# ANALYSIS OF NETWORK PERFORMANCE USING IMPROVED DREAM PROTOCOL IN MANET

Khushboo Gandhi[1], Pinakini Patel[2], Nisarg Patel[3]
[1]Student, [2,3]Assistant Professor, [1,2]Department of Computer Engineering,
[3]Department of Computer Science & Engineering (Ph.D Pursuing),
[1,2]Swaminarayan College of Engineering & Technology, Kalol, Gujarat, India
[3]C.U.Shah University, Wadhwan, Gujarat, India

***Abstract:*** ***MANET (Mobile Ad-hoc Network) is infrastructure dependent, collection of wireless mobile nodes that can communicate with each other directly or indirectly through intermediate nodes. Thus, all nodes in MANET behave as mobile routers and they decide and maintain the routes. Nodes in MANET have high mobility that makes difficult to find routes when message packets are routed. The location based DREAM Distance Routing Effect Algorithm for Mobility maintains information about location of each node in between sender and receiver. As this protocol works better with any energy efficient protocol so we need to consider it for its performance measurement. In our work we use location based scheme (DREAM) with multipath routing protocol AOMDV for better network performance. In proposed work routing of the nodes is done by AOMDV protocol by using location based DREAM protocol. If the nodes in the network have information about the status of receiver, will leads to better throughput and lower the end-to-end delay. Final result will lead to better throughput, increase the packet delivery ratio and improve end-to-end delay. Simulation can be done using NS 2.***

***Keyword: AOMDV, DREAM and throughput, wireless ad-hoc network, MANET.***

## I. INTRODUCTION

Mobile ad hoc networks (MANET) are characterized by multi-hop wireless mobile nodes that communicate with each other without centralized control or established infrastructure. There are various challenges in MANET such as routing, dynamic topology, scalability, bandwidth optimization. But the major challenge in MANET is link failure due to high mobility. Topology-Based routing protocols become unsuitable for MANET when the nodes are highly mobile and topology changes dynamically. Geographic routing protocols are regarded as efficient and scalable when mobility is high. Therefore, geographic routing protocols have attracted a lot of attention in the field of routing protocols for MANET. Position-based approaches have been proposed to address some drawbacks of topologic-based techniques by using information about physical or geographical position of nodes that can be obtained by positioning services such as GPS (Global Positioning System). We focus particularly on energy aware geographic routing since it is the one of the research of geographic routing includes DREAM that proposed constrained flooding. The expected zone is defined by predicting the boundary of the destination node's movement. In this protocol, prediction is made based on the time difference between sending data and the location information's update, as well as the destination node's speed. In the DREAM protocol, however, according to the location information, the data packet is flooded in a restricted directional range without sending a routing packet. Although this kind of forwarding effectively guarantees delivery, its energy use is notably high, especially in large-scale networks. We also focus on the improvement of the throughput of the network by providing higher CPU utilization in the network. The table for the throughput will maintain the information of the destination routing path. The next packet forwarding path should be selected on the basis of node having higher residual energy with shortest path in descending order to improve the throughput of the network

## II. RELATED WORK

A. "Performance Evaluation of the Location-based Protocol DREAM for Large Mobile Ad hoc Networks", M. Bakhouya, N. Cottin University of Technology of Belfort-Montbeliard, France.[4]

Functional Description: The author has given the performance evaluation of position based routing protocol DREAM for large.

Conclusion: the average latency is less sensitive as the network size increases. Moreover, despite the number of control packets sent for position updates, DREAM is robust and provides localized information.

B."A Research Paper on Comparison between Energy Efficient Routing Protocol with Energy and Location in MANET", IOSR Journal of Computer Engineering (IOSR-JCE), Ruchi Gupta1, Akhilesh A.Waoo, Sanjay Sharma and P. S Patheja.[8]

Functional Description: This paper suggests comparison between three energy techniques to reduce energy consumption at protocol level. The first technique uses only AOMDV protocol second uses ENERGY BASED AOMDV protocol and third technique uses location based AOMDV protocol.

