

# Performance Analysis of Mobility Pattern for Vehicular Ad-Hoc Network Using Various Routing Protocols

Richa Mishra<sup>1\*</sup> and Sachin Choudhari<sup>2</sup>

<sup>1\*</sup>Dept. of Computers and Science ,RGPV University, India,

<sup>2</sup>Dept. of CSE, RGPV, India

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**Abstract**— The network technology which is used to form a communication network by the use of cars as mobile nodes is known as Vehicular Ad-hoc Network (VANET).In VANET, there is a very important and significant role of routing protocols. The protocol helps to find out the performance of all those packets which are received and send between the mobile nodes. In this paper, we consult the performance of routing protocols over Constant Bit Rate data type with the help of Destination-Sequenced Distance Vector routing protocol (DSDV). The main focus of this paper is to compare and examine the best routing protocol so as to secure the network in future. For validate result , DSDV performs with all other evaluated protocols.

**Keywords**— VANET;MANET;IVC;WIMAX;

## I. INTRODUCTION

There are many kind of infrastructure-less networks .In which either mobile or vehicles act like nodes. In such networks the vehicles moves across the predefined traffic lanes or road .Thus for defining a infrastructure-less network, we take an example of Vehicular Ad-hoc Network(VANET) and Mobile Ad-hoc Network(MANET).In both the networks, where there is no need of any particular infrastructure. Both the networks can be deployed anywhere ,where needed.

This is so because in both the networks the nodes are movable and have there self organized characteristics. The main purpose of VANETs and MANETs is to provide security to the network .VANET is a modern technology used now a days. This helps the driver of any vehicle to drive safely by being connected with another drivers.There are many suitable applications provided by the VANET to its driver and hence it is used widely.Ther are mainly two types of communications in VANET. They are Vehicle-to-vehicle communication and Inter-vehicle communication.

Over passed years,we have perceive that many reasearches have been made that have investigated various issues regarding V2I,V2V,and VCR areas. Inspite many projects over VANET has been officiated by several governments,academic institutions and industries too around the world.

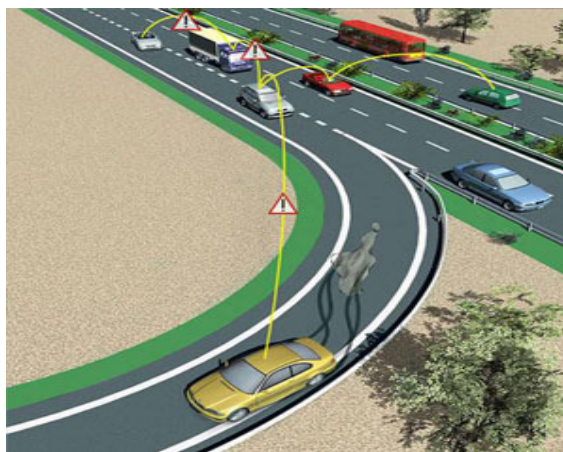


Fig.1 Vehicles in VANET

## II. PROTOCOL USED

### A. Ad-hoc On Demand Routing Protocol

AODV or Ad-hoc On Demand Routing Protocol is reactive and works on demand property. This protocol uses bi-directional links and also is a route discovery cycle which is used for finding the routes.AODV helps for maintenance of the active routes during packet receiving and delivery.Protocol uses sequence numbers which is used for loop prevention and used as routes freshness criteria.The protocol also provides the unicast and multicast communication .The routes are maintained just as long as necessary and does not maintain routes from every node to each other.

**B. Dynamic Source Routing Protocol**

Dynamic Source Routing Protocol or we can say DSR only routes the those want to communicate . Thus reduces the overhead of route maintenance. It does not keeps the record of the respective nodes. Neither it need any infrastructure in order to send the data in packets nor it uses any sort of announcements which further low downs the routing overhead of any wireless network.

