

An Evaluating Multicast Routing Protocols and Techniques of Mobile Ad-hoc Network in Node Mobility and Route Validity Density Classifier

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Abstract- Mobile ad hoc networks (MANETs) are intensely characterized by multi-hop wireless connectivity and enthusiastically changing network topology. Wireless ad hoc network is a collection of infra-structure less mobile nodes making a temporary network without any centralized organization. The various ad hoc routing protocols have been proposed and implemented, which include Ad hoc On-Demand Distance Vector Routing (AODV), NMDC and Temporally Ordered Routing Algorithm (TORA). Though, simulation work has been done extensively to estimate the performance of these routing protocols, a new performance assessment is mandatory. Hence, in this paper, we perform extensive simulations using Network Simulator - 2 considering the node density, node delay throughput and static scenario. Further, we analyzed the performance differentials to compare the above-mentioned commonly used protocols. To find the effect of network size on the performance of these protocols, we chose a scenario specifically 10 to 50 nodes. Results revealed that for specific differentials, TORA exhibits enhanced performance over the two protocols, that is, NMDC and AODV. Therefore, our results are expected to enhance performance of several ad hoc networks in the future.

Keywords — *Node Mobility Model, Route Validity and Mobility Model, Node Density Model, Network Simulator (NS2).*

I. INTRODUCTION

In advanced networking and communications technologies, portable wireless devices are commonly found in our daily activities. Mostly, people carry and use laptop, computers and phones that help itinerant computing of network users. In wireless communication, a node can transmit information through the electromagnetic waves to all of its adjacent nodes. Simultaneously, a node can receive numerous signals sent from its neighbors. MANET is one form of wireless networks, is an independent system of mobile hosts attached by wireless links. There is no base stations (static infrastructure) for this network. Each node in the network also acts as a router, sending data packets for other nodes [1,2]. The knowledge of such networking is to assist robust and effective operation in mobile wireless networks by including routing functionality into mobile nodes. Pattern of an ad hoc network is shown in Figure 1, where there are several combinations of broadcast areas for various nodes. From the source node to the destination node, there are different tracks of connection at a certain point of time. It is evident from the Figure 1, every node

typically has a limited area of transmission by the elliptical circle around each node. A source can only transfer data to node B, but B can transfer data either to C or D. It is a difficult task to opt a good route to establish the connection between a source and a destination. Therefore, they can roam around and transmit robust communication.

Several protocols have been proposed for MANETs, with aim of realizing efficient routing [4–7]. These algorithms differed in the process used for searching a novel route and altering a well-known route, when hosts move. The ad hoc routing protocols are generally classified as table-driven and source initiated on-demand driven. The simulation results were well documented in the previous literatures, it shows that on demand routing protocols have higher packet delivery ratio and require less routing messages than table-driven routing protocols [8, 9]. There are four foremost ad hoc routing protocols such as AODV, NMDC, TORA and destination sequence distance vector (DSDV). All these protocols are continually being enriched by the research community [].As a result, a comprehensive performance assessment of ad hoc routing protocols is necessary. This paper compares the performance of three ad hoc routing protocols namely, AODV, TORA and TORA routing protocols using the Simulator Network version 2. TCL is open script language which is used to program NS2 and trace analysis is performed using PERL/ MATLAB. The mobility models are commonly used in their spatial and temporal dependencies. The entity of mobility models are specified to handle the movement of individual mobile nodes within the group. Hence, we evaluated all available metrics supported by Simulator Network version 2 for used protocols and then performed a comparative performance evaluation. Since these protocols have dissimilar characteristics, the comparison of all performance differentials is not achievable. Nevertheless, the following

system parameters are used for comparative study on the protocols:

II. DIFFERENT CATEGORIES OF AD-HOC NETWORKS

A. AODV

AODV is the combining both DSR and DSDV protocols. It's the basic route discovery and route maintenance of the both dsr and dsdv. The AODV routing protocols are both reactive and proactive it's based on hop – by – hop routing an distance sequence number method[2]. The number of messages through forwarding and receiving the data forwarding is also available. The route discovery

can also done by requested message can appropriate data. RREQ and RREP are commonly used in this ad-hoc network while the combination of node updates the lifetime information in the routing table.

B. FMM

The Freeway Mobility model are considered the motion of behavior of the mobile nodes can be freely moving the tacking[3]. The velocity of the mobile node can examined the both previous and after velocity model. In this model we use the maps and graphs.

C. DSR REACTIVE ROUTING

The Dynamic Source Routing (DSR) is the reactive protocol that explains the method of routing source to destination. DSR routing operations can expressed two main phases one is route discovery and another one is route maintenance. They are two structures are applicable in DSR protocols. One is Free Space Structure and another one is Two Ray Ground Structure.

