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Performance Comparison of Destination Sequenced Distance Vector and Optimized Link State Routing Protocol using Tracegraph

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Abstract: **An Adhoc network is a special type of network containing a number of mobile hosts that are connected with one another via wireless connections. Adhoc word is used because the connections are established and network is developed only when needed. The nodes used in this network are mobile, therefore the established network is not permanent. It means that the network configuration changes time to time. All the links are temporary and will change every time a connection is made. Due to this, these networks does not hold any base station and also these are infrastructure less networks. Adhoc network does not have any special and specific routers. So, every mobile host will perform the functioning of router when required. The limited range of communication of all mobile nodes, every node cannot establish the connection with all the other nodes available in network directly. To communicate with others, a node takes help of its neighboring mobile hosts by developing links with them. A large number of protocols are available for finding out the best possible route between required nodes. Here, we study, analyze and compare the performances of destination sequenced distance vector routing (DSDV) and optimized link state routing protocol (OLSR), taking different density in network. Both protocols are proactive in nature, also known as table driven protocols. Some parameters are used to analyze the performance like average throughput of packets, end to end delay, size of packet etc. A simulator tool, ns-2 is preferred for simulation. An intelligent graph utility known as tracegraph is used to draw graphs.**

Keywords: Dsdv, Olsr, link state, distance vector, throughput, delay.

I. INTRODUCTION

In past communication was very difficult with wireless networks. Communication was only possible with wired networks but as technology is improving day by day it has become very easy to communicate by using wireless networks. These networks are highly dynamic in nature as links keeps on changing. So network is created only when need to communication arises. That's why these networks are called as ad-hoc networks. It is not possible for every node to have a direct link with all other moving hosts in the network. So some protocols are designed to provide routes. These protocols are divided as on-demand and table driven types. On demand protocols are also called as reactive protocols because these provide routes only when request comes for communication. Table driven protocols are also called as proactive protocols because these protocols always have routes available. Whenever there is some change in network topology tables stored at each node gets updates by flooding like methods and stale entries are removed. In this paper we study and analyze the results of two proactive protocols. It is Difficult to store and maintain entries at each node. So proactive protocols are not good for large networks as overhead created by flooding messages in these protocols is very large. All proactive protocols used for mobile ad-hoc networks use inbuilt algorithms to create routes between nodes.

II. DSDV

The protocol used to solve the major problem which is loop free path associated with distance vector protocol of wired network is Destination Sequenced Distance Vector Protocol(DSDV).It is a proactive or table driven protocol and it is based on Bellman-Ford algorithm. It was introduced by C. Perkins and P. Bhagwat in 1994.Each mobile host maintains a routing table where each entry contains destinations IP address, next hop IP address, number of hops to reach the destination, sequence number assigned by the destination node and settling time. Sequence number is the number which is used to remove stale entries from the routing table. If there is valid link available to destination then sequence number is generated by destination node which is owner node.

Owner node always uses even number. If there is a link break in the route a non owner node can also update sequence number for that route which is an odd number. Each mobile host advertises its own routing table entries with its neighbors nodes in update packet forms. To reduce traffic route update packet is of two types. Full dump packets are used to send complete routing table entries .Full dump packets are used in case of fastly changing network. Incremental update packets are used to send only those entries from the routing table that has a metric change since the last update and it must fit in a packet. It is used when the network is relatively stable to avoid traffic. Each route update packet in addition to the routing table information also contains a unique sequence number assigned by the transmitter. There are two ways to select a route.

1) The route labeled with the highest sequence number is used.

2) If two routes have the same sequence numbers then the route with the best metric cost is used.

Based on the past history, the nodes estimate the settling time of routes. The stations delay the transmission of a update packets by settling time so as to eliminate those updates that would occur for a very small time. Each row of the update packets contains Destination IP Address, Destination Sequence Number, Hop Count.

