ANALYSIS OF QUEUE LENGTH IMPACT ON PERFORMANCE OF AOMDV, DSR IN MANET

[1]Dr. Nitin Kumar, [2]Dr. Vishant Kumar , [3]Varun Kumar
[1]Assistant Professor, [2]Professor, [3]Assistant Professor

[1]Department of CSE, Shobhit University, Saharanpur, U.P. India
[2]Department of CSE, J. B. Institute of Technology, Dehradun, U.K. India
[3]Department of CSE, Shobhit University, Saharanpur, U.P. India

Abstract: Mobile Ad Hoc networks are gaining popularity to its peak today, as the users want wireless connectivity irrespective of their geographic position. In Mobile ad hoc networks mobile devices are in movable form so that there can be chances of congestion can be occurred. Therefore congestion is likely to an issue in mobile Ad Hoc network routing. Routing protocols can improve the speed of a network and also improve the performance of network. In this research paper we analyze that which protocol gives the best performance by increasing the queue length. So that if the performance of a network will be good then the congestion chances will be decreases, hence the congestion problem is mostly removed and the performance of network will be good. And the aim of this research paper is to improve the performance of a network, network speed and preventing the network from congestion as well. In this process we will use Network simulator (NS-2) to analyze the simulation results from different perspectives.

***Index Terms* - MANETs, Mobile Ad Hoc networks, Queue size, Routing Protocols, Network simulator (NS-2)**

1. INTRODUCTION

Mobile Ad Hoc Networks are autonomous and decentralized wireless systems. MANETs consist of mobile nodes that are free in moving in and out in the network. Nodes are the systems or devices i.e. mobile phone, laptop, personal digital assistance, MP3 player and personal computer that are participating in the network and are mobile. These nodes can act as host/router or both at same time. They can form arbitrary topologies depending on their connectivity with each other in the network. These nodes have the ability to configure themselves and because of their self-configuration ability, they can be deployed urgently without the need of any infrastructure. Internet Engineering Task Force (IETF) has MANET working group (WG) that is devoted for developing IP routing protocols. Routing protocols is one of the challenging and interesting research areas for researchers. Many routing protocols have been developed for MANETS.

Security in Mobile Ad Hoc Network is the most important concern for the basic functionality of network. Availability of network services, confidentiality and integrity of the data can be achieved by assuring that security issues have been met. MANET often suffer from security attacks because of the its features like open medium, changing its topology dynamically, lack of central monitoring and management, cooperative algorithms and no clear defense mechanism. These factors have changed the battle field situation for the MANET against the security threats.

In ad hoc networks, the routing protocols for MANETs are classified into three categories (i) proactive, (ii) reactive and (iii) hybrid (joined both proactive and reactive). The Examples of proactive routing protocols are DSDV and OLSR (Perkins and Bhagwat, 1994; Murthy and Manoj, 2004; Chen and Heinzelman, 2007). The example of reactive routing protocols is AODV (Perkins et al., 2003; Murthy and Manoj, 2004) The hybrid routing protocol is ZRP (Murthy and Manoj, 2004; Chen and Heinzelman, 2007).

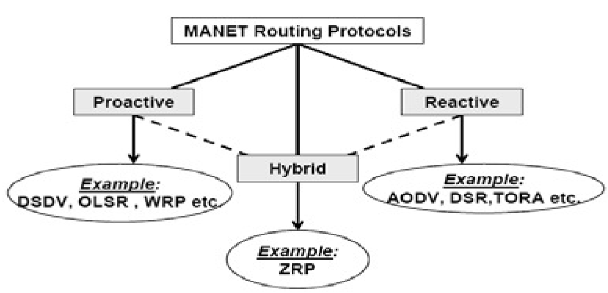

Fig 1. MANET Routing Protocols

There is a new aspect to categorize routing protocols into two divisions (i) congestion-control routing and (ii) congestion non control routing.(Lochert et al., 2007; Tran and Raghavendra, 2006).

When we consider the congestion non control routing protocol, during the packet transfer between the source and destination, congestion may occur; this is not managed by the existing routing protocol.

The above problems turn into the harmful in a network in terms of packet loss, increasing delay and reduced throughput. (Lochert et al., 2007; Tran and Raghavendra, 2006). The exsisting congestion control techniques cannot directly used in an adhoc networkbecause in an adhoc network, it is more expensive, in terms of time and overhead and removes congestion after it happened (Lochert et al., 2007; Tran and Raghavendra, 2006).

