Reduction of chances of Link Failure by Enhancement in AOMDV Protocol in Mobile Ad-hoc Network

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Abstract **-** Mobile Ad-hoc Network (MANET) is a collection of intermediate nodes whose topology changes frequently. Due to this MANETs have no fixed structure. There is degradation in the performance of MANETs which is caused during the data transmission. In the network the nodes are thus deployed, which results in establishment of a path from source to destination with the help of EAODMV protocol. A few nodes have more number of movements than the others as to which the link failure occurs. As a result there is a decrease in parameters such as reliability and performance of the network. So, to overcome link failure in EAOMDV a novel technique is put forth in this paper.

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

I. INTRODUCTION

A network is a group of two or more computer systems which linked together. It is mode of exchange of information to communicate with one another. It is a connection of computer devices which are attached with the communication facilities [1]. When number of computer are joined together to exchange information they form networks and share resources. Networking is used to share information like data communication. Sharing resources can be software type or hardware types. It is central administration system or supports these types of system. Wireless Networks term is refers to a kind of networking that does not require cables to connect with devices during communication. The transmission is take place with the help of radio waves at physical level [2]. Ad hoc network is a decentralized type of wireless network. There is no pre-existing infrastructure such as routers in wired networks or access points in wireless networks on which it is depended. In routing each node participates by forwarding data for other nodes in ad hoc network the determination of which nodes forward data is made dynamically on the basis of network connectivity. Ad-hoc networks are a new standard of wireless communication for mobile hosts.

MANET stands for Mobile Ad hoc Network. It is a robust infrastructure less wireless network. It can be formed either by mobile nodes or by both fixed and mobile nodes. Nodes are randomly connected with each other and forming arbitrary topology. They can act as both routers and hosts. With respect to the more widely used mobile cellular networks .Mobile Ad Hoc Networks do not use any form of fixed infrastructure or centralized administration. These types of networks have the salient characteristics: dynamic topologies, bandwidth constraints, variable capacity links, limited physical security and energy –constrained operations [3]. There are various types of MANETs. Vehicular Ad Hoc Networks (VANETs) are used for the communication among the mobile vehicles. Thus the communication being carry on even if the vehicles are moving in the different direction with in a particular area. Intelligent vehicular ad hoc networks (InVANETs) are used in case like collision of vehicles or any other types of mobility problems. It uses the scheme intelligently and the flow less communications goes on. Internet Based Mobile Ad hoc Networks (iMANET) is an ad hoc networks that connection mobile nodes and fixed nodes of Internet-gateway. Ad hoc routing algorithms don't apply directly in such type of networks [4].

Adhoc On-demand Distance Vector **(**AODV) is an on-demand routing protocol used in ad hoc networks. This protocol is like any other on-demand routing protocol which facilitates a smooth adaptation to changes in the link conditions. In case when a link fails, messages are sent only to the affected nodes. With this information, it enables the affected nodes invalidate all the routes through the failed link. AODV has low memory overhead, builds unicast routes from source to the destination and network utilization is less [5]. There is least routing traffic in the network since routes are built on demand. When two nodes are in an ad hoc network wish to establish a connection between each other, it will enable them build multihop routes between the mobile nodes involved. AODV defines three messages: Route Requests (RREQs), Route Errors (RERRs) and Route Replies (RREPs). These messages are used to discover and maintain routes across the network from source to destination by use of UDP packets. When a link failure occurs, Route Errors (RERRs) message is generated [6].

