PERFORMANCE MATRICES IN MANET USING AODV, OLSR

Hardeep Singh[1], Mohit Kumar [2]

[1] *Student, Department Of Computer Science and Engineering, DBU, Punjab (India)*
[2] *Assistant Professor, Department Of Computer Science and Engineering, DBU, Punjab (India)*

ABSTRACT

We are Focusing on Performance metrics in Mobile Adhoc network in which each node act as node as well as router. In this paper we are focusing on the model that will helpful in calculating the performance metric's in MANET like Data Dropped, Data Delay, Routing Load, media Access delay, Network load, retransmission Attempt, throughput. In our work, we use simple model for calculating the performance matrices' by Adhoc Network protocols AODV (Adhoc on demand Distance vector routing), OLSR (optimized Link State routing) by using these parameter obtained the performance matrices'. We will create the simulation by varying the intensity of nodes. By using Random Mobility Model the performance of AODV and OLSR is evaluated. Performance of the AODV is better than OLSR not only in terms of Load Capacity but according to other parameters like Delay, Data Dropped, load, Media Access Delay Retransmission Attempt etc when we move from lower density of nodes to higher density of node.

Keywords: MANET, AODV (Adhoc On Demand Distance Vector Routing), OLSR (Optimized Link State Routing)

I. INTRODUCTION

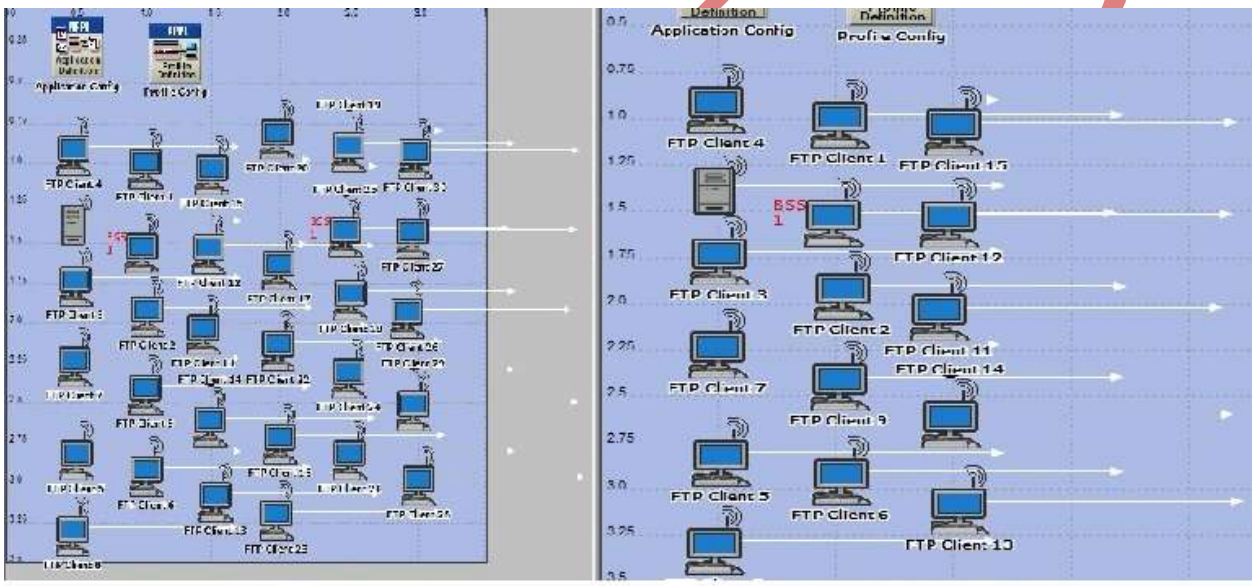
Mobile Adhoc network is the self-organization system in which is infrastructure less architecture.in this network every node act as a node as well as router. The rapid growth of Internet has made communication an integrated and highly important factor of computing. In today's scenario with the development of mobile devices it has become important to stay online all the time. In order to stay online all the time it must be possible to set up a network fast and cost effective when moving between different infrastructures, ad hoc networks deals with this kinds of issues. Furthermore in military operations or after environment disaster it is important to establish communication fast in addition it is highly probable the existing infrastructure has been destroyed. After the ad hoc network has been established the nodes that connect the network might move, say for example that one military squad is under heavy attack and has to escape. In ad hoc networks nodes should be able to move freely and the information should be routed through new paths after old ones have been broken, the network should also be able to handled clustering. The advent of ad hoc network has given birth to new kinds of routing algorithms and new security threats. The primary focus of this paper is to evaluate the performance metrics by

using the Ad hoc network protocols AODV and OLSR to find the Performance metric's for mobile ad hoc network.