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**III. SIMULATION PARAMETER**

Simulation parameter belongs to the measurement in VANET. For example how many nodes have taken, there range, area of communication etc.

Parameters	Quantity
No. of vehicles	50
Transmission range	10KM
Channel	Wireless
Antenna	Omni directional
Area	500*500
Propagation model	Two ray ground
Speed (kmph)	10,20,30,40,50,60
Packet size	1000Byte
Routing protocol	DSDV
Traffic Type	UDP/CBR
MAC	802.16e

In the above table we have discussed about the parameters used for communication in the networking.

Potocol	Aodv
Throughput	3.28Mbps
PDR	95.75%
PLR	4.24%
Delay	2.33Ms

Table 2 .Simulation results for AODV shows the protocols, throughput results, packet delivery rate, packet loss rate and delay for simulation.

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Potocol	Dsdv
Throughput	19.86Mbps
PDR	27.65%
PLR	72.34%
Delay	8.66Ms

Table 3.Simulation result for DSDV is shown with the help of its throughput, packet delivery rate , packet loss rate and delay during the simulation process

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Table 4 shows the comparison between the simulation of AODV routing protocol and DSDV routing protocol. In this we have examined that the AODV is better than that of DSDV in simulation.

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Table 4. Comparison of simulation result for AODV & DSDV. In this we have examined that the AODV is better than that of DSDV in simulation.

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**IV. USING THE TEMPLATE**

Graph for DSDV

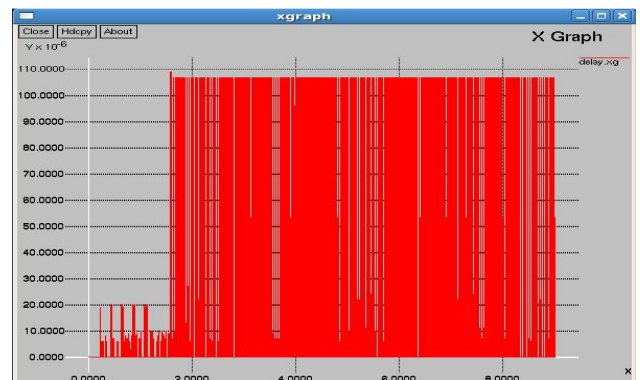


Fig.2 Delay Graph is the graph for Destination Sequenced Routing Protocol or DSDV. The x axis denotes the simulation time and the y axis denotes the delay time.Each vertical red line shows the delay of each packet and total number of lines shows that how many packets has been send.

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DSDV Trace File

The below figure is the nam file for dsvd . This figure shows about how vehicles do communicate with each other during there motion. The numbered circle shows the vehicles and the big circles around them shows the range of vehicle upto which they can communicate.

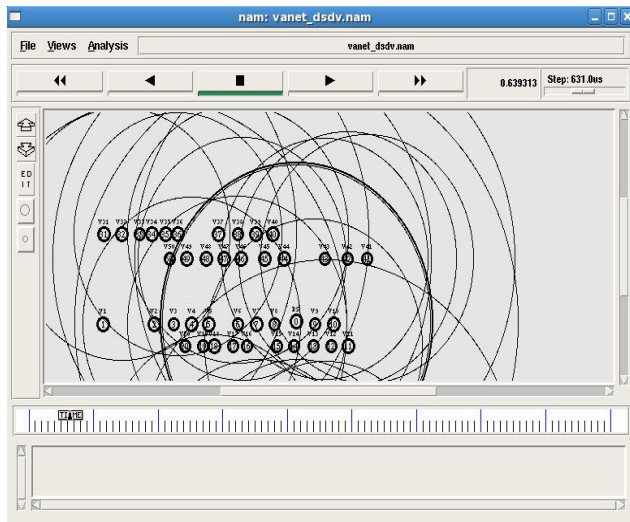


Fig.3 DSDV nam file shows about how vehicles do communicate with each other during there motion. The numbered circles shows the vehicles and the big circles around them shows the range of vehicle upto which they can communicate.