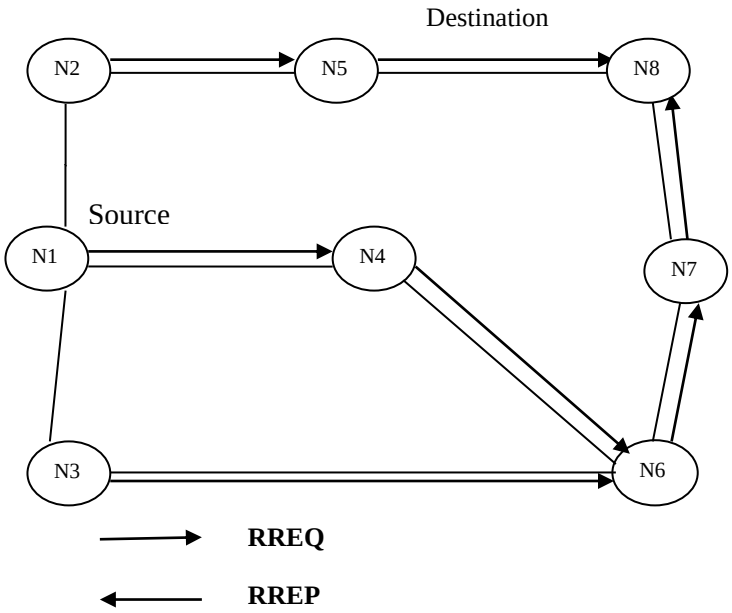

Fig. 1 AODV Algorithm

II. REVIEW OF LITERATURE

In this paper [7], it is explained that in many existing networks, some nodes do not support multicast, i.e., they cannot create multiple outgoing flows with one incoming data flow. In this paper, the authors propose an algorithm for multicast tree computation in networks with multicast incapable nodes. Paths that originate at the source and traversing all destinations are computed first; if such paths cannot be found, destinations are partitioned into subsets and traverse paths are computed over each subset, which is executed recursively until feasible trees can be built based on traverse paths found or no further partition is possible. Two procedures for traverse path computation are presented and their respective advantages are discussed, in terms of both complexity and solution optimality. In this paper [8], it is introduced that based on the data delivery structure, most of the existing multicast routing protocols can be classified into two folders: tree-based and mesh-based. It is observed that tree-based ones have high forwarding efficiency and low consumptions of bandwidth, and they may have poor robustness because only one link exists between two nodes. As a tree-based multicast routing protocol, MAODV shows an excellent performance in lightweight ad hoc networks. As the load of network increases, QoS is degraded obviously. In this paper, they analyze the impact of network load on MAODV protocol, and propose an optimized protocol MAODV-BB which improves robustness of the MAODV protocol by combining advantages of the tree structure and the mesh structure. In this paper [9], it is examined that with the increasing number of high-bandwidth applications, energy consumption of networks has become an important issue that needs to be addressed. Manycasting is a communication paradigm that finds applications in such high-bandwidth environments. To support manycasting functionality in an optical network that is Split-Incapable (SI), i.e., the optical cross connects are incapable of switching an incoming optical signal to more than one output interface, manycasting must be implemented as an overlay to the optical layer. They propose two such overlay approaches: Manycasting with Drop at Member Node (MA-DAMN) and Manycasting with Drop at Any Node (MA-DAAN) which employ. In this paper [10], it is discussed that consideration of energy consumption in wireless ad hoc networks prevents the problem of the network exhausting batteries, thus partitioning the entire network. Power-aware multicasting is proposed to reduce the power consumption. This letter presents an energy-efficient genetic algorithm mechanism to resolve quality of service (QoS) multicast routing problem, which is NP-complete. The proposed genetic algorithm depends on bounded end-to-end delay and minimum energy cost of the multicast tree. Simulation results show that the proposed algorithm is effective and efficient.

III. LINK FAILURE IN MANET.

It is a need for each system to have some type of reliable communication where the delivery of the packets to the destination is ensured. For wired networks and static wireless networks Transmission Control Protocol (TCP) is the connection-arranged transport layer protocol that ensures this usefulness. It guarantees all together delivery of the bundle and uses flow control and congestion control components. For specially appointed networks however the standard TCP does not give attractive execution. In the specially appointed system the nodes are drifting and there are no base stations. At the end of the day the topology of the system is consistently evolving. The communication between the sender and receiver nodes occur through different nodes in the system and each of the intermediate nodes is going about as a switch for the communication. The connection can have different jumps. This causes execution misfortunes because of the high error rate, system congestion and conceivable connection failure.

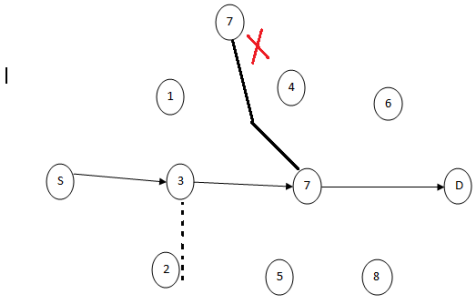

Fig 2: Link Failure in MANET

In Figure 2, Network is deployed having finite numbers of nodes. After that, Path is established between source and destination. In this case node 7, which are intermediate nodes, move from their 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

START ()