II. METHODOLOGY, SIMULATION DESIGN RESULT AND DISCUSSION

METHODOLOGY

Our goal of experiment is to examine and quantify the effect of various factors on the overall performance of Ad hoc network. To achieve this we have Ad hoc model, consist of mobile nodes in which we will apply the various parameters Data Dropped, Data Delay, Routing Load, media Access delay, Network load, retransmission Attempt, throughput by using the ad hoc network protocols. For the simulation we have OPNET simulator 14.5 for wireless network with the help of that we can build the scenario's by varying the intensities and then create the various scenarios by using the AODV and OLSR protocols.



Scenario 1 (30 nodes) Scenarios 2 (15 nodes)

Fig 1.1 Scenarios (15 Nodes and 30 Nodes)

III. SIMULATION ENVIROMENT

Several researchers have done the qualitative and quantitate analysis of ad hoc routing protocol area by means of different performance metrics. They have used different simulators for this purpose which is one of several tools provided from the OPNET Technologies suite. For undertake the experimental evaluation, the most recently available version, namely OPNET MODELER 14.5 has been adopted in our study OPNET is one of the most extensively used commercial simulators based on Microsoft Windows Platform, which incorporates most of the MANET routing parameters compared to other commercial simulators available . The network entities used during the design of the network model are wireless server, application configuration, profile configuration, mobility configuration and workstations (nodes).

Parameter	Value
Simulator	OPNET MODELLER 14.5
Network Size	15 nodes,30 nodes
Protocol	AODV,OLSR
Address Mode	IPV4
Mobility Model	Random Mobility Model
Simulation Time	900 (Sec)

VI. RESULTS AND DISCUSSION

a) **Data Dropped**: A buffer overflow occurs when a program or process tries to store more data in a buffer (temporary data storage area) than it was intended to hold.

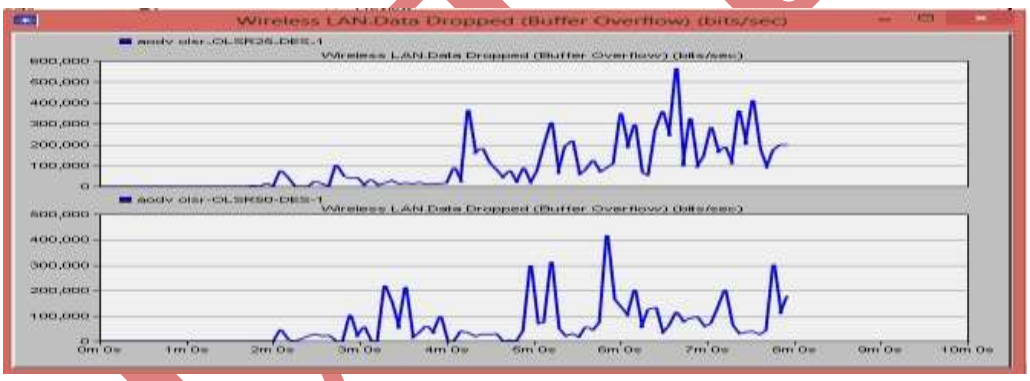


Fig 1.2 Data Dropped Using OLSR (15 Nodes and 30 Nodes)

From the above results it is clear that the delay using 15 nodes is more than that of 30 nodes.so performance is directly depends upon the delay if delay is more than performance is less. Here from the fig 1.2 it shows that delay in Data Dropped is 30 nodes.so performances is better in 30 nodes. if we increase the node density ,data dropped is less and thus performance is improved.