Conclusion: In routing load analysis we observe that in energy based AOMDV protocol the routing load is maximum it means that here links are break rapidly by that again connection request packets or control packets are

  

generated by sender then routing load increases and route disjoint path are also not able to provide strong connection between sender and receiver but in normal multipath routing in the absence of energy factor routing load is minimum because one link is break then second one is present to providing proper data delivery. Now third case in DREAM protocol nodes are also forwarding data on the basis of location means senders are aware about the position of destination with multiple routes (because of AOMDV) then the routing load in location based routing is minimum as compare to all.

C. "Energy Efficient Location based Routing Using DREAM Algorithm for MANET", IOSR Journal of Engineering (IOSRJEN), Mr. Sourabh Pandey, Mr. Rajender Singh Yadav.[9]

1) Functional Description: This paper proposed a new location based energy efficient scheme with AODV(DREAM-EAODV) protocol. In this scheme energy dependent nodes are do routing with AODV protocol on the basis of location based protocol DREAM. Nodes in network are not intimated about their energy status, for that remove the suddenly link breakage. If the nodes in network are know about the energy status and also about the status of location of receiver that reduces the energy consumption.

## III. AD-HOC ON DEMAND MULTIPATHDISTANCE VECTOR ROUTING PROTOCOL

One of the most commonly used AOMDV is a multipath routing protocol provides loop-free extension to another multipath routing protocol AODV. It ensures about disjoint alternate paths at every node, so that it can achieves path disjointness without using source routing. AOMDV with a route tables contain a list of paths for each destination, to support multipath routing. All the paths have the same destination sequence number to a destination. All the routes with the old sequence number are removed, once a rout advertisement with higher sequence number is received. Two additional fields, hop count and last hop, are stored in the route table entry to help address respectively the problems of loop freedom and path disjointness. The loop freedom guarantee from AODV is no longer required here, because the multipath routing protocol implement multipath discovery. AOMDV having two table fields hop count field and last hop field, in which hop count field initialized once at the time of the first advertisement for that sequence number and contains length of the longest path for a specific destination sequence number. That's why hop count field remain unchanged till a path for a higher destination sequence number is received. To ensure disjointness of that path in the route table, a node discards a path advertisement that has either a common last hop or a common next hop as already stored in the routable.

## IV. DREAM PROTOCOL

DREAM is an early example of a routing protocol which is completely location based. The location service is also part of the same protocol. With DREAM's location service, every node proactively updates every other node about its location. The overhead of such location updates is reduced in two ways: First, distance effect (nodes move slowly with respect to each other as their distance of separation increases).

Second, each node generates updates about its location depending on its mobility rate fast moving nodes update more often whereas slow moving nodes generate updates less often. DREAM geographically forwards data packets in the form of a directional flood. [6]

In DREAM the sender S of a packet with destination D will forward the packet to all one-hop neighbours that lie "in the direction of D." In order to determine this direction, a node calculates the region that is likely to contain D, called the expected region. As depicted in figure, the expected region is a circle around the position of D as it is known to S. Since this position information may be outdated, the radius r of the expected region is set to (t1-t0)vmax, where t1 is the current time, t0 is the timestamp of the position information S has a bout D, and vmax is the maximum speed that a node may travel in the ad hoc network. Given the expected region, the "direction toward D" for the example given in figure is defined by the line between S and D and the angle α. The neighboring hops repeat this procedure using their information on D's position. If a node does not have a one-hop neighbor in the

required direction, a recovery procedure has to be started. This procedure is not part of the DREAM specification.

Disadvantages of DREAM

- It works efficiently with only some energy efficient protocols.

