Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X

IJCSMC, Vol. 4, Issue. 9, September 2015, pg.296 – 303

RESEARCH ARTICLE

To Propose Enhancement in Reactive Routing AODV Protocol to Overcome Congestion in MANET

Barinder Singh[1] (M. Tech Student at KC College of Engineering & Information Technology)
Jagdeep Kaur[2] (Assistant Professor at KC College of Engineering & Information Technology)
[1]CSE & PTU, India; [2]CCE & PTU, India
1: barinder.er@rediffmail.com; 2: jagdeep.kaur@kcinstitutes.com

Abstract: The wireless ad hoc network is the self-configuring network; mobile nodes can leave or join the network when they want. There are various types of routing protocol in MANET. But there is a problem in routing protocol i.e. link failure problem which is responsible for degrade the performance of the network. In proposed technique we will follow that path only which has the highest signal strength. Second assumption is based upon the hop count similar as AODV protocol. The path which has the minimum hop count is considered as the final path. Third assumption is based upon the sequence number. The experimental results show that, proposed technique has minimum packet loss and highest throughput in the network.

Keywords: MANET, Routing protocols, AODV, Link failure

1. INTRODUCTION

The physical connection between networked computing devices is established using either cable media or wireless media. Internet is the best-known computer network .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. A network can be wired network and wireless network. Wired network is that which used wires for communicates with each other's and wireless network is that which communicate without the use of wires through

© 2015, IJCSMC All Rights Reserved

a medium. 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 [4]. Wireless Networking is a technology in which two or more computers communicate with each other using standard network protocols and without the using of cables [5]. It is also known as Wi-Fi or WLAN. With the help of this network, devices can be joined easily with the help of radio frequency without wires to sharing information. The wireless network offers certain advantages over the wired networks that are as follows [7]:

1. It is very easy and fast to set up a wireless system and it eliminates the need for wires and cables.
2. Wireless networks can be extended to the places that cannot be wired.
3. It adapt easily and more flexibility to changes in the configuration of the network.

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 [6]. Each mobile are free to move i.e. no central controller available. It is one of the types of adhoc network. There are mainly two types of routing protocol available. These are as following:

1. Proactive Routing Protocol (Table-driven)
2. Reactive Routing Protocol (On- demand)
3. Hybrid

There is problem during data transfer using routing protocol which will be discussed in this paper. In section 2nd we will do literature survey. In section 3rd we will focused link failure.

2. Literature Survey

In this paper, S. Zeadally E. Yaprak1 Y. Li X. Che [1], they discussed about the various networking tools accessible for measurements and testing over wide area networks and many of them have constraints, which limit their use to only a select group of users. As a result, the collection of wide area traffic data and their analyses becomes a difficult task, particularly in cases where the test site lacks collaboration support with other sites with which there is desire for traffic measurements to be used in undergraduate/graduate computer networking classes. In this work, they review a selection of some of the tools that can be used for wide area traffic measurements. Our survey highlights the features and characteristics of each tool as well as their limitations. They also demonstrate the use of one of the tools we used in some preliminary wide area traffic tests on bandwidth, packet loss, delay, and jitter, and present some initial results and observations. They hope this review will enable educators to make appropriate decisions on the selection of a networking tool that is best suited to meet their teaching goals in the area of computer networking. In this paper Asha Ambaikar, H.R. Sharma, V. K. Mohabey [2], they discussed many challenges and issues. An ad hoc network is a collection of mobile nodes that dynamically form a temporary network, without the use of existing infrastructure. When two nodes are not within the radio range of one another, they use intermediate nodes to route packets for them. Routing in MANET is a challenging problem which draws researcher's vision, due to nodes mobility, dynamic topology, frequent link breakage, limitation of nodes (memory, battery, bandwidth, and processing power), and lack of central point like base stations or servers. So by analyzing and comparing different ad hoc routing protocols

