MODIFICATION OF AODV TO ASSURE RELIABILITY FOR THE EFFICIENCY OF QOS IN MANET

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ABSTRACT

Wireless Networks is the Evergreen Technology in the computer network world. MANET is the blooming technology in today's scenario. AODV is a challenging protocol in this environment. Basically it is a Reactive routing protocol in which the assuring of reliability occurs as a Challenging Task. MANET is a self-configuring and self -healing wireless network in which the network topology varies continuously with the time. As many methods are available for assuring the reliability, One of the finest method is which we implemented. This method consists of evaluating the three major parameters such as End-to-End Delay, Packet Delivery Ratio and Throughput from the simulation of AODV. By calculating for different attempts, We can plot a graph for them. Then by considering another parameter called Energy which acts as a deciding parameter and by considering those values, some nodes can be neglected and again those three parameters are calculated and plotted as a graph for them. As a conclusion, We compared the Graphs (Without Energy) and Graphs (With Energy). The Latter Graphs with Energy will be an improved one as compared to former graphs . Finally by considering these graphs, We can conclude that the Reliability can be assured in AODV by considering these three parameters such as End-to-End Delay, Packet Delivery Ratio and Throughput and a deciding parameter as an Energy. Thus the entire average life-time of the network can be increased by decreasing the average energy consumption. Hence the reliability can be assured in AODV.

INTRODUCTION

MANET*:*

Mobile Ad Hoc Network is a self-configuring, infrastructure-less, self-forming, self-healing network of mobile devices connected wirelessly. MANET does not follow any specific topology because of self handling network. It is an emerging type of wireless networking in which mobile nodes associate on ad-hoc basis. It involves enabling of peer-level communication between mobile nodes without reliance on centralized resources or fixed infrastructure. These attributes enable MANET to deliver significant benefits in virtually any scenario that includes a cadre of highly mobile users or platforms, a strong need to share IP-based information and an environment in which fixed network infrastructure is impractical or impaired or impossible. Each devices in a MANET is free to move independently in any direction and therefore change its links to other devices frequently. It consists of many autonomous or free nodes that travels in any ways without causing traffic and they arrange their data information without any strict top-down network administration. Due to this, the mobility in MANET increases to higher extent. They are capable of changing their locations and topology at any time if necessary to perform that operation. Routing is a very important function in MANET which is productive unless all component nodes are connected and believed to be in Trustworthy manner.

AODV:

Ad-hoc On demand Distance Vector(AODV) is a reactive routing protocol used to transfer the packets in wireless networks like mobile ad-hoc

network(MANETs) and other ad-hoc networks. AODV enables "dynamic, self-starting, multi-hop routing between mobile nodes wishing to establish and maintain an ad hoc network". The philosophy in AODV, like all reactive protocols, is that topology information is only transmitted by nodes on-demand. AODV allows for the construction of routes to specific destinations and does not require that nodes keep these routes when they are not in active communication. When a node wishes to transmit traffic to a host to which it has no route, it will generate a *route request*(RREQ) message that will be flooded in a limited way to other nodes. This causes control traffic overhead to be dynamic and it will result in an initial delay when initiating such communication. A route is considered found when the RREQ message reaches either the destination itself, or an intermediate node with a valid route entry for the destination. For as long as a route exists between two endpoints, AODV remains passive. When the route becomes invalid or lost, AODV will again issue a request(RERR) message to send the valid packets. Then finally the RREP is sent to the source node. The AODV protocol is only used when two endpoints do not have a valid active route to each other. Route table information must be kept for all routes even short-lived routes.

RELATED WORK

Over the decades there have been tremendous developments to improve the efficiency of MANETs through the regular proposals and advancements in the routing protocols. The main goal of all these developments is to setup stable and efficient routes with the optimal utilization of network resources. As there is no provision of any QoS parameters in the basic framework of AODV. Thus it becomes highly essential to make some arrangement to provide reliability to the applications in terms of providing quality in services.

In August 2012 another advancement E-AODV was proposed with enhanced packet delivery ratio and minimized end to end delay .The simulated results suggests its ability to adapt in real world networks [1].

In June 2012 the authors investigated the efficiency of AODV protocol in a network which is constrained with bandwidth [2].

In July 2010 the authors implemented Blocking ERS (Expanding Ring Search) to reduce the control packet overhead . The basis of the approach is that route search procedure is not resumed from its source node but each time a broadcast is required [3] .

A routing protocol called QoS Mobile Routing over Ad hoc On-demand Distance Vector routing (QMRB-AODV) [4] constructs a routing backbone consisting of nodes that are rich in resources. These backbone nodes are responsible to route packets to end nodes.

In September 2013 a proposal came to introduce QoS into AODV by considering varying Queue Length and Dynamic TTL value [5].

A QoS aware routing that is based on the Bandwidth Estimation (BE) for mobile ad hoc networks is proposed [6].

