Zone Based Analysis of Hybrid Routing Protocol (ZRP) Under Varying Mobility Rate in Vehicular Ad Hoc Network

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Abstract - In vehicular ad hoc network, mobility is a major problem. There are many problems in routing with vehicular ad hoc network like asymmetric links, routing overhead, dynamic topology and interference. The present chapter focused on ZRP hybrid routing protocol to designing scenario for parameter that gives its best and how much effective in VANET. For the simulation of routing protocol is Qualnet 6.1 simulator has been used to analysis the performance of ZRP for different zone radius by varying mobility rate with CBR traffic on Qos based performance metrics.

Keywords: Vanets, ZRP, Throughput, End To End Delay, Packet Delivery Ratio, Routing Overhead.

I. Introduction

Vehicular networking is an emerging technology that allows vehicles to access information and services electronically, regardless of their geographic position. vehicular networks can be classified into two types: one is infrastructure less (Ad Hoc) network which is used to form a wireless ad hoc network among users wanting to communicate with each other with no pre-established infrastructure and other is infrastructure networks, in this type of network a vehicle host communicates with the network through an access point within its communication radius. A vehicular ad hoc network uses no centralized administration. Every node acts both as a host and as a router. The topology of vehicular ad hoc networks varies with time as nodes move, join or leave the network

II. Zone Routing Protocol (ZRP)

From the literature survey it had been found that lot of work has been done on ZRP, however no analysis work advised us how well ZRP can adapt in manet with regard to nodes mobility, zone size and data transmission vary. After the review study, the result had been shown that there square measure many issues in routing with Mobile ad hoc Networks like randomly connections and interference. In individual connections most of the wired networks rely on the symmetrical links that are regularly preset. On the other hand this preserve exist not a casing by means of ad-hoc networks because the nodes are mobile and constantly dynamical their position among network. However major problem is interference within which mobile ad-hoc networks as links come back and go depending on the transmission characteristics, one transmission would possibly interfere with another one and node would possibly overhear transmissions of alternative nodes and might corrupt the whole transmission. One node transmission would possibly interfere with another one and node would possibly overhear transmissions of alternative nodes and might corrupt the whole transmission. thus objective is to investigate the impact of network density on ZRP below variable mobility rate and transmission point MANETs.

III. Simulation Setup

The performance matrices include the following Qos parameters such as throughput, end to end delay, packet delivery ratio and routing overhead.

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Table 1 Simulation Parameter

Parameter	Value
Simulation time	300s
Number of nodes	100
Mobility model	Random way point
Data rate	2 Mbps
Radio type	Accumulated noise model
Mobility rate	30s, 40s, 50s, 60s, 70s
Routing protocol	ZRP
Zone radius	2, 4, 6

Performance Matrices and simulation results

3.1 Throughput-

It is the ratio of total established packet to the entire period of imitation moment.

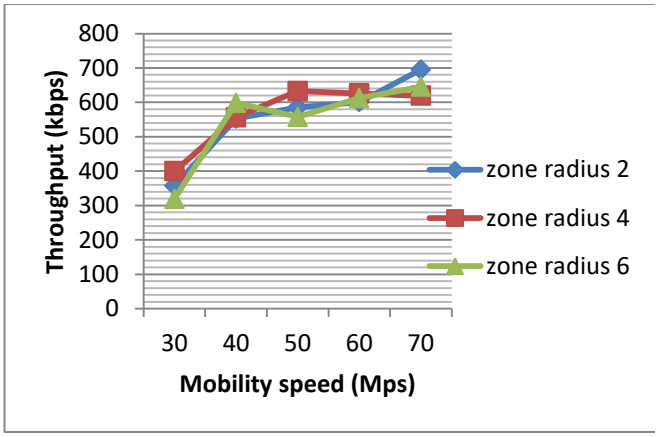

Figure 1 Impact of mobility speed on Throughput for different Zone Radius

Form figure 1 it is observed that ZRP for zone radius 4 gives better throughput than other zone radius i.e. 2 and 6 considered over higher mobility rates.

3.2 Packet delivery ratio - It is the fraction of the packet sent to the destination to those generated by the CBR sources. This metric characterizes both the completeness and correctness of the routing protocols.

