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Comparison of AODV and DSR Routing Protocols by Using Group Mobility Model with Varying Pause Time in Vehicular Ad-Hoc Network

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Abstract

Vehicular ad hoc network is a type of network and provides the communications between vehicle to road side, vehicle to vehicle and vehicle to infrastructure.VANET has new applications and features for travelers to providing vehicle related information for safety purpose that have never been possible in past. It is an application of MANET. In MANET the node is communicating with the base station. The present paper is mainly intended to compare the routing protocol for the improvement of network services by comparing the routing protocol in terms of throughput, end to end delay by using group mobility model on Qualnet 6.1.The research works evaluate the performance of two protocols namely AODV andDSR. To provide multihop routes from node to the server all mobile nodes were randomly positioned in the network.

Keywords*: VANET, MANET, AODV, DSR, QUALNET*

1. INTRODUCTION

A special type of wireless ad hoc network is known as vehicular ad hoc network. It is obtained between vehicle to vehicle for exchanging the vehicle information directly but if vehicles are in a range else sending the message information and vehicle location through multi hop fashion. In some error found of signal that vehicle fall away range and drop out the network, in that case mobile internet is created and remaining vehicle join the connecting vehicles to one another.

The application of VANET is road safety, e-commerce and many more. VANET has property to exchange information using vehicle as a node. A unique class of MANET is known as VANET [1].

All these nodes of VANETs are using cars, buses, and motor cycles for communication purpose with the base station. For the road course and traffic regulations the movement of the VANETs nodes will be restricted by the factors and by some means of fixed infrastructure in the network regularly access for stationary networks could be achieved. It is noted that the VANET must be rely fast on one node to other node and node to node communications [2].

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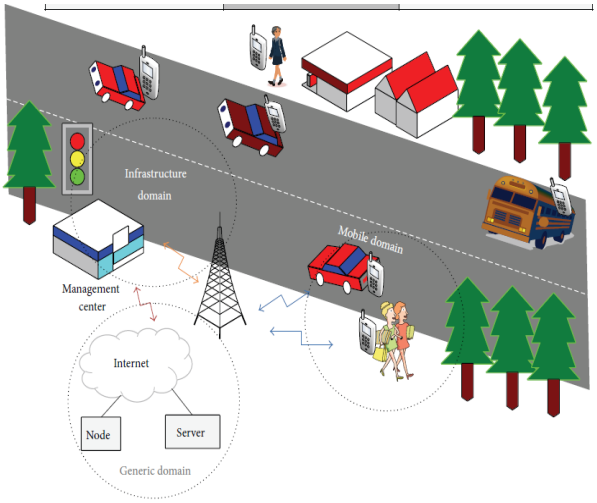

Figure 1. Architecture of VANET

2. VANET PROTOCOLS

2.1 *AODV*

Ad hoc demand distance vector routing protocol is a reactive protocol. This reactive routing protocol has a table. The routing table of reactive protocol do not update every time it is only updated when a node receives the control packet that time this routing table is updated.

This routing protocol is same as MANET routing protocol and is developed for mobile networks. AODV has several properties that it is loop free and capable of handling both unicast and multicast routing and also working only on demand [3].

2.2 *DSR*

DSR is also reactive protocol. The DSR assembly will oblige each one bundle to pass on the whole area from source to goal. This protocol has property that it is capable only for the use of multi hop networks and is useful for nodes.

If there is large network then this protocol will not be very efficient. In dynamic source routing protocol every packet carry the complete address of source to destination [5].

For mobile IP it is interoperated and has migrated between WLAN'S, and other communication data services. There is no existence of network administration because network is completely belonging to self configuring so there is no existence of network infrastructure. DSR discover a source route across multiple networksto destination VANET.

2.3 Group Mobility Model

Group mobility models are to simulate group movement behaviors within the real world [14]. These mobility models tend to mimic motions of the mobile nodes in mobile Ad-hoc networks wherever communications are done among teams that coordinate their movements. The group movements apply that mobile nodes work along in a very cooperative manner so as to accomplish a standard goal [2].