DSDV Nam File

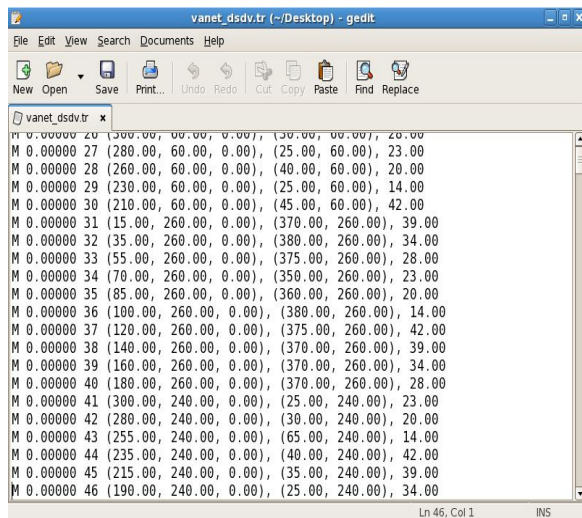


Fig.4 DSDV trace file

This is the trace file for dsvd protocol.

Graph for AODV

The AODV graph shows the packet simulation rate and delay time. The red lines shows the number of packet delivered .The x axis shows the simulation time of the packets whereas the y axis shows the delay time of the packets which has to be delivered.

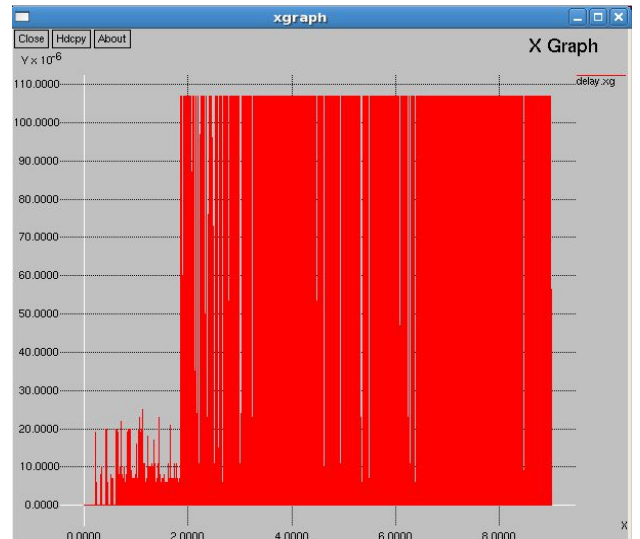


Fig.5 AODV graph shows the packet simulation rate and delay time. The red lines shows the number of packet delivered

AODV NAM FILE

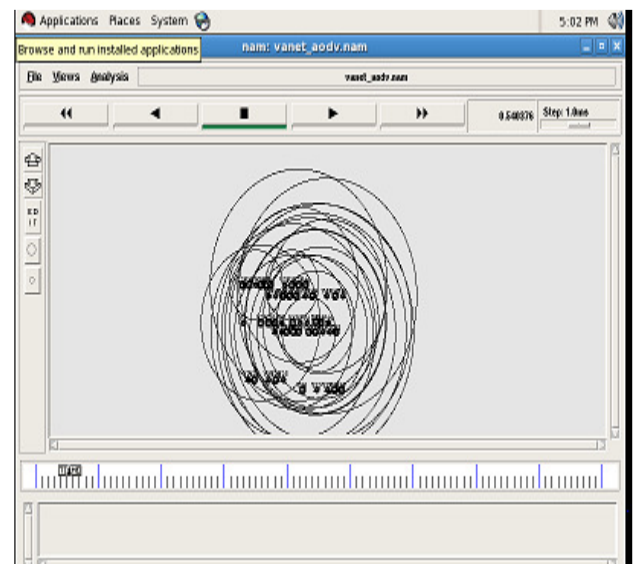


Fig.6 AODV nam file protocol shows that there are 50 vehicles in a communication each vehicle is numbered as nodes.and each vehicle has its own networking area.

