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VANET routing protocols used in city environments

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ABSTRACT
The vehicular Ad-hoc network is the research emerging area and which makes a phrase Network on the wheel. Vehicular traffic is a growing attention from academia and industry, due to importance and the amount of the related applications, ranging from traffic control for road safety up to mobile entertainment. Vehicular ad hoc network is a type of communication vehicles and is used to broadcast desired information. VANET is a self organized and it is built up to moving vehicles form source to destination. VANET are part of MANETs broader class. In VANET high speed is the real problem and characteristics which leads to interference and frequent breakdown. Then the routing protocols are helpful to improve the performance of service quality. In the present research is discuss vehicular Ad-hoc routing protocols. Routing protocols is used to improve the performance in terms of packet delivery, bytes and average jitter in VANET scenario. The research protocols i.e. AODV, DYMO and OLSR are compressed and show that real traffic scenarios of VANET. Where these all there protocols are compared using Qualnet 6.1 as a simulation tool.

Keywords:

VANET, MANET, routing protocol (AODV, DYMO and OLSR), PDR, bytes, jitter, city environment, Qualnet

1. INTRODUCTION

VANETs are a wireless ad hoc network, and the property of this network is fast changes topology and high node mobility. In the absence of road traffic safety poses a dire threat to our environment as well as also takes a toll of precious human lives and it increase energy waste and pollution [1]. In present VANET play a important role to improving the road condition for safety of human life. A special case of Mobile ad hoc network is known as Vehicular ad hoc network because of its high mobility model.

In order to improve the road safety intelligent transportation system refers to the effort of mixing communication technology and information to vehicle and transport this to systems because performance and efficiency. Vehicular ad hoc are the core of ITS [2]. In the world the current issue is vehicle accidents and traffic congestion which will be reduce with the help of VANETs application.

Further in section 2 show the previous work of VANET protocols. In section3 will show the model how to evaluate and measure the pdr, bytes and jitter. The results and the analysis of simulation are shown in section4. At last the conclusions are shown in section5

2. VANET ROUTING

2.1 VANET routing in the city environment

Previous work shows that the existing routing protocols of VANET are based on geographical protocols of mobile ad hoc network [3]. To satisfy the requirement it is important to design of routing protocol of VANET. The routing methodology is totally depends on the nature of the communication network. In 2013 HYUN YU ETAL proposed a stable routing protocol for vehicles in urban environment which is based on the real time road vehicle density information in order to provide fast and reliable message delivery so that it can adapt to the dynamic vehicular urban environment. Each vehicle establishes a reliable route for packet delivery in the city environment [4]. In present section, the paper describes the routing protocol of VANET and is applicable in the city environment having high mobility model. The real traffic measurements show that the vehicle distribution on roads follows the

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exponential distribution, and this may significantly impact the performance of routing in vehicular networks. Therefore the smarter method is used to transmit periodically beacons and it contains the direction of movement of vehicle [5].

3. PERFORMANCE EVALUATION

The protocol execution is investigated utilizing the Qualnet test system from 6.1.The simulation parameters utilized for simulating the situation of vehicular ad hoc network is demonstrated in the table 3.1.

Table3.1. Simulation parameters [6]

Parameter	Value
Simulator	QULANET 6.1
Terrain size	1500*1500
Mobility model	Random way point
MAC layer	802.11P
Routing protocol	DYMO, OLSR, AODV
No. of nodes	30
Simulation time	150sec
Packet size	512 byte
Application	CBR
Network	Ipv6
Data rate	2 Mbps
Antenna model	Omni directional
Interface type	Wireless (ad hoc)

4. RESULTS

To get the result of different metrics a framework execution of the scenario takes place and after executing the information was recorded and the value were collected according to framework. Then framework includes comparison analysis of the scenario. The simulation is performed with different CBR traffic flow and node mobility speed. With CBR 512 bytes are applied. Fig. 4.1 shows the simulation of AODV, OLSR and DYMO.