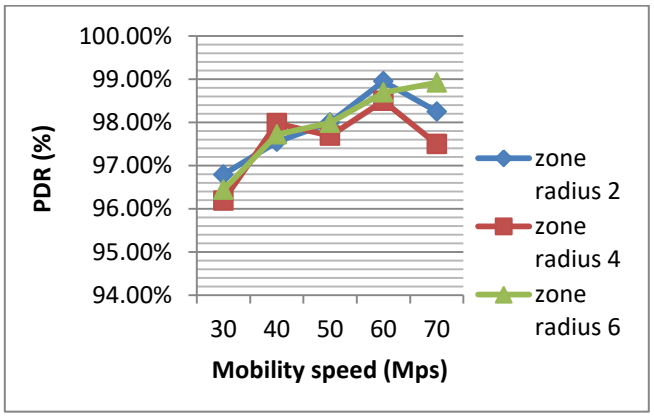

Figure 2 Impact of mobility speed on the packet delivery ratio for different Zone Radius

The zone routing protocol gives better results when zone radius i.e. 2, 6 than the mobility rate of 4.

3.3 End to end delay

It is the average time taken by a packet to send from source node to objective node. In other words, it is fraction of sum of total delay to the come to of packet established by objective.

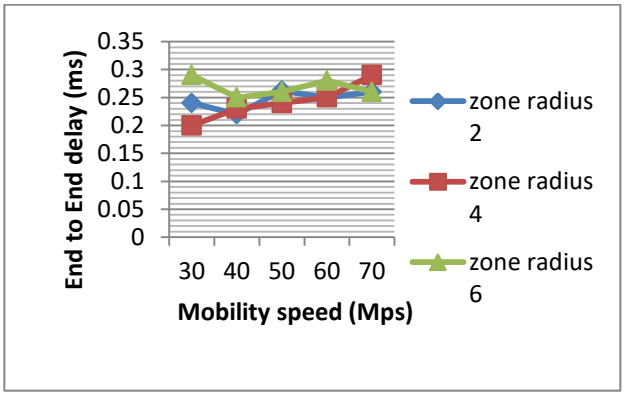

Figure 3 Impact of mobility speed on the Avg. delay for different Zone Radius

3.4 Routing overhead

Routing overhead is that the multiplicity of routing packets transmits for each packet send to the objective. Additionally every forwarded packet is counted collectively transmission. This metric is additionally extremely related with the number of route changes occurred within the simulation.

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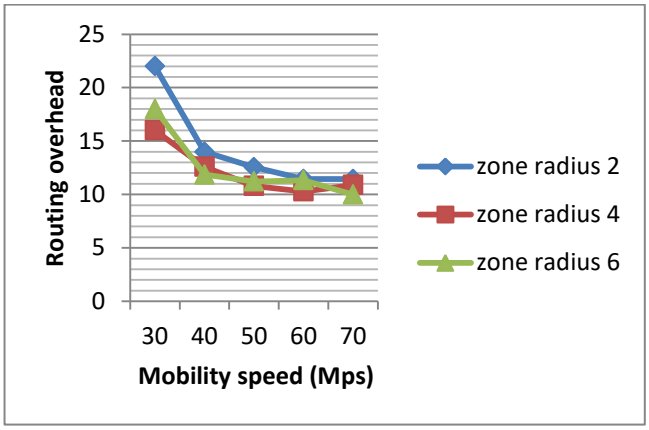

Figure 4 Impact of mobility speed on the routing overhead for different Zone Radius

In case of routing overhead, it is observed that ZRP under lower zone radius and higher mobility rate performs betters.

Table 2 Result showing the impact of varying mobility rate and default transmission range

Metrics used	**Conclusion**	
	Best performance	**Worst performance**
Throughput	Zone radius 2	Zone radius 4
Average end to end delay	Zone radius 4	Zone radius 6
Packet delivery ratio	Zone radius 4	Zone radius 6
Routing overhead	Zone radius 4	Zone radius 2

IV. Conclusion

The simulation result it has been analyzed that ZRP uses hybrid routing inside the neighborhood zone as neighborhood zone range get superior at that time delay keep on dropping objective nodes can move toward in the routing sector. The present research work concluded; for default transmission range, when mobility rate is maximum then performance parameters gives better results for zone radius2 and zone radius 6.

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