Novel Technique for Path Recovery in Mobile Ad hoc Networks

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Abstract- The mobile ad hoc network is the self configuring type of network in which mobile nodes can join or leave network when they want. Due to dynamic nature of the network routing is the major issue which needs to resolve. The routing protocols are broadly classified into reactive, proactive and hybrid. The AODV routing protocol is the reactive routing protocol which is used to establish secure and shortest path from source to destination. The performance of the routing protocol is reduced due to link failure in the network. In this research work, AODV protocol is improved to reduce chances of link failure in the network. The AODV and proposed AODV protocol is implemented in NS2. The simulation results shows that proposed protocol performs well in terms of all parameters

Keywords- AODV, Link Failure, Path Recovery

I. INTRODUCTION

Wireless network refers to the type of networks in which the communication between devices is implemented without use of wires. Radio waves and microwaves are used for communicating between devices in wireless networks. Both devices that are communicating to each other, these are lays within the radio range of each other. The IEEE standard for wireless network is 802.11. Wireless networks have many properties such as mobility, simplicity and very affordable and cost saving installation. A wireless ad-hoc network consists of a collection of "peer" mobile nodes that are capable of communicating with each other without help from a fixed infrastructure or any centralized administration. There is no stationary infrastructure or base station for communication [1]. Each node itself acts as a router for forwarding and receiving packets to/from other nodes.. A mobile ad-hoc network (MANET) is a self-configuring infrastructure less network of mobile devices connected by wireless. Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Each must forward traffic unrelated to its own use, and therefore be a router. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route traffic. Mobile Ad hoc Network (MANET) is a collection of independent mobile nodes that can communicate to each other via radio waves [2]. The mobile nodes that are in radio range of each other can directly communicate, whereas others need the aid of intermediate nodes to route their packets. One of the most important and a difficult mechanism to maintain in ad hoc networking is the routing mechanism. An ad hoc routing protocol is nothing but an agreement amongst nodes as to how they control routing packets amongst themselves. The nodes in an ad hoc network discover routes as they do not have any prior knowledge about the network topology. Routing protocols in MANETs are classified into three different categories according to their functionality [3]. The AOMDV is based upon AODV protocol during connection establishment process. It is reactive protocol based upon multipath scheme. AODV use DSR technique which is based upon Ford's algorithm and try to eliminate infinity problem. It is formed using two major points wherever flooding follow with link disjoint and loop freedom. The source node broadcast RREQ to the immediate neighbor nodes. The RREQ packet has basic parameter one is the sequence number and other is hop count. These parameters judge to find out loops. When a source node floods a RREQ packet in the network, each RREQ arrive at the intermediate node suppose M, through different neighbor of source. Source it and node disjoint path is formed from M to source. Duplicate copies of RREQ are discarded but not immediately. Each packet is analyzed carefully, it could be encountered to form disjoint path from source. It is said node disjoint when it comes from different neighbors of the source [4]. Multipath routing establishes number of routes from source to destination. If when link failure problem occurs communication from source and node continue through other routes. Route disconnections cause data transmission failure. Therefore, Multicasting helps a lot to decrease multicasting in MANET and maintain route by other available paths and take less time. During route discovery process, during the route discovery routing protocols search node-disjoint, link-disjoint or non-disjoint routes. There are no nodes or links in common in node link ad joint. Link-disjoint routes have no common links but it may have nodes in common. Non-disjoint routes also use nodes or links in common. If a node or link failure occur in non-disjoint and link-disjoint routes, then the main and backup route get be disconnected at the same time. However, if main route will be disconnected, data transmission may be available through the backup route. Link failure is a main problem in AOMDV which is responsible for the degradation of the network and

packet lost. There are number of nodes in the network. Source is host node from where data has to be send and destination node is final node [5]. An active node is responsible for updations of table entry. During link failure, the source is informed about the failure in the network so that either it may slow down the packet transmission rate or find an alternate route which may not necessarily be an optimal route. It must be pointed out that all the congestion control methods are able to inform the source about the congestion problem because they use Transmission Control Protocol. To maintain and allocate network resources effectively and fairly among a collection of users is a major issue. The resources shared typically are the bandwidth of the relations and the queues on the routers or switches. Packets are queued in these queues awaiting transmission. When too many packets are challenging for the similar link, the queue overflows and packets have to be dropped [6]. When such drops become common events, the network is said to be congested and link failure problem occurs. In Ad-hoc networks, since there is no fixed infrastructure there are no separate network elements called routers and hence the mobile nodes themselves act as the routers.

