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SIMULATION AND PERFORMANCE ANALYSIS OF PROACTIVE AND REACTIVE ROUTING PROTOCOLS IN VEHICLE BASED AD HOC NETWORK

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***Abstract*— Vehicle based ad hoc network is a technology used for communication between moving vehicles. The main study will be based on vehicle to vehicle communication in ad hoc network. This paper presents the performance evaluation of ad hoc routing protocols when there is more number of vehicles. Simulation scenario is prepared using NS2.35 simulator. Performance of these protocols is evaluated on different performance metrics**

***Index Terms*— VANET, MANET, AODV, DSR, DSDV, Routing Protocols.**

I. INTRODUCTION

In mobile ad hoc network each node move randomly without any defined sequence. But in vehicular ad hoc network, defined nodes act as vehicles which move in a fashion like vehicles moving on road. The navigation system available on each vehicle makes it aware of its own geographical location as well as its neighbor's geographical location. The Intelligent Transportation System (ITS) has proposed the Wireless Access in Vehicular Environment (WAVE) standards. These standards define an architecture that enables vehicle communicating with other vehicle and vehicle communicating with infrastructure. [1]

II. CLASSIFICATION OF ROUTING PROTOCOLS

Routing protocols are mainly classified into two- Topology based and position based. Under topology based they are reactive, proactive or hybrid.

Routing protocols which are evaluated in this paper are topology based. AODV and DSR are reactive routing protocol whereas DSDV is a proactive routing protocol. Reactive routing protocols send data or information only when it is requested hence it is also called as on-demand routing protocols. This reduces burden of the network. Proactive routing protocols are based on routing table as they maintain a routing table of all the nodes. While sharing data packets they also share routing table. Hybrid routing protocols are mostly zone based which means whole network is divided into number of zones. It is combination of reactive and proactive routing protocols. [2][3][4][5]

III. SIMULATION SCENARIO

The standard NS2 simulation software of version 2.35 is used to run the tcl script. After successful execution of tcl script a trace file was generated for each routing protocol. Using this trace file graphs are plotted in order to check the performance. Network Animation (NAM) trace is used to record the simulation details in a test file. The table below gives the simulation parameters used:

TABLE I. SIMULATION PARAMETERS

Parameters	Specifications
Network simulator	NS-2.35
Simulation time	150 seconds
Simulation area	1100m x 600m
Number of vehicles	100
Speed	40Kmph
Data type	Constant Bit Rate (CBR)
Source / Destination	Random
Data Packet Size	512 bytes
MAC protocol	IEEE 802.11
Propagation Model	Two-ray ground reflection
Mobility Model	Random Way Point (RWP)
Channel Type	Wireless Channel
Antenna Model	Omnidirectional
Interface Queue type	Priority queue

The above scenario consists of 100 vehicles. Source and destination are chosen randomly. Simulation area used is 1100m x 600m.

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IV. Simulation Results And Performance Analysis

The performance evaluation is done based on three performance metrics which are end to end delay, average throughput and packet loss ratio. Total simulation time is 150secs. Based on the graphs it is found out that which routing protocol performs best for the given scenario. X-axis gives Simulation time in seconds. Y-axis gives End to end delay, packet loss analysis and throughput for Fig 1, Fig 2 and Fig 3 respectively.