D. Goals in Mobile Ad hoc Networks:

The MANET is an intense of the requirement of new application routing protocol is a major advantage of topology is used frequently. MANET is having the objective of the routing method to find the optimum route to the destination in terms of minimum delay and shortest path. The mainly used in the routing protocols in MANET assumes friendly and co-operative environment but presence of malicious node and vulnerability to security the node[4]. The malicious node are reduce the performance of protocol under the attack of node to improve the flooding attacks. Secure routing and transfer protocols are improved flexibility.

III. DESIGN AND IMPLEMENTATION OF NM

In MANET the routing protocols are commonly derived the formation of very large number of nodes with limited resources [5]. The protocol involves the appeared and disappeared the data packets can sending and receiving the n number of nodes. Routing protocols need to be the following qualities are distributed operation, loop formation, freedom, demand based operation, proactive operation and reactive operation. The Node mobility and Density Classifier using Mobile Ad-hoc Network that considered the travelling the node movement and node density method.

A. NM & NNB Algorithm

Node mobility establishes a range of problem that is not managing well by periodically stimulating state information as algorithms intended for static networks typically do. The design of quasi-static cover on top of a mobile topology has been performed[6]. It has power-driven with local connections along with nodes and exhibits self-healing and self-organization capabilities with respect to failures and node mobility.

MANET has statistical models to exactly assess the allocation of the lifetime of a wireless link. In this method a nodes move arbitrarily within constrained areas. In this link the lifetime can be computed through a two-state Markov model and further apply the computed statistic tot eh optimization. It is the optimization of segmentation method of information stream.

$$D = \sqrt{\Delta x_n^2 + \Delta y_n^2}$$

X = Stating Process, Y = Ending Process

B. Limitations of NS2

NS2 is widely used in the research and enhancements of the complicated structure which is difficult to be reused in the real life implementation. Its also bugs found in unreliable and flexible. Classless and inter domain connection are routing and sub netting are provided the NS2 emulation.

C. Limitations of NS3

In this paper presented the following Parameter are analyzed to study the effects of mobility of the node on each of the multicast routing protocols. There is limited for visualization due to the use of python in Network Simulator 3[3]. It requires the powerful community contribution in order to improve it. The wireless systems are real time animators are required its complex to use.

Node Mobility and Validity

To ensures that the route between each node-pair is valid. It states that traffic is circulating from node i to node j only when the link (i ,j) exists. The routing algorithm is analyzed through the effects of mobility model are compared the node density and classifier using Mobile Ad hoc Network. The ratio of the number of packets received and number of packets delivered. The delay path is different from source to destination or sender and receiver paths [7]. The ratio of number of data messages are oriented or forwarded. The route validity is defined as the dominant form of addressing on the internet through widely used in localized environment.

The numbers of delivers schemes are routing schemes like unicast, broadcast, multicast, any cast, geo cast[8]. A mobile node participation of MANET will be entries in node's route cache.