2. RELATED WORKS

Amirhossein Moravejosharieh et al. (2013) reveals the performance analysis of reactive routing protocols AODV, AOMDV and DSR in comparison with proactive routing protocol DSDV. Reactive routing protocols represent some similarities in terms of PDR, packet loss and number of dropped packets. However disparities among reactive routing protocols themselves are undeniable due to the different approach of routing storage and maintenance. Significant disparities between DSDV routing protocol and other reactive routing protocol makes this traditional routing protocol highlighted. Large amount of packet loss as well as a large number of dropped packets compels network administrations to revise on applying DSDV routing protocol on delay sensitive networks. Simulation of fundamental yet major parameters such as PDR, Average End-to-End delay, Packet loss amount and number of dropped packets based on variety of velocity and density for some reactive and proactive routing protocols in VANET results in some useful information. The simulation results reveal the fact that although MANET routing protocols could be applied on VANET but when the velocity and density of vehicles increase, in most of the time, the performance of both reactive and proactive routing protocols will decrease and this makes utilizing MANET routing protocols in vehicular ad hoc networks a major issue which requires tangible improvements.

Chadha, Joon and Sandeep (2012) evaluated the performance of AODV, AOMDV and DSR. Comparison was based on the packet delivery fraction, throughput and end-to-end delay. The author concluded that in the static network (pause time 50 sec), AOMDV gives better performance as compared to AODV and DSR in terms of packet delivery fraction and throughput but worst in terms of end-to end delay. The author also seen that DSR routing protocol is best in terms of end-to-delay in both Static and dynamic network for each set of maximum connections.

Vanaja K., Dr. Umarani R. (2012) show that when comparing single path AODV with multipath AOMDV, AOMDV results it is superior than AODV when there is mobility induced link break in distributed environment. The tested network performance results reduced packet loss, end to end delay, increased throughput when there is mobility in a distributed network.

Pirzada AA. (2006) Provide a comparison of AOMDV and DSR the two well known multi-path ad-hoc routing protocols. The author specifically studied their performance in a wireless hybrid mesh network comprising of static MESH ROUTERs and dynamic MESH CLIENTs. Our results indicate that both protocols, when assisted by MESH ROUTERs, have a high packet delivery rate even under excessive MESH CLIENT mobility. Compared to DSR-MP, AOMDV is able to establish more optimal paths at the cost of a higher routing overhead. On the other hand, DSR-MP has lower packet latency due to its effective utilization of available routing cache. The performance of both multi-path routing protocols is greatly influenced by the number of MESH ROUTERs along with their placement in the network. These MESH ROUTERs aid the routing protocols in provisioning of reliable gratuitous routes, which in turn reduce the packet losses, improve the packet delivery ratio and lower the latency of the network.

Ramadhan Mstafa(2013) examined and analyzed the performance of AODV, AOMDV, DSR and DSDV routing protocols using TCP and CBR traffic connections. The author considered the speed and the packet size as the controlled parameters in our experiments to determine the best routing protocol. The author simulate, for TCP traffic connection we observe that DSR is more stable than the other three protocols for the measured parameter; Packet Delivery Ratio. Furthermore, AOMDV outperforms AODV and DSDV. In the case of CBR traffic connection, DSR and DSDV have better performance than AODV and AOMDV routing protocols for the Packet Delivery Ratio. In Average End to End Delay, DSR presents the best performance among the four routing protocols as it has the minimum delay.

3. PROPOSED WORK

3.1 Simulation Environment

Here the basic parameters of the proposed work are presented respective to the simulation environment. The system is implemented on Ubuntu Environment with NS2 simulator and XGraph is used as the tool for graph analysis.

Parameter	**Value**
Number of Nodes	20
Topography Dimension	800 m x 800 m
Traffic Type	CBR
MAC Type	802.11.Mac Layer
Packet Size	512 bytes
Pause time	5sec
Antenna Type	Omni directional

Table 1.