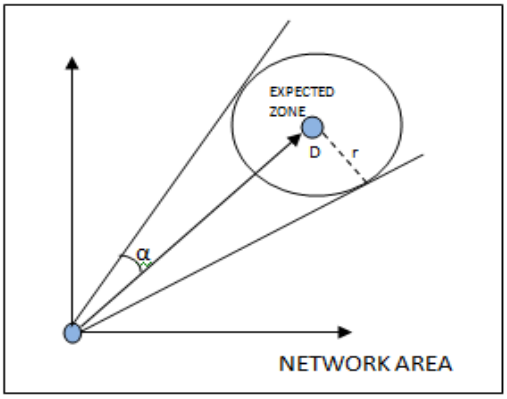


Figure DREAM protocol[6]

*Advantages of DREAM*

As far as control information is concerned, only location information is exchanged which are in form of short sized location packets. So, it saves bandwidth.

Due to directed flooding, possibility of loops is minimized as packets travel in the direction of the destination.

It efficiently adapts to dynamic topologies (or mobility in the network). This is because of the mobility effect.

This Kind of packet forwarding effectively guarantees packet delivery.

  

## V. PROBLEM WITH CURRENT APPROACH

Mobile Ad Hoc network are maintained dynamic topology with random mobility that we can't identify the location of nodes. Multipath protocols have definitely sort the problem of single path by providing alternative route in between sender and receiver. It means, if the existing route is break than in that case the alternative route is available but it is not providing the location of mobile nodes. AOMDV has more message overheads during route discovery due to increased flooding and since it is a multipath routing protocol, the destination replies to multiple RREQs those results are longer overhead. For this overhead enhancement the location based scheme DREAM is used with AOMDV for better throughput and increase packet delivery and decrease end to end delay.

## VI. PROPOSED WORK

Consider a network consists of N nodes. The maximum radio range of the node is set to 550m. The sender will broadcast the route request message. If the destination is within radio range and next hop is available than the route table of the node is updated. If more than one path is available to the destination then the shortest path with higher residual energy is selected. The Every node in the MANET calculates its remaining energy periodically. The nodes may operate in either transmission or reception mode.

The energy consumed for transmitting a packet is given by
Consumed energy = Transmitted power (TP) * time (t) … (1)
The energy consumed for receiving a packet is given by
Consumed energy = Receiving power (RP) * time (t) … (2)
Where t=Data size (Ds)/Data rate (Dr) … (3)
So the residual energy (E) of each node can be calculated using equation (1), (2) and (3)
E = Current energy – Consumed energy
Wherever we get the value of the residual energy (E), we calculate the best shortest path with minimum residual energy. Then we select the routes on the basis of descending value of residual energy. Finally select the path with maximum nodal residual energy to forward the data packets. As the nodes in MANET moves because of mobility calculate the direction of the destination by using the DREAM protocol. Once the direction of destination is calculated send the route request message in the same way until the destination is found. Finally send the packet in the reverse path that was established during the RREQ message. Else the destination is out of range.
This proposes a modification DREAM protocol.
Set Sender = S;
Set receiver = R;
Set protocol = AOMDV;
Set location protocol = DREAM;
Step 1: Set the maximum radio range (RR) of the node which is 550m.
Step 2: The sender will broadcast the route request packet to all the neighbor nodes.
Step 3: Check if the radio range of the destination is less than equal to 550m and next hop is available.
Step 4: Update the route table of the node.
Step 5: If there are more than one path available from the source to the destination.
Step 6: Find the shortest path to the destination with higher residual energy.
Step 7: Check whether receiver R changes its position because in MANET all the nodes are mobile in nature.
Step 8: Calculate the direction of the receiver node using the DREAM protocol.
Step 9: Send route request message to the next node.
Step 10: Repeat steps 4 to 9 until the destination is found.
Step 11: Route the packet to the reverse path that was established during the RREQ message.
Step 12: Else destination is out of range or not found.

## VII. SIMULATION PARAMETERS AND RESULTS

### *A. Packet Delivery Ratio*

It is the ratio of data packets delivered to the destination to those generated by the sources. It is calculated by dividing the number of packet received by destination through the number of packet originated from source.

### *B. Throughput*

Throughput is the ratio of number of packets received to the time seconds.

### *C. End to End Latency*

The average time taken by data packets to arrive in the destination. Lower value of end to end delay means the better performance of the protocol.
The experiments were carried out using network simulator (ns-2). The scenarios developed to carry out the tests use as parameters the mobility of the nodes and the number of active connections in the network.