© 2015, IJCSMC All Rights Reserved

based on the metric throughput, packet delivery ratio, end to end delay which may give a solution to the challenges in the ad hoc routing in different situations. The mobility of node sand instability of the wireless environment may result in link breaks between neighboring nodes even causes the route to be invalid. This paper focuses on the mobility of the source node and intermediate node which may result link failure. If a source node moves, it is able to reinitiate the Route Discovery Protocol (RDP) to find a new route to the destination using path updation. For intermediate node link break a Local Repair Procedure is used to update the path. This main objective of this paper is new path updation and resolving link failure in AODV. Computer simulation using NS2 simulator on Linux operating system shows the behavior and performance improved in AODV routing protocol based on the metrics. In this paper Sunil Kumar and Pankaj Negi they discussed [3] about AODV and most of the on demand ad hoc routing protocols use single route reply along reverse path. Rapid change of topology causes that the route reply could not arrive to the source node, i.e. after a source node sends several route request messages; the node obtains a reply message, especially on high speed mobility. This increases both in communication delay and power consumption as well as decrease in packet delivery ratio. To avoid these problems, a "Backward AODV (B-AODV)" which tries multiple route replies. Backward AODV (B-AODV), which has a novel aspect compared to other on-demand routing protocols on Ad-hoc Networks: it reduces path fail correction messages and obtains better performance than the AODV and other protocols have proposed. Backward AODV provides good results on packet delivery ratio, power consumption and communication delay. Successful delivery of RREP messages are important in on-demand routing protocols for ad hoc networks. The loss of RREPs causes serious impairment on the routing performance. This is because the cost of a RREP is very high. If the RREP is lost, a large amount of route discovery effort will be wasted. Furthermore, the source node has to initiate another round of route discovery to establish a route to the destination. They proposed the idea of "BACKWARD AODV (B-AODV)", which attempts backward RREQ. B-AODV route discovery succeeds in fewer tries than AODV. They conducted extensive comparison study to evaluate the performance of B-AODV and compared it with AODV. B-AODV improves the performance of AODV in most metrics, as the packet delivery ratio, end to end delay, and energy consumption. In this paper [4] Ravindra .E, VinayaDatt V Kohir and V. D Mytri ,they mentioned about the A mobile Ad Hoc network is a collection of wireless mobile terminals that are able to dynamically form a temporary network without any aid from fixed infrastructure or Centralized administration. In Large scale Ad Hoc networks the terminal mobility may cause radio links to be broken frequently. With reactive protocol such as AODV, This leads to increase in end-to-end delay, packet dropping rate and can reduce the packet delivery rate. In view of such disadvantages, we propose a new Algorithm which introduces a mechanism of link failure prediction and accordingly perform a rapid local route repair. Simulation results shows that a new algorithm reduces end-to-end delay and packet dropping rate and increases packet delivery rate. AODV takes too much time to rebuild the route after a link break along the active route is broken. This time is too long for some application, such as the real time services of voice and video. The route rebuild time can be reduced if to reduce the recommended HELLO interval.

In this paper [7], SrinathPerur, Abhilash P. and Sridhar Iyer , they described about the Link failure caused by node mobility is a common feature of multi-hop, wireless ad hoc networks. With a reactive routing protocol such as AODV (Ad hoc On-demand Distance Vector),leads to increased delay and routing overheads while route repair procedures are carried out. They present a strategy called Router Handoff wherein a node that detects one of its links weakening, preemptively hands off routing information to a suitably situated node. This results in routing around the weak link and

© 2015, IJCSMC All Rights Reserved

prevents the route from being broken. The simulation results show that this approach leads to increased throughput and reduced routing overheads in most cases. In this paper they presented a preemptive route repair strategy for AODV called Router Handoff. They found that in most cases tested it reduces routing overhead and improves throughput. They are currently in the process of refining the criteria for performing handoff and assessing the impact of Router Handoff on network latency and average path length. They also believe that the concept of handoff could be used in contexts other than link failure. For instance, a node that is low on power, or a node that knows it is going to switch off could handoff without affecting the rest of the ad hoc network. It might also be interesting to incorporate Router Handoff into other ad hoc routing protocols.

3. Link Failure in AODV

Link failure is a main problem in AODV which is responsible for the performance degradation and packet lost [7]. Suppose we have number of nodes in our network. Source is host node from where data has to be send and destination node is final node. Any active node which is responsible for the updation of table entry [8]. 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.

