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SIMULATION STUDY FOR PERFORMANCE COMPARISON WITH MOBILITY MODELS OF ROUTING PROTOCOLS IN MOBILE ADHOC NETWORK

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Abstract- Mobile computing: is computing for fixed infrastructure based wireless Network. Due to insufficient frequency band and tremendous growth of the mobile users, complex computation is needed for the use of resources. Long distance communication began with the introduction of telegraphs and simple coded pulses, which were used to transmit short messages. Since then numerous advances have rendered reliable transfer of information both easier and quicker. Wireless network refers to any type of computer network that is wireless, and is commonly associated with a telecommunications network whose interconnections between nodes is implemented without the use of wires. Wireless network can be broadly categorized in infrastructure network and infrastructure less network. Infrastructure network is one in which we have a base station to serve the mobile users and in the infrastructure less network is one in which no infrastructure is available to serve the mobile users this kind of networks are also known as mobile Adhoc networks. In this paper we simulated the result for different mobility scenarios with protocols like AODV, DSR and OLSR
Keywords- Adhoc Network, AODV, DSR, OLSR, Mobility Model, Power Aware Routing, Security, opnet.

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Introduction

Mobile Adhoc Network is a future technology; various challenges are superimposed by this technology. MANET inherited the challenges from fixed wireless cell architecture; in addition bandwidth and highly dynamic topology and battery back up problem. MANET is used where no infrastructure is available for communication; such like disastrous area, military tactical application, sensor network .One primary application of MANET is in military use including tactical operations. In these environments security is often the primary concern. Future information technology will be based on wireless technology. Infrastructure based cellular and mobile networks are still limited by the need of infrastructure such like base station, allocation of frequencies .to fulfill the demand of users various approaches are given such as frequency reuse concepts, clustering technique, sectoring technique, and assignment of conflict free channels. The Ad Hoc On-Demand Distance Vector (AODV) routing protocol enables multi-hop routing between participating mobile nodes wishing to establish and maintain an ad-hoc network. AODV is based upon the distance vector algorithm. The difference is that AODV is reactive, as opposed to proactive protocols like DV, Dynamic Source Routing (DSR) [4, 5, 6] also belongs to the class of reactive protocols and allows nodes to dynamically discover a route across multiple network hops to any destination. OLSR is based on Proactive Routing Protocol.

In this paper section 2 is describing the related work section 3 shows the Simulation Environment and section 4 shows the validation and section 5 holds the conclusion about the simulation.

Related work

Many routing protocols have been proposed [6, 7, 8, 9, 10, 11, 12, 13, 14, 15, &16], but few comparisons between the different protocols have been made of the work that has been done in this field, only the work done by the Monarch project at Carnegie Mellon University (CMU) has compared some of the different [17] proposed routing protocols and evaluated them based on the same quantitative metrics. For Mobile Adhoc Network there are various model

proposed for security because it is an important and crucial aspect, some very good references are given in [21 ,22, & 23]

Simulation environment

Simulator used for simulation is the Opnet Modeler 14.

Problem Definition

In this scenario we have taken the campus of "Graphic Era University" for our simulation.

In this scenario we have 10 mobile nodes enabled with AODV, DSR and OLSR routing protocols.

Simulation Setup:

In Opnet we have to configure the profile for MANET, and there are three important configurations for standard application.

1. Mobility Configuration
2. Application Definition
3. Profile Definition.

Mobility Configuration

Mobility configuration is related to description about the mobility of mobile nodes, and for this we have set the three important parameters.

