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Parameter Analysis of |MANET for (20, 40, 60) Nodes

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Abstract: Infrastructure-less mobile networks are known as mobile ad hoc networks (MANET). A node communicates directly with the nodes within radio range and indirectly with all others using a dynamically-determined multi-hop route. Routing protocols are used to find routes between mobile nodes to facilitate communication within the network. In this paper, a comparative study is made between different node groups for particular specific algorithm using IEEE802.11g standard with constant speed of 36Mbps. In this work an attempt has been made to explore the analysis work for 5 different routing algorithms (AODV, DSR, OLSR, GRP and TORA) with 5 parameters like bit transmitted and bit received. These mentioned algorithms are applied to 20, 40, 60 nodes in the MANET simultaneously.

Keywords: MANET, AODV, DSR, OLSR, GRP, TORA

I. INTRODUCTION

The age of laptops and 802.11/Wi-Fi wireless networking have made MANETs a popular research topic since mid-1990s. MANETs are a type of ad hoc networks that have a routable networking environment on top of a Link Layer. In MANET mobile nodes form a temporary network without the use of any existing network infrastructure or centralized administration. There are various routing algorithms (protocols) available like AODV, DSR, OLSR, GRP and TORA for providing efficient routes between mobile nodes, but it is difficult to identify which algorithm performs best at different traffic conditions. To resolve this problem we have analyzed these algorithms in different situations of traffic by using software OPNET 14.5.

II. NETWORK DESIGNING

A. Work Scenario

TABLE 1 : Simulation Parameters and their Value

Simulation Parameters	Value
Routing protocols	AODV, DSR, OLSR, GRP and TORA
Data rate	36Mpps
Transmit power	0.005W
Topology	Circular
Mobility profile	Random waypoint
IEEE standard	802.11g
Area	5000m ²
Applications	FTP and HTTP

For the 20 nodes MANET designing we will select node value 20 and the above parameter given in table 1 are applied then the steps being followed are as shown in figure.1 below-

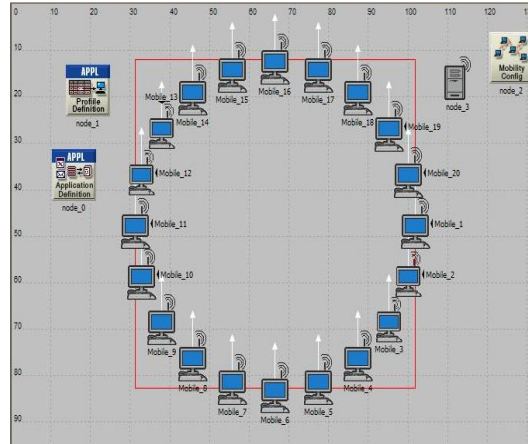


Fig.1: 20 node MANET

For the 40 nodes MANET designing we will select node value 40 and the above parameter given in table 1 are applied then the steps being followed are as shown in figure.2 below -

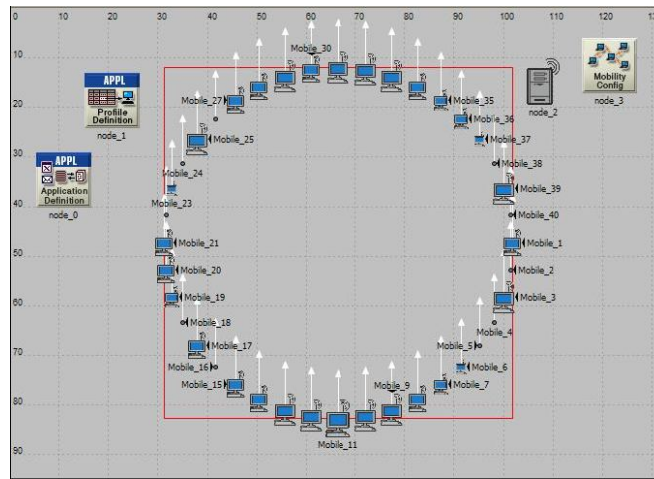


Fig.2: 40 node MANET

For the 60 nodes MANET designing we will select node value 60 and the above parameter given in table 1 are applied then the steps being followed are as shown in figure.3 below -

