Analysis of Data Delivery Issues in MANET Using Implementation of MTOOR Algorithm

S.M.Nandhagopal, S.N.Sivanandam

Abstract: - This research paper addresses the issues of reliable data delivery in mobile ad- hoc network and implies a new (Moving Target Oriented Opportunistic Routing) Algorithm for which existing routing protocols are not suitable. This algorithm is implemented in Wireless Routing protocol (WRP) which is good in delivering the data in highly dynamic MANETs. This WRP has an issue in the over heading problem and less data security. So I propose a new proactive routing algorithm known as MTOOR routing algorithm. This algorithm provides good result for delivering data in highly dynamic ad-hoc networks by searching the target node and updating all the information for delivering data without over heading. This proposed scheme works efficiently in a large network of high mobility nodes and this concept is implemented using OMNeT++ environment. The main Objective of the paper is to reduce the high overheads and improve the routing performance in a proactive protocol WRP by reducing the Overheads.

Keywords: Moving Target oriented Opportunistic Routing, WRP, and Data Delivery

I. INTRODUCTION

A "mobile ad hoc network" (MANET) is an autonomous system of mobile routers connected by wireless links. The routers in MANET are free to move randomly and organize themselves arbitrarily so the network's wireless topology may change randomly and unpredictably [1]. MANET operates in a standalone fashion, or also may be connected to the larger Networks. There is no fixed infrastructure, all the nodes move dynamically hence each node in the networks acts as a router for forwarding and receiving data packets for other nodes.In MANET there exist two types of protocols namely Proactive and Reactive. A packet data is sent from source to destination in an Ad hoc network through multiple nodes that are mobile. Maintain one or more routing tables in every node in order to store routing information about other nodes in the MANET [2]. These routing protocols attempt to update the routing table's information either periodically or in response to change.

In Reactive routing protocol, every node in a network discovers a route based on the demand. It floods a control message by global broadcast during discovering a route and when route is discovered then with the existing bandwidth data transmission is done. The main advantage is that this protocol needs less touting information but the disadvantages are that it produces huge control packets due to route discovery during topology it incurs higher latency [3].

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S.M.Nandhagopal, Research Scholar, Assistant Professor, Department Of Computer Science and Engineering, Easa College of Engineering and Technology, Coimbatore - 641105, Tamil Nadu, India.

Dr.S.N.Sivanandam, Professor Emeritus, Department Of Computer Science and Engineering, Karpagam College of Engineering, Coimbatore-641032, Tamil Nadu, India.

The most popular type of protocol is Dynamic Source Routing (DSR), Ad-hoc On Demand Routing (AODV) and Associatively Based Routing (ABR) protocols. In order to explain the problem clearly, let us consider a problem where a moving node collects some customized moving information, such as real-time traffic information, as obtained from information source. In this situation, there are two effective message delivery processes: (1) the node sends the message request to information source, or (2) the message received from information source is forwarded to the moving node reversely. The process one has been studied in the existing research; however, the second process has not been considered for deep research as it has more of a challenge. Here, ***Moving Target oriented Opportunistic Routing*** is proposed for the second process.

Proactive protocols:

In this type of routing protocol, each node in a network maintains one or more routing tables which are updated regularly [4]. Each node sends a broadcast message to the entire network if there is a change in the network topology. However, it incurs additional overhead cost due to maintaining up-to-date information and as a result; throughput of the network may be affected but it provides the actual information to the availability of the network. Distance vector (DV) protocol, Destination Sequenced Distance Vector (DSDV) protocol, Wireless Routing protocol Fisheye State Routing (FSR) protocol are the examples of Proactive protocols.

The combination of these two protocols is known as Hybrid Protocols.

Wireless Routing Protocol

Wireless Routing Protocol – Its is a proactive unicast routing protocol for mobile ad-hoc networks it uses an enhanced version of the distance vector routing, which uses the Bellman-Ford algorithm to calculate paths [5]. Because of the mobile nature of the nodes within the MANET, the protocol introduces mechanisms which reduce route loops and ensure reliable message exchange. The wireless routing protocol (WRP), similar to DSDV, inherits the properties of the distributed Bellman-Ford algorithm.

