JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Hybrid Routing Protocol (ZRP) Zone Based Analysis for Varying Mobility Rate

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***Abstract*:** For facilitating radio transmission between mobile hosts, there are two basic ways. The first method involves deploying a fixed network equipment with wireless access points. A mobile host connects with the network via an access point within its communication radius in this network. When it leaves one accessible point's range, it connects to a new access point within its range and begins speaking with it. The cellular network infrastructure is an example of this sort of network. Several external factors influence the effectiveness, durability, and efficiency of the model. Degree of Linkage of Base stations, Mobility, Density, and Frequency of Data Flows are some of these parameters. Flat gateways, multilevel routing overhead, and destination protocol are the three types of Routing algorithms that are classified based on network size and location-based services. The research model shows the results of hybrid routing protocols, such as ZRP, for varying zone sizes in line with different transportation models, such as the Random Trip Vehicular network, Random Point Group model, Hudson, and Gauss-Markov mobility model. CBR is regarded as a traffic generator. Tests based on zone size are predicated on ns2 simulations.

Keywords: CBR, ZRP, Mobility, Zone radius

1 INTRODUCTION

Lifi is a new service that lets to electronically acquire content and data regardless of their location. Due to recent technological breakthroughs in computer and wireless technology, mobile network for mobile users it became extremely prevalent. This has resulted in cheaper pricing and greater data rates, which are the two primary reasons why mobile computer is predicted to grow in popularity [1].

Handoff, which seeks to manage the circumstance where a contact should be easily handed off from one ap to the next access point without apparent latency or packet loss, is a fundamental flaw in this technique. Another concern is that networks based on fixed hardware are only available in regions where such gear exists [2]. A minimal infrastructure network is depicted in Figure 1

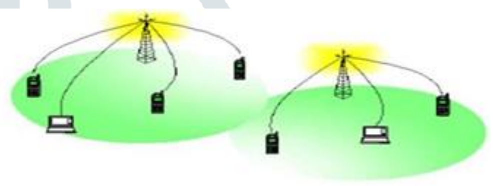

Figure 1: Infrastructure based wireless network [3]

The second strategy, which is the subject of this dissertation work, is to create a wireless ad hoc communication among users who want to interact with one another without using pre-existing architecture. Nodes in an ad hoc network include laptops and personal digital assistants (PDAs) that come into direct contact with one another. The nodes in an ad-hoc network are frequently movable, although they can also be fixed. Each node has its own wireless interface and connects with the others through radio or infrared channels.

1.1 Mobile Ad-hoc Network

An ad-hoc mobile network is composed of base stations that personality into a network out without assistance of a network infrastructure. Some of these nodes, if not all, are movable. Mobile Ad-hoc Networks (MANETs), Wireless Mesh Networks (WMNs), and Wireless Sensor Networks are the three types of ad-hoc networks that may be classed depending on their uses (WSN).

An ad-hoc wireless network is made up of two or more devices that are capable of electromagnetic communication and networking. These devices can connect with another node that is either instantaneously within or even outside their radio range. A device used to enter is employed in the latter case to relay or pass the packet from the sender to the receiver. Identity and adaptable, an ad-hoc wireless network. This means that a network that has been built can be distorted on the fly without requiring any system management. "Can be transportable, solo, or networked," the phrase "ad-hoc" implies. Ad hoc nodes or devices should be able to identify the existence of other ad hoc nodes or devices and complete the appropriate handshakes to allow services to be shared. A group of mobile nodes known as hosts creates and organizes a mobile ad-hoc network. The nodes connected via a single-hop or multiple-hop wireless system, and each node in the ad - hoc networks can act as a packet level router for other nodes [4].

In the absence of a permanent infrastructure, mobile ad hoc networks are made up of wireless hosts that connect with one another. In MANET, routes between two hosts may include hops across other sites in the network. Because host movement generates frequent and unpredictable topological changes, establishing and maintaining routes in MANET is a difficult task. Recently, a variety of MANET protocols for efficient routing have been suggested. When hosts relocate, they use different approaches to finding a new route and/or changing an existing one. It is believed that each node in MANET is cognizant of all other nodes. Of again, in order for this to operate, all nodes in the network must be able to see each other and communicate with them. When a node is out of range, it simply disconnects from the rest of the ad-hoc system. By embedding routing capabilities into mobile nodes, the objective of mobile ad hoc networking is to provide resilient and efficient functioning of mobile wireless networks [5].

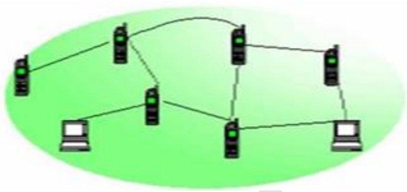

Figure 2 : Mobile Ad hoc network.[5]

The purpose of mobile ad hoc communication is to expand manoeuvrability into the world of autonomous, mobile, wireless domains, where a group of nodes, which may be a combination of routers and hosts, constitute an ad hoc network routing architecture.