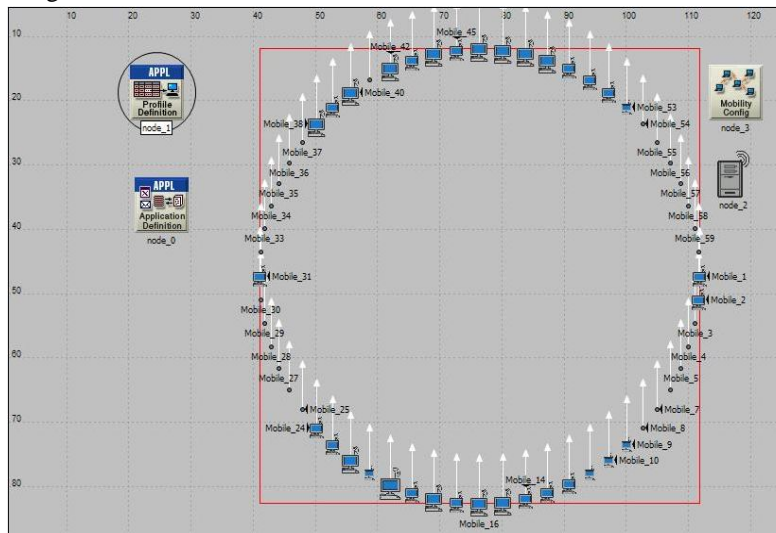


Fig.3: 60 node MANET

III. RESULTS AND DISCUSSION

A. AODV traffic Sent Parameter Analysis

In this simulation, routing protocol AODV is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic sent parameters are analyzed. Simulation shows that as the no. of mobile nodes increase traffic also increases as shown in graph. For individual 20, 40 and 60 nodes the traffic sent parameter increases initially very fast and then becomes constant.

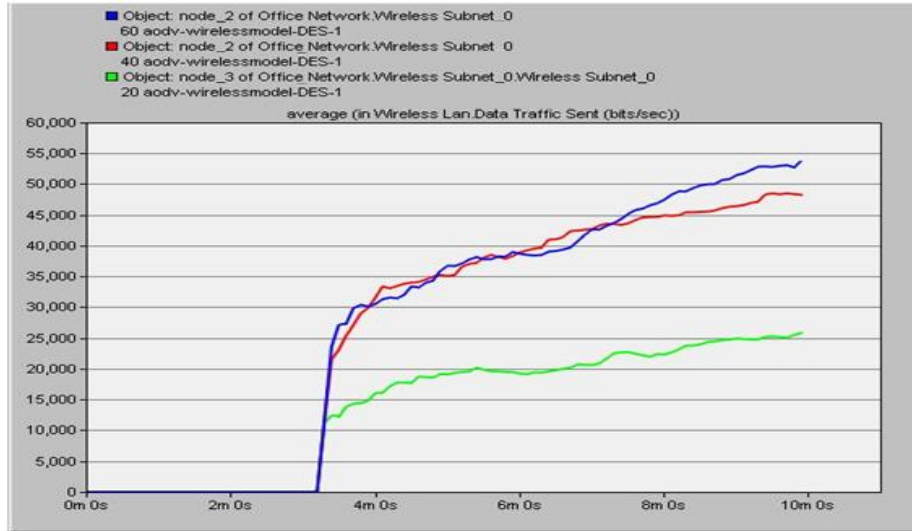


Fig.4.Comparison Graph of Traffic Sent for AODV (20, 40, 60)

B. AODV Traffic Receive Parameter Analysis

In this simulation, routing protocol AODV is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic receive parameter analyzed. Simulation shows that as the no. of mobile nodes increase traffic also increases as shown in graph. For individual 20, 40 and 60 nodes the traffic received parameter increases initially very fast and then becomes constant.