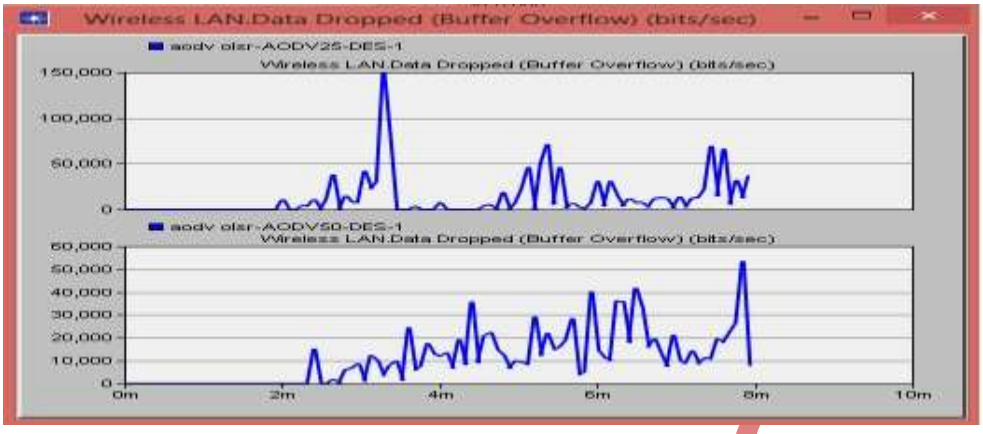


Fig 1.2 Data Dropped Using AODV (15 Nodes and 30 Nodes)

Here from the fig 1.2 it shows that delay in Data Dropped is 30 nodes. So a performance is better in 30 nodes. if we increase the node density ,data dropped is less and thus performance is improved for the AODV protocol.

b) **Data Dropped** (Retry Threshold exceeded bits/Sec) :This statistic records the total amount of data that was received from the upper layer and then dropped by all WLAN nodes in the network due to repeatedly failed retransmission (i.e, exceeded the corresponding short retry or long retry threshold value).

From the fig 2.1 and fig 1.2 it clears delay in Data Dropped is 30 nodes is more than 15 nodes by using the AODV and OLSR protocol.

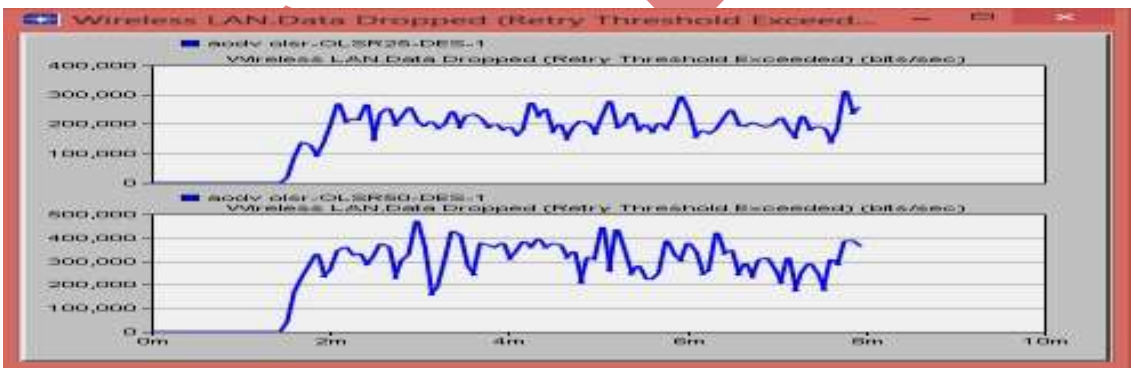


Fig 2.1 Data Dropped (Retry Thresh Hold Bits) Using OLSR (15 Nodes and 30 Nodes)