II. LITERATURE REVIEW

Gagandeep Kaur et.al, (2014) proposed that in mobile adhoc network there is a routing protocol that transfers the packets for destination in the most efficient manner [7]. Adhoc multipath routing protocol AOMDV with load balancing scheme is proposed to distribute the traffic evenly in the network the packet loss decrease. This paper is motivated factors in a unified way. In this paper they propose is energy efficient dynamic queue based that uses load balancing. The routing is energy based mu (EAOMDV) in which we define an energy factor threshold value. The life time of proposed E-AOMDV is limited but routing as compared to AOMDV without including the energy factor. The performances of proposed scheme are better in limited life time. The performance metrics shows better results in proposed scheme.

Shancang Li, (2014) proposed that Service-oriented architectures for wireless sensor networks (WSNs) have been proposed to provide an integrated platform, where new applications can be rapidly developed through flexible service composition [8]. A congestion control and load-balancing algorithm that can adaptively adjust the load over multipaths is proposed. A threshold sharing algorithm is applied to split the packets into multiple segments that will be delivered via multipaths to the destination depending on the path vacant ratio. Simulations demonstrate the performance of the adaptive and secure load-balance routing scheme.

Harpreet Kaur et.al, (2014) proposed [9] an enhanced AODV protocol is used. The techniques will follow only the path which has the highest signal strength. Header part is added in RREQ message which helps to find out the destination. Destination nodes check the vicinity of the adjacent nodes and those nodes further checks the vicinity of their adjacent nodes. After that source find out the average of the path. The path which has the maximum average value is selected as the final path. This work will help to reduce the problem of link failure and packet lost problem.

P. R. Jasmine Jeni et.al (2014) explained [10] about the mobility factor of the nodes in a mobile Ad Hoc networks (MANET) changes the network topology leading to changes in size of the network. As the topology changes, link failure between the nodes takes place due to several reasons like channel interference and dynamic obstacles that give rise to severe performance degradation. They developed the Quantum based Routing protocol (QRP) associated with Local Link Failure Recovery Algorithm (LLFR). The QRP is a routing protocol that uses DSR and AODV as an underlying protocol to improve the QoS in scalable wireless network. The QRP and LLFR establish link failure recovery spontaneously at the point of link breakage. The performance parameters like; packet delivery ratio, throughput, average end to end delay and routing overhead of the routing protocol QRP with LLFR is analyzed using NS2 simulator.

Er.Rubia Singla, et.al (2014) explained [11] about Constant link failures are occurred in mobile ad-hoc networks because of node's mobility and use of fickle wireless channels for data transmission. In this, they propose to implement node-disjoint multipath routing based on AOMDV protocol. The main objective of proposed approach is to obtain all available node-disjoint routes from source-destination with minimum routing control overhead. With the given approach, as first route for destination is dogged the source starts data transmission. All other backup routes, if available, via the first route are scheduled concurrently with data transmission. In the current work they are proposing the concept of Node Disjoint–Multipath based on the congestion threshold and results will be obtained through various simulations shown through the effectiveness of their proposed methods in terms of End to end delay, Throughput, hop count, Packet delivery Ratio.

Mina Vajed Khiavi et.al (2013) explained [12] about the main challenges of Mobile Ad Hoc Networks is the design of robust routing algorithms that adapt to the frequent and randomly changing network topology. In this paper they compare AODV and AOMDV routing protocols for MANETs. The AODV is a unipath routing protocol and AOMDV is a multipath version of AODV. We analyses these routing protocols by extensive simulations in ns2 simulator and show that how number of nodes, pause time and traffic rate affect their performance. Performance of AODV and AOMDV is evaluated based on Packet Delivery Ratio, Network Life Time, System Life Time and End –to-End Delay.

III. RESEARCH METHODOLOGY

The MANET is the mobile ad hoc networks which is the self configuring type of network. The self configuring means that any mobile nodes can join or leave the network when they want. The nodes are deployed in the network and path is established according to EAOMDV protocol from source to destination. There are some nodes in the path having much movement than other nodes. Due to these nodes link failure problem occurs. So link failure problem is responsible for performance degradation and low reliability of the network. A novel technique is proposed to overcome link failure problem in EAOMDV.

ALGORITHM

Set M Mobile Node's

Set S sender and R receiver

Node Routing = AOMDV

Set Route

{ If (route from S to R found)

{ Check number of route;

If (route => 1) //means alternative route exist in network

{

Find (energy of each route && energy > 20)

Select only 3 routes as a best route //shortest path

Send route acknowledge through all exist path }

}

Else {route unreachable} } {

Source send(Ping message, adjacent nodes)

{

Adjacent nodes revert back to source which can recover path

Check(Node which has higher energy is path recover node)

{

Increment-Q;

Store incoming data;

} Receiver receives data from I node;