On the basis of the graphs of simulation we analyze the performance of AOMDV and DSR routing protocols which are shown in 1 and in fig 2 the performance analyze in terms of packet drop ratio and end to end delay. After analyzing we are getting these results which are described below:

Performance is analyze in these terms-

- End to End delay
- Packet delivery ratio

End To End delay

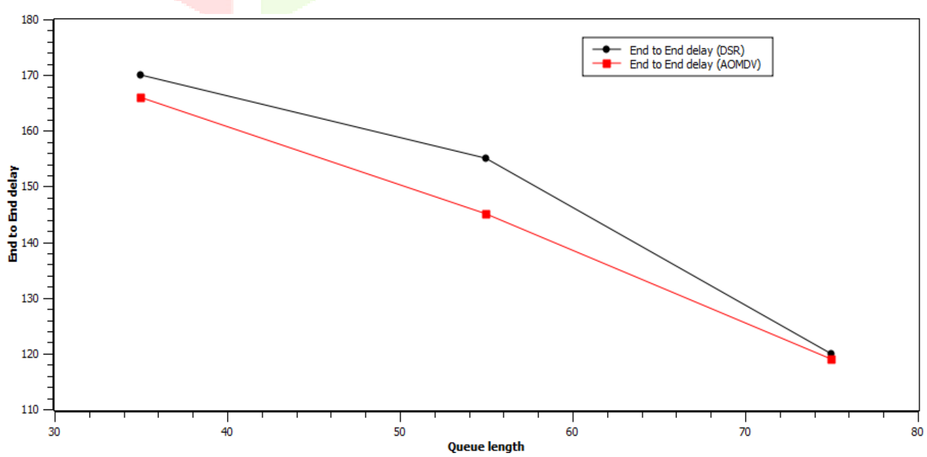

Fig. 2 End To End delay with different -2 protcols with different-2 sizes

Here in the Fig. 2 shows that the End to End delay delay with AOMDV and DSR protocols and here the Queue size are taken 35,55,75. After the simulation result these values are founded which are mention in graph and and on the basis of these values the graph has been drawn. These values are taken after the simulation.

3.2 Packet drop ratio

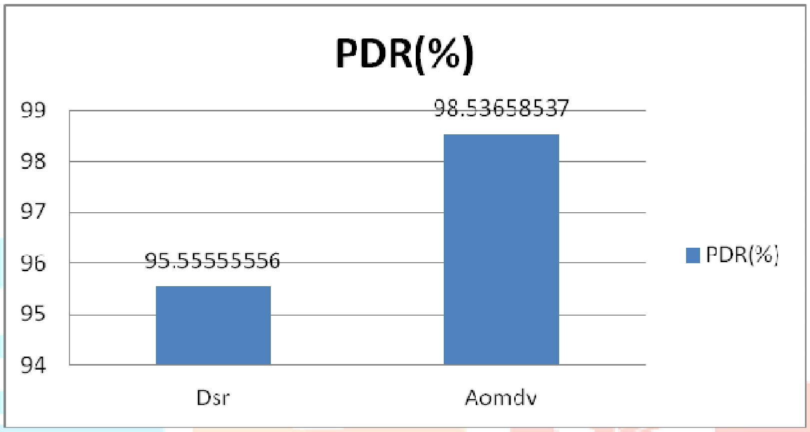

Fig. 3 Packet delivery ratio

Here Fig 3 shows that the percentage of packet which are buffering fromsender node. It calculates that how many packets are buffered and how many packets are received at the destination node graph shows that what percentage has been come after simulation and the values are shown in the graph.

3.3 Observations

The analysis results which are getting after simulation are described below:

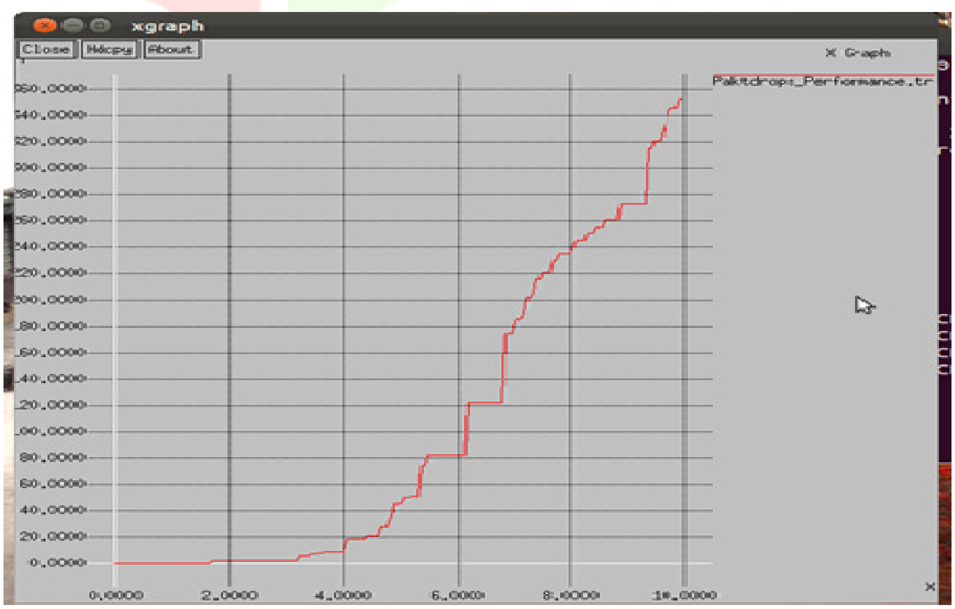

Fig 4. Packet drop (AOMDV with 35 queue length) i.g. 350

Here in Fig 4 shows that the packet drop which is calculated with the AOMDV routing protocol where the queue size is taken 35 and after simulation the results are getting which is the packet drop are 350.when we setup the queue size 35 then the packet drop are 350.

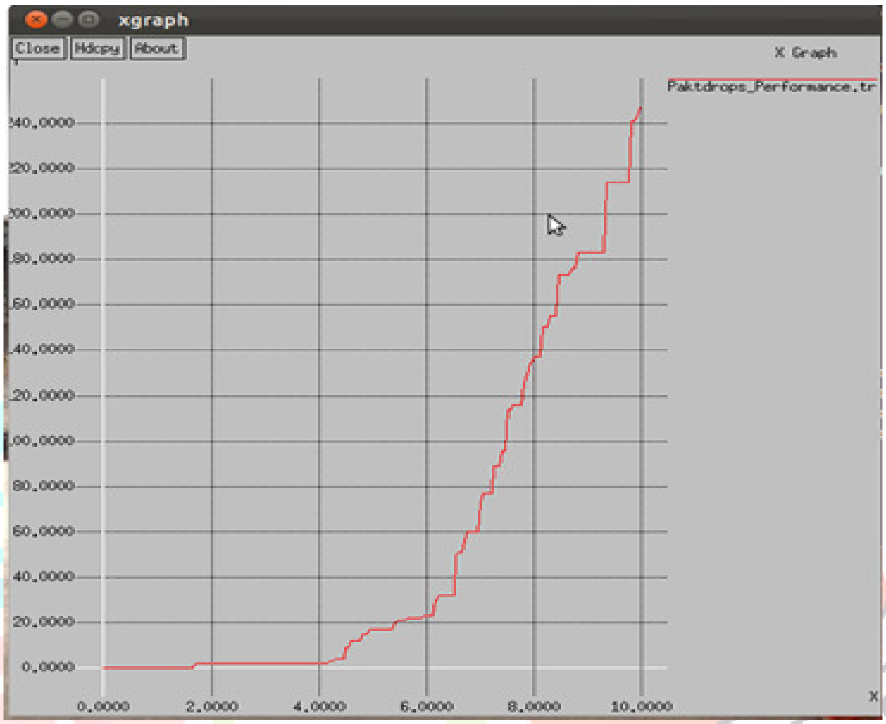

Fig 5 Packet drop (AOMDV with queue length 55) i.g. 250

Here in figure 5 shows that the packet drop which is calculated with the protocol AOMDV routing protocol where the queue size is taken 55 and after the simulation the results are getting in terms of the packet drop are 250. In this simulation we take the queue length 55 and after simulation we getting our results in terms of packet drop that the packet drop are 250 which are less than the previous where we setup the queue length 35.