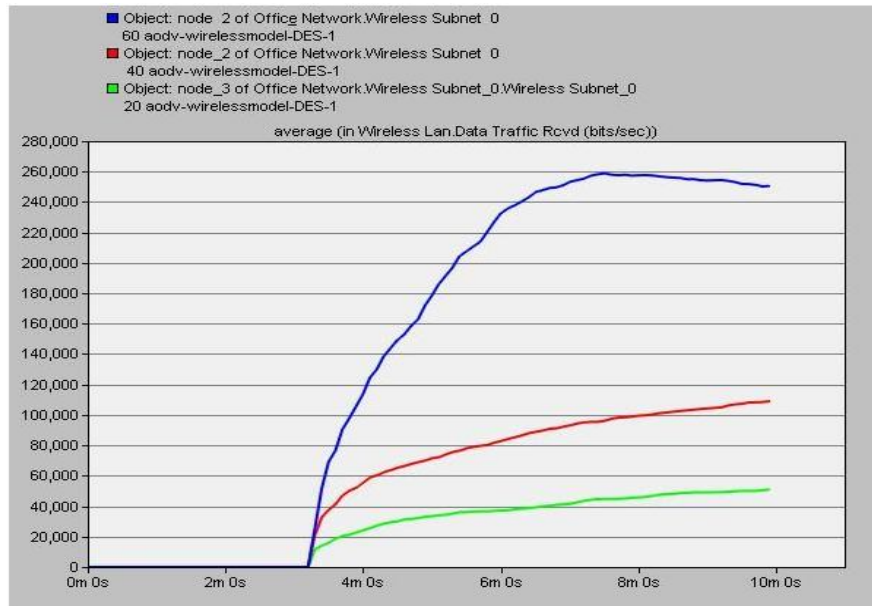


Fig.5.Comparison Graph of Traffic Receive for AODV (20, 40, 60)

C. DSR Traffic Sent Parameter Analysis

In this simulation, routing protocol DSR is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic sent parameters are analyzed. Simulation shows that as the no. of mobile nodes increase, traffic also increases but at very high traffic DSR response starts disappearing as shown in graph.

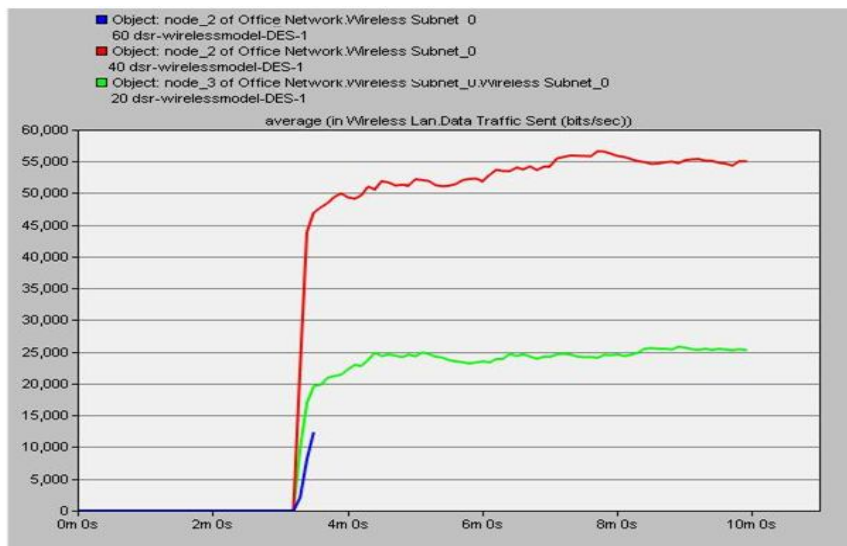


Fig.6.Comparison Graph of Traffic Sent for DSR (20, 40, 60)

D. DSR Traffic Receive Parameter Analysis

In this simulation, routing protocol DSR is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic receive parameters are analyzed. Simulation shows that as the no. of mobile nodes increase, traffic also increases but at very high traffic DSR response starts disappearing as shown in graph.