Send ACK to sender S; } } }

IV. EXPERIMENTAL RESULTS

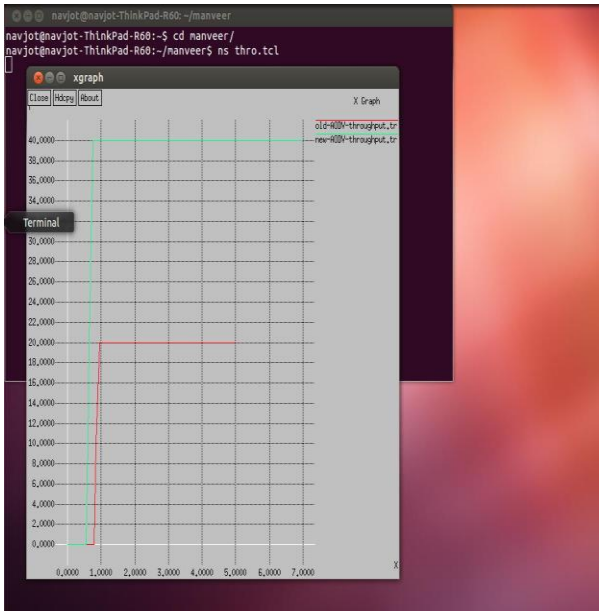

Fig.1: Throughput graph

As shown in figure 1, the throughput graph is plotted in which the old throughput in which link failure scenario is analyzed. The new throughput is shown with green line in which link failure problem is resolved. The graphs shows that throughput of new scenario is better than existing scenario.

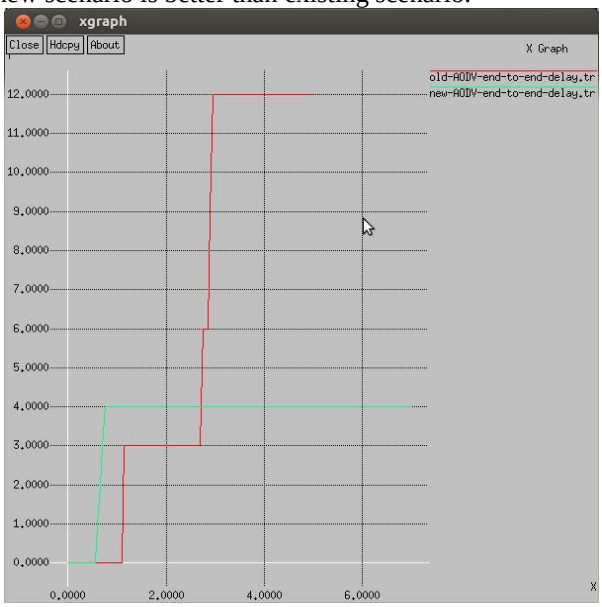

Fig.2: End-to-end delay

As shown in figure 2, the graph is plotted of end-to-end delay in the network. In this graph red lines shows the graph of old scenario in which link failure caused. The second green line is of new scenario in which problem is link failure is resolved. The delay in new scenario is less as compared to old scenario.

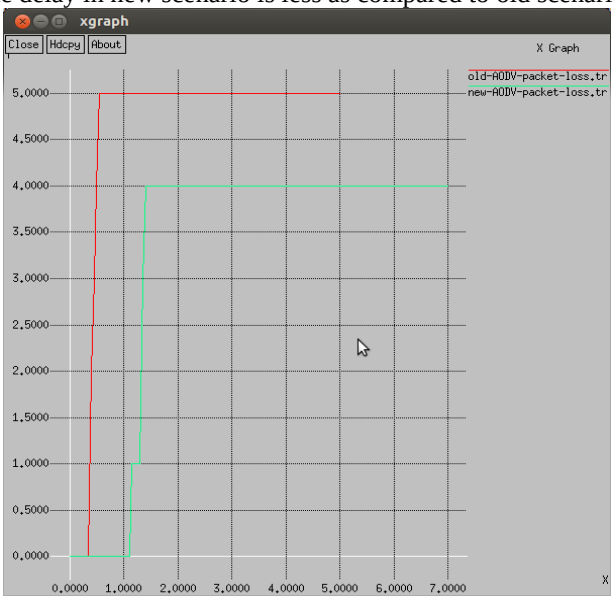

Fig.3: Packet-loss graph

As shown in figure 3, the packet-loss comparison is shown between old and new scenario. The old line is of old scenario in which packet-loss is more due to link failure. In the new scenario packetloss is less because the problem of link failure is resolved in the network.

V. CONCLUSION

The mobile adhoc networks are the decentralized type of network in which mobile nodes can join or leave the network when they want. Due to its decentralized nature routing, security and quality of service are the three major issues of the network. To establish path from source to destination reactive protocols are used which performs well in terms of various parameters. In this research work, it has been concluded that AODV is the best performing reactive routing protocol. The mobile nodes can change its location any time due to which link failure may occur in the network. In this research work, technique has been proposed which recovery link from source to destination.

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