Table 1- Mobility Configuration

S. No.	Parameter	Value
1	Speed	10/20/30 Meter / Sec
2	Pause Time	0 Sec
3	Start Time	10 Sec.

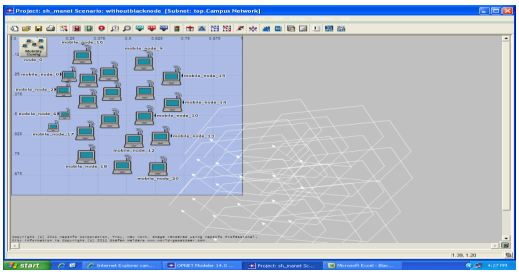

Fig.1- Simulation Environment

Application Definition

Application definition is related to the description about the application for which our setup will deal.

Table 2- Application Definition

S.No.	Parameter	Value / Type
1	Application	FTP
2	File Size	12000000 Byte
3	Inter Request Time	360 seconds

For this Scenario we have taken standard application type which is FTP. & inter request time is 360 Seconds.

Profile Definition

Table 3- Profile Definition

S.No.	Parameter	Value
1	Start Time	5 Seconds
2	Start Time offset	5 Seconds
3	Repeatability	Unlimited

Parameters for AODV & DSR.

Routing parameters are set to default values.

Table 4- AODV

S.No.	Parameter	Value
1	Active Route Time Out	3 Seconds
2	Hello Interval (Uniform distribution) Min Max	 1 1.1
3	Addressing Mode	IPV4
4	Net Diameter(Number of max possible hops)	35

DSR

Table 5- DSR

S.No.	Parameter	Value
1	Route Expiry time	300 seconds
2	Request Table Size	64 Nodes

Simulation Parameters

Table 6- SIMULATION PARAMETERS

S.no.	Parameter	Value
1	Transmission Range Transmission Power Packet Reception Power	 0.005 - 95 dBm
2	Simulation Time	3600 Seconds
3	Number of Nodes	10 Mobile nodes
4	Pause Time	0 Seconds
5	Environment Size	(1000*1000)Meter
6	Traffic Type	FTP