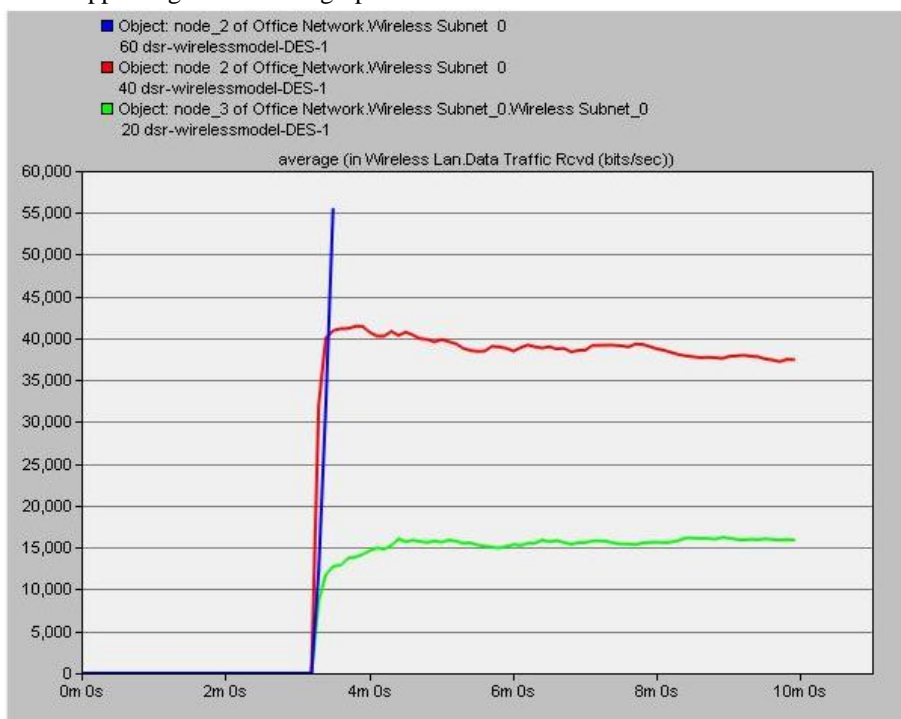


Fig.7.Comparison Graph of Traffic Receive for DSR (20, 40, 60)

E. OLSR Traffic Sent Parameter Analysis

In this simulation, routing protocol GRP is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic sent parameters are analyzed. Simulation shows that as the no. of mobile nodes increase traffic also increases as shown in graph. For individual 20, 40 and 60 nodes traffic sent increases very fast initially and then becomes constant. But AODV have better characteristic because for 40 and 60 node traffic have nearer value in AODV.

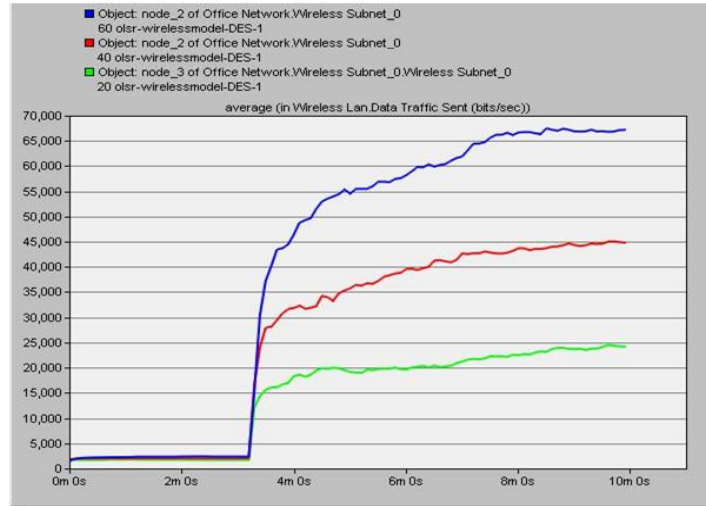


Fig.8.Comparison Graph of Traffic Sent for OLSR (20, 40, 60)

F. OLSR Traffic Receive Parameter Analysis

In this simulation, routing protocol OLSR is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic received parameters are analyzed. Simulation shows that as the no. of mobile nodes increase traffic also increases as shown in graph. OLSR have high diversion in results than AODV and DSR.