III. OLSR

Optimized link state routing (OLSR) protocol is a proactive protocol. It is an optimization of link state protocol used in wired network. As it is a table driven protocol it always has routes available. It used two types to messages hello messages and Topology control (TC) messages. Multipoint relay concept is used to reduce the traffic due to retransmission of flooding messages. In pure link state protocol links with all the neighbor nodes are declared. But in case of Olsr to reduce the size of control packet only links with multipoint relay selector are declared in hello messages. To minimize the control traffic it uses the concept of selected nodes called as Multi point relay (MPR) nodes. MPR's set is selected in such a way that set of one hop neighbor set of MPR's consist of all two hop neighbor nodes of multipoint relay selector. Only nodes selected as MPR can retransmit the broadcast messages. The nodes which are not in the MPR's set can only receive and process broadcast messages but cannot retransmit them. Each node maintains a list of MPR selector. Every packet coming from MPR selector is assumed to be retransmitted. This list keeps on changing every time nodes move. This change is reflected by the selector nodes in their hello messages. Each node in the MPR's set generates TC messages.TC messages consists of originator's address, addresses of MPR's set that node and MPR selector nodes. If a node is not selected as MPR by any MPR selector than it can not generate TC messages. Olsr is best suited for large and dense network as multipoint relay concept is best suited in this context. More dense a network is more optimization is achieved. MPR's set should as small as possible. Higher optimality is achieved in case of small MPR set. Every route in Olsr from source to destination is a sequence of hops which are multipoint relays. MPRs are one hop neighbors with bi-directional links available. MPRs act as intermediate nodes in every path. So to maintain routes in the routing table available each node has to periodically broadcast information about its one hop bi-directional neighbors. Each node creates and updates routes after receiving information. Selection of bi-directional nodes as intermediate nodes solves the problem related with acknowledgment of data packets along uni-directional links. With the help of hello messages each nodes can select its MPRs set because hello messages contain information about neighbors which are upto two hops. After receiving hello messages nodes can construct the list of its Multipoint relay selector nodes. In the neighbor table, Each node records the information about its one hop neighbors with their link status which can be uni-direction,bidirectional, MPR and two hop neighbors. The validity of entries of neighbor table depends upon the holding time. It also contains a sequence number which is incremented every time the MPR set of the local node is updated.