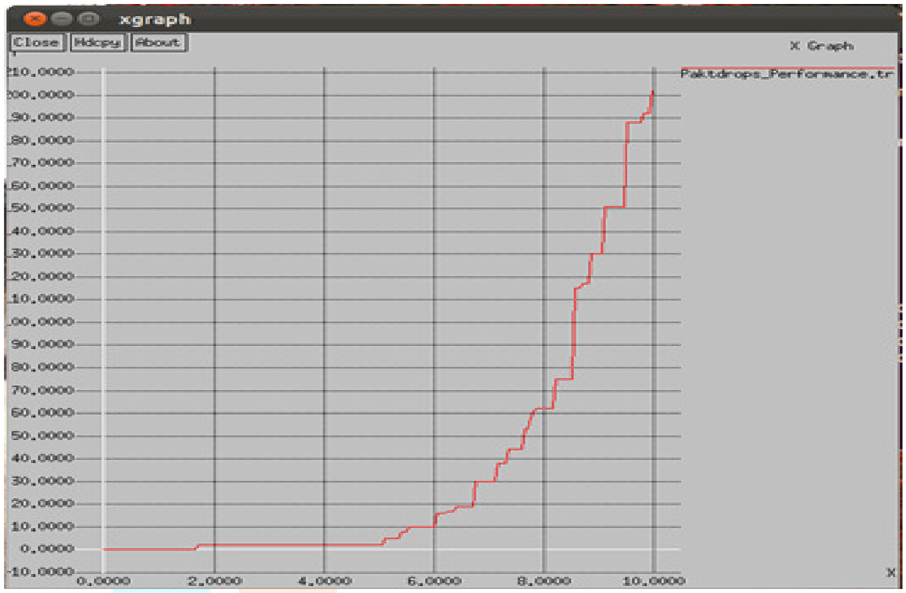

Fig 6. Packet drop (of AOMDV with queue length75) i.g. 205

Here in Figure 6 shows that the packet drop which is calculated with the protocol AOMDV routing protocol where the queue size is taken 35 and after simulation the results shows that the packet drop are 205. In this simulation we taken the queue length 75 and after simulation our result is getting that is the packet drop is 205 which is less than the previous where we setup the queue length are 55.

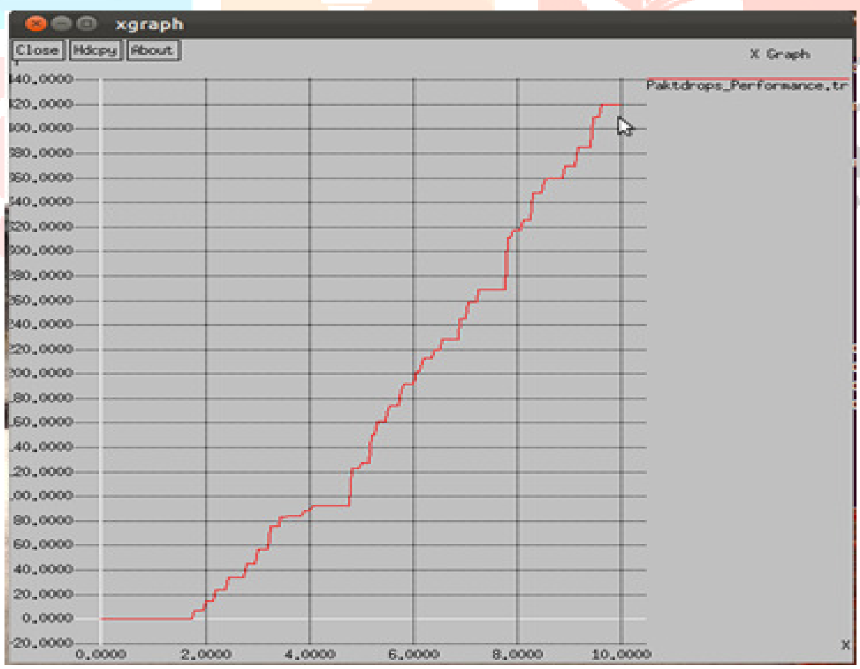

Fig 7. Packet drop (DSR with queue length 35) i.g. 420

Here in Figure 7 shows that the packet drop which is calculated with the protocol DSR routing protocol where the queue size is taken 35 and after simulation the results shows that the packet drop are 420. In this simulation we have taken the queue length 35 and after simulation result we getting the results that is the packet drop ratio is 420.