Where routes are mainly multi-hop and networked hosts interact using packet radios, mobile ad-hoc networks are used in tasks such as contingency planning and remote collaborative computing. Routing is one of the most difficult problems in a mobile ad hoc network. MANETs are anticipated to be employed in a variety of practical business applications, such as wlans, home area connectivity, and military contexts. Recent advancements in wireless technology have improved the practicality and usefulness of wireless mobile Ad hoc networks [6,7].

Mobile ad hoc networks are more difficult to develop and maintain. In ad hoc networks, there are a number of challenges that have yet to be overcome. When it comes to evolution, ad hoc networks are still in their early stages. Because ad hoc networks rely on radio connectivity, designing protocols for varied tasks is more difficult. Over the last several years, there has been a lot of research on the performance of these networks in order to build more efficient and reliable routing algorithms. Many academics have developed many protocols to satisfy the needs of Ad hoc Networks so far. So far, investigations on MANET related to process performance analysis have shown varied findings, depending on network variables such as traffic type, parameters, and network size, as well as the simulators used.

1.2 Evolution of MANET

Ad hoc networks are not a new concept. Its origins may be traced back to the 1970s, when the Pentagon funded research into Packet Radio Networks (PRNET) for military purposes. The life cycle of ad-hoc communications may be divided into three categories: first-generation, second-generation, and third-generation ad-hoc networks systems. The new breed of ad-hoc networks systems is referred to as the third generation [8,9].

The first generation was born in the year 1972. They were known as PRNET at the time (Packet Radio Networks). Options for medial data access and a type of distance-vector forwarding PRNET were utilized on a limited basis in combination with ALOHA and CSMA (Carrier Sense Medium Access) to give varied network connection in a combat situation.

The new group of ad-hoc networks appeared in the 1980s, when the SURAN (Nigh invulnerable Adaptive Radio Nets) program improved and deployed ad-hoc network technologies. In a setting with no equipment, this delivered a tcp is a connection network to the mobile battlefield. This effort was successful in enhancing the capacity of radios by creating them smaller, less, and more resistant to electronic assaults.

With the introduction of gaming laptops and other practical networking devices in the 1990s, the notion of economic ad-hoc networks was born. Several research conferences suggested the notion of a collection of mobile nodes at the same time. The name "ad-hoc networks" had been accepted by the IEEE 802.11 commission, and the research in this field had begun to investigate the feasibility of implementing ad-hoc networks in additional fields of industry.

Ad-hoc mode is a means for wireless devices to connect with one another in a lively manner without a need for infrastructures. Self-organizing networks are what they are. All nodes operate as participants as well as forming an ad - hoc network. Peer-to-peer networking is the same as ad hoc connectivity. This means that no access point is required to communicate to any other base station. In an ospf network, any node can connect directly with any other node in the same network in a peer-to-peer way. Ad hoc network nodes are frequently mobile, implying that they use transceiver to retain connectivity; in this instance, the nets are referred to as mobile ad hoc networks (MANET).

A node sends a signal to form a MANET. After sending a message and recognizing the IBSS metrics, another ad hoc mobile node can simply be added. All facilities that join the wireless networks must send a signal every so often if they do not receive a beacon from this other stop within a very small wire ignition delay after the signal is intended to be sent. By efficiently lowering the number of stations that will emit a warning, the randomization delay decreases the emission of transmitters from numerous stations. If a facility does not receive a signal within the randomised delay time, it thinks that another station are transmitting and that a signal is required.

Each outpost changes its local circadian clock with the data obtained in the beacon frame after receiving a signal, providing the timestamp value is larger than the local clock. This guarantees that all stations may execute actions at the same time, such as beacon deployments and power saving duties.

2 OBJECTIVES

The objective of this thesis work is:

i.To develop traffic situations, the RTMM, RPGM, GMMM, and MHM Mobility Models are used.

ii. Flat cross layer different benchmark - ZRP for zone sizes 2 and 3.

iii. The above-mentioned protocols' progress will be monitored in four distinct simulations with variable number of nodes: 20, 30, 40, 50, and 60 nodes.