IV. RESULT

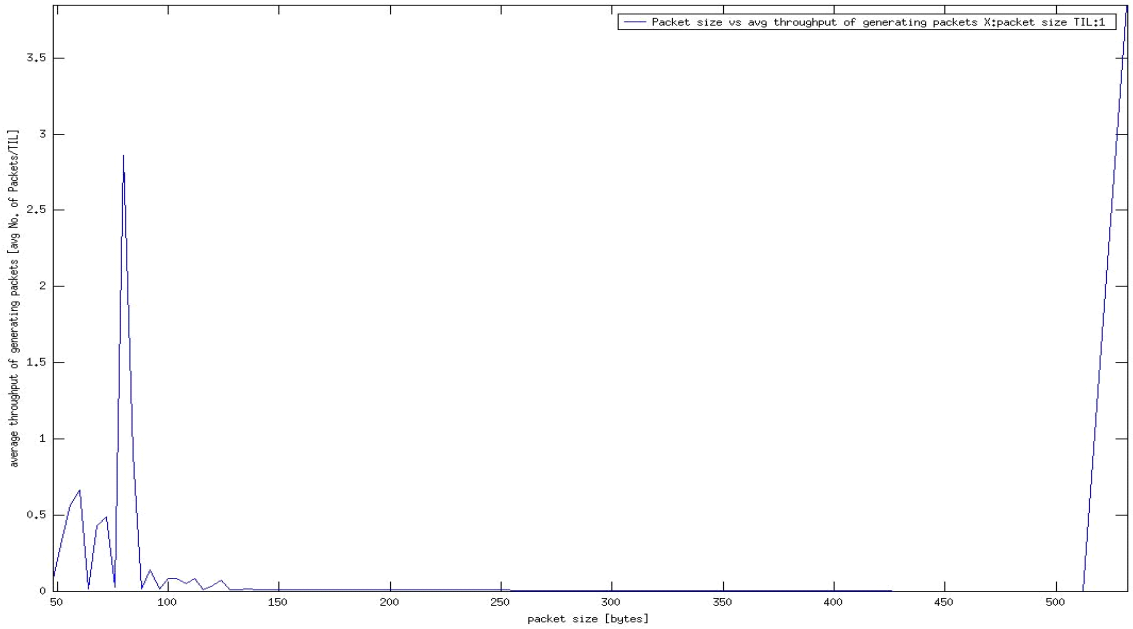
Table1: Parameters used

Metrices	Packet size vs throughput Packet size vs end to end delay Packet sent time vs average simulation
Number of nodes	15,30
Name of used Protocols	Olsr,Dsdv
Connection type	Tcp
Maximum size of packet	1000 bytes
Maximum topological area	550*550
Maximum time of simulation	140
Type of mobility model	Random way point model
Maximum length of queue	45 Packets
Name of Simulator used	Ns-2.35

