Enhancement in AOMDV Protocol to Reduce Chances of Link Failure in Mobile Adhoc Network

[1] Indu Sharma, [2] Shaina Pundir
1 Student- Department of Computer science, Baddi University Of Emerging Science & Technology.
2 Assistant Professor - Department of Computer Science,Baddi University Of Emerging Science & Technology

Abstract: *MANET is a self configuring network which has no fixed infrastructure. Topology in MANET changes frequently. During data transmission, there is a problem of link failure which degrade the performance of the network. 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. In this paper, a novel technique is proposed to overcome link failure problem in EAOMDV.*

Keywords: *AODV, AOMDV, EAOMDV, MANET, Link Failure*

I. INTRODUCTION

Wireless network refers to the type of networks in which the communication between devices is implemented without use of wires [1]. Wireless networks have many properties such as mobility, simplicity and

very affordable and cost saving installation. Wireless networks can be classified into two types:
1. Infrastructure Network
2. Infrastructure less Network

Infrastructure networks has center controller that is Access Point. All the wireless devices, that is communicate to each other through Access point and Access point is responsible for data routing [2]. Access point is a fixed base station and all wireless devices that are communicating to each other are connected to access point. It is also known as Adhoc Network.

Infrastructure-less networks has no central controller means no Access point. Ad hoc networks are decentralized type of wireless networks [3]. In ad hoc network, each node participates in routing by forwarding data to other nodes, and so the determination of the nodes forward data is made dynamically based on the network connectivity.

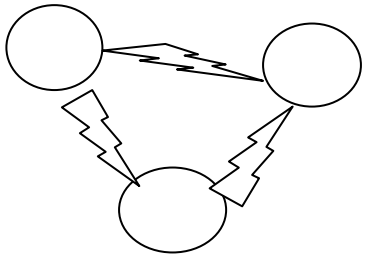

Fig 1.1: Infrastructure less Network

1.1 Types of Adhoc Network: There different types of adhoc network available. These are as following:

1.1.1 MANET: MANET is a mobile adhoc network. It is self-configuring network which is infrastructure less in nature. In Manet different mobiles are connected through wireless link. Each mobile are free to move i.e. no central controller available [2, 3].

***1.1.2. Wireless Sensor Network*:** A wireless sensor network is collections of sensing device that can be wirelessly communicate. Each device is capable of talk to its peer, sense, process. It is centralized system. It is inexpensive to install and no wiring is required for data transfer [4].

1.1.3. Wireless Mesh Network: Wireless mesh network is a communication network made up of radio nodes which are ordered in a mesh topology. Wireless mesh networks made up of gateways, mesh routers, mesh clients and. The mesh clients are may be laptops, cell phones and other wireless devices. The traffic is forwarded by mesh routers to and from the gateways but not connect to the internet [5].

1.2 Routing Protocol in MANET: 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 [7]. 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:

1. Reactive Routing Protocol: It is also called the On Demand routing protocol. They don't maintain routing information or routing activity at the network nodes if there is no communication. It means that it creates the routes only when desired by the source node. E.g. AODV, DSR

2. Proactive Routing Protocol: It maintains the routing information even before it is needed. They attempt to maintain up to date information from each node to every other node in the network [8]. Routes information is generally kept in the routing tables and is periodically updated as the network topology changes.Proactive routing protocols are table driven routing protocols. E.g. DSDV, WRP