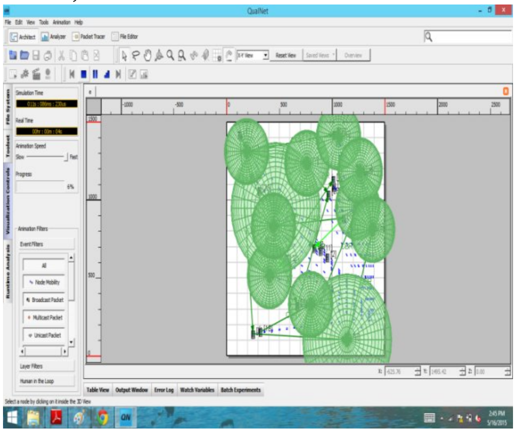

Figure 4.1. Snapshot of simulation of AODV, OLSR and DYMO

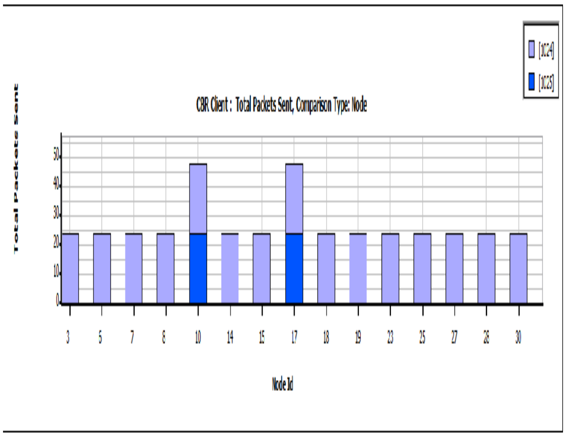

Figure 4.2. Total packet sent by AODV

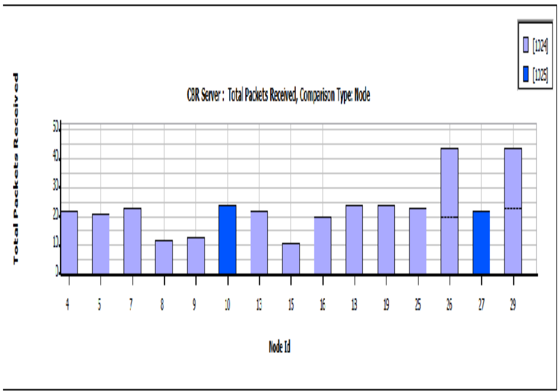

Figure 4.3: Total packet received by AODV

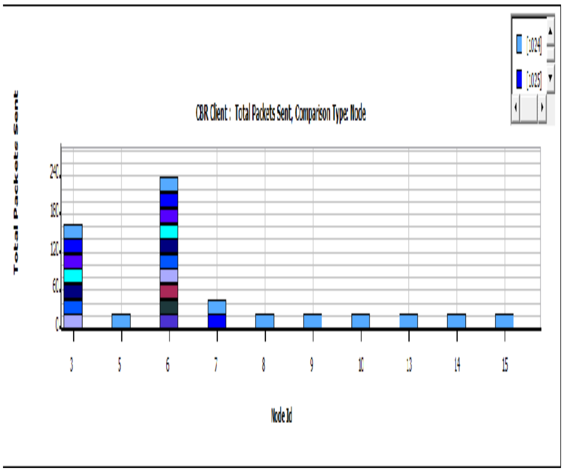

Figure 4.4. Total packet sent by DYMO

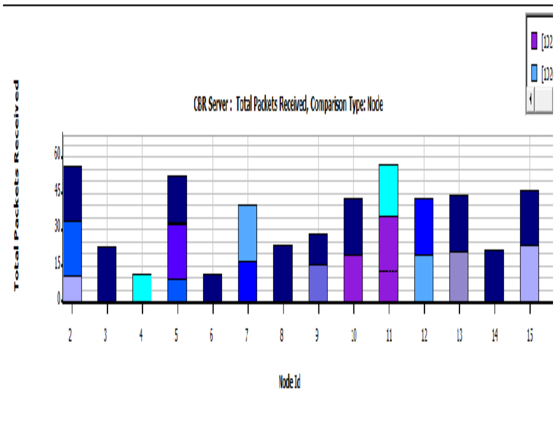

Figure 4.5. Total packet received by DYMO

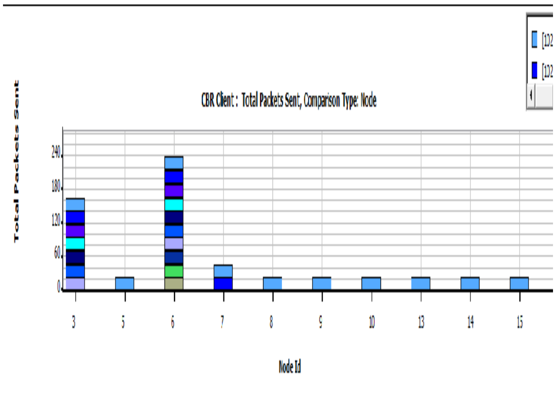