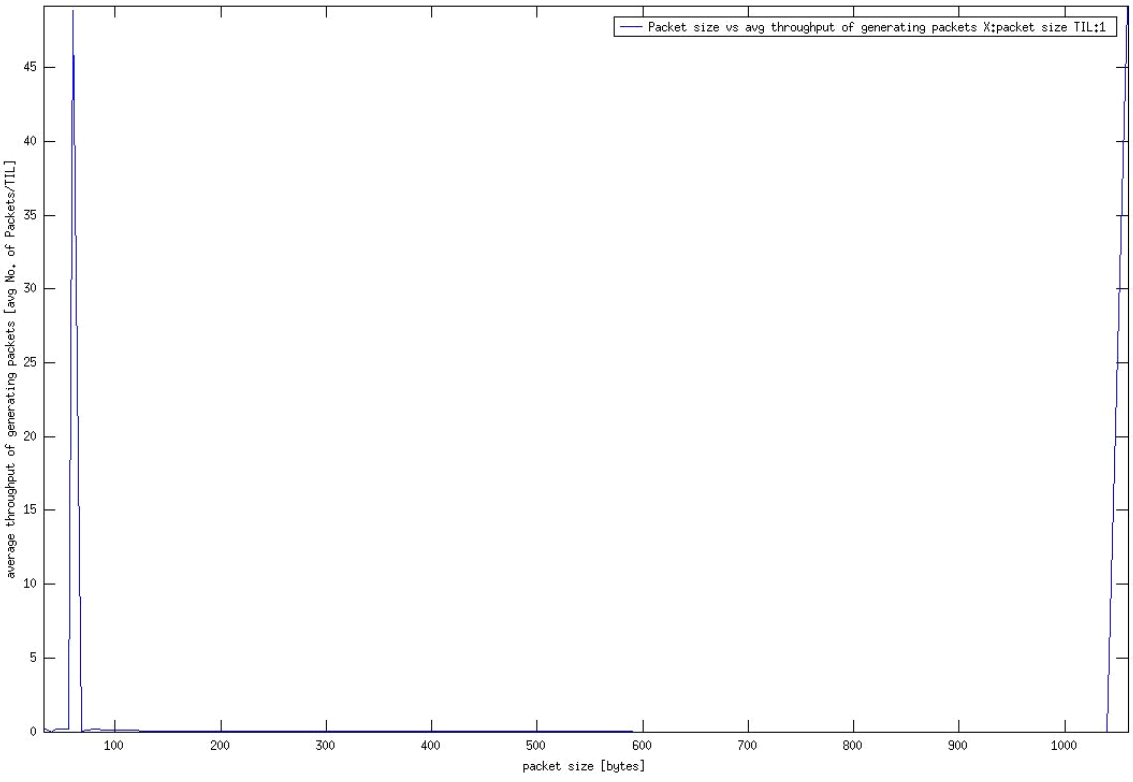
Graphs for 15 nodes

A) Graphs for packet size vs average throughput of generating packets

For OLSR

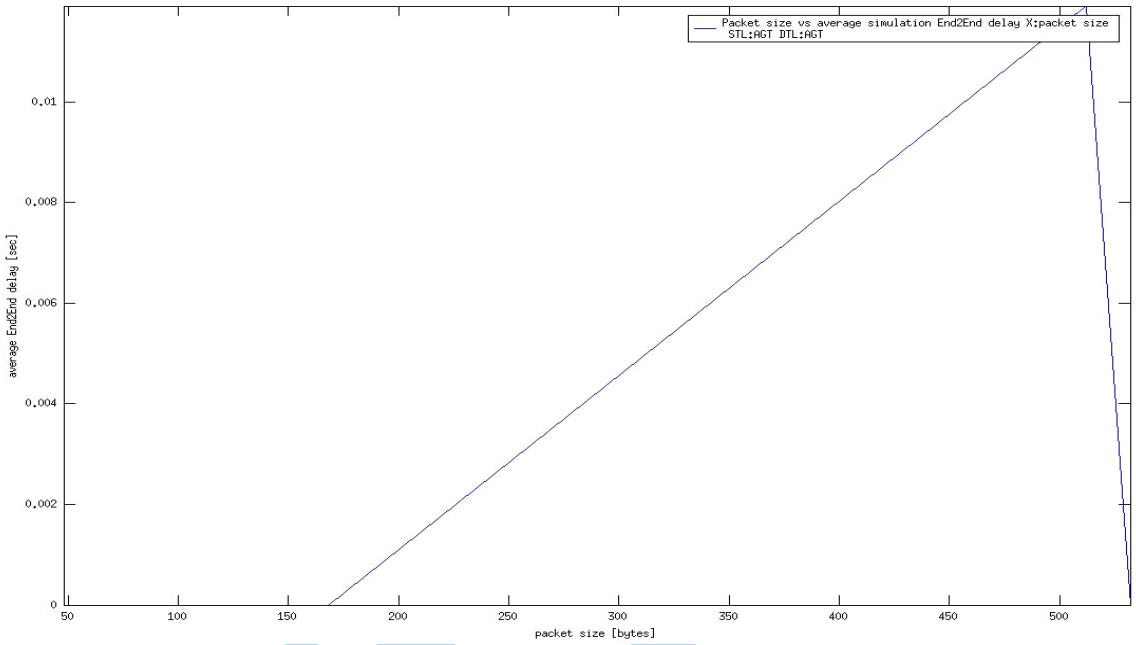


For DSDV

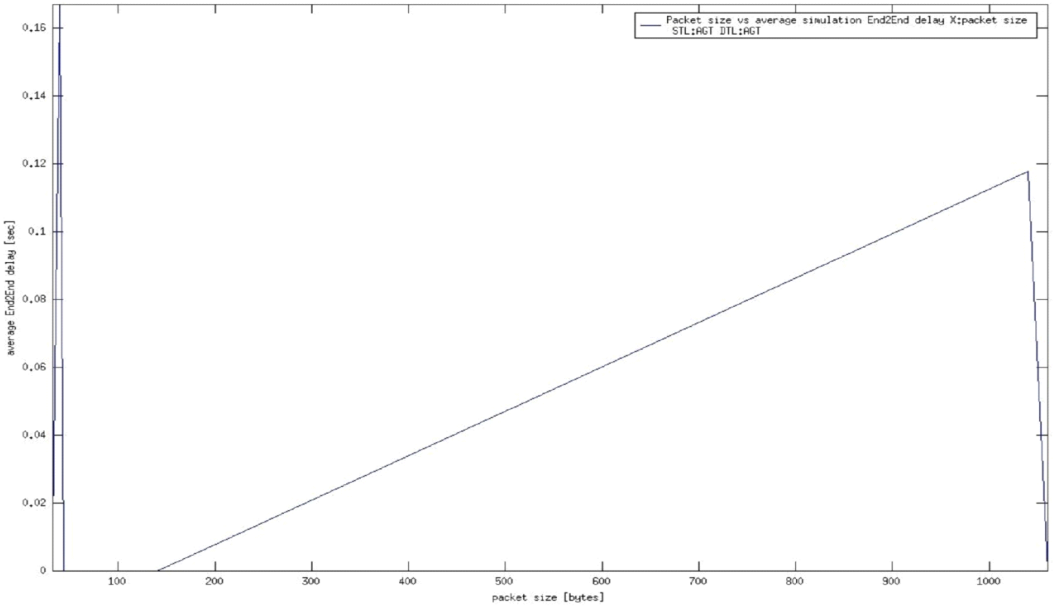


In case of 15 nodes we observe that as the packet size is increasing throughput of dsdv in much higher than olsr.