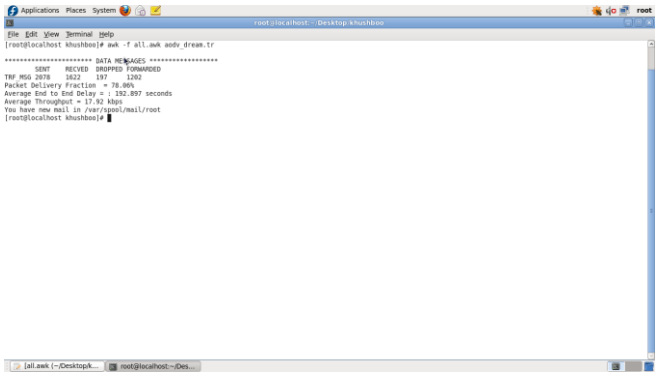

Figure Result of AODV_DREAM

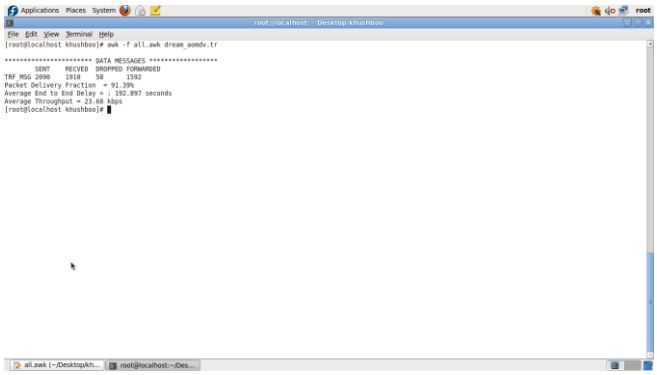

Figure Result of AOMDV_DREAM

  

| Parameters | AODV_DREAM | AOMDV_DREAM |
|---|---|---|
| Throughput | 17.92kbps | 23.68kbps |
| Packet Delivery Ratio | 78.06% | 91.39% |
| End to End Delay | 192.897s | 148.935 |
| No of Packets Send | 2078 | 2090 |
| No of Packets Received | 1622 | 1910 |
| No of Packets Dropped | 197 | 58 |

## VIII. CONCLUSION AND FUTURE WORK

There are various routing algorithms to minimize energy efficiency, one of which is AOMDV. It is energy efficient, and a robust routing protocol. With addition to this, DREAM protocol, which is a location-based protocol, uses the Global Positioning System to find the location information. It helps to maintain the location information of each node, which in turn reduces the frequency of flood route discovery. Therefore, the long lifetime of the nodes in the network is achieved, with reduced overhead and delay, and with an increased throughput and packet delivery ratio. After implementing the location based DREAM AOMDV protocol it is seen that throughput increases, packet delivery ratio also increases and the delay decreases. Our future work is to analyze the performance of proposed algorithm with different values of parameters. Also try to reduce load of the network by increasing lifetime of network.

## REFRENCES

[1] "Performance Comparison of Distance Routing Effect Algorithm for Mobility (DREAM) and On-Demand Distance Vector (AODV) Routing Protocols". Shivi Rastogi, Sanjay Singh Bisht, Rachit Katyal, Manoj Kumar Singh, MIT International Journal of Computer Science and Information Technology, August 2014.

[2] "Simulation Based Analysis of DSR, LAR and DREAM Routing Protocol for Mobile Ad hoc Networks", Puneet Kumar, Dr. Ashish Kumar, MIT International Journal of Computer Science & Information Technology, August 2013

[3] "Performance Evaluation of the Location-based Protocol DREAM for Large Mobile Ad hoc Networks", M. Bakhouya, N. Cottin University of Technology of Belfort-Montbeliard, France.

[4] "Performance Evaluation of DREAM Protocol for Inter-vehicle Communication", M. Bakhouya, J. Gaber, M. Wack GSEM/SeT Laboratory, UTBM 90010 Belfort, France, IEEE, 2009.