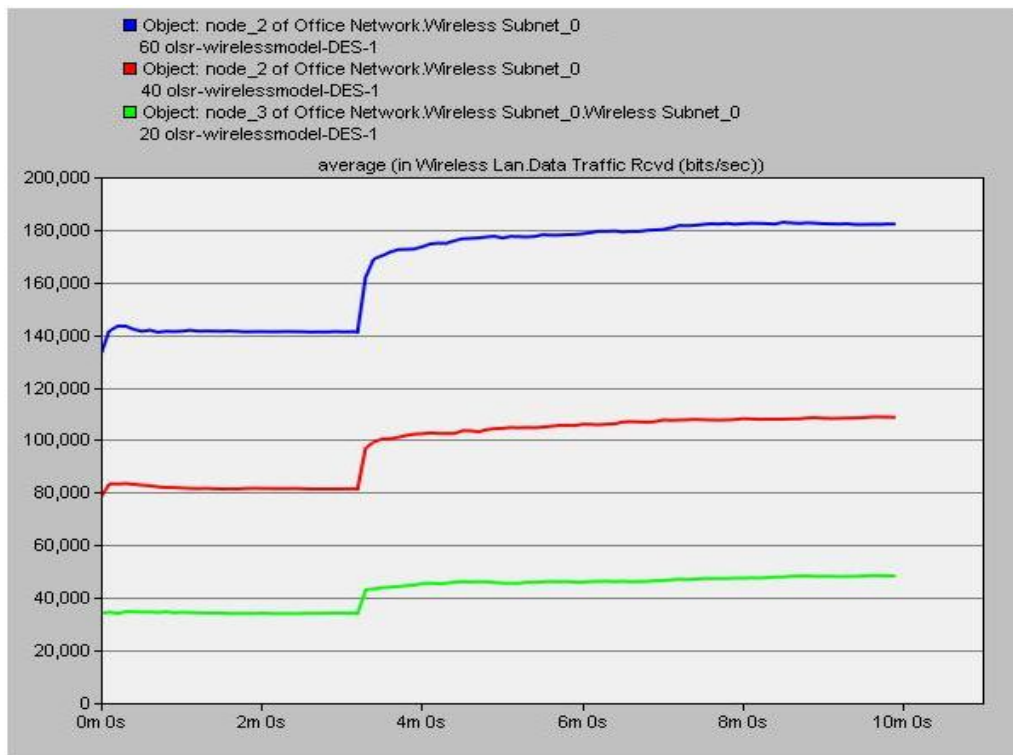


Fig.9.Comparison Graph of Traffic Receive for OLSR (20, 40, 60)

G. GRP Traffic Sent Parameter Analysis

In this simulation, routing protocol GRP is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic sent parameters are analyzed. Simulation shows that as the no. of mobile nodes increase, traffic also increases but for each node bit transmission starts negatively and then becomes constant and at last increases positively as shown in graph.