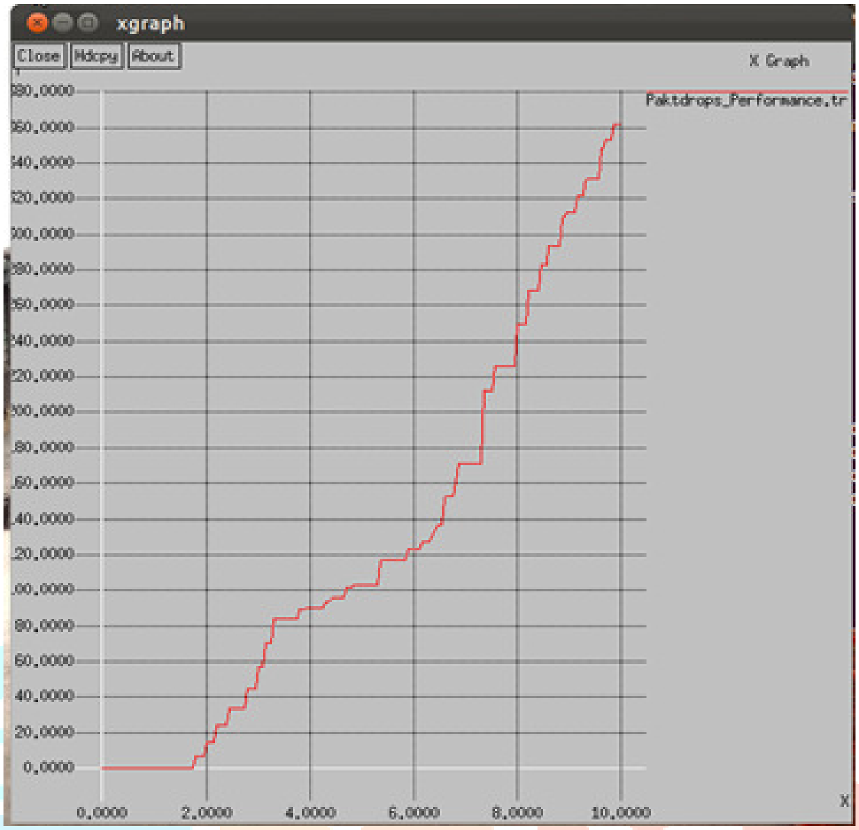

Fig 8 Packet drop (DSR with queue length 55) i.g.365

Here in Figure 8 shows that the packet drop which is calculated with the protocol DSR routing protocol where the queue size is taken 55 and after simulation the results shows that the packet drop are 365. In this simulation we take the queue length 55 and the result which is getting in terms of the packet drop is 365 and is comparatively less than the previous simulation.

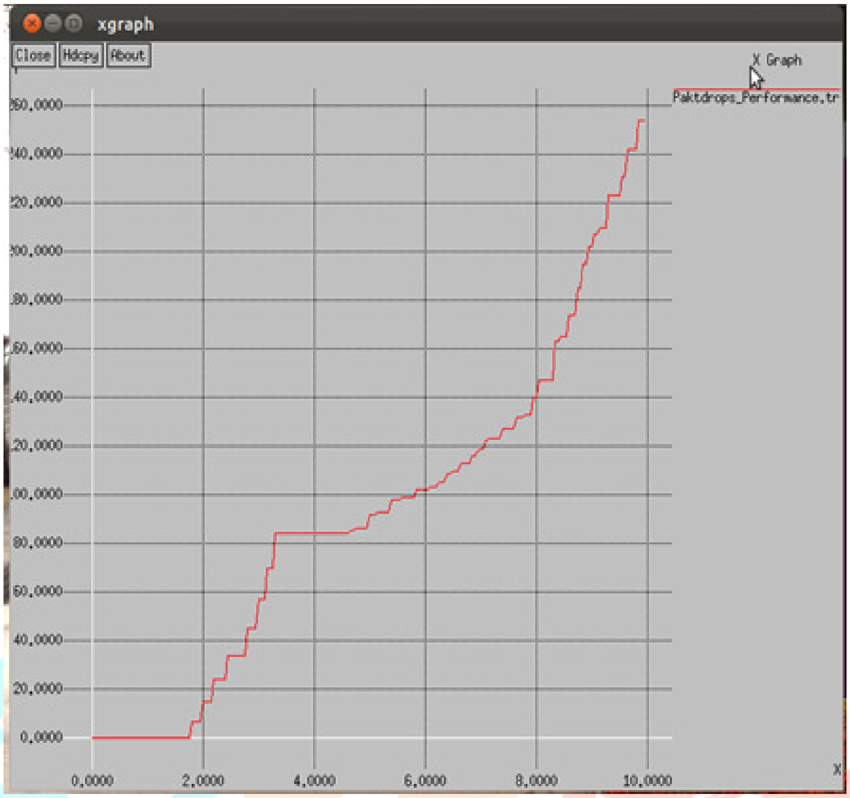

Fig 9. Packet drop (DSR with queue length 75) i.g. 245

Here in Figure 9 shows that the packet drop which is calculated with the protocol DSR protocol where the queue size is taken 75.after simulating the simulation results shows that the packet drop are 245. In this simulation we taken the queue length 75 and after the simulation result the packet drop are 245 which is less than to the previous one.