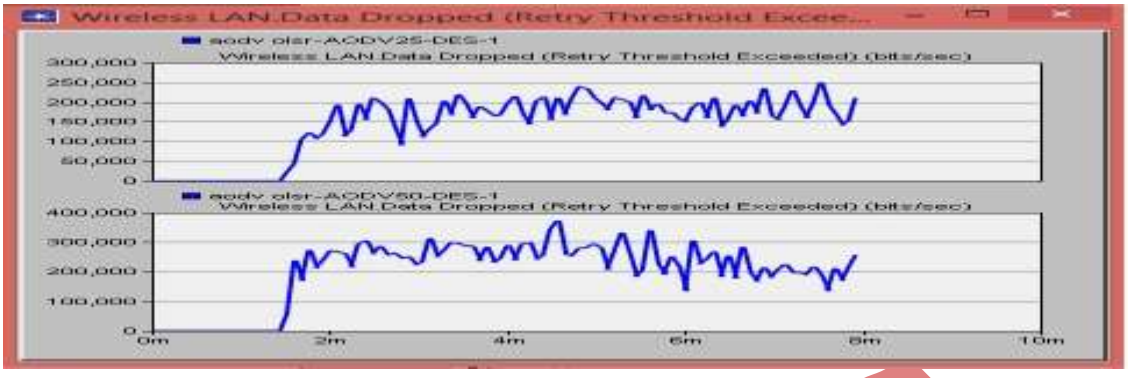


Fig 2.2 Data Dropped (Retry Thresh Hold Bits) Using AODV (15 Nodes and 30 Nodes)

c) **Load (Bits/Sec)**: This statistic records the total amount of data submitted by the upper layer for transmission by the WLAN layer on all the nodes in the network.

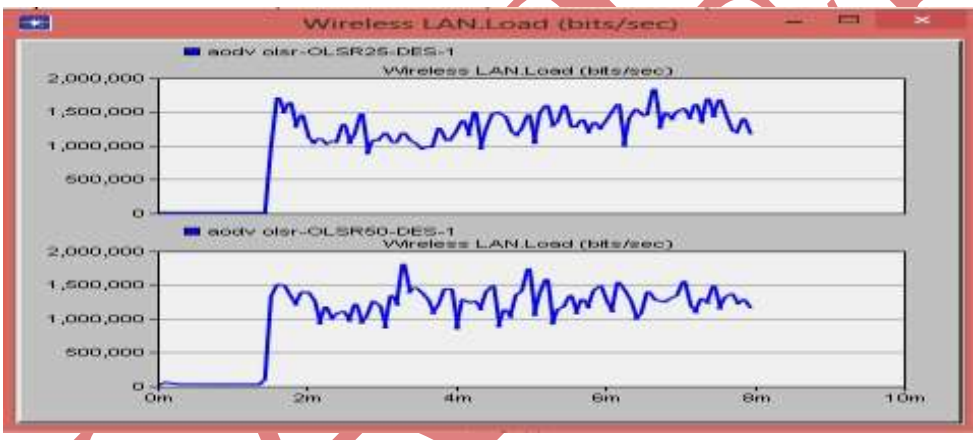


Fig 3.1 Load Using OLSR (15 Nodes and 30 Nodes)

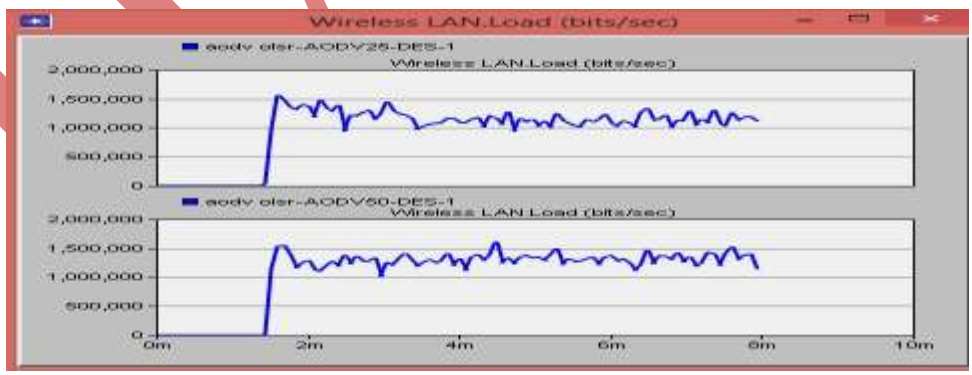


Fig 3.2 Load Using AODV (15 Nodes and 30 Nodes)

From the fig 3.1 and fig 3.2 it clears that Load carrying capacity in 15 nodes is more than 30 nodes by using the OLSR protocol and AODV protocol.

d) **Media Access Delay:** This statistic records the medium access delay experienced by the packets submitted for transmission on all WLAN interfaces in the network. This value is computed as the interval from the time the packets was inserted into the transmission queue until the time when the packet was sent to the physical layer for the first time.