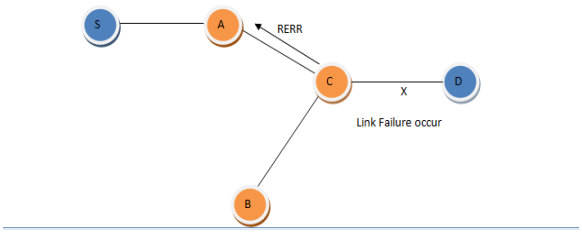

Fig.1: Link failure Problem

Link between C and D breaks. Now node C invalidate route D in the route table. Node C creates Route Error message and lists all destinations that are now unreachable and sends to upstream neighbor this messages.

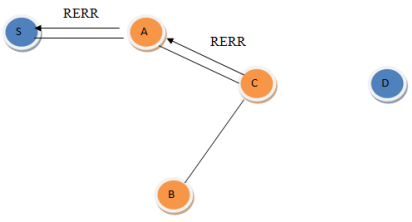

Fig. 2: Route Error to upstream nodes

Now when node A receives RERR message then it checks whether C is its next hop on route to D. Delete route D from the table and forward RERR message to source node when it reaches to source

© 2015, IJCSMC All Rights Reserved

node [9]. Now route D is deleted and search new route. This problem can be overcome by doing enhancement in AODV protocol [10].

4. Proposed Methodology

In our proposed work, enhancement of AODV network is deployed same as in AODV networks. Nodes are free to move anywhere. There is no central controller in the system. Data transfer from source to destination. Similarly with the help of RREQ message data is broadcast. RREQ message is sent from destination to source as a response. But main difference in Enhancement AODV is RREQ message than simple AODV. Header part is added in RREQ message which helps to find out the destination. To find out the best path first assumption is based upon the signal strength. Destination nodes check the visicinity of the adjacent nodes and those nodes further checks the visicinity 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 value lies between 1 to 10. So this will overcome the problem of link failure. We will follow that path only which has the highest signal strength. Second assumption is based upon the hop count similar as AODV protocol. The path which has the minimum hop count is considered as the final path. Third assumption is based upon the sequence number. The fresh sequence number nodes path will be select as final path. So in this way with the help of signal strength best path will be select in enhanced AODV. This will help to improve the performance of system than simple AODV.

5. Experimental Results

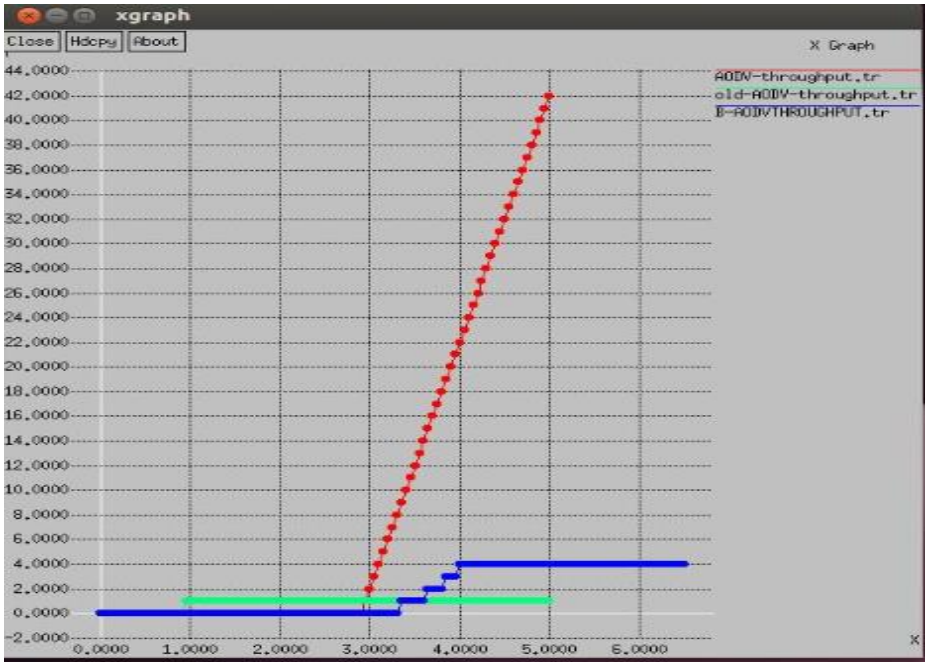

Fig.1.3 Throughput Graph

In throughput graph the figure 1.3 illustrated the throughput of the new and previous

