol has many desirable proprieties especially for applications that include little delay for route discovery. Also maintain routing tables that contains the information and the update for each node in the network to obtain a global optimal route for each destination. In reactive protocols the source nodes call all the remaining nodes in the network, after getting the proper acknowledgement from destination to source then it decides to share its information. These protocols, however, consume significant amount of energy to periodically disseminate routing information which could be a critical overhead for MANETS with limited battery power [5]. In recent years there are so many new proposals and studies, works mainly on improvement in QOS along with its energy storage and usage as well as to increase the life time of the designed network. In this section we analyzed two different protocols one of reactive type (AODV) and other from proactive type (DSDV) are considered.

A. AODV

The AODV (Adhoc On Demand Distance Vector) protocol is which one among all protocols of MANETS is widely used in different areas for means of communication and it is an improvement form of DSDV routing algorithm. In AODV routing protocols it reduces the count of broadcast messages in packet transferring. Source node in the network generates a route request message and then the same message is broadcasted to the nearest neighbor nodes and the same will follow till the message reaches the destination if the node already receives the request then it discard the received request [6]. After this a route reply message is given as acknowledgement to all nodes which broadcast message form source node, now source node decide to transmit the data packets depending upon the returned values from different intermediate nodes [7]. This message uses sequence number to decide those routes are loop free and no intermediate node requests. All these information is updated to the source node with the latest information in table and to construct a reverse path to receive acknowledgement message. If any link failure in this process this message is broadcasted to the neighbor nodes and repeats the same for successful transmission. In this entire process the networks are suffering with problems are discussed clearly in the next section [8].

B. DSDV

The DSDV (Destination Sequenced Distance Vector) routing algorithm developed based on "Bellman Ford Routing Algorithm". Every node in the network maintains routing table information and also about number of hops to reach the information from source to destination in it. Depending upon the sequence number all packet transmission is take place. For every operation routing tables of nodes will be updated to avoid formation of loops in both time-driven and event-driven. These updates are sent in two ways namely as "full dump" or an "incremental" update. In fully dump it transmit all the routing table information to all the nodes and this uses lots of memory as well as high energy consumption. In incremental update it mainly based on the sequence number where this value is updated every time for operations in the network, if two different nodes with the same sequence number then it chooses the best one [9].

II. LITERATURE SURVEY

In this section we studied various analyzed methods and algorithms used to increase the performance of networks but still problems like mobility, packet loss, packet delay, throughput which may affects the overall performance of the network [10]. Due to these problems energy consumption at the mobile nodes increases and it may causes reduction in life time of entire network [11]. This study is focused us to implement a new algorithm in addition to base routing algorithms to overcome all these problems in different routing environment discussed in the next section. Usage of energy or power at the mobile nodes will be improved. Both route setup and maintenance are clearly mentioned in Distance-based Energy Aware Routing (DEAR) [12], [13] to reduce the consumption of energy. Calculating of energy efficiency path based on node energy and the reliability of the formed link between Adhoc mobile nodes are analyzed using different protocols [14], [15].

III. PROPOSED METHOD

A MANET is considered with 20, 40 and 60 nodes connected in an area of 1000 * 1000 meters using random waypoint mobility, TCP and UDP as

agents and CBR with packet size 512 bytes using IEEE 802.11 as MAC layer protocols. Every node has a finite energy which is consumed at the time of working to make communication in the network. The main aspiration is to reduce the consumption of energy at each node and to improve the life time of network, to obtain better throughput which helps in improvement of performance and bandwidth utilization. Proposed method is discussed below in detail to enhance QOS in MANETS.

Energy Calculation and Ranking

In this algorithm we calculate the energy consumed by each node after all the packets transmitted successfully through the node periodically and store values in the memory of the mobile node. Depending on the consumed energy node rank is assigned to every which vary for every time interval node with highest reaming energy is ranked as one. This proposed algorithm based on the energy conservation of nodes, helps to determine the available power and energy consumption rate of each node. At first we calculate the node energy periodically for every time interval and current consumed energy. Later we calculate that taken node is with enough energy to transmit the packets or not. Then routing path from source to destination is decided by finding route based on newly assigned node rank. Proposed method reduces the delay time at the time of link breakage and helps to optimize the energy conservation at nodes.

PERFORMANCE METRICS

1. Throughput

It is the measure of total number of generated packets successfully transmitted from source node to destination node with respect to time, measuring unit is bits per second (bps).

2. Packet Delivery Fraction (PDF)

It is the ratio between total numbers of packet received successfully by destination from source node.

3. Average End to End Delay (AEED)

It is defined as the total average time taken to deliver a packet from source to destination successfully. Here it represents the delay in transferring the data but finally gives the value that number of packets successfully delivered to the destination node.

4. Average Consumed Energy (ACE)

It is the ratio of total energy consume by all the nodes in the network to the number of nodes in the network.

IV. SIMULATION RESULTS

In this section we detailed the simulated results of AODV and DSDV routing protocols used for routing in the designed network. The following simulation graphs show total energy consumed by each node, average energy consumed by all nodes, average end to end delay.

Fig.1. Energy consumed by each node

Fig.3. Average end to end delay

I. CONCLUSION

In this work performance evaluation metrics and power consumption of the network in detail based on AODV and DSDV routing protocols. Thus the life time and QOS of the MANETS increases by ignoring the nodes that which are having less energy and no sufficient energy to transmit all the generated packets to the destination at the time of path discovering. Various performance metrics like throughput and delivered packets is improved, end to end delay and packet loss is reduced. The unwanted use of energy consumption is optimized. Need for broadcast is minimized. It reduces the use of memory to store the routing information. No delay in routing due to link breakage between mobile nodes. It supports large number of nodes or users to transmit the data without any collision in between among them. Life time of the network is also increased by this method.