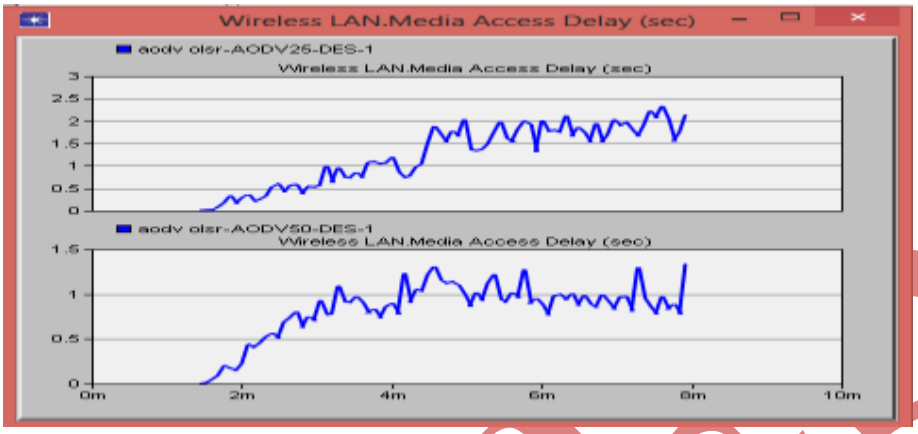


Fig 4.1 Media Access Delay Using AODV (15 Nodes and 30 Nodes)

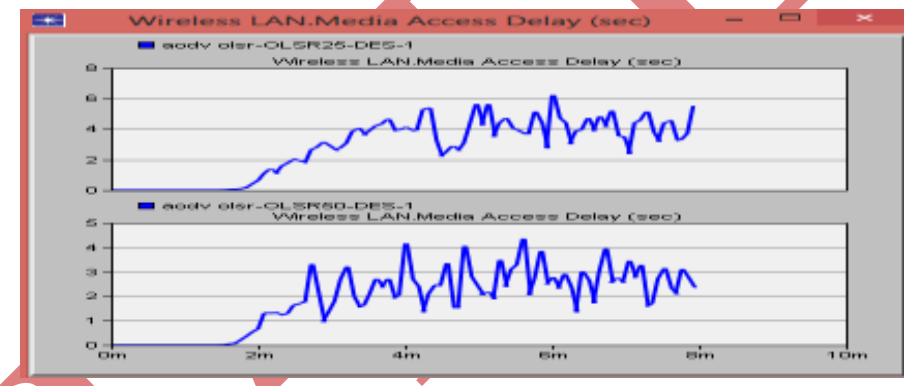


Fig 4.2 Media Access Delay using OLSR (15 nodes and 30 nodes)

From the fig 4.1 and fig 4.2 it clears that Mac Access Delay in 15 nodes is more than 30 nodes by using the AODV protocol and OLSR protocol.

e) **Network load (Bits/sec):** This statistic is computed on a per-BSS basic. It represented the amount of data from the higher layer that was received, accepted and queued for transmission by the entire WLAN BSS

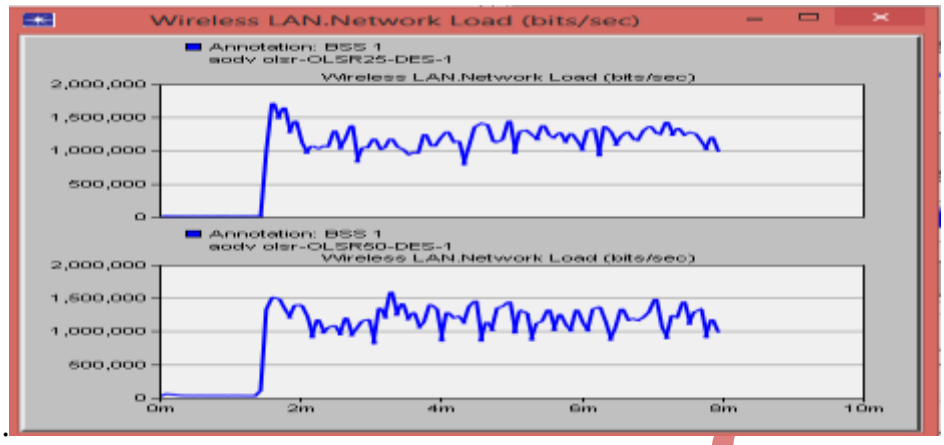


Fig 5.1 Network Load Using OLSR (15 Nodes and 30 Nodes)