© 2015, IJCSMC All Rights Reserved

technique. The green line shows the throughput of the network of B-AODV technique. Blue line shows throughput of old technique. The throughput of the new technique is shown in red line. The efficiency of the enhanced AODV increases with the help of signal strength. The throughput is enhanced through the use of new proposed technique because the packet loss in the network is reduced. The results helps to improve the performance of the system.

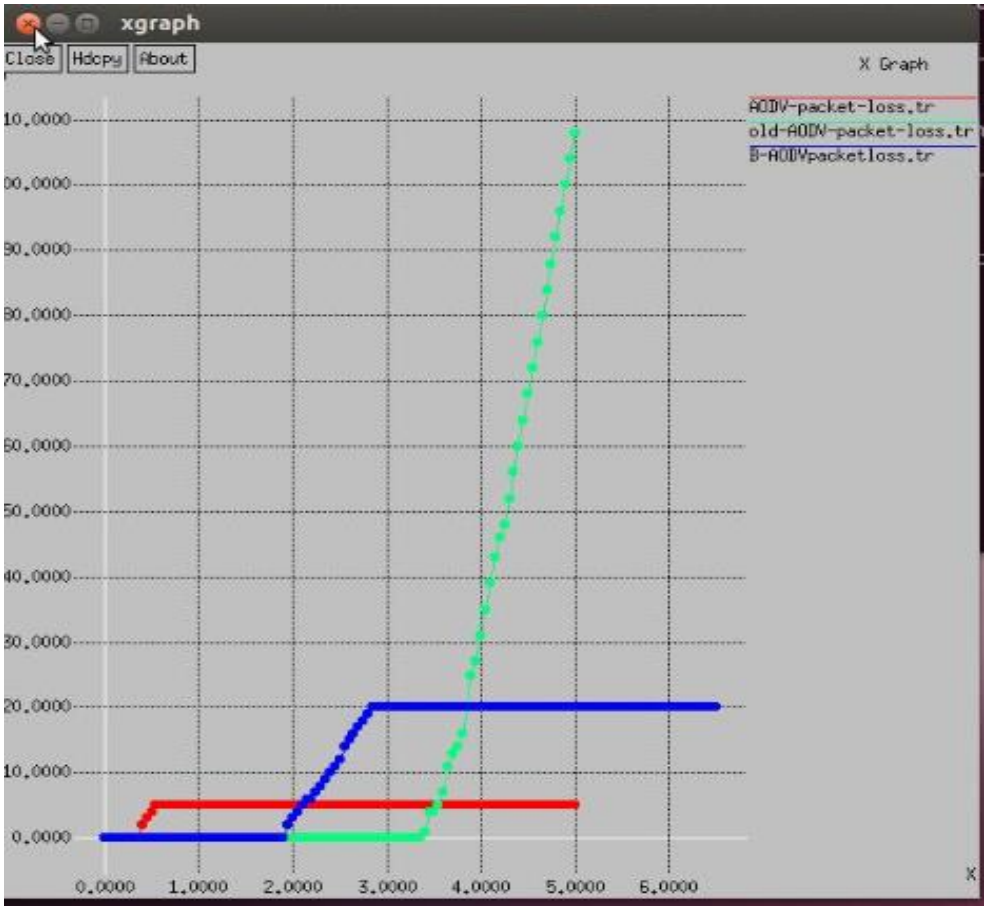

Fig.1.4 Packet Loss

As illustrated in fig. 1.4, during link failure problem packet loss occur in old AODV. But this problem can be overcome signal strength in enhanced AODV. Here x-axis represents time and y-axis represents no. of packets. Red line shows new AODV and green line old AODV. This shows that packet loss is less in new AODV as compared to old AODV. Blue line shows packet loss of B-AODV technique.