To counter the count-to-infinity problem and enable faster convergence, it employs a unique method of maintaining information regarding the shortest distance to every destination node in the network. Since WRP, like DSDV, maintains an up-to-date view of the network, every node has a readily available route to every destination node in the network.

Methodologies WRP follows

Every Mobile informs each other of link changes through the use of updated messages.

An updated message is sent only between neighboring nodes and contains a list of information about the neighboring nodes, as well as a list of responses indicating which mobiles should acknowledge the update [6]. Loss of a link between two nodes makes the nearby neighbors to update messages. The neighbors then update the distance table entries and check for new possible paths through other nodes. Any new paths are relayed back to the original nodes so that they can update their tables accordingly. If a node is not responding to the sent message, it must respond to a HELLO message within the specified time period to confirm the connectivity. Lack of messages from the node indicate the failure of that link, this may cause a false alarm.

Related work

Previous researches on Multihop message delivery through MANET are complicated by the fact that highly Dynamic networks are highly mobile and have the potential to be frequently disconnected. The issue is again a problematic further when the destination of a message is also in motion, as the network must identify the position of the moving Dynamic node and make sure the message is delivered successfully.

The Next solution for the delivery of a message to a moving target involves the calculation of the route before the transmission takes place. The calculation is based on the speed, location, movement, or trajectories of nodes. The optimal route from source to destination is selected according to the smallest expected disconnection degree, which is calculated from the given information on nodes moving speed, trajectory, and location. The algorithm forwards the message to the node with the smallest expected disconnection degree value of all nodes in the whole vehicular network. The shortest trajectory from source to destination is calculated from the roadway geometry along with the location and movement. There are few similar algorithms in this process. Although these algorithms result in a relatively good performance, the overhead and massive calculation for the whole network makes the approach unrealistic.

Some advanced research in this area has resulted in improvements to these types of approaches by finding an optimal point on the project path of the target node, which stores the message and waits for the target node to arrive. TSF is designed to find one optimal target point which then node is expected to intersect. This point is also designated as the position where the message is delivered to the destination, and is determined by the distribution of message delay and node delay. When the message is delivered to the target point, a stationary node stores it and waits for the target node. The target point is selected to minimize the delivery delay and satisfy the required message delivery success ratio. Obviously, in this case TSF will work only in the optimal situation that the traffic statistics follow the Poisson arrival models.theese are few areas where the researchers are helpful for my publications.

Simulation Experimental Design:

The two major tests are made using OMNeT++ Simulation is the mobility of the node and the Density of the node. Experimental modeling, design, results and analysis are described below to compare the performance of two routing protocols such as DSR and AODV.The simulations are made in two computers with different speed and memory capacity even though there is no effect of speed and memory.

The performance metrics are Average end-to-end delay; packet delivery ratio and Overhead in routing as measured by the number of packets sent for routing .that were used to compare the two routing protocols.

1. Average end-to-end delay: Average time taken for a packet to travel from source to destination including route delay.
2. Packet delivery ratio: It is the Ratio of packets successfully delivered to the destination comparing the total number of packets transmitted by the source node.
3. Overhead in message: Total number of packets sent for routing.

The main parameters used for Node density, node mobility and traffic are the three control parameters used for this simulation. Average end-to-end delay, packet delivery ratio and routing overhead were measured for node mobility and node density were for two different levels of traffic load in experiment Constant bit rate generator was used for generating packets of same size [7]. Three different types of traffic load were used for simulation such as low medium and high traffic situations.

parameters used in OMNeT++ Simulation

Implemented Parameter	Value
Size of network area	m^2
Simulation time	500 s
Transmit range	100 m
Transmit speed	3 Mbps
Node number	5 to 500
Average node speed	1580 MPH
Message size	5 kB

Table 1-Parameters For Simulation

II. PROPOSED ALGORITHM

The main aim of Moving Target Algorithm is to deliver message from information source to a moving target node as dependent on the ability of the message to be opportunistically carry and transmit across moving nodes [8-10]. The main consideration is maximum success delivery, while the minimum success time is also taken account.