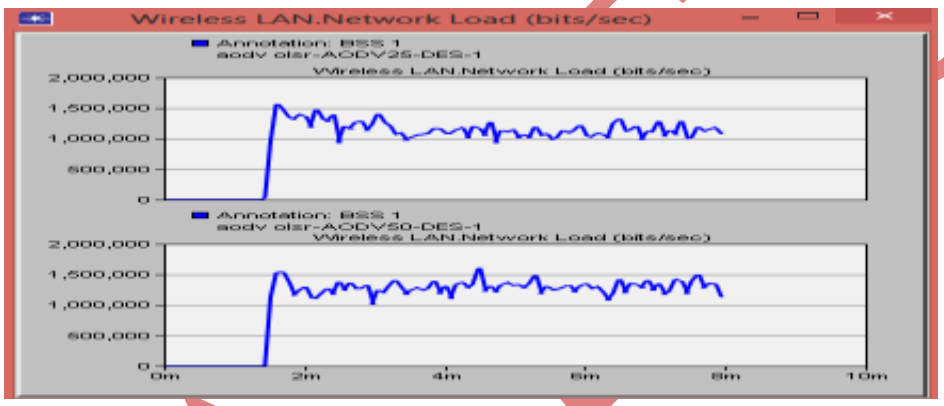


Fig 5.2 Network Load Using AODV (15 Nodes and 30 Nodes)

From the fig 5.1 and fig 5.2 it clears that Network Load in 15 nodes is more than 30 nodes by using the AODV protocol and OLSR protocol.

f) **Delay:** Represents the end to end delay of all the packets received by the wireless LAN MACs of all WLAN nodes in the network and forwarded to the higher layer.

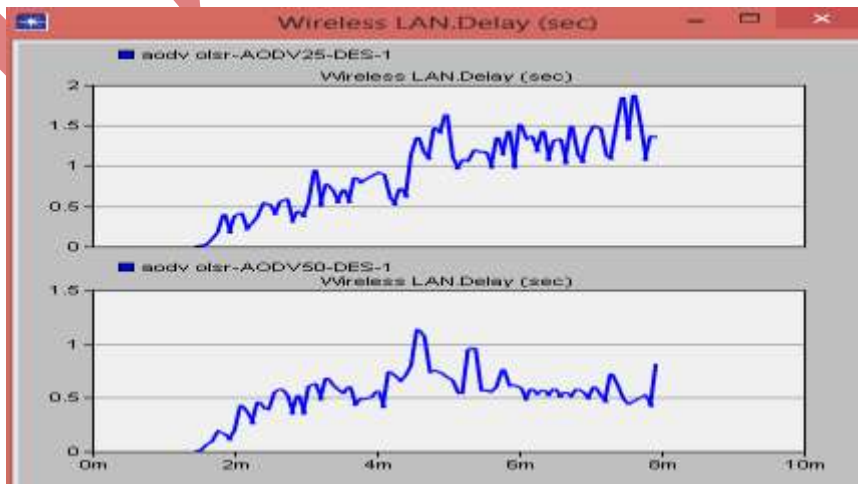


Fig 6.1 Delay Using AODV (15 Nodes and 30 Nodes)