Iv. Acquire a basic grasp of ad-hoc networks.

v. Create a simulation environment that may be utilized for more research.

vi. Make protocol recommendations for various network circumstances

3 LITERATURE REVIEW

Mehran Abolhasan et al [8], analysed the platform and reactive character of these networks and necessitated the implementation of innovative networking methods in order to enable effective end-to-end communication. The classic TCP/IP framework was used by MANET to facilitate end-to-end communication between nodes. Routing is an exciting study subject in MANET. As a result, a variety of MANET routing protocols have been developed. As a result, determining which protocols would perform best in a variety of network conditions, such as growing node density and traffic, proved challenging. This study provided an overview of several different network topologies that have been presented in the literature. It also compared the results of all routing methods and indicated which one could perform better in big networks [10]. A variety of conclusions have be drawn for each group of protocols by examining performance metrics and attributes. Flat addressing have be straightforward to implement in global routing, but it may not scale well for big networks.

Wireless ad hoc networks were initially used in the 1990s, by Lu Han,[11] mobile ad hoc networks were been intensively investigated for many years. Mobile It was observed that Ad-hoc Networks were made up of two or more devices that are capable of wireless communications.. Also it was observed that there is no gateway in Wireless Ad-hoc Networks; instead, any node can operate as a gateway. Albeit much study has been done in this sector, it has been debated if the design of Mobile Ad-hoc Networks is fundamentally defective, according to this report. The major point of contention was that Mobile Ad-hoc Networks were seldom employed in practice; instead of partnering forwards transmissions hop-by-hop, practically all wireless network nodes interface with base stations and access points. The essential technologies for Wireless Ad-hoc Networks were not deployed as expected, according to the contents of this article.

4 PROBLEM STATEMENT

A lot of work has been done on the ZRP when it comes to evaluating the performance. The paper that we enhanced and took as a standard was by Avni Khatar and Yudhvir Singh where the authors evaluated the effectiveness of the hybrid routing protocols ZRP and CBRP based on Packet Delivery Ratio, End to End latency, and Average Throughput, simulation-based tests are carried out. These outcomes are contrasted with the routing methods AODV, DSR, and FSR using various numbers of nodes. The comparison demonstrates that the hybrid routing system outperforms both AODV and DSR in ad hoc networks. But in this work, it was noted that the network is exemplified by the cellular network infrastructure. The efficacy, resilience, and efficiency of the model are influenced by several outside influences. These factors include Mobility, Density, and Frequency of Data Flows, as well as the Degree of Base Station Linkage. Based on network size and location-based services, three different types of routing algorithms are categorized: flat gateways, multilayer routing overhead, and destination protocol. In accordance with several transportation models, including the Random Trip Vehicular Network, Random Point Group model, Hudson, and Gauss-Markov mobility model, the research model displays the findings of hybrid routing protocols, such as ZRP, for changing zone sizes. CBR is thought to increase traffic. Ns2 simulations serve as the foundation for tests based on zone size.

5 METHODOLOGY

. To test the performance of routing protocols, network simulated data such as NS2, NS3, Glomosim, Opnet, Omnet++, and Qualnet is available. Each one has its own set of benefits and drawbacks. For my research, I'm going to employ NS2 [12,13], which is a good fit for me. A simulation consists of the following steps in general: Here, NS2 is used for simulation experiments since it is preferred by the networking research community. NS2 is an object oriented simulator, written in C++ and OTcl (Object oriented Tool command language) as the frontend. If the components have to be developed then both Tcl (Tool command language – scripting language) and C++ have to be used. In this section, we have described about the performance metrics and implementation details ZRP

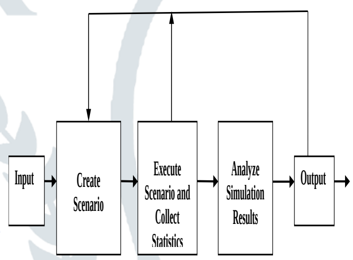

Figure 3 Scenario-based Simulation Phases

Figure 3 can be explained as follows:

ZRP employs proactive routing inside a single cluster and reactive routing across distinct clusters, as was already mentioned. Although proactive routing has a short end-to-end delay, it also has a low bandwidth consumption and dependability. Additionally, proactive routing has a high end-to-end latency but also high bandwidth utilization and dependability. Therefore, sending an irrelevant communication has the potential to result in the loss of a vital message and the waste of time.

In this analysis we have chosen the simulation of 5 nodes in 500x500 square meter area, in other words we have chosen two dimensional area (2D) rectangle. The position of each mobile node is represented in 2D grid, the X-axis value is chosen from the range of (0,500) and Yaxis value is chosen from the range of (0,500).

The mobile node then moves to the destination at given speed. Once the destination is reached, the mobile node stops for a given pause time. The mobile node then chooses another random destination for mobile node"s next movement. The complete simulation parameter are

1. Numbers of nodes – 5(0-4) This is constant during the simulation. We used 5 nodes for simulations.

2. Total simulation time – 270 sec. The time for which simulations will be run i.e. time between the starting of simulation and when the simulation ends.