Algorithm

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STEP 1: Given an undirected weighted graph.
STEP 2: Set Node = 0 for all 1 ≤ transmission
power of node.
//Set=Source Node of Multicast Session //
STEP 3: While set of nodes do find an edge to
incremental power.
// Add node to Set //
STEP 4: Calculate Set=transmission power +
incremental power
// For Power Consumption //

```

IV. PERFORMANCE EVALUATION METRICS

Efficient Network Based Broadcasting in Manet

The MANET routing protocols are the resolution of the controls the nodes can sending the routing packets between the source to the destination. In mobile ad-hoc networks, how to nodes are determine the network topology. A new node can anomies the presence of network broadcasting algorithm between the neighbor nodes[9]. The reactive and proactive methods are commonly used in the efficient network in manet. The Manet routing protocols are related with the concerns like appeared and disappeared of nodes in different locations. Computer networks are group of networks that computes the user applications with each other.

The node mobility is the key attribute of ad-oc networks. Modeling is the movement of the set of nodes is evaluating the performance of a mobile ad-hoc network. PING Packet Internet Grouper is a computer network is used to check the Internet Packet based network. The manet is a adaptive network the underlying communication graph changes overtime the dynamic topology control, limited resources and limited wireless communications range through nearby devices connected modules.

To route the PING packet its node, needs the routing protocol. The reactive based routing protocol can be considered at the rout on demand at the start of the communication network[10]. In AODV, its considered at the normalization of control overhead. AODV Query and AODV reply. RREQ is message broadcasted to other nodes for finding the other nodes. The Destination node will generate the unicast back to the network communication. This protocols works the assumption that all nodes in the network are friendly and co-operative nodes.

The network community is largely depending on simulation of the performance of protocols. The field of communication of the two discrete simulators likes NS2 and NS3. The AODV of scenarios is MANET environment. The performance of NS2 could like platform, language, architecture, memory, visualization and finally we got the results at simulation.

V. EXPERIMENTAL RESULTS OF NETWORK NODE

The Network and Node Mobility and Density Classifier using MANET around as the formation of routing protocols. The proactive protocols are also called the table driven protocols where information about every node is maintained the required AODV and DSR [16]. The reactive protocols are on demand routing protocols where routes are discovered only when required the AODV. The proactive protocols are latency of finding the route and node mobility its less than but its extra overhead control messages. Reactive protocols are advantage of saving the bandwidth and its easy to maintain the routs so that reactive protocols are main popular protocols in MANET [17]. The presence of compromised nodes cans many problems in MAET. All routing protocols are require cooperative environment such like as some attacks are possible in MANET.