1. Deploy the wireless adhoc network with finite number of mobile nodes

2. Define source and destination nodes in the network

3. Check path from source to destination ()

4. If (path==exists)

5. Start communicating on established path

6. Else

7. Source flood route request packets in the network

8. Source select best path on the basis of hop count and sequence number

9. If(node send error message)

10. Alert link failure

11. If (link failure ==true)

12. Node(i)=send route recovery message

13. If(node(i)>Node(i+1)

14. Node(i)=selected as best node for recovery

15. Else

16. Keep on communicating on established path

17. End

V. EXPERIMENTAL RESULTS

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

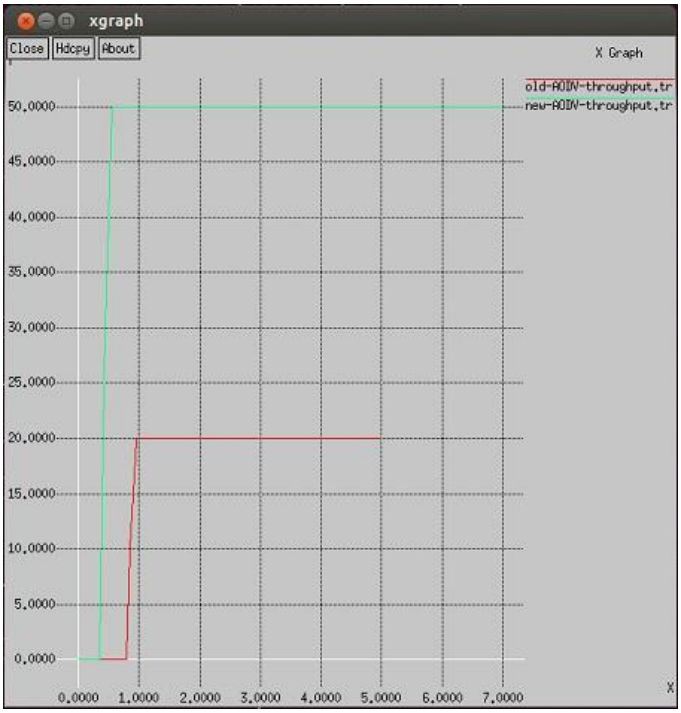

Fig 3: Throughput

As shown in figure 3, 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.

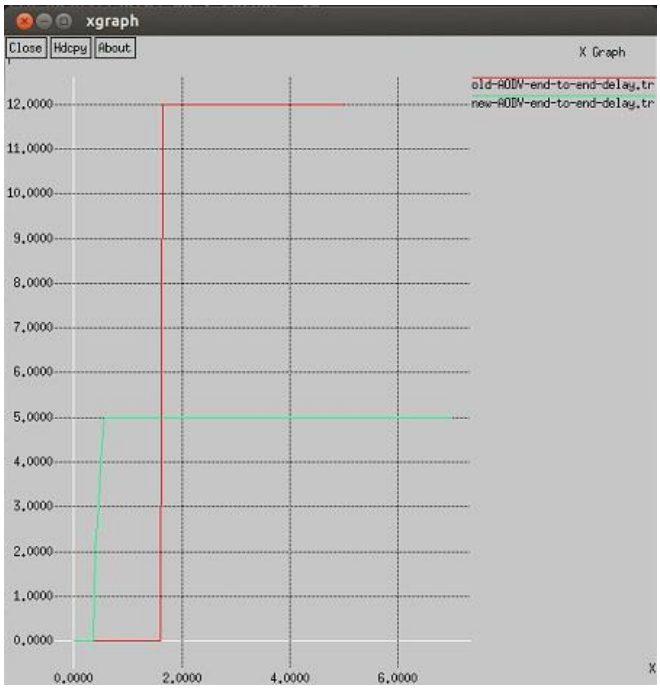

Fig 4: End-to-end delay

As shown in figure 4, 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.

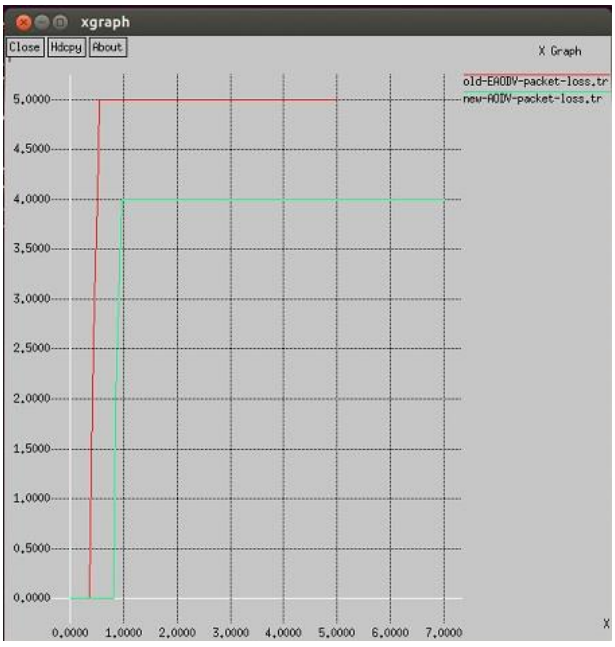

Fig 6: Packet Loss in MANET

As shown in figure 6, 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

Due to the property of MANETs being self-configuring, the load balancing is found frequently in these networks. Due the link failure reliability and performance degrade for the avoidance of which various techniques have been proposed. 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.

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