3. Transferred packet size – 512 bytes. Packet Delivery Ratio in this simulation is defined as the ratio between the

number of packets sent by constant bit sources (CBR) and numbers of packets received by CBR sink at destination.

4. Routing protocol –ZRP

5. Network size – 500*500(square meter) It determines the number of nodes and size of area that nodes are moving within. Network size basically determines the connectivity. 6. Pause time – 0.01 sec. Nodes will stop a "pause time" amount before moving to another destination point. 7. Traffic type – Constant Bit Rate. In the simulation work we, apply same parameters for each MANET protocol (ZRP).

i.. The first phase entails developing and testing a computational model based on the network specifications and key metrics.

ii.The next stage is to run the scenario, display it, and evaluate it, as well as collect simulation findings. Scenario visuals, runtime metrics, final statics, and output traces are examples of results obtained.

iii.The mathematical model must be analyzed in the final step. Users may need to make changes to the circumstances as a result of the simulations findings.

5.1 *Software Platform*

5.1.1 *Network Simulator 2*

Amongst the most widely used open-source broadband applications is NS2. The first version of NS was a discrete event simulator designed for network simulation. We'll offer a quick overview of the NS2 system in this part.

5.1.2 *Overview*

The revision of NS is NS2 (Network Simulator). NS is based on the REAL simulation tool. The initial version of NS was released in 1989, and it has progressed significantly over the years. DARPA has provided funding for the current NS project. The current second edition, NS2, is extensively utilized in academic research and includes many products supplied by many non-benefit organizations.

5.1.3 *Main features*

To begin with, NS2 is an image, trivial matter driven packet tracer that was created at the University of California-Berkeley [14]. C++ and OTcl are the languages used (Tcl script language with Object-oriented extensions developed at MIT). There is a purpose for the use of these two programming languages. The intrinsic properties of these two languages are the primary explanation. C++ is an efficient way to implement a design, but it is difficult to see and convey aesthetically. Without a very clear and easy-to-use descriptive language, it's difficult to alter and assemble separate components and adjust different settings. Furthermore, NS2 isolates control path solutions from data path counterparts for ecological reasons. To minimize packet and event time consumption, the event dispatcher and fundamental network component objects in the data route are developed and built in C++. OTcl has a functionality that C++ does not have. As a result, the combination of these two languages is quite effective. The full protocol is implemented in C++, while users manage the simulation scenario and schedule events using OTcl. . Figure 4 depicts a simplified user's view of NS2. The OTcl script starts the information for planning, configures the network structure, and tells the traffic source when to transmit messages through the event optimizer. The sceneries may be simply altered by modifying the OTcl script. When a user wishes to create a new network object, he has two options: construct the object from scratch or compose a compound object from an existing object library and plumb the data flow via it. NS2 is extremely powerful because of this plumbing.

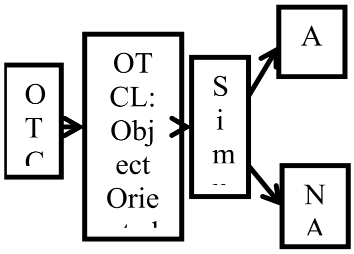

Figure 4 Simplified User's View o f NS2

The event calendar is another aspect of NS2. The event scheduling algorithm in NS2 maintains track of simulation time and invokes the relevant network parts to release all of the notifications in the event queue. The event dispatcher is used by all system components to issue an event for a passenger and then wait for the event to be withdrawn before taking further action on the packet.

Because of its open-source nature and abundance of module libraries, NS2 is the most popular in academics. Many non-profit organizations add considerably to the device's library, and the NS2 iterative development has proven to be quite effective. NS-2 is a free program that may be purchased from the company's website. It runs on both Unix/Linux and Windows systems. To run on Windows, you'll need to install Cygwin and configure the computer's environment to Unix. NS-2 (version 2.33) is installed on a Workstation 6.x linux environment in this project. The Linux platform was chosen because it is more compatible with NS-2 than the Software side. NS-2 may be downloaded in two ways: an all download or as a piecemeal transfer. We used an all-in-one package for this project.

5.1.4 *Installation of NS-2*

The following procedures must be followed to install NS-2 (version-2.33) on a Linux platform:

i. Place the uploaded package, which is a zip folder in the /root/Desktop subdirectory, in the /root/Desktop catalog (one can choose directory according to their choice).

ii. Place this folder in the same directory as the previous one, i.e. /root/Desktop.

iii) At the computer, type cd /root/Desktop/ns-allinone-2.33 to enter the /root/Desktop/ns-allinone-2.33 directory, and then type. /Install.

iv. The installation process will now begin. At this time, kindly wait because that will take some time. It might take up to half an hour, and the time will vary depending on the system settings.

v. If step-4 is successful, the path list will be displayed on your display device, prompting you to set the path.