Results

a) Speed 10 Meter/Sec

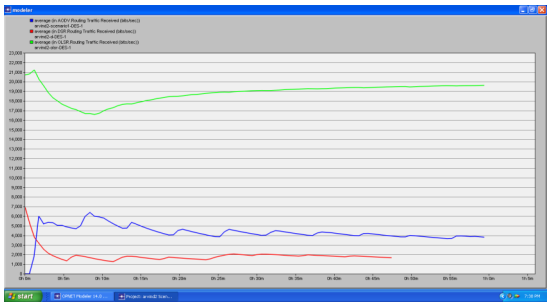

Fig. 2- Routing Traffic Received

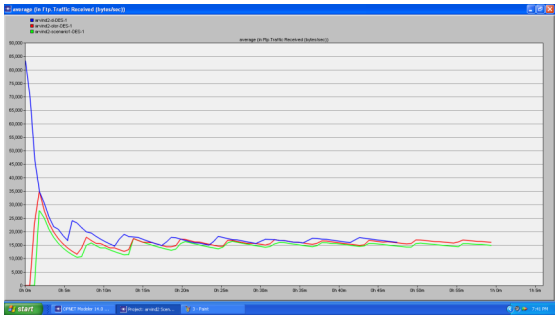

Fig. 3- Routing Traffic Sent

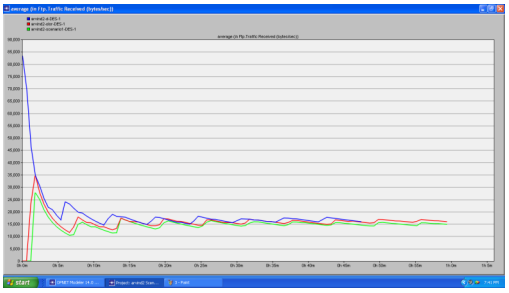

Fig. 4- Routing Traffic Sent

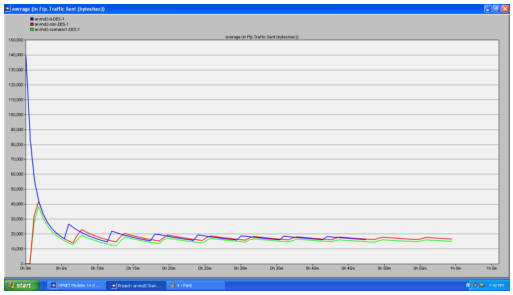

Fig. 5- FTP Traffic Received

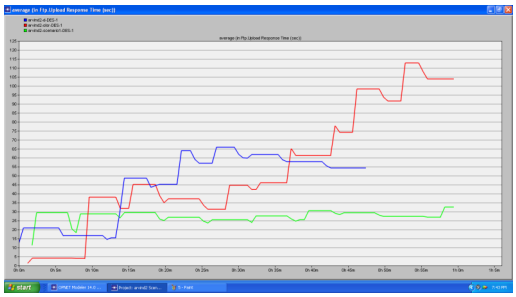

Fig. 6- FTP Traffic Sent

Speed 20 Meter/Sec

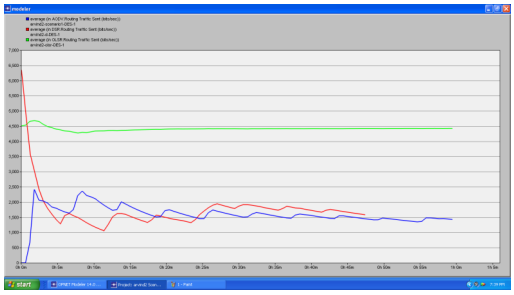

Fig. 7- FTP Upload Time

Fig. 8- Routing Traffic Received

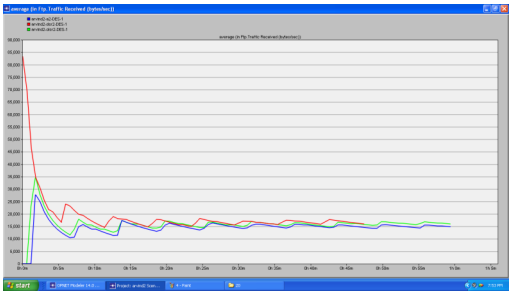

Fig. 9- FTP Traffic Received

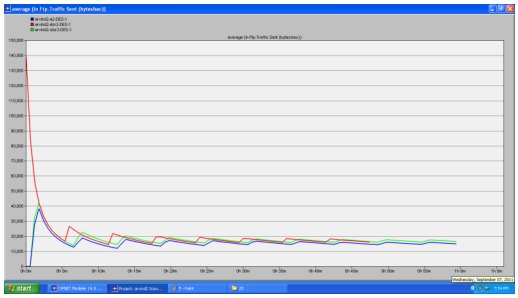

Fig. 10- FTP Traffic Received

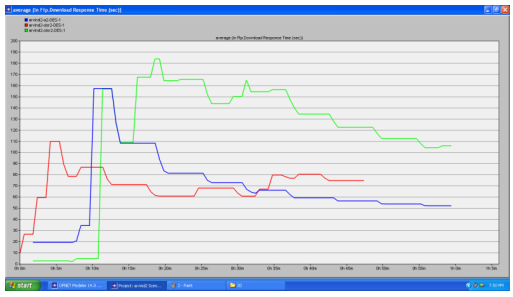

Fig. 11- FTP Traffic Sent

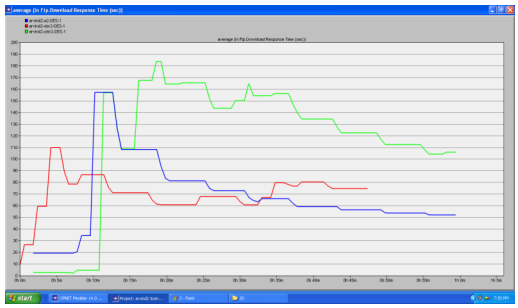

Fig. 12- FTP Download Time

Speed 30 Meter/Sec

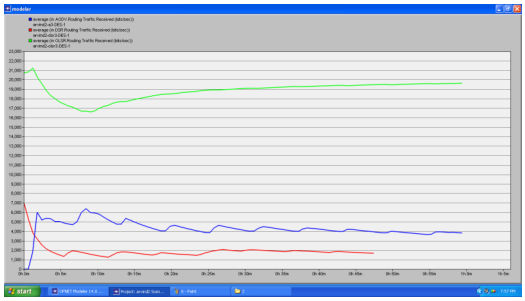

Fig.13- FTP Upload Time

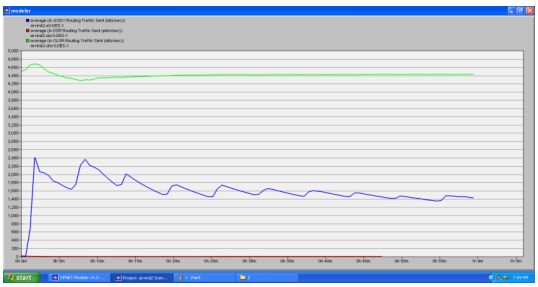

Fig. 14- Routing Traffic Received

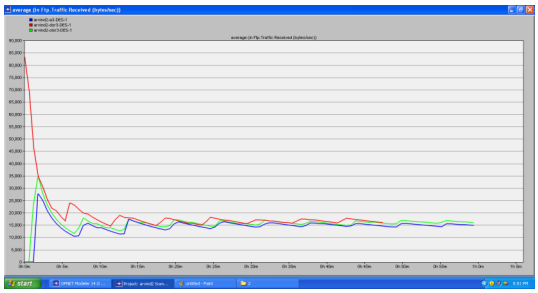

Fig. 15- Routing Traffic Sent