II. REVIEW OF LITERATURE

In this paper [5], they introduced about congestion control is a key problem in mobile ad-hoc networks. Congestion has a severe impact on the throughput, routing and performance. Identifying the occurrence of congestion in a Mobile Ad-hoc Network (MANET) is a challenging task. The congestion control techniques provided by Transmission Control Protocol (TCP) is specially designed for wired networks. There are several approaches designed over TCP for detecting and overcoming the congestion. This paper considers design of Link-Layer congestion control for ad hoc wireless networks, where the bandwidth and delay measured at each node along the path. Based on the cumulated values, the receiver calculates the new window size and transmits this information to the sender as feedback. The sender behavior is altered appropriately. The proposed technique is also compatible with standard TCP. In this paper [6], they implemented a new distributed routing protocol i.e., Temporally-Ordered Routing Algorithm for mobile, multihop, wireless networks. TORA can be used for highly dynamic mobile ad hoc networks. The protocol's reaction is structured as a temporally-ordered sequence of diffusing computations; each computation consisting of a sequence of directed link reversals. The protocol is highly adaptive, efficient and scalable; being best -suited for use in large, dense, mobile networks. The protocol is designed to minimize reaction to topological changes. A key concept in its design is that it decouples the generation of potentially far-reaching control message propagation from the rate of topological changes. It guarantees all routes are loop-free, and typically provides multiple routes for any source/destination pair which requires a route. In this paper they proposed [7], 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. In this paper they explained [8] the routing in Mobile Ad hoc Network (MANET) is a critical task due to dynamic topology. Many routing protocols were proposed which are categorized as proactive and reactive routing protocols. Route maintenance is a great challenge in MANET due to frequent link failure which causes high data loss and delay. To counter such problems, lots of link repair mechanisms were proposed, but all these have their own limitations. This paper proposes a novel routing algorithm for route maintenance based on link failure localization called DSR-LFL. DSR-LFL takes decision on the basis of location of failure link in source route. Proposed algorithm may improve the packet salvaging, delivery ratio and performance of DSR.

III. LINK FAILURE IN MANET.

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 [10]. An active node which is responsible for updations of table entry. When source node move, new route discovery initiated. If intermediate nodes or the destination move then following conditions possible:

1. The next hop links break resulting in link failures.
2. Routing tables are updated when link failure occurs.
3. All active neighbors are informed by Route Error message.

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 [11]. When too many packets are challenging for the similar link, the queue overflows and packets have to be dropped. 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.

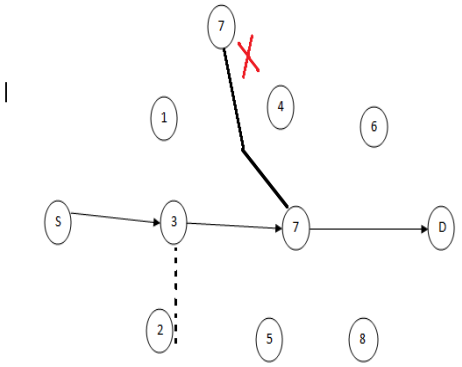

Fig. 1.3 Link Failure in MANET

In fig. 1.3, Network is deployed having finite numbers of nodes. After that, Path is established between source and destination. In this case node 7 , which is intermediate nodes moves from its position. So packet loss occurs at node 3.

IV. PROPOSED METHODOLOGY

The main problem occurs during transfer of data from source to destination is of congestion problem in AODV protocol. As we discussed earlier in MANET number of nodes are present which can move freely in the area. There is no controller in the MANET. So moves are free to move easily. It is self configuring system. So when the data send from source to destination congestion control problem occur easily due to free or easily movements of the nodes. To overcome the problem of congestion in the network various techniques of load balancing had been proposed in the previous times. Among all the proposed techniques multipath routing is the most efficient and advanced technique for load balancing in energy efficient mobile adhoc networks. In the proposed technique dynamic queues are defined on the basic of threshold values for load balancing in MANET. As discussed earlier, MANET is the self configuring network in such network it is very difficult to define threshold values. In this work, we will enhance the proposed EAOMDV protocol for load balancing in MANETs. The enhancement will be based on the actual values of the networks. The most advanced and energy efficient technique is multipath routing which is based on dynamic queue threshold values. In this work enhancement in the proposed technique will be done to increase its efficiency in terms of energy, throughput and delay.

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; } } }

V. EXPERIMENTAL RESULTS

In proposed work, a new technique has been proposed to increase efficiency of the network which is implemented at NS2 Simulator.

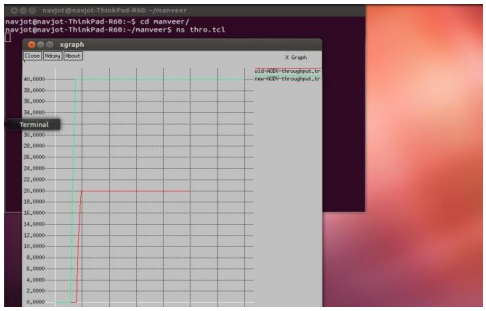

Fig.1.4 Throughput

As shown in figure 1.4, 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.