4. CONCLUSION

In this research paper we analyze that by increasing the queue length of nodes in a network, the packet delivery ratio increases. It is not only reduces the end to end delay due to little chances of transmission of packet but also increases the throughput of connection because of wrongly interpretation of congestion. Simulation shows that the positive effect of queue by increasing the queue size/length at every node. This analysis is more beneficial in preventing congestion because of wrongly interpretation of congestion. it improve the network performance if because of avoiding the slow start problem and also if there are packet drops in the network are very less. then the slow start problem has been occurred but if there are less packet drop then this problem will not occur so that the performance is improve. We works only with AOMDV and DSR protocol. The work can be implemented and analyzed along with other protocols. We works only with CBR traffic source. the work can be implemented with any other traffic source. Our work has done with 20 nodes in future we can take more than 20 nodes for simulation.

5. FUTURE SCOPE

Congestion loss in bust networks depends on the number of active flows and the total storage in the network. Total storage included both router buffer memory and packets in flight on long links. In this thesis a simple flow counting algorithm is presented. The algorithm takes a few instructions per sender and uses one bit of state per flow. The algorithm provides congestion feedback by varying the number of packets per sender in proportion to the queue length. This approach has the desirable effect of reducing queuing delay, however it produces high loss rate as the number of flows increases, causing long and unfair timeout delays.

REFERENCES

[1] Amirhossein M., Hero M., Rosli S. and Ehsan M. 2013. Performance Analysis of AODV, AOMDV, DSR, DSDV Routing Protocols in Vehicular Ad Hoc Network. Research Journal of Recent Sciences, 2(7): 2277-2502.

[2] Chadha M.S., Joon R., Sandeep. 2012. Simulation and Comparison of AODV, DSR and AOMDV Routing Protocols in MANETs. International Journal of Soft Computing and Engineering, 2(3) 2231-2307.

[3] Vanaja K., Dr. Umarani R. 2012. An Analysis of Single Path AODV Vs Multipath AOMDV on Link Break Using ns-2. International Journal of Electronics and Computer Science Engineering. 1(3) 1080-1086

[4] Pirzada AA. 2006. Performance Comparison of Multi-Path AODV and DSR Protocols in Hybrid Mesh Networks. IEEE Conference, Queensland Research Laboratory, National ICT Australia Limited, Brisbane, QLD 4000, Australia.

[5] Ramadhan Mstafa. 2013. Analysis of Routing Protocols over VANET. American society for engineering studied.

[6] Aujla G.S., Kang S.S. 2013, Comprehensive Evaluation of AODV, DSR, GRP, OLSR and TORA Routing Protocols with varying number of nodes and traffic applications over MANETs, IOSR Journal of Computer Engineering. 9(3) 54 -61.

[7] Annapurna D, K B Raja, Venugopal K R, Patnaik L.M. 2012. Analysis of On Demand and Table Driven Routing Protocol for Fire Fighter Application. International Journal of Innovative Technology and Exploring Engineering. 1(2) 55-59.

[8] Mahesh K. Marina Samir R. Das. 2001. On-demand Multipath Distance Vector Routing in Ad Hoc Networks. IEEE Conference. Dept. of ECECS University of Cincinnati Cincinnati, OH 45221.

[9] Chaudhary D.D., Pawar P., Waghmare L.M. 2011. Comparison and Performance Evaluation of Wireless Sensor Network with different Routing Protocols. International Conference on Information and Electronics Engineering. 6.

[10] Singh D. Wadhwa, Singh T. 2011. Performance Comparison of Single and Multipath Routing Protocols in Adhoc Networks. Int. J. Comp. Tech. Appl. 2 (5) 1486-1496.

[11] Rao A, Upadhyay N, Rai V.K. 2013. A Survey on AODV Protocol Performance with Black Hole Node in MANET, International Journal of Engineering and Advanced Technology, 2 (4) 57-62.