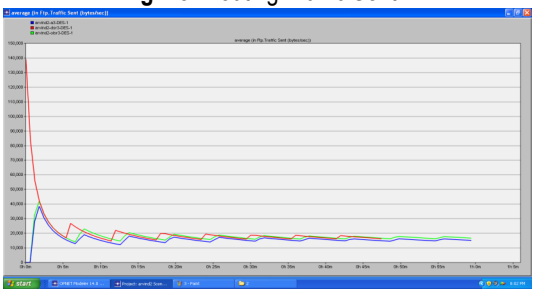

Fig. 16- FTP Traffic Received

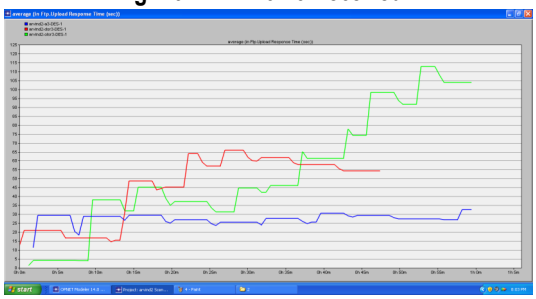

Fig. 17- FTP Traffic Sent

Validation

Table 7- Performance Table

	10 m/s	20 m/s	30 m/s
Routing Traffic Received	DSR	DSR	DSR
Routing Traffic Sent	DSR/AODV	DSR/AODV	DSR
FTP Traffic Received	AODV	AODV	AODV
FTP Traffic Sent	AODV	AODV	AODV
FTP Download Response Time	AODV	AODV	AODV
FTP Upload Response Time	AODV	AODV	AODV

From above table we can say that control messages are better in DSR but Data Traffic is better in AODV and OLSR is not standing for any condition.

Conclusion

In this Paper we have simulated the performance result for Routing Protocols for Mobile Adhoc Networks with different mobility models for 10 nodes and routing protocols AODV, DSR and OLSR. For the above condition we can say that AODV is better than the DSR and OLSR. OLSR is not performing well because it is proactive routing protocol and for mobile adhoc network Reactive routing protocols are best suited.

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