To set entries, go to the /etc/bashrc directory, where bashrc is the file that will include all of these paths.

vii. Paste the path list below into the /etc./basher directory export.

PATH=$PATH:/root/Desktop/ns-allinone-2.33/bin:/root/Desktop/ns-allinone-

Export LD LIBRARY PATH=$LD LIBRARY PATH:/root/Desktop/ns-allinone-2.33/otcl-1.13 export LD LIBRARY PATH=$LD LIBRARY PATH:/root/Desktop/ns-allinone-2.33/otcl-1.13 export LD LIBRARY PATH=$LD LIBRARY PATH:/root/Des

viii. For future reference, save this path list to the /etc/bashrc directory. The method for establishing a route has now been completed.

ix. Now, in the terminal, type cd ns-2.33 (assuming you're already in the /root/Desktop/ns-allinone-2.33 directory). This will be moved to the ns-2.33 file for you.

x. Now, at the terminal, type. Validate. It will begin the methodology. Please bear with us at this time, as it will take some time. It might take up to an hour, and the time will vary depending on the machine settings.

xi) Everything will be in order; the next message will be displayed:

Validate the entire report: All of the tests were completed successfully. It brings the installation process to a close.

5.2 *Snapshots of Simulation Scenarios*

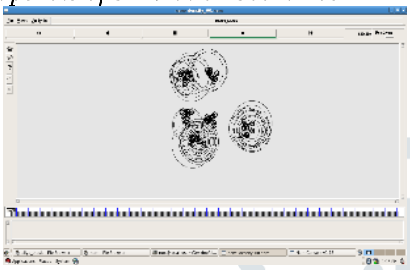

Figure 5 Snapshot for Zone radius 2 in RPGM Model.

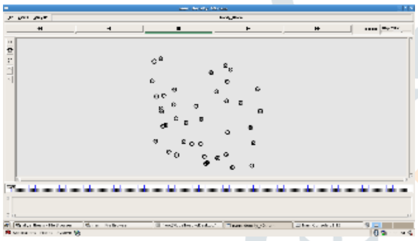

Figure 6 Snapshot for Zone radius 2 in RTMM Model.

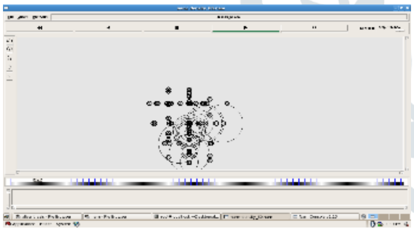

Figure 7 Snapshot for Zone radius 2 in MHM Model

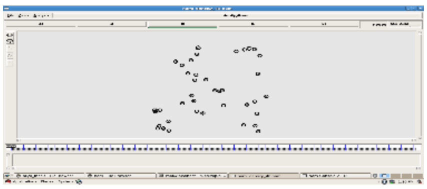

Figure 8 Snapshot of LSR in FWM Model Result

5.3 *Pseudocode of the Algorithm*

```
BEGIN
 if (node i can communicate with the sink node directly) then
  nexthop = sink;
 else
  if (the neighbor node set ∑ is not empty) then
   nexthop = Ψ_1 ;// Ψ_1 means the first node in set ∑
  else
   nexthop = i;
  endif
  for (z = 1; z < Z; z++) do
   if ( MED_Ψz is valid and ( it is less than MED_nexthop or equal to
MED_nexthop and min( T^E_{i,Ψz} , T^E_Ψz ) > min( T^E_{i,nexthop}, T^E_nexthop ) )) than
    nexthop = Ψ_z ;
   endif
  endfor
  if ( T_i^S is valid and not more than MDE_nexthop + t_hop) then
   nexthop = i;
  endif
 endif
END
```

6 SIMULATION AND RESULTS

The major goal of this simulator research was to assess the quality of common Hybrid network topologies, such as ZRP, to zone radius 2 and 3, one from each category, with various scalability with four distinct mobility models. The simulations were carried out with NS2 version 2.33.

Table 1The simulation parameters

S.no.	Parameters	Value
1	Mobility Models	Random Trip, Random point Group Mobility, Manhattan, and Gauss-Markov
2	Radio Propagation Model	Two Ray Ground Model
3	MANET Routing Protocols	ZRP
4	Nominal Traffic Type	FTP
5	No. of Nodes	20, 30, 40, 50, 60
6	Simulation Time	200 seconds
7	Data Rate	2 Mbs
8	Terrain Area	1700x1700 m^2
9	Packet Size	512 bytes
10	MAC type	802.11
11	Zone Radius	2, 3
13	Antenna	Omni-Antenna

6.1 *Network Scenarios*

1 We have evaluated the following 2 instances in the ad hoc network:

2 Concentration of network with Variable Trip Mobile Adhoc networks • Density of network with Variational Point Group Transportation

3 Metropolitan Mobility's network concentration

4 Gauss-Markov internet backbone density

Unless the stated, the modelling settings in each event are same as Table .1.