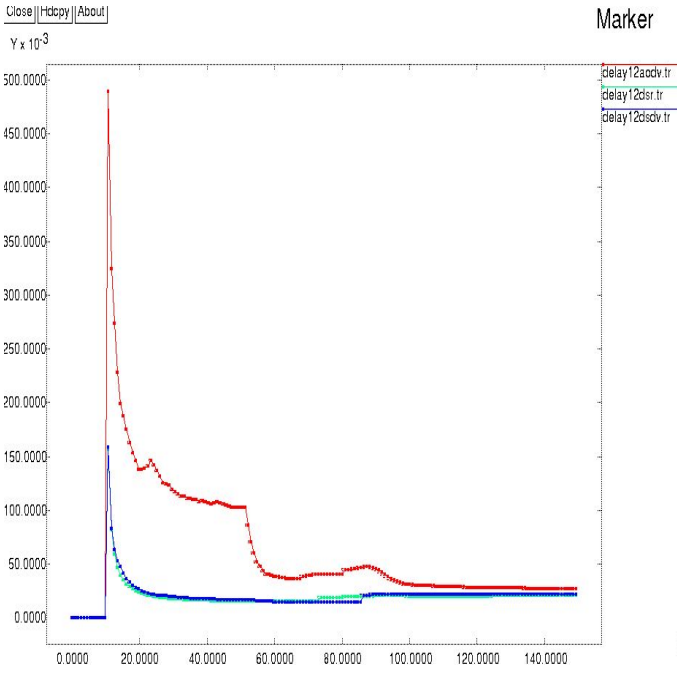

Fig. 1. End to end delay for AODV, DSR and DSDV

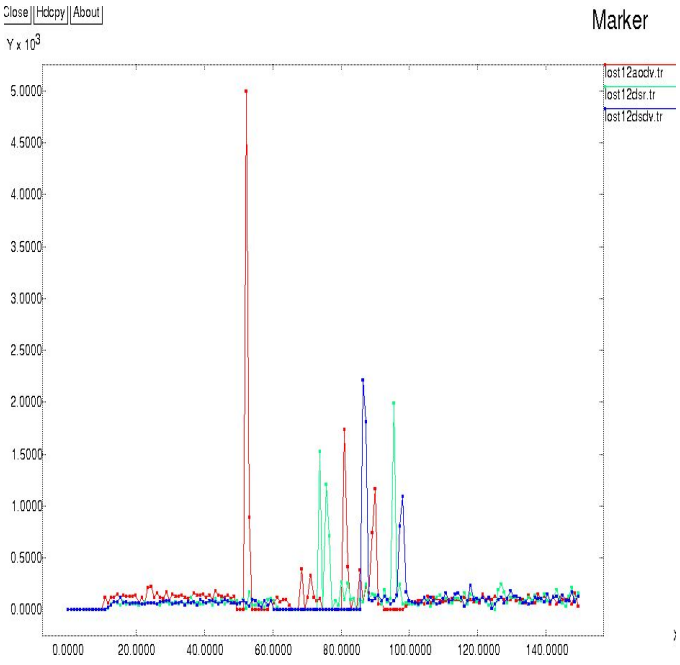

Fig. 2. Packet loss analysis for AODV, DSR and DSDV

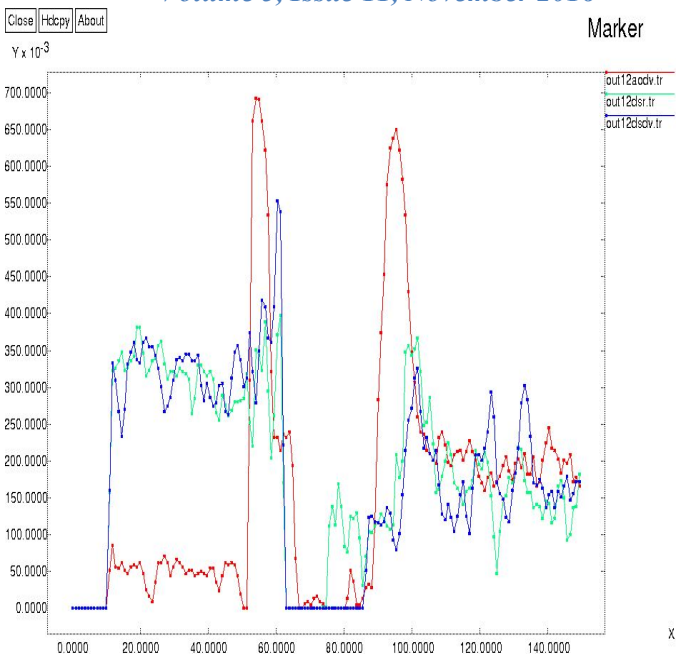

Fig. 3. Average Throughput for AODV, DSR and DSDV

V. Observation

From the graph in Fig. 1 it was observed that at the beginning the delay is high for all three routing protocols. But as the time increases the delay decreases. AODV shows more delay then DSR and DSDV. DSR and DSDV show almost same performance.

From the graph in Fig. 2 it was observed that at around 50seconds AODV is showing high packet loss. Similarly in between 70seconds to 100seconds there is a high packet loss for all the three routing protocols.

From the graph in Fig. 3 it was observed that at the beginning DSR and DSDV shows high throughput as compared to AODV. But as the time increases, AODV throughput increases.

VI. Conclusion

From the observations it can be concluded that, performance of DSDV and DSR is good because it shows low delay and less packet loss as compared to that of AODV.

Throughput of AODV is low in the beginning but with increase in time its performance increases.

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