The main purpose of is to watch for the nodes that can effectively deliver the message nearer and earlier to the highly Dynamic Node. It requires the carrier node to be closer to the de intimation node at time than the present carrier node, so that the route nearest distance of the new node is smaller than that of the present carrier node [11].

The framework can be explained as follows.

(a) A node carrying the message periodically broadcasts the route of the Destination node.

(b) The One-hop neighboring nodes calculate the nearness of route

(c) The possible success time of themselves according to the route of the Destination node .The present carrier node make decisions, either to keep the message or forward it to a one-hop neighbor based on comparing the relative nearness of the neighbor and itself. The present carrier node monitors the valid time limit of the message If the message is invalid, the current carrier node will reject the message[12]. This iteration is done until the Destination node receives the message or until the message is in valid time limit.

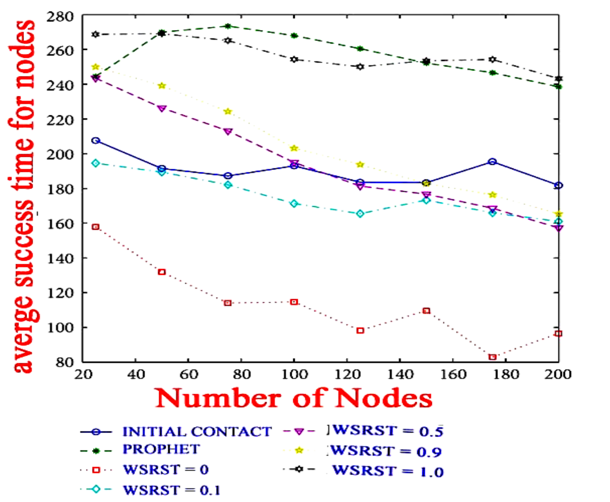

Fig: 1-The average success time comparison for different node density

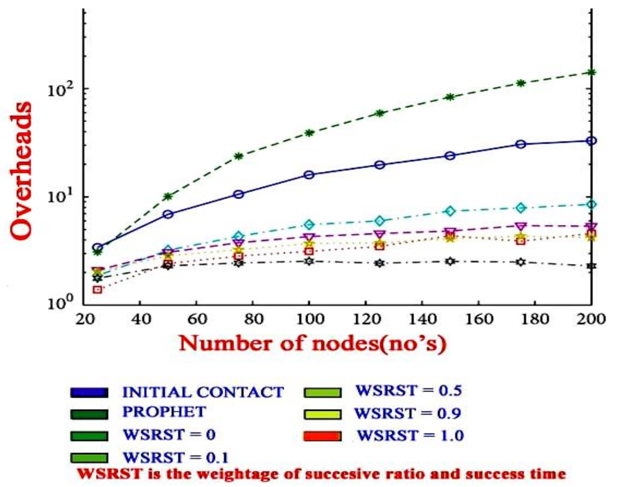

Fig: 2-The Overhead comparison for different node density

Few factors are considered for the in built set of an Algorithm, The factors at which the algorithm targets is

1. Calculating Nearness of the node
2. The maximum possible time of delivery

a. Distance = dmin $_{(V_i, V_j)}$

b.nearest of distance of 2 node = V_i, V_j

c.time = 0<=t<=TTl d V_i, V_j (t)

First we have to find distance of 2 node at the time t

Speed = distance/time d V_i , V_j (t)=dist(V_i (t) , V_j (t))

Then we can calculate as

=root of (x V_i (t) – x V_j (t))^2 + (y V_i (t) – y V_j (t)^2)

Then we have to find nearness of 2 node d*min(vi,vj)

=d*min (V_i , V_j) = d V_i, V_j ^(t)/o<=t<=TTL d-IS,v-tar(0)

=dmin (V_i, V_j)/d-IS,v-tar(0)

IS = Information source

Vtar=target

Nearest degree of 2 node at any available time

=d*(V_i) = d*min (V_i ,v-tar)

=d V_i,v-tar(t)/min0<=t<=TTL d-IS,v-tar(0)

=dmin(V_i,v-tar)/d-IS,v-tar(0)

Minimum time for nearest distance = tmin(V_i,vj)

Simulation results from OMNeT ++.