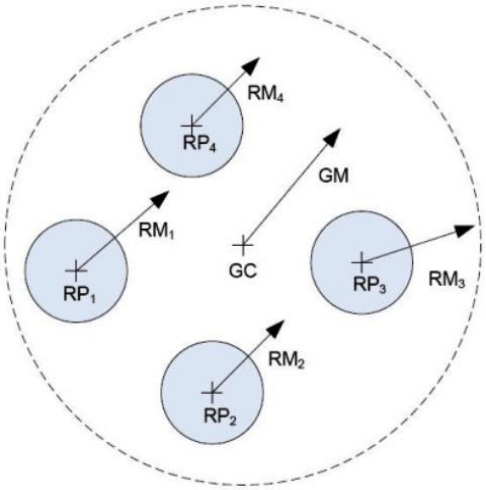

Figure 2. (b) Group Mobility Model

Several group mobility Models exist, however here we are going to be discussing only two models:

- point of reference group mobility Model and
- Colum mobility Model

3. SIMULATION SETUP AND PERFORMANCE METRICS

To evaluated the comparison of routing protocols after the simulation using the Qualnet 6.1. Nodes are travelling with speeds over 1200*1200 meters area for 300sec simulation time and it follows a group mobility model.

It uses a same scenario because these routing protocols have unique property to produce output. And the all the parameter of the simulation is shown in Table 3.1.

Table 3.1. Simulation Parameters [7]

Parameter	Value
Simulation area	1200*1200
Simulation time	300sec
Simulator	QUALNET 6.1
Number of nodes	30, 60, 90
Routing protocols	AODV,DSR
Data types	CBR
Packet generation rate	80 kbps
Packet size	512 bytes
Mac protocol	IEEE 802.11e
RTS/CTS	None
Channel type	Wireless channel
Mobility model	Group mobility model
Antenna type	Omni antenna
Network	Ipv6
Pause time	30s, 60s, 100s

4.SIMULATION RESULTS

Table 4.1. End to End Delay Comparison of AODV and DSR

Pause time	AODV			DSR		
	30 Node	60 Node	90 Node	30 Node	60 Node	90 Node
30s	135.91	257.71	56.56	197.41	353.52	300.5
60s	157.2	225.6	92.9	96.4	334.2	221
100s	211.36	155.89	65.25	259	221.84	98.47

Table 4.2. Throughput Comparison of AODV & DSR

Pause time	AODV			DSR		
	30 Node	60 Node	90 Node	30 Node	60 Node	90 Node
30s	356.84	276.59	199.98	370.8	172.48	195.73
60s	335.65	118.39	100.00	325.6	115.03	95.35
100s	387.76	158.03	118.35	313.82	133.27	95.00

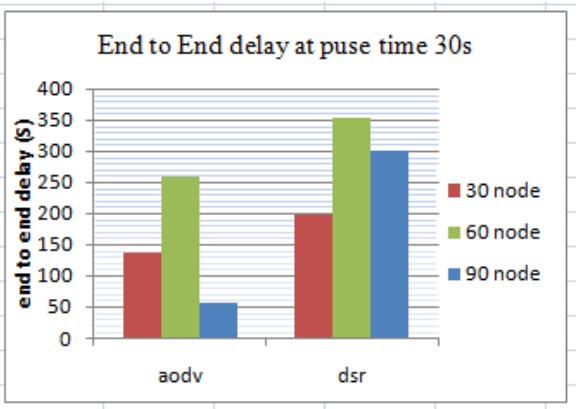

Figure 4.1.1. Packets End to End Delay at 30s Pause Time with Varying no. of Nodes

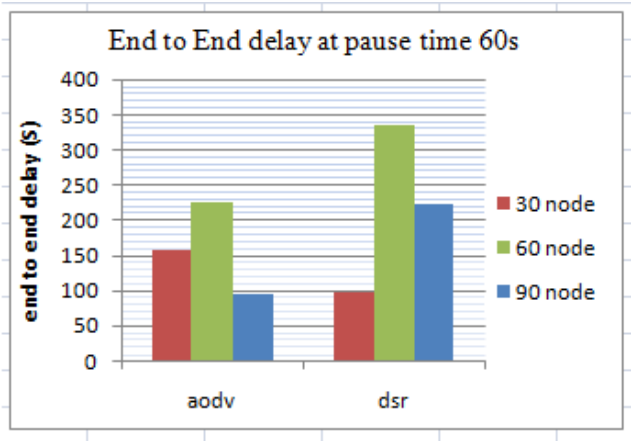

Figure 4.1.2. Packets End to End Delay at 60s Pause Time with Varying no. of Nodes