6.1.1 *Network density with*

We employed the random Tript mobility model (RTMM), unpredictable point group mobility (RPGM), Manhattan mobility (MHM), and Gauss Markov velocity (GMM) in MANET models since they are commonly used. Nodes move at a fairly spaced pace in [MIN SPEED, MAX SPEED] in RTMM. We investigated different offered loads for data transfer in our calculation, and the node density studied was 20, 30, 40, 50, and 60 nodes. Each node starts the test by traveling towards a direction that is picked at random. When a node selects a destination, it pauses for a period of time. Our pause time has been set to zero. It then selects a new target and goes in the same direction. This technique is continued until the simulation timer runs out.

6.1.2 Performance Evaluation

There are several factors that may be used to assess routing performance of the proposed. The following performance metrics are considered:

6.1.3 Throughput

The quantity of data transported over a long period given in Megabits per second is one approximation of speed (Kbps). The other is the packet delivery proportion, which is calculated as a ratio of the number of data packets delivered and receive. The term "throughput" refers to the number of bits supplied to a destination every second, hence unicast network throughput is the total number of bits given to all locations over time.. It is one of the network's dimensions parameters that indicates how much of the channel capacity is utilised for useful communication. picks a recipient at the beginning of the test and reports into whether data packets were transferred appropriately to the locations. In any network, a higher throughput is more often an absolute choice. Throughput is calculated as (number of transported packets * packet size)/total test time.

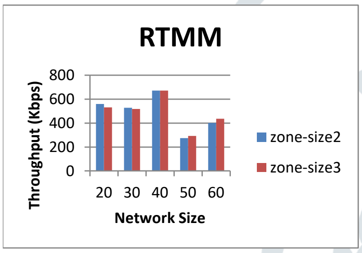

Figure 9 : Throughput with respect to network size in RTMM Mobility Model

In comparison to zone radius 2, zone radius 3 has the high bandwidth, as seen in Figure 4.1. Table .1 shows that when the network size is the smallest, which is 20 nodes, the number of packets received per unit simulation time is the highest, implying that throughput is the highest in this scenario. However, as network size grows, zone radius throughput decreases for smaller zones.

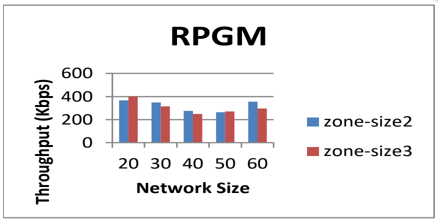

Figure 10 Throughput with respect to network size in RPGM Mobility Model

In the Group Estimation method, the chart shows the influence of member nodes on capacity. When the network density is increased, a smaller zone radius, i.e. zone size 2, provides better throughput.

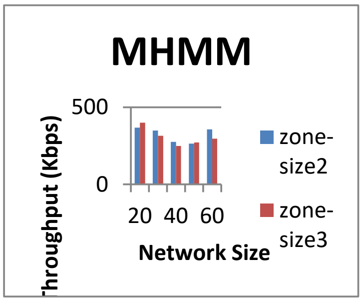

Figure 11 Throughput with respect to network size in MHM Mobility Model.

In the Manhattan proposed methodology, the effect of member nodes on throughput is depicted graphically. When the link density is increased, zone radius 2 performs well in terms of packet delivery ratio.

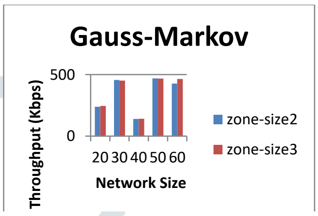

Figure 12 Throughput with respect to network size in GMMM Mobility Model

In a Gauss-Markov design, the influence of node density on throughput is depicted graphically. When the network density is increased, a larger Zone radius provides higher speed.

6.1.4 Packet Delivery Ratio

The entire number of data legitimate nodes at all nodes is divided by the total number of data packets sent out by the FTP sources to compute the packet delivery ratio. Because, in similar instances, the size of the data packets satisfactorily delivered at the destination depends primarily on path abundance, which in highly dependent on how effective the innate routing algorithm is in a mobile case [2, the average packet ratio is a good metric for measuring performance of an ad hoc rpl. This figure shows a protocol's efficacy and throughput in delivering data to the network's intended recipients. The ratio of the number of successfully delivered legitimate packets to the number of actual parcels generated.