In this simulation the data delivery issues in WRP are overcome with the performance of through extensive simulations using the OMNeT++ simulator. The most popular DTN routing is one of the possible solutions for message delivery to moving target node without the help of stationary nodes, we have compared the performance of with two alternate DTN routing mechanisms—INITIAL Contact and PRoPHET .In the case of the former alternate mechanism, INITIAL Contact, a meeting of two or more nodes, triggers transmission of the message from one node to another as it has time. Then, it removes the message from the first node after it has been transferred. As a result, only one copy of every message is retained in the network—similar to PRoPHET, the latter alternate mechanism, performs variants of flooding. It estimates the "likelihood" of each node's ability to deliver a message to the target node based on node encounter history. Simulation in OMNet++ parameters used are listed in Table.2

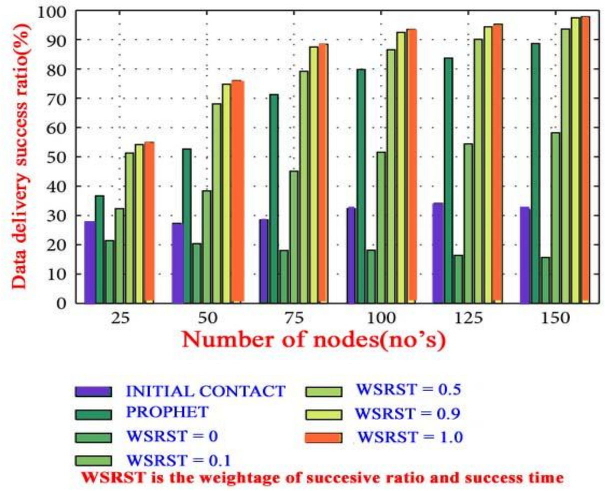

Fig 3-Data delivery success ratio in Parameters

III. CONCLUSION

In this paper and moving target opportunistic routing algorithm in MANET networks was successfully implemented. The main idea is to identify a potential delivery of message, reduce the High overheads and improve the routing performance in a proactive protocol WRP by reducing the Overheads. the comparative results of overheads with the proposed algorithm and different node densities are compared and the average success times of the nodes are analyzed with different node density, a message closer and earlier to the moving target node. And the transmission procedure of Moving Target oriented Opportunistic Routing is implemented completely through the message carrying and forwarding across nodes, without any help of infrastructures. In , there is no universal route from source to destination that must be created and maintained, and the forwarding decision is made on a per-hop system. Even the path of the message is not determined before the forwarding starts. The evaluation results show that, when compared to the existing algorithms, has a good performance in various node densities in terms of success ratio, average hops, overhead, and success time. Even when the node density is high, had an excellent speed and accuracy in delivery of Data in WSN.

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Mr.S.M.Nandhagopal completed his B.E. (Computer Science and Engineering) in 2004 from Dr.Pauls Engineering College under Madras University and M.E. (Computer Science and Engineering) in 2009 from Vellalar College of Engineering & Technology under Anna University, Coimbatore. He is working as an Assistant Professor, Department of Computer Science and Engineering at Easa College of Engineering & Technology, Coimbatore. He is a member of various professional bodies like ISTE, IEEE and IAENG. His research areas include ADOC networks, and Wireless Sensor Networks and having 7 years of teaching experience in Engineering Colleges.

Dr. S. N. Sivanandam completed his B.E. (Electrical Engineering) in 1964 from Government College of Technology, Coimbatore, and M.Sc (Engineering) in Power Systems in the year 1966 from PSG College of Technology, Coimbatore. He acquired PhD in control systems in 1982 from Madras University. He received best teacher award in the year 2001 and Dhakshina Murthy Award for teaching excellence from PSG College of technology. He received the citation for best teaching and technical contribution in the year 2002, Government College of Technology, Coimbatore. His research areas include Modeling and Simulation, Neural Networks, Fuzzy Systems and Genetic Algorithm, Pattern Recognition, Multidimensional system analysis, Linear and Non linear control system, Signal and Image processing, Control System, Power System, Numerical methods, Parallel Computing, Data Mining and Database Security. He is a member of various professional bodies like IE (India), ISTE, CSI, ACS and SSI. He is a technical advisor for various reputed industries and engineering institutions.