The protocol incorporates an admission control scheme together with a feedback scheme to meet the QoS requirements of real-time applications. In 2001 Quality of Services in MANETs were explored covering each and every dimensions touching QoS architecture [7].

PROPOSED MODEL

Our proposed model to assure Reliability in AODV is the calculation of packet delivery ratio(PDR),throughput, end to end delay for the nodes which are involved in both routing process and non-routing process. By calculating those values, plot a line graph by taking minimal number of attempts. These graphs are used to compare with the simplified graph which we are obtained at the end of the proposal by considering the energy parameter as a deciding one.

End to End Delay:

It is also called as One-way delay(OWD) refers to the time taken for a packet to be transmitted across the network from source to destination.

Delay(ms) = ending simulation time(ms) – starting simulation time(ms).

Packet Delivery Ratio:

It is the ratio between the number of packets successfully received to the number of packets successfully sent.

Packet delivery ratio = no of successful packets received / no of successful packets sent**.**

Throughput:

It is the maximum number of packets sent per unit time.

throughput(Kbps) = received packet size / (stop time – start time) * 8/1000.

Energy:

Energy of a node is the maximum capacity that can be utilized for the mobility and packet transfer.

Energy Consumed = Initial Energy - Remaining Energy.

In our proposed model, Energy is the deciding parameter which decides whether the reliability can assured in AODV. Initially, The simulation is performed with certain number of nodes(say x) with Initial Energy as 100.In the simulation time, the nodes will consume energy for both mobility and packet transfer. By analyzing the simulation at the end, The nodes which involved in both mobility and packet transfer consumes more energy than the nodes that consume for mobility only. Since those are only created not undergone for routing process. Those nodes are non-routing nodes for that particular simulation period. Those non routing nodes are just utilizes energy for their mobility only so they can be isolated. By isolating those nodes, we are simplifying the entire network by reducing the nodes by considering the nodes that are involved in both mobility and routing. Hence these routing nodes perform simulation for the same particular time period by which all of them are part of simulation as with the modified AODV(M-AODV). Now again all the above three parameters are calculated and plotted and finally they are compared. Thus an existing AODV is modified as M-AODV to assure Reliability for the efficiency of QOS in MANET to become as new R-AODV.

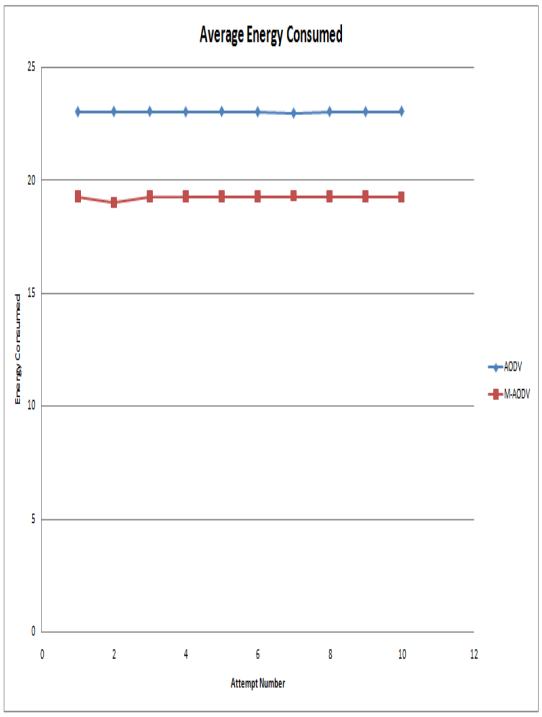
ADVANTAGES OF THIS PROPOSED MODEL

1.The M-AODV nodes consumes less energy than the nodes consumes in AODV.
2.Overall remaining energy of the entire network is high in M-AODV than AODV.
3.The entire Lifetime of the network is increased by less energy consumption in
M-AODV.
4. So the network is more reliable in R-AODV.

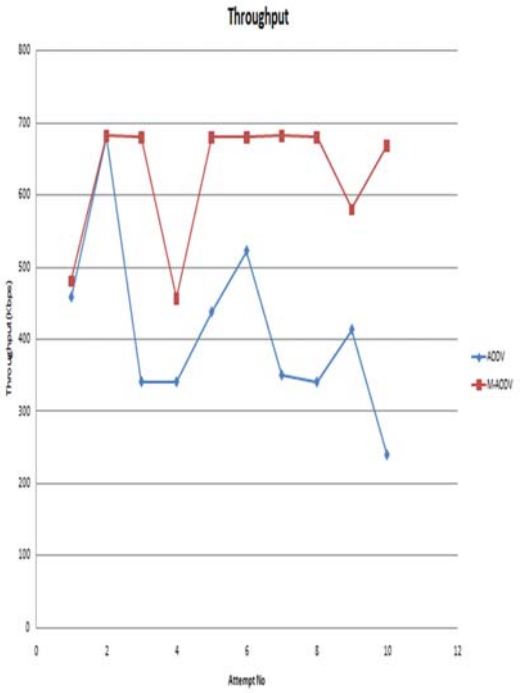
RESULTS AND COMPARISON

The Simulation parameters are listed below as:-
Simulation Environment : NS2
Number of nodes used : 12
Number of nodes reduced : 7
Protocol used : AODV,M-AODV,R-AODV
X Dimension : 1500
Y Dimension : 1000
Size of Mobile node : 30
Queue Length : 50
Maximum Speed of node : 40 m/s
Bandwidth : 2Mbps