Figure 4.6. Total packet sent by OLSR

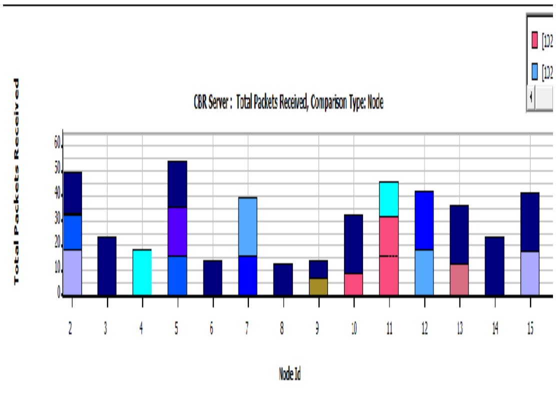

Figure 4.7. Total packet received by OLSR

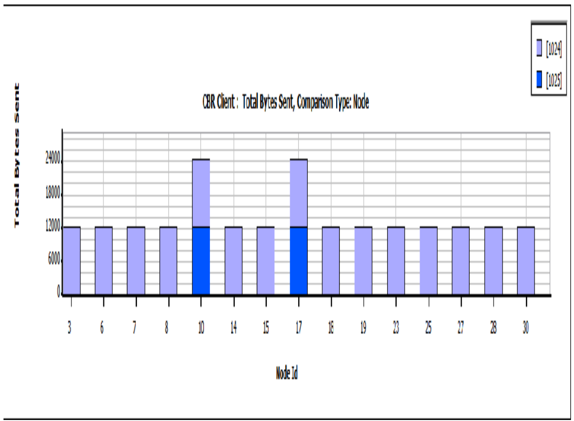

Figure 4.8. Total bytes sent by AODV

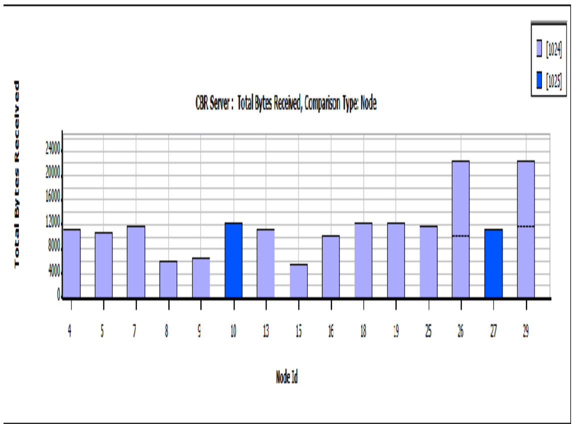

Figure 4.9. Total bytes received by AODV

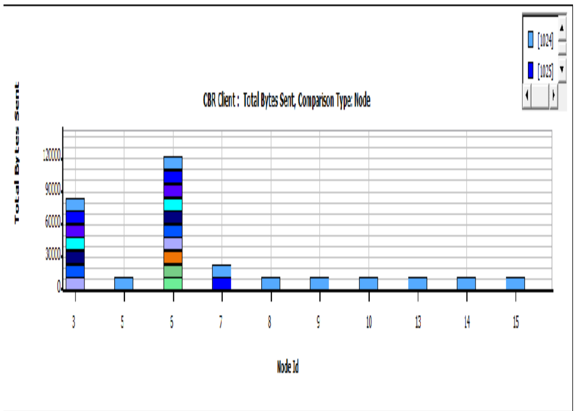

Figure 4.10. Total bytes sent by OLSR

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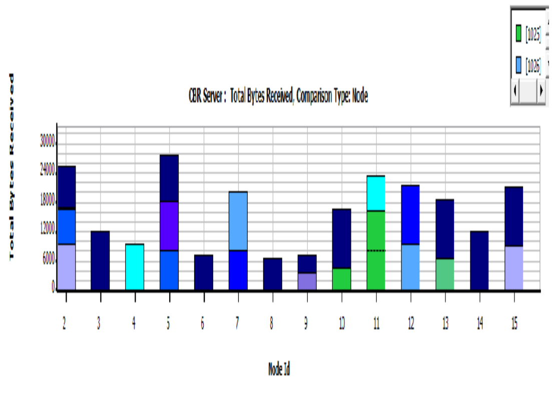