## AODV Trace File

```

M 0.00000 1 (30.00, 188.00, 0.00), (380.00, 188.00), 14.00
M 0.00000 2 (50.00, 188.00, 0.00), (310.00, 188.00), 28.00
s -t 0.000000000 -Hs 1 -Hd -2 -Ni 1 -Nx 30.00 -Ny 188.00 -Nz 0.00 -Ne
-1.000000 -Nl AGT -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 1.2 -Id 0.3 -It cbr -
Il 1000 -If 0 -Ii 0 -Iv 32 -Pn cbr -Pi 0 -Pf 0 -Po 0
r -t 0.000000000 -Hs 1 -Hd -2 -Ni 1 -Nx 30.00 -Ny 188.00 -Nz 0.00 -Ne
-1.000000 -Nl RTR -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 1.2 -Id 0.3 -It cbr -
Il 1000 -If 0 -Ii 0 -Iv 32 -Pn cbr -Pi 0 -Pf 0 -Po 0
s -t 0.000000000 -Hs 0 -Hd -2 -Ni 0 -Nx 220.00 -Ny 190.00 -Nz 0.00 -Ne
-1.000000 -Nl AGT -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 0.4 -Id 2.2 -It cbr -
Il 1000 -If 0 -Ii 1 -Iv 32 -Pn cbr -Pi 0 -Pf 0 -Po 0
r -t 0.000000000 -Hs 0 -Hd -2 -Ni 0 -Nx 220.00 -Ny 190.00 -Nz 0.00 -Ne
-1.000000 -Nl RTR -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 0.4 -Id 2.2 -It cbr -
Il 1000 -If 0 -Ii 1 -Iv 32 -Pn cbr -Pi 0 -Pf 0 -Po 0
s -t 0.000000000 -Hs 1 -Hd -2 -Ni 1 -Nx 30.00 -Ny 188.00 -Nz 0.00 -Ne
-1.000000 -Nl RTR -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 1.255 -Id -1.255 -It
AODV -Il 48 -If 0 -Ii 0 -Iv 30 -P aodv -Pt 0x2 -Ph 1 -Pb 1 -Pd 0 -Pds 0 -Pss
1 -Pss 4 -Pc REQUEST
s -t 0.000000000 -Hs 0 -Hd -2 -Ni 0 -Nx 220.00 -Ny 190.00 -Nz 0.00 -Ne
-1.000000 -Nl RTR -Nw --- -Ma 0 -Md 0 -Ms 0 -Mt 0 -Is 0.255 -Id -1.255 -It
AODV -Il 48 -If 0 -Ii 0 -Iv 30 -P aodv -Pt 0x2 -Ph 1 -Pb 1 -Pd 0 -Pds 0 -Pss

```

Fig.7 AODV trace file

## CONCLUSION

In this paper , to determine the best routing protocol for communication ,we examined the performance of AODV,DSR and DSDV protocols .This is done with the help of CBR traffic connections. also considered the number of nodes and the speed as controlled parameters for better results.

As per the simulation, AODV is superior then comes DSDV and DSR .For various speed and number of nodes, AODV proves to be consistent .The throughput is better for all the considered nodes. In case of DSDV and DSR ,on increasing the speed of nodes the throughput seems to be decreases. Delay for DSDV was calculated lowest and so as for DSR is highest .By applying the optimization on AODV routing protocol, delay can be reduces and also can be made equal to that of DSDV and DSR.

Thus we recommend AODV in VANET's for secured communication. This is because of simulation results of AODV.

## FUTURE WORK

In future we can use more than 50 nodes to implement the Ad-hoc networking. Number of base stations can also be increased so as to enhance the communication criteria. The range of networking for communication between vehicles and base station can also be increased.

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