PDR = Total no. of Packets Received/Total no. of Packet sent

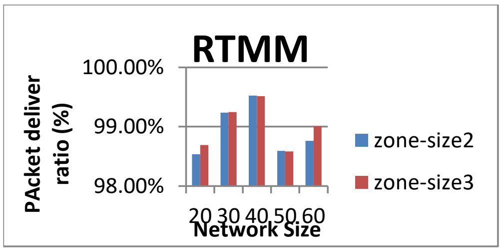

Figure 13 PDR with respect to network size in RTMM Mobility Model

In the Random Wave Point Mobile ad hoc network, the chart displays the influence of mobile on PDR. In this mobility paradigm, a larger zone size is better in terms of PDR.

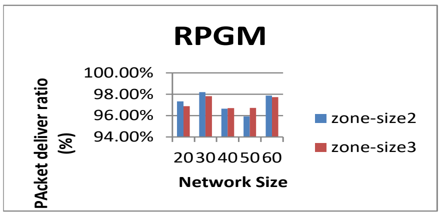

Figure 14 : PDR with respect to network size in RPGM Mobility Model

In the RPGM prototype, the influence of manoeuvrability on PDR is depicted graphically. In this proposed methodology, a larger considered zone radius is undesirable in terms of PDR for a smaller network size. For big networks, zone radius 3 is preferable over zone radius 2.

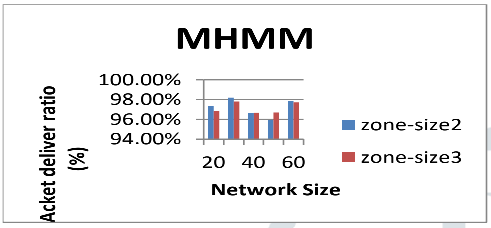

Figure 15 PDR with respect to network size in MHMM Mobility Model.

In the MHM model, the influence of movement on PDR is depicted graphically. In this mobile ad hoc network, zone radius 3 has a low PDR. PDR is higher in zone radius 2 than in zone radius 3.

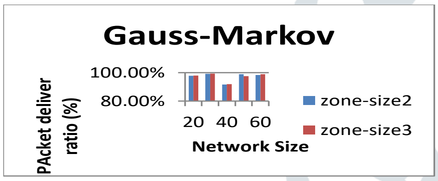

Figure 16 PDR with respect to network sizein RPGM Mobility Model

Table 5.4 and Figure 5.4 show that the throughput is maximum when the mobility rate and zone radius are both the smallest. on the PDR in the RPGM model The PDR is largest when the zone radius is smallest, according to the data in Table 4.8.

6.1.5 Average End to End Delay

The average end-to-end latency is the time it takes for a data packet to travel from the time it leaves the which to to the time it arrives at the intermediate nodes. Because the latency is mostly determined by the global optimization of the perfectly illustrated, the delay encountered at the link queues, and the noise generated by data transfer at the physical layer caused by collisions, this parameter is a reflection of how successful the underlying routing method is. Routing overhead has a significant impact on interface queue delays and number of packets. Because the forwarding expense is larger, the latency at the queues will be longer, and the number of collisions will be higher. This encompasses any delays induced by buffering during packet forwarding latency, link queue queuing, MAC resend delays, and propagation and transfer durations.

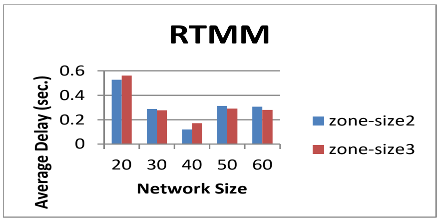

Figure 17 Average Delay with respect to network size in RWPM Mobility Model.

The graph depicts the effect of network size on average end-to-end latency for two distinct zone sizes for the ZRP routing protocol under the Random Trip Proposed methodology. As channel density increases, the zone radius 2 suffers the most in considerations of end-to-end delay. In the RWPM Model, the delay increases greater in Zone Radius 2 and has the highest end-to-end latency.

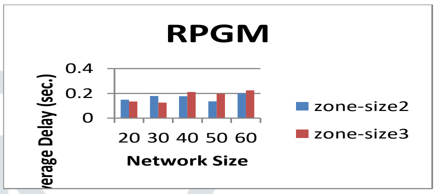

Figure 18 Average Delay with respect to network sizein RPGM Mobility Model.

Under the Stochastic Point Group Mobile ad hoc network, the function of number of nodes on the end to end delay on ZRP for varying zone radius is shown in the graph. When we increase the network density, it has little influence on lower zone radius in terms of End-to-End Delay in this limit.

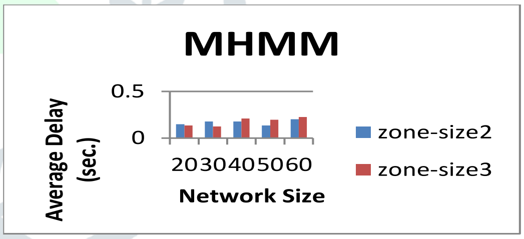

Figure 19 Average Delay with respect to network size in MHM Mobility Model.