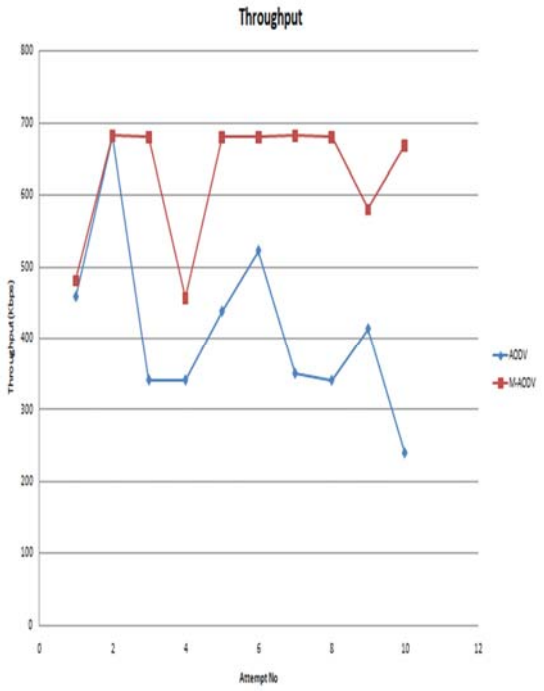
ENERGY:



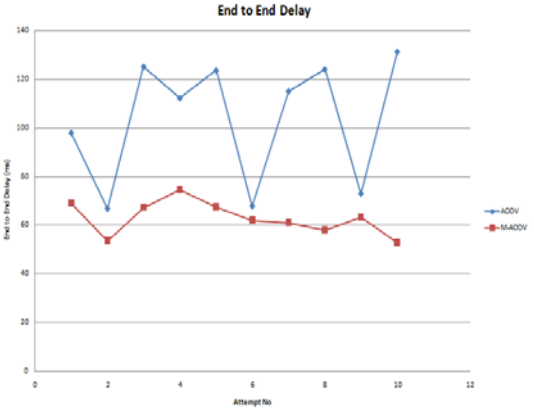
PACKET DELIVERY RATIO:



THROUGHPUT:



END TO END DELAY:



CONCLUSION AND FUTURE WORK

MANET has many drawbacks as one of them is assuring reliability to AODV. By implementing the our proposed work, The Reliability can be assured for the modification of AODV(M-AODV) in MANET. Thus the entire Lifetime of the network can be improved by reducing the energy consumption of nodes that are involved in both mobility and packet transfer. Hence by doing this, the nodes which are not in routing only in mobility are need to be isolated. The Future Work of this implementation can be performed by improving same the entire Lifetime of the network but not by reducing those nodes but by including those mobile nodes too. Therefore by doing this, How the Reliability can be assured in the modification of AODV(M-AODV) can be made clear.

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REFERENCES

1. Patil V. P , Efficient AODV Routing Protocol for MANET with enhanced packet delivery ratio and minimized end to end delay , in International Journal of Scientific and Research Publications , Vol. 2 , Issue 8 , August 2012 , pp 1-6 .
2. 2. K. Tamizarasu , Rajaram M. , The Effective and Efficient of AODV Routing protocol for Minimized End-to-End Delay in MANET , in International Journal of Advanced research in Computer and Communication Engineering , Vol. 1 , Issue 4 , June 2012 , pp 250-254.
3. SrinivasSethi , Siba K. Udgata , Optimized and Reliable AODV for MANET , in International Journal of Computer Applications (09758887) , Vol. 3 , July 2010 , pp 22-26.
4. Ivascu, G.I., Pierre, S. and Quintero, A., 2009. QoS routing with traffic distribution in mobile ad hoc networks, Elsevier Journal on Computer Communications, Volume-32, Number-2, pp.305–316.
5. Yadav Shweta , Richhariya Vivek , Improvement of QoS Contained by AODV Routing Protocol On the Basis of Varying Queue Length and Dynamic TTL value in MANET ” , in IOSR Journal of Computer Engineering , Vol. 14 , Issue 3 , September –October 2013 , pp 13-19.
6. Chen, L. and Heinzelman, W.B., 2005. QoS aware routing based on bandwidth estimation for mobile ad-hoc networks, IEEE Journal on Selected Areas in Communications, Volume-23, Number-3, pp.561-572.
7. Zeinalipour-YaztiDemetrios , A Glance at Quality of Services in Mobile Ad-Hoc Networks.