Figure 4.11. Total bytes received by OLSR

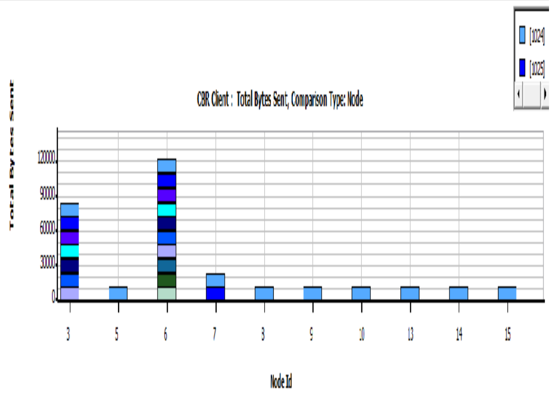

Figure 4.12. Total bytes sent by DYMO

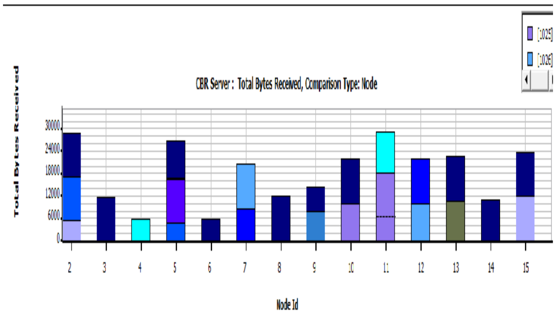

Figure 4.13.Total bytes received by DYMO

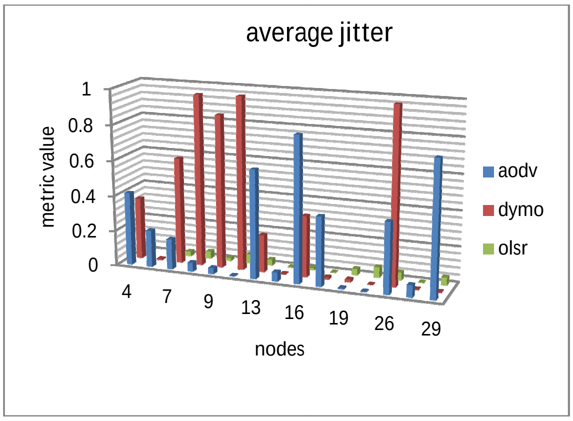

Figure 4.14. Comparison of AODV, DSR and OLSR with vehicle to roadside communication for average jitter

Following graphs show the comparison of AODV, DSR and OLSR [7] of VANET routing protocols in the city environment with high vehicle mobility model for vehicle to Road sides Communications. Also the following graph shows the comparison VANET protocol for total bytes and packets by different protocols. Fig 4.2, 4.4, and 4.6 shows the total packet sent by AODV, OLSR and DYMO. Fig. 4.3, 4.5, and 4.7 show the total packet received by these protocol. And fig 4.8, 4.10, and 4.12 show total bytes sent by the AODV, OLSR and DYMO. Fig 4.9, 4.11, and 4.13 show total bytes received by the routing protocol of VANET. By comparing these three protocols under random way point mobility model it is clear that packets and bytes sent by the CBR server is different node and the highest node is used by signal in AODV is high as compared to two other protocols. But AODV has low average jitter as compared to DYMO[8]. This is because AODV is predetermines the route and proactive in nature also when network topology changes it offers quick convergence.In the average jitter DYMO is high as compared to OLSR and AODV. Because DYMO is reactive in nature and is working is different as compare to AODV and OLSR. DYMO node are receive information from all intermediate nodes of a new path. In AODV and DYMO generates route table entries for destination node this is a major difference between these protocols. There is performance of OLSR is low because it has high altitude and shows significant results [9].

5. CONCLUSION

The routing in vehicular Ad-hoc network is the main part of communication. Several types of routing protocols are used in vehicular network. to enhance the overall performance of the vehicular network, improvement in the routing protocol is need to time.

It has been noted that VANET routing protocol should be more powerful to deal with traffic related problem. Evaluation and expect quality service of VANETs operated as per random way point and IPV6 with the routing protocol AODV, DYMO and

OLSR. AODV is higher in packet and bytes sent/receive but DYMO is higher in average jitter shows significant results. Simulation results therefore seem to encourage an adaptation of the AODV protocol for VANET use. Since routing protocol is heart of wireless networking. Hence its performance at any level counts and shows the path for future applications.

6. FUTURE WORK

The research work can be performed by varying network in terms of vehicles speed, clusters size may be affect the connectivity of VANET and the performance of vehicular ad hoc network.

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