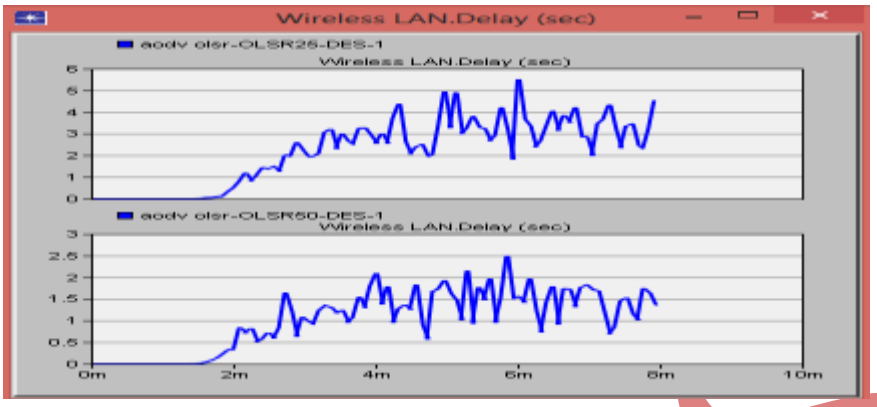


Fig 6.2 Delay Using OLSR (15 Nodes and 30 Nodes)

Fig 6.1 and fig 6.2 Delay it clears that Network Load in 15 nodes is more than 30 nodes by using the AODV protocol and OLSR protocol.

g) **Retransmission Attempt:** it is the numbers of retransmission attempts of packets as shown in the fig 7.2 and fig 7.3

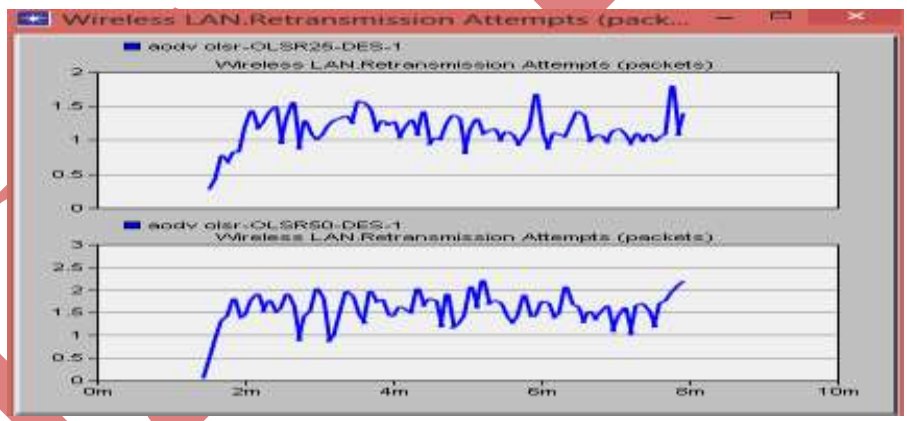


Fig 7.2 Retransmission Using OLSR (15 Nodes and 30 Nodes)

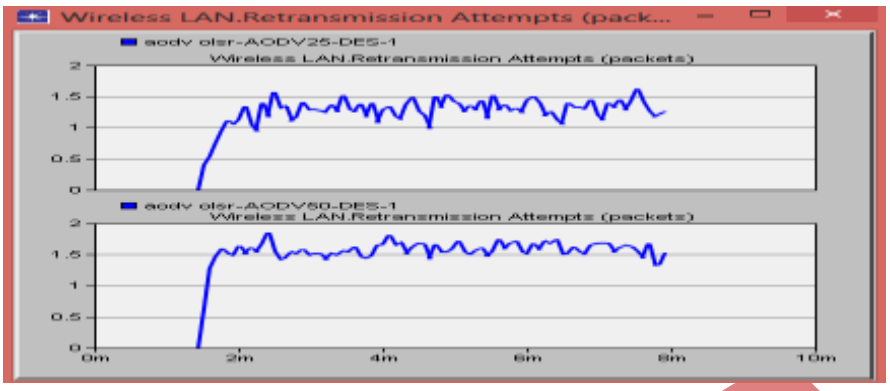


Fig 7.2 Retransmission Using AODV (15 Nodes and 30 Nodes)

From the fig 7.1 and 7.2 it is clear that retransmission in case of lesser density nodes have more retransmission than as compare with higher density of nodes.

h) **Throughput**: Throughput refers to how much data can be transferred from one location to another in a given amount of time.in the Fig 8.1 and Fig 8.2 the throughput in higher numbers of nodes is more as compare with lesser numbers of nodes.