B) Graphs for packet size vs average simulation end to end delay
For OLSR



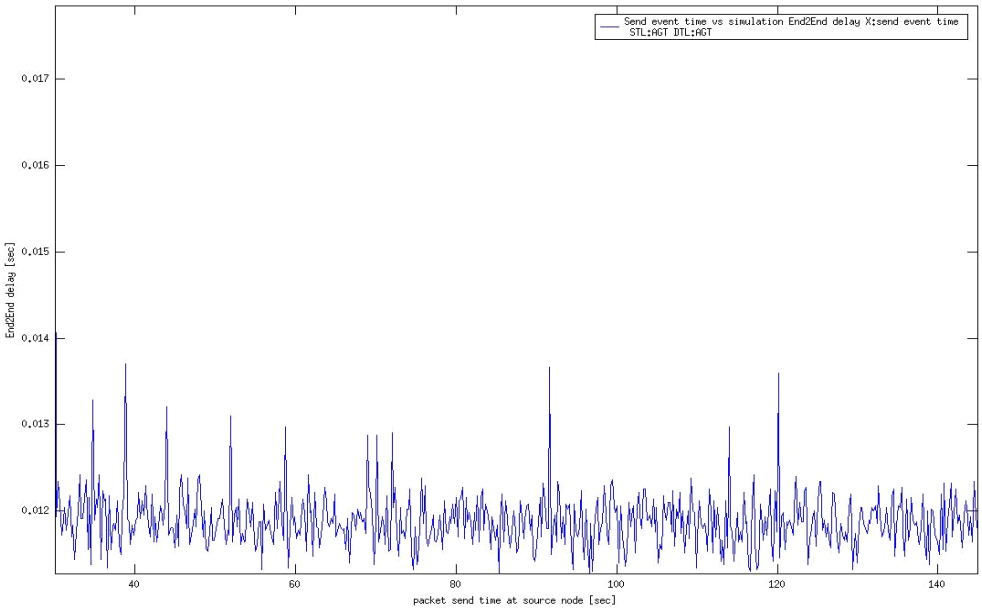
For DSDV



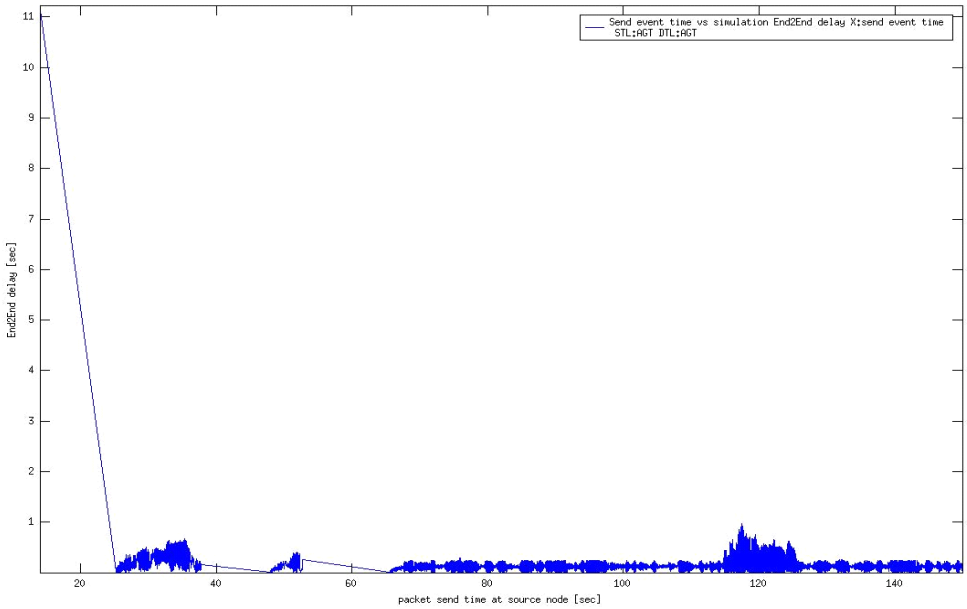
In case of 15 nodes we observe that as the packet size is increasing end to end delay of dsdv is slightly higher than olsr.