[5] "Ad-hoc Multipath Routing Protocol Based on Load Balance and Location Information", Xia Li , Song Zhi , Su Xin ,Wang Zhiyuan , Li Qilong College of Information Science and Engineering, Northeastern University, Shenyang 110004, China, IEEE, " 2009.

[6] "A Review of Comparision of Geographic Routing Protocols in Mobile Adhoc Network", Advance in Electronic and Electric Engineering. ISSN 2231-1297, Divya Wadhwa, Deepika, Vimmi Kochher and Rajesh Kumar Tyagi, 2014.

[7] "Energy Efficiency in Manets Using AOMDV", Sheetal, H.B.Mahesh, IJEDR, 2015.

[8] "A Research Paper on Comparison between Energy Efficient Routing Protocol with Energy and Location in MANET", IOSR Journal of Computer Engineering (IOSR-JCE), Ruchi Gupta, Akhilesh A.Waoo, Sanjay Sharma and P. S Patheja.

[9] "Energy Efficient Location based Routing Using DREAM Algorithm for MANET", IOSR Journal of Engineering (IOSRJEN), Mr. Sourabh Pandey, Mr. Rajender Singh Yadav, August 2013.

[10] 10."Energy Efficient MANET with Multipath Routing using Location Based Approach for PDF Analysis",International Journal of Modern Computer Science and Applications Akhilesh A. Waoo, Sanjay Sharma, September 2014.

[11] "Opportunistic Routing for Wireless Ad Hoc and Sensor Networks Present and Future Directions", Haitao Liu and Baoxian Zhang, Chinese Academy of Sciences Hussein T. Mouftah, University of Ottawa Xiaojun Shen, University of Missouri — Kansas City Jian Ma, Nokia Research Center, IEEE 2009.

[12] "Secure Localized node positioning in Mobile ad-hoc networks using PSO", Subburaj.V and Dr.K.Chitra, 2014 IEEE.

[13] "Energy Efficiency in Manets Using AOMDV", Sheetal,H.B.Mahesh, IJEDR 2015.

[14] "Performance Comparison and Implementation of Distance Based Routing Protocol in MANET Using NS-2", V. Gowri, V. Seethalakshmi, Dr. G. Mohankumar, International Journal f Emerging Technology and Advanced Engineering, December 2012.

[15] "Energy Efficiency And Better Throughput In MANET Using Improved AOMDV", Nisarg A Patel1 Manojkumar B Patel2 Ankit K Patel, IJSRD,2014.

[16] Research Reviews of IEEE 802.11 Wireless Adhoc Networks", International Journal of Recent Trends in Engineering, May 2009.

[17] "Simulation and Comparison of AODV, DSR and AOMDV Routing Protocols in MANETs", Manveen Singh Chadha, Rambir Joon, Sandeep, International Journal of Soft Computing and Engineering (IJSCE), July 2012.

[18] "Performance Analysis of AODV & DSR Routing Protocol in Mobile Ad hoc Networks", Amit N. Thakare, Mrs. M. Y. Joshi, IJCA 2010.

[19] "Self-Adaptive On Demand Geographic Routing Protocols for Mobile Ad Hoc Networks", Xiaojing Xiang, Zehua Zhou,Xin Wang, IEEE 2007.

[20] "Performance Comparison of AODV and AOMDV Routing Protocols in Mobile Ad Hoc Networks ",

  

Mina Vajed Khiavi, Shahram Jamali, International Research Journal of Applied and Basic Sciences 2013.

[21] "An Analysis of Single Path AODV Vs Multipath AOMDV on Link Break Using ns-2", K.Vanaja , Dr. R. Umarani, International Journal of Electronicsand Computer Science Engineering.

[22] "Performance issues on AODV and AOMDV for MANET", SR.Balakrishna, U.Rajeswar Rao, N.Geethanjali N, International Journal of Computer Scienceand Information Technologies 2010.

  