The graph depicts the impact of network size on average end-to-end latency on ZRP for various zone radiuses.

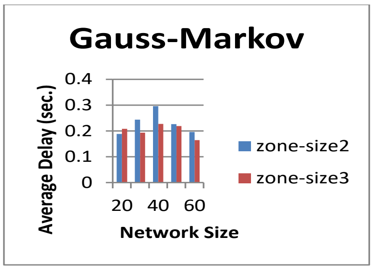

Figure 20 Average Delay with respect to network size in GMMM Mobility Model.

Under the GMMM model, the effect of network size on average end-to-end latency ZRP for varying zone radius is shown in the graph. Within this limit, increasing the network density has little influence on zone radius 3 in terms of End-to-End Delay.

7 CONCLUSION

The effect of network density is investigated in this report to optimize the results of two different zone sizes for hybrid routing protocols, namely ZRP under FTP traffic in Unusual tript Transport and Random Point Group, Manhattan and Gauss-MArkov Mobility Models, under varying network density. When comparing different zone radius in the Group Mobility Model scenario, we found that smaller zones have better throughput, PDR ratio, and average end-to-end latency than larger zones. Similarly, for the cases studied under Manhattan mobility, zone radius 2 produces superior outcomes. In the Rolling Trip mobility model and Gauss-Markov mobility model scenarios, however, a larger zoned radius is beneficial. The mobility is altered when the network density zone radius is increased. In the future, we intend to find methods to perform service discovery and efficient usage of those services which are present in different networks with scalability

REFERENCES

A. K. Pandey, H. Fujinoki, “Study of MANET routing protocols by GloMoSim simulator” Intl of network management NT, Wiley InterScience 15: 393–410, Intl. Journal Network Management 2005.

2. A. Shrestha, F. Tekiner, “Investigation of MANET routing protocols for mobility and scalability” International Conference on Parallel and Distributed Computing, Applications and Technologies, Higashi Hiroshima, 2009.

3. Amr M. Hassan, Mohamed I. Youssef and Mohamed M. Zahra, “Evaluation of Ad Hoc Routing Protocols in Real Simulation Environments” The 2006 International Conference on Computer Engineering and Systems, 2006, pp. 288 – 293.

4. Anuj K. Gupta, Harsh Sadawarti, Anil K. Verma “Performance analysis of AODV, DSR & TORA Routing Protocols” IACSIT International Journal of Engineering and Technology, ISSN: 1793-8236, Vol.2, No.2,2010, pp. 226-232.

5. Bhavyesh Divecha, Ajith Abraham, Crina Grosan,and Sugata Sanyal, “Impact of Node Mobility on MANET Routing Protocols Models”, Journal of Digital Information Management, Volume 5, Number 1, February 2007.

6. Brent Ishibashi, Raouf Boutaba, “Topology and mobility considerations in mobile ad hoc networks”, Canada N2L 3G1Received 1 September 2003, accepted 1 March 2004 Available online 28 April 2004.

7. Byung-jae Kwar, Regular Member, Nah-Oak Song, and Leonard E. Miller, Non member, “A Standard Measure of Mobility for Evaluating Mobile Ad hoc network Performance”, IECE Trans. Commun., VOL. (E86-B), NO., 11 November 2003, pp 3236-3243.

8. Improver, C.K.Toh, “A review of current routing protocols for ad hoc networks”, IEEE Communications, vol 6, 1999, pp. 46-55.

9. Ekta Barkhodia, “Simulation based Performance and Comparative Study of Different Reactive and Proactive Routing Protocols in MANET”, IJECT ,Vol. 3, Issue 1,2012, pp. 158-161.

10. Farhat Anwar, Md. Saiful Azad, Md. Arafatur Rahman and Mohammad Moshee Uddin, “Performance Analysis of Ad hoc Routing Protocols in Mobile WiMAX Environment” Trends in Communication Technologies and Engineering Science, (ISDN: 978-1-4020-9532-0-5), Volume 33, pp. 53-65(2008).

11. G.Santhosh Kumar, M.V. Vinu Paul and K. Poulose Jacob, “Impact of Node Mobility on Routing Protocols for Wireless Sensor Networks”, International Conference on Sensors and Related Networks (SENNET’07), Dec. 12-14, 2007, pp, 480-485.

12. Geetha Jayakumar and G. Gopinath, “Performance Comparison of Two On-demand Routing Protocols for Ad-hoc Networks based on Random Way Point Mobility Model”, American Journal of Applied Sciences 5 (6): 2008, pp. 659-664