Table – 1: Parameters using during simulation

Parameters	Value
Simulation Area	1500*2000 m
No. of nodes	10 to 60
Times of Period	100 sec
No. of repetition	5 times
Physical/Mac layer	IEEE 802.11
Pause time	30 sec
Mobility model	Random direction model
Node movement	5 – 35 m/s
Traffic Type	CBR / TCP

MANETS uses a multiple number of derivations in the performance of n number of packets and protocols.

Packet Data Delivery Ratio

The ratio of the number of packets delivered to the destination nodes and number of the data packets can sending and receiving the nodes at source and destination.

$$\text{Packet delivery ratio} = \frac{\text{Number of packets}}{\text{Number of lost Packet} + \text{Number of packets received successfully}}$$

C. End-To-End Delay

The packet delivery ratio re similarly consider the n number of packets through manet at the packet can sending end to end delay process. The sum of packets can sended and received the data as the client and server. Thus the location information of the source and destination nodes is estimated. In this LTA, the current locations are considered and messages are transmitted between source nodes to destination node. The arrival time is recorded in a given time period and compute the location information using LTA. By recording all the transmission paths the distance of each and every node to destination is known. It helps to identify the nodes which are nearer to destination intentionally better parameter for CH selection. Thus the LTA is used to provide exact location for efficient communication over network.

Packet Delivery Ratio can be applicable in the sending and receiving packets.

Table - 1 Network Node Mobility

Node Mobility (m/s)	Node Lifetime		
	Existing NM	Proposed NNM	Proposed Node Mobility
5	75	82	98
10	71	78	97
20	76	77	96
30	62	63	95
40	60	62	94
50	58	61	93

Figure-1 Node of Validity 50 Nodes

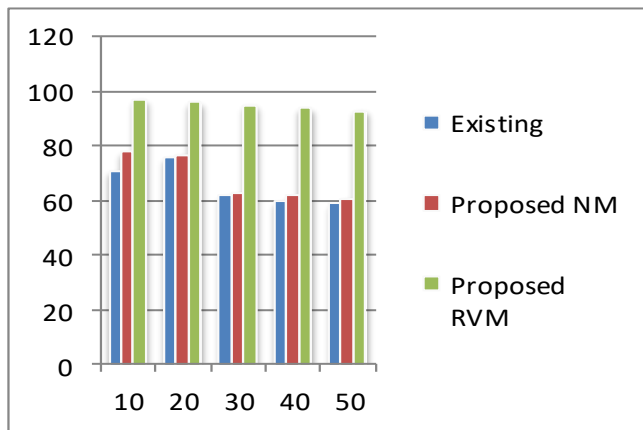


Table - 2 Random Node Mobility

Node Mobility (m/s)	Random Node Mobility		
	Existing NM	Proposed RDM	Proposed Node Mobility
15	0.7	8.5	6.1
25	1.0	10.5	7.5
35	1.2	12.5	8.2
45	1.4	13.5	11.0
55	1.6	14.0	12.3
65	1.8	15.3	13.8
75	2.0	16.5	14.7

Figure - 2 Random Validity Node Mobility

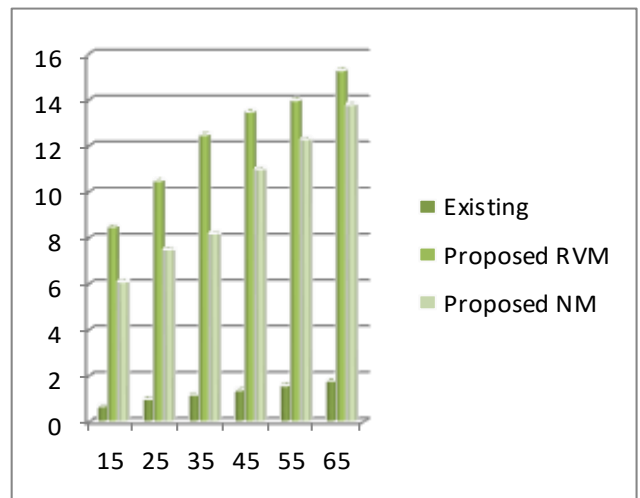
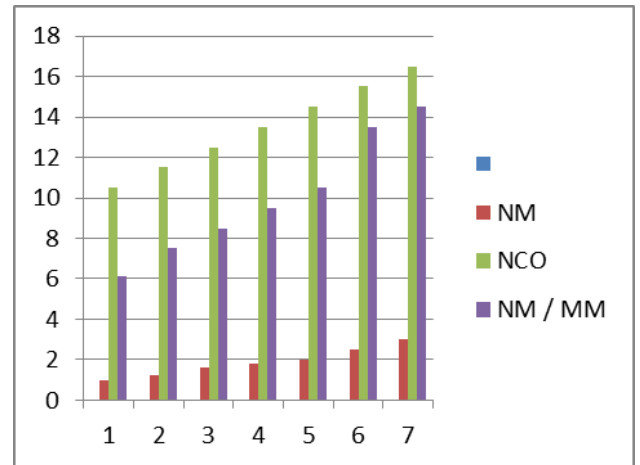


Figure - 3 Normalized CO / NM

Figure - 4 Number of packets delivery ratio

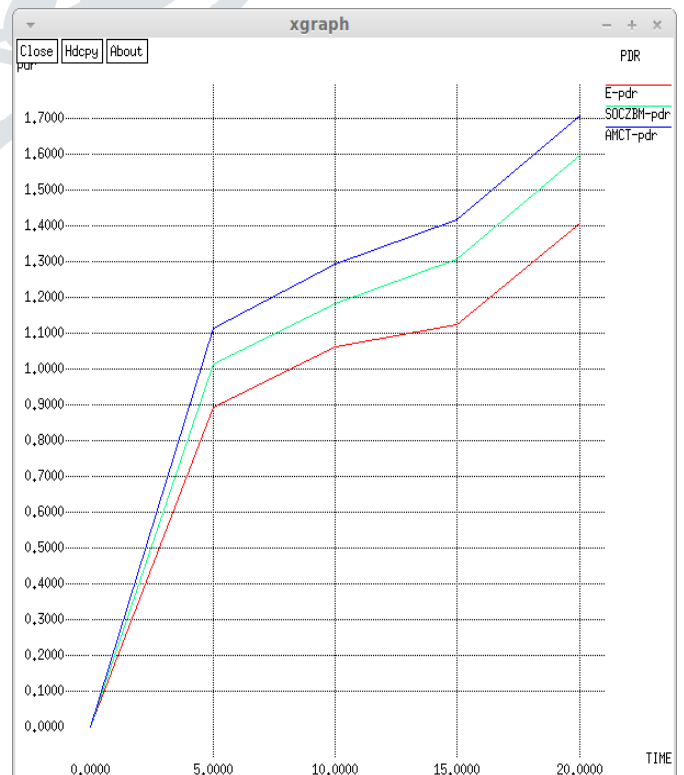
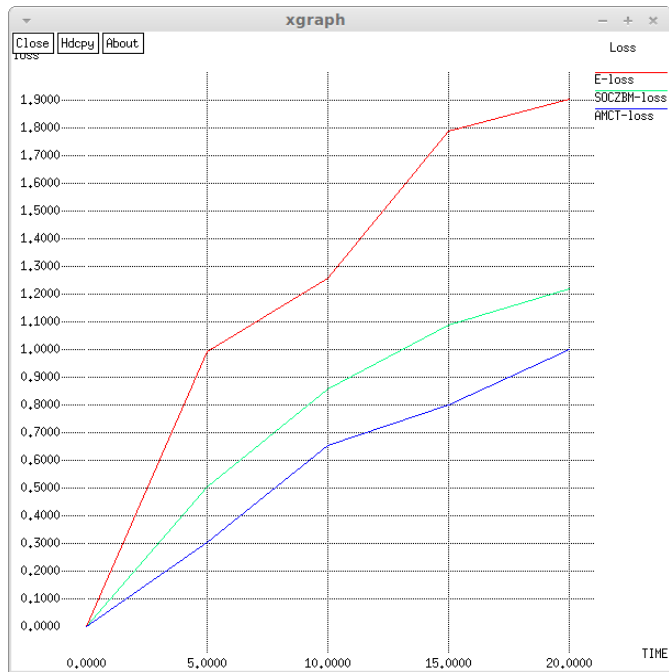


Figure - 5 Normalized Control Overhead for using NS2



VI. CONCLUSION

In this paper we presented the Node Mobility and Random Validity Mobility using the Manet. The scenario of the AODV protocol performs the static and dynamic protocols are considered the remaining energy of Ad-hoc network and MANET. From the simulation results the performance of the random mobility model and density node mobility model are better than the other random models. It is evident the results and random waypoint are the performance of mobility model is lower. This is significant the mobility node models are the routing protocols are AODV and DSR. It's all based on different criteria. We assumed the performance of systems in terms of throughput, number of received packets and routing way point models.

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