Packet overhead graph represents that old AODV has more packet overhead than new AODV and B-AODV. New technique has fewer packets overhead as compare to other technique which makes it more reliable as shown in fig. 1.5.

© 2015, IJCSMC All Rights Reserved

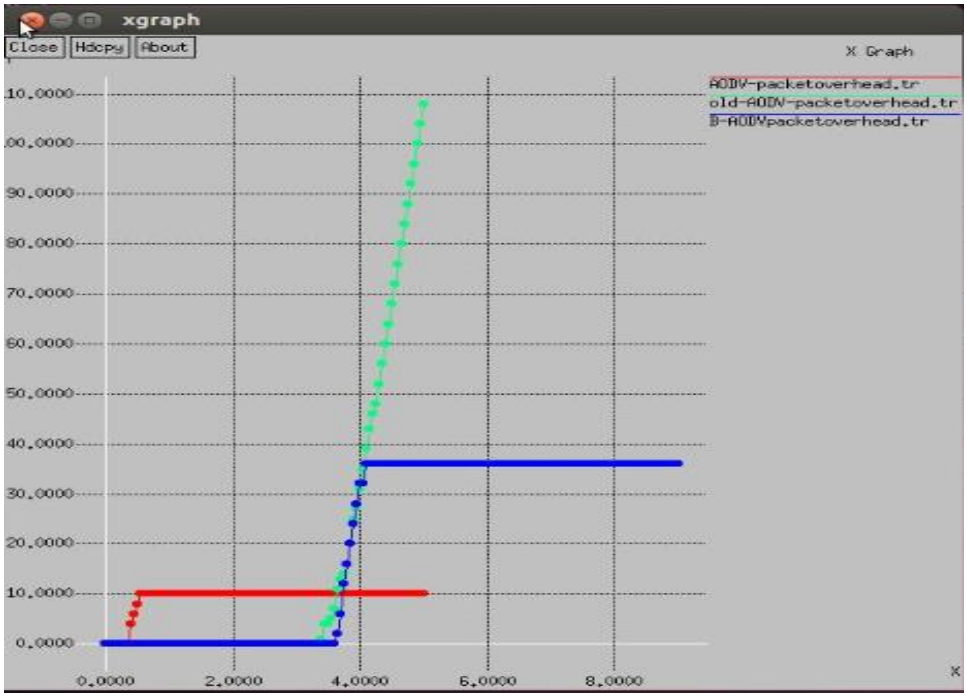

Fig. 1.5: Packet Overhead

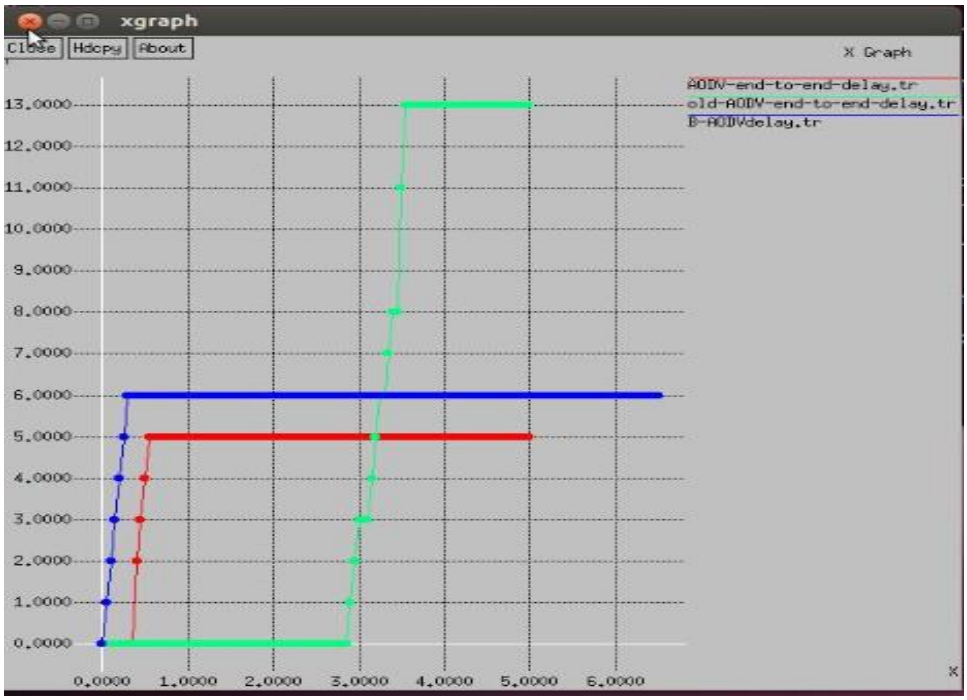

Fig. 1.6 Delay

As illustrate in fig. 1.6 B-AODV has more delay as compare to old and new technique. B-AODV delay is shown with blue line. Old technique delay is shown with green line and new technique delay is shown with red line. Fig. 1.6 illustrate that proposed technique is better as it has less delay as compare to other techniques.

© 2015, IJCSMC All Rights Reserved

6. Conclusion

AODV is used to find out the path of the data transfer. But simple AODV has the problem when the nodes move. Enhancement in AODV is required so that to overcome the problem of link failure during data transfer from host to destination. First of all mutual authentication is required between the mobile nodes to prevent the various inside and outside attacks. When the mobile nodes are mutually authenticated, it leads to the reliable data transmission between the mobile nodes. But the main problem occurs during the failure of the link. Due to link failure packet is lost easily. In proposed work, enhancement in AODV concept is important. This protocol is designed to provide best path according to signal strength. The path which has maximum signal strength will choose as a final path. This work will helps to reduce the problem occur in link failure and packet lost problem. Now the performance degradation problem will also improve. In new AODV, route selection is based upon the signal strength. The maximum signal strength nodes are considered as final routes.

References