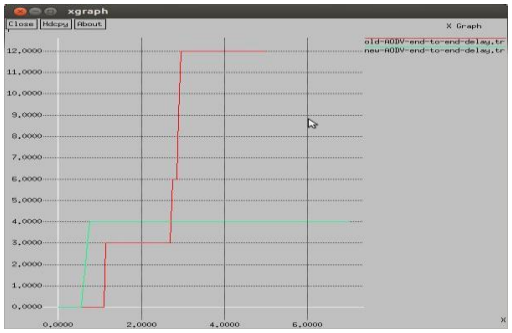

Fig.1.5. End-to-end delay

As shown in figure 1.5, 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.

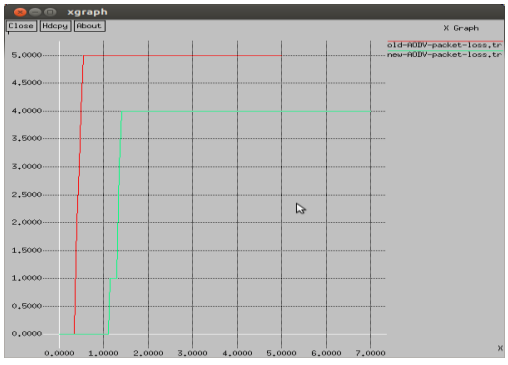

Fig.1.6 Packet Loss in MANET

As shown in figure 1.7, 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.

VI. CONCLUSION

As MANET is the self configuring type of network, the problem of load unbalancing generally exists. During data transmission there is a problem of link failure in manet which decreases network performance and reliability. In the previous type various techniques had been proposed for load balancing. The most advanced and energy efficient technique is multipath routing which is based on dynamic queue threshold values. In this work enhancement in the proposed technique will be done to increase its efficiency in terms of energy, throughput and delay.

References

[1] Rachida Aoudjit , Mustapha Lalam“Load Balancing: An Approach Based on Clustering in Ad Hoc Networks”, Journal of Computing and Information Technology - CIT 17, 2009, 2, 177–184 , 2009

[2] Gagandeep Kaur , “ A new Energy Efficient Queue based Multipath Load Balancing in Adhoc Network”, IEEE, 2014

[3] Prof. S.A. Jain, Mr. Abhishek Bande, “An Improvement In Congestion Control Using Multipath Routing In Manet”, IJERA, 2012

[4] Mohammad Amin Kheirandish Fard, Enchanching Congestion Control To Address Link Failure Loss Over Mobile Adhoc Network”, International Journal of Computer Networks & Communications (IJCNC) Vol.3, No.5, Sep 2011

[5] Sreenivas B.C G.C. Bhanu Prakash K.V. Ramakrishnan, “L2DB-TCP: An adaptive congestion control technique for MANET based on link layer measurements”, IEEE, 2011

[6] Narendra Babuji and Yadla,Suresh, “Route Recovery Schemes for Efficient MANET”, IJSER, Volume 4, issue 5, 2013

[7] Harpreet Kaur, G. S. "To Propose A Novel Technique To Reduce Link Failure Problem In Manet",International Journal of Advanced Research in Computer Engineering & Technology, pp 3517-3521, 2014

[8] Praveen Yadav, Roopali Soni and Joy Bhattacharjee, "A Novel Routing Algorithm Based on Link Failure Localization for MANET" International Journal on Computer Science and Engineering, volume 4. issue 10, oct 2012

[9] Zibouda Aliouat and Makhlouf Aliouat, “Improving Wireless Sensor Networks Robustness through Multi-level Fault Tolerant Routing Protocol”,Modeling Approaches and Algorithms, SCI 488, Springer, pp. 115–124, 2013

[10] Er.Rubia Singla, Er.Jasvir Singh, “Review on Node-Disjoint Multipath Routing Based on AOMDV Protocol for MANETS”, International Journal of Computer Science and Information Technologies, Vol. 5 (3) , 2014, pp 2755-2757, 2014

[11] Periyasamy and Dr.E.Karthikeyan, “ Performance Evaluation of AMODV Protocol based on Various Sceanrious and Traffic patterns”, International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.1, No.6, December,2011