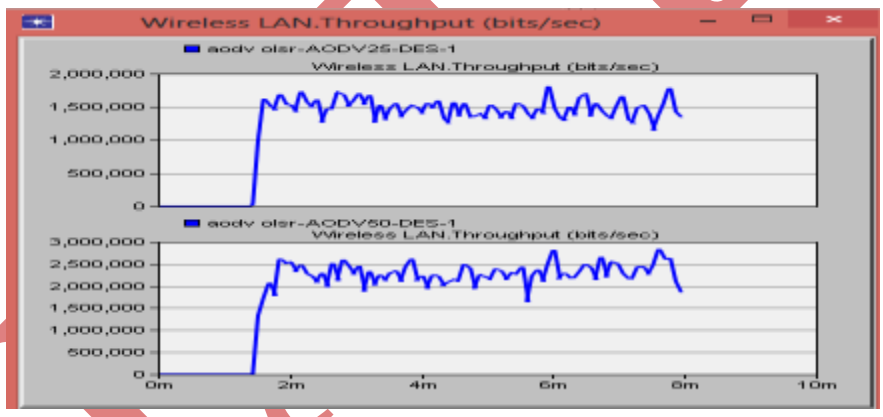


Fig 8.1 Throughput Using AODV (15 Nodes and 30 Nodes)

From the fig 8.1 and 8.2 it is clear that throughput in case of high density nodes have more throughput than as compare with lesser density nodes.

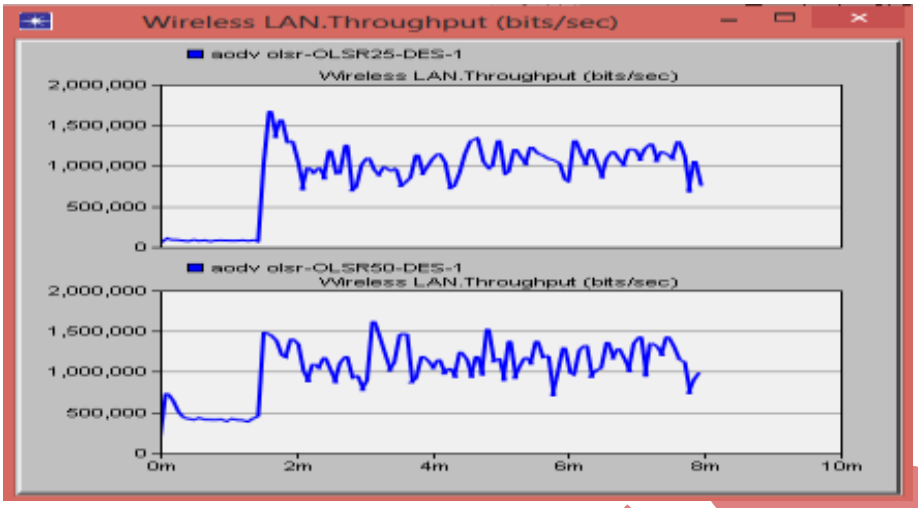


Fig 8.2 Throughput Using OLSR (15 Nodes and 30 Nodes)

Results: The result of various parameters like Data Dropped (Temporary Buffer Area), Data Dropped (Retry thresh hold exceeds bits), Load Capacity (Bits/sec), Media Access Delay, Network load (Bits/sec), Delay (Sec), Retransmission Attempt, Throughput are shown in table 1 and table 2 as given below by using the given models (higher as well as lower density of nodes).what we have observe is that performance of the in concern to Load Capacity of AODV is better than OLSR .

	Data Dropped (Temporary Buffer Area)		Data Dropped (Retry thresh hold exceeds bits)		Load Capacity (Bits/sec)		Media Access Delay	
	15 Nodes	30 Nodes	15 Nodes	30 Nodes	15 Nodes	30 Node	15 Nodes	30 Nodes
OLSR	more	less	less	more	more	less	more	less
AODV	more	less	less	more	less	more	more	less

	Network load (Bits/sec)		Delay (Sec)		Retransmission Attempt		Throughput	
	15 Nodes	30 Nodes	15 Nodes	30 Nodes	15 Nodes	30 Nodes	15 Nodes	30 Nodes
OLSR	more	less	more	less	more	less	less	more
AODV	more	less	more	less	more	less	less	more

Table2

From the above results we have concluded that performance of AODV is better than OLSR in case if we increased the number of nodes

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