[1] S. Zeadally E. Yaprak1 Y. Li X. Che , "A Survey of Network Performance Tools For Computer Networks Classes", Division of Engineering Technology, 2001

[2] Asha Ambaikar, H.R. Sharma, V. K. Mohabey , " Improved AODV for Solving Link Failure In Manet" , International Journal of Scientific & Engineering Research, Volume 3, Issue 10, October-2012 1 ISSN 2229-5518 2012

[3] Sunil Kumar and Pankaj Negi , "A Link Failure Solution in Mobile Adhoc Network through Backward AODV (B-AODV)", IJCEM International Journal of Computational Engineering & Management, Vol. 11, January 2011 ISSN (Online): 2230-7893, 2011

[4] Ravindra .E, VinayaDatt V Kohir and V. D Mytri , "A Local Route Repair Algorithm Based On Link Failure Prediction In Mobile Adhoc Network", World Journal of Science and Technology 2011, 1(8): 64-67 ISSN: 2231 – 2587, 2011

[5] SrinathPerur, Abhilash P. and Sridhar Iyer , "Router Handoff: A Preemptive Route Repair Strategy for AODV" IEEE, 2003

[6] DonatasSumyla, **"** MobileAdhoc Networks**" ,** IEEE Personal Communications Magazine, April 2003, pp. 46-55.

[7] Amandeep Singh Bhatia and Rupinder Kaur Cheema ,"Analysing and Implementing the Mobility over MANETS using Random Way Point Model" ,International Journal of Computer Applications (0975 – 8887) Volume 68– No.17, April 2013

[8] JeroenHoebeke, Ingrid Moerman, Bart Dhoedt and Piet Demeester , " An overview of Mobile Adhoc Networks: Applications and challenges", SintPietersnieuwstraat 41, B-9000 Ghent, Belgium ,2005

[9] Priyanka Goyal, VintraParmar and Rahul Rishi , " MANET: Vulnerabilities, Challenges, Attacks, Application" , IJCEM International Journal of Computational Engineering & Management, Vol. 11, January 2011 ISSN (Online): 2230-7893 2011

[10] Tim Groth , "Introduction to Computer Networks", McGraw Hill 2004, pp.446-459

© 2015, IJCSMC All Rights Reserved