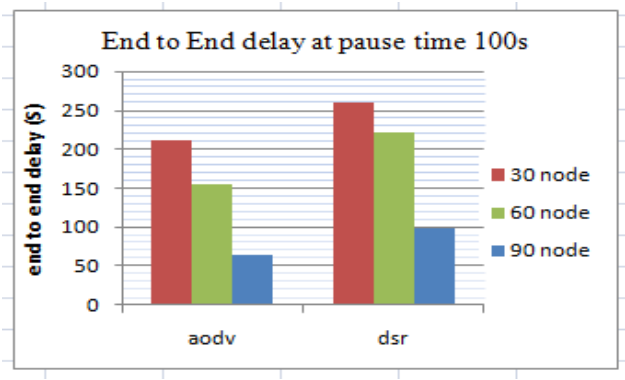

Figure 4.1.3. Packets End to End Delay at 100s Pause Time with Varying no. of Nodes

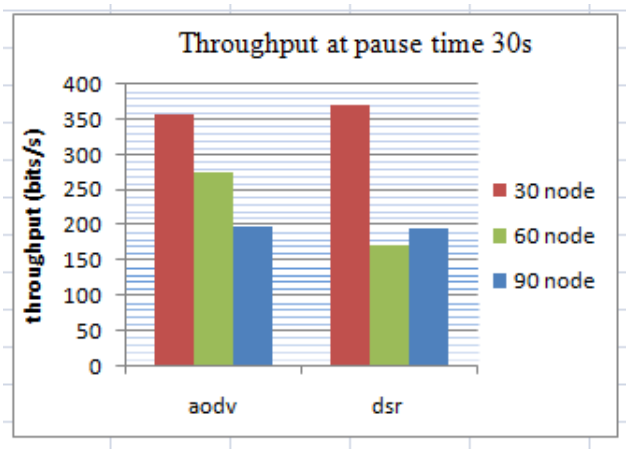

Figure 4.2.1. Throughput at 30s Pause Time with Varying no. of Nodes

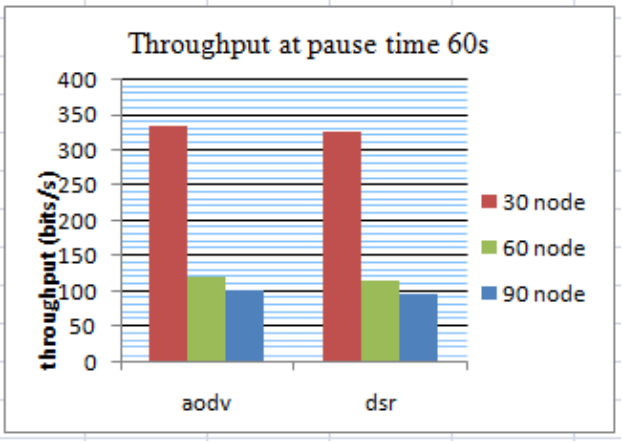

Figure 4.2.2. Throughput at 60s Pause Time with Varying no. of Nodes

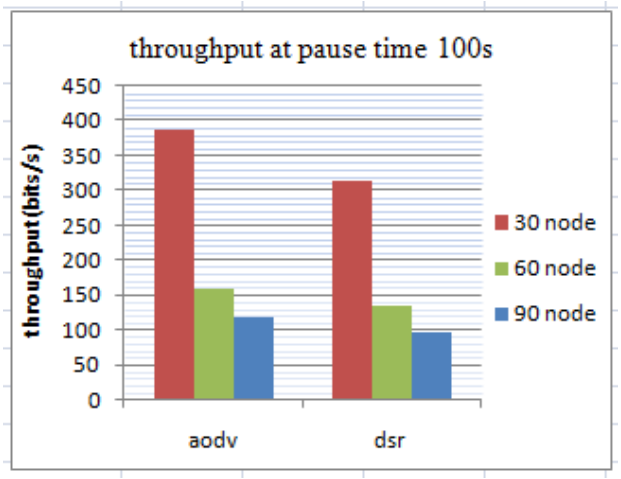

Figure 4.2.3. Throughput at 100s Pause Time with Varying no. of Nodes

From the simulation results it is found that AODV has high jitter then DSR routing protocol. Also AODV has highest throughput then DSR. Finally the last comparison i.e. end to end delay AODV is show high performance then DSR.

At last AODV proves to be more promising and versatile then the other protocols.In both three cases results is that AODV is better than DSR. Here the performance of AODV is best because of the routing protocol of AODV is reactive in nature.

5. CONCLUSION

The present paper shows the comparison of AODV and DSR. From the simulation it is cleared that AODV has a good performance then DSR. In VANET, application AODV is well suited then other protocols for vehicular ad hoc networks. The selection of the correct routing protocol mainly depends upon the scenario you are working with. Generally we can say that reactive routing protocol performs better in low capacity network while proactive routing protocols performs better in high capacity network.

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