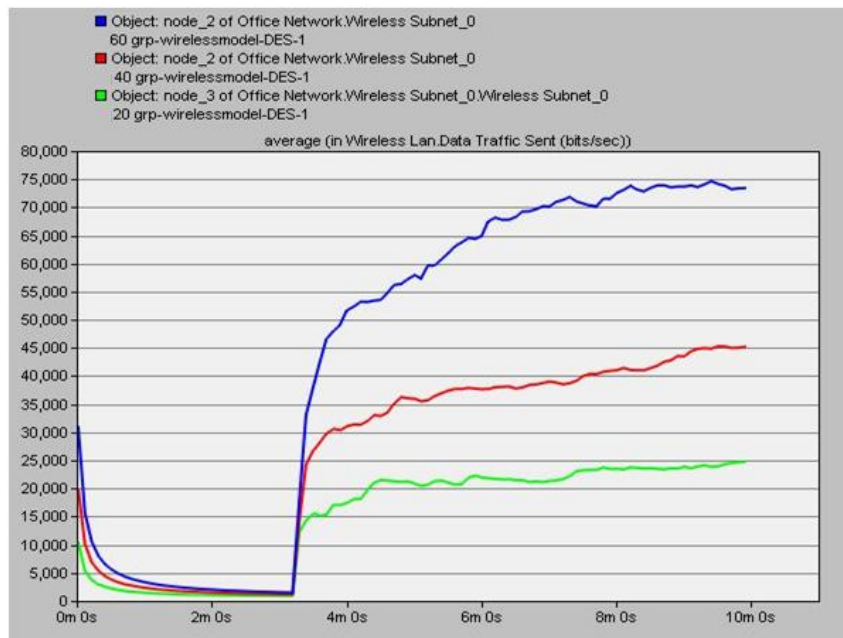


Fig.10.Comparison Graph of Traffic Sent for GRP (20, 40, 60)

H. GRP Traffic Receive Parameter Analysis

In this simulation, routing protocol GRP is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic receive parameters are analyzed. Simulation shows that as the no. of mobile nodes increase, traffic also increases but for each node bit transmission start negatively and then becomes constant and at last increase positively as shown in graph.

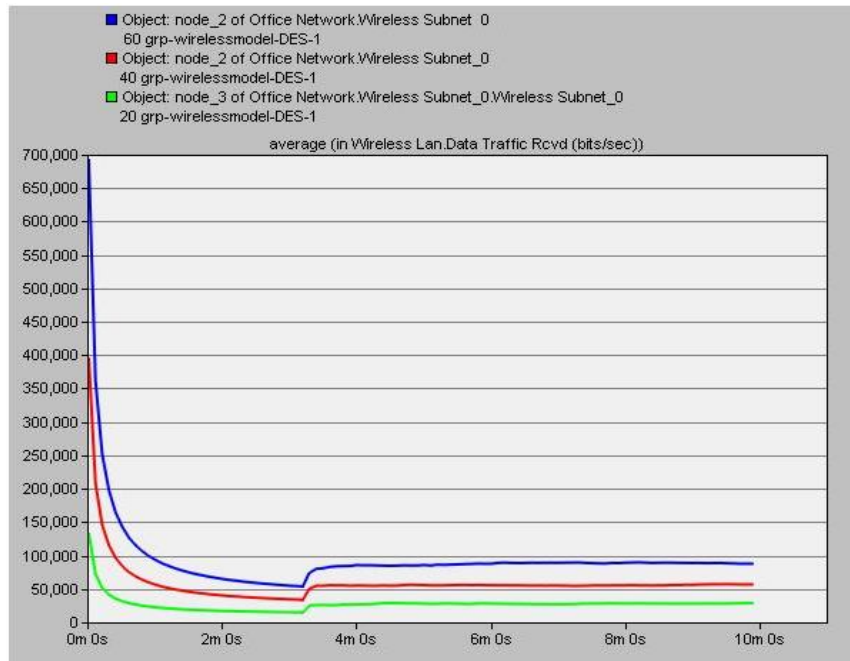


Fig.11.Comparison Graph of Traffic Receive for GRP (20, 40, 60)

I. TORA Traffic Sent Parameter Analysis

In this simulation, routing protocol TORA is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic sent parameters are analyzed. Simulation shows that as the no. of mobile nodes increase, traffic also increases as shown in graph.

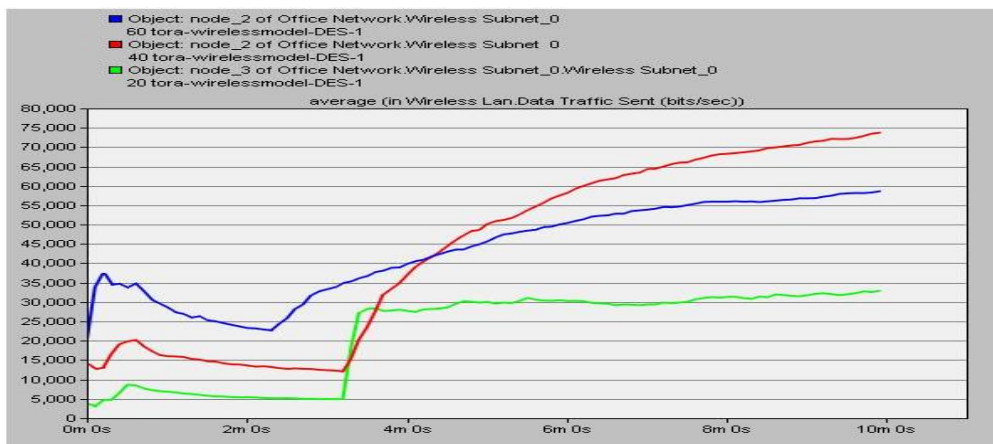


Fig.12.Comparison Graph of Traffic Sent for TORA (20, 40, 60)

J. TORA Traffic Receive Parameter Analysis

In this simulation, routing protocol TORA is applied simultaneously to the 20, 40 and 60 MANET mobile station nodes and traffic received parameters are analyzed. Simulation shows that as the no. of mobile nodes increase, traffic also increases as shown in graph.

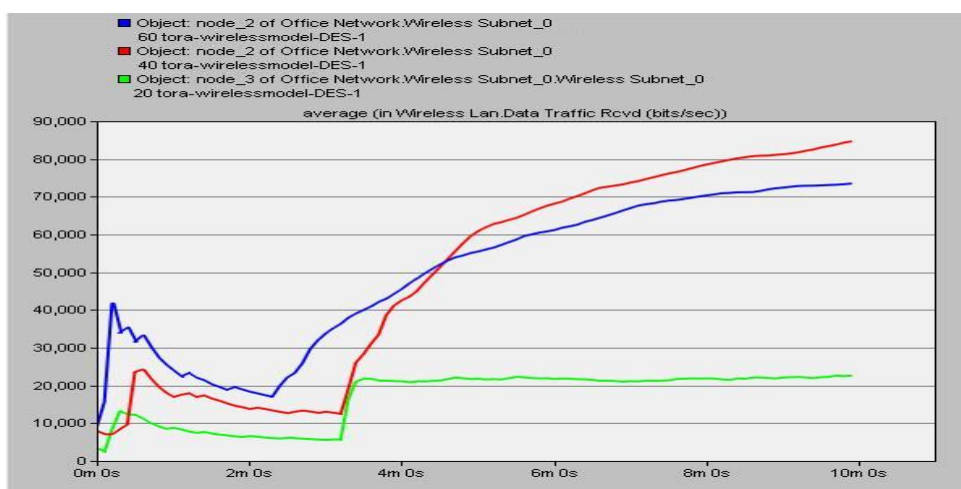
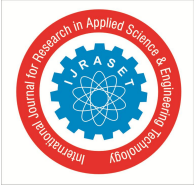


Fig.13.Comparison Graph of Traffic Receive for TORA (20, 40, 60)

Table 2: Observation for different parameters

Algorithm	Analysis for 20 Nodes in MANET		Analysis for 40 Nodes in MANET		Analysis for 60 Nodes in MANET	
	Bit Transmit (bits/sec)	Bit Received (bits/sec)	Bit Transmit (bits/sec)	Bit Received (bits/sec)	Bit Transmit (bits/sec)	Bit Received (bits/sec)
AODV	25000	38000	48000	100000	54000	235000
DSR	25000	15000	55000	41000	Increase	Increase
OLSR	20000	40000	45000	90000	66000	150000
GRP	25000	25000	45000	50000	75000	80000
TORA	32000	22000	59000	72000	64000	80000



IV. CONCLUSION

- A. AODV performs best at every level node (20, 40, 60)
- B. DSR performs well only at low level (20, 40) and for 60 nodes its characteristic are undeterminable for application ftp and http.
- C. GRP performs better than OLSR at low level (20) for parameter bit transmitted and received per second
- D. TORA performs well for bits transmit, received

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