C) Graphs for packet send time vs simulation end to end delay

For OLSR



For DSDV

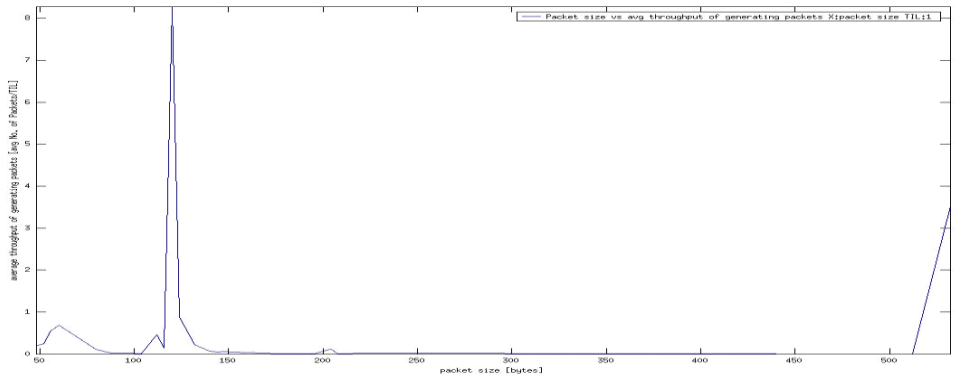


In case of 15 nodes we observe that as the packet sent time is increasing end to end delay of dsdv is much higher than olsr.

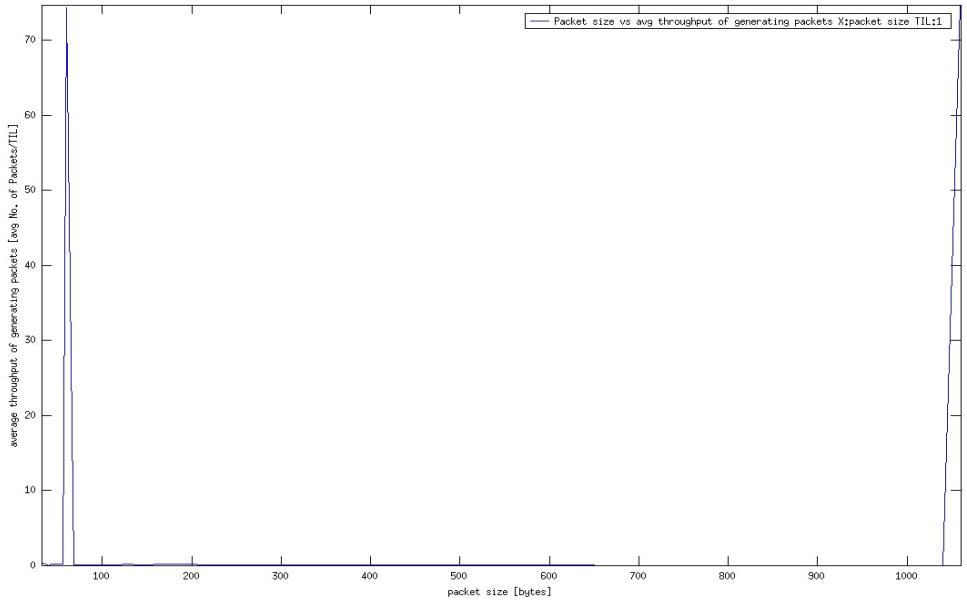
Graphs for 30 nodes

A) Graphs for packet size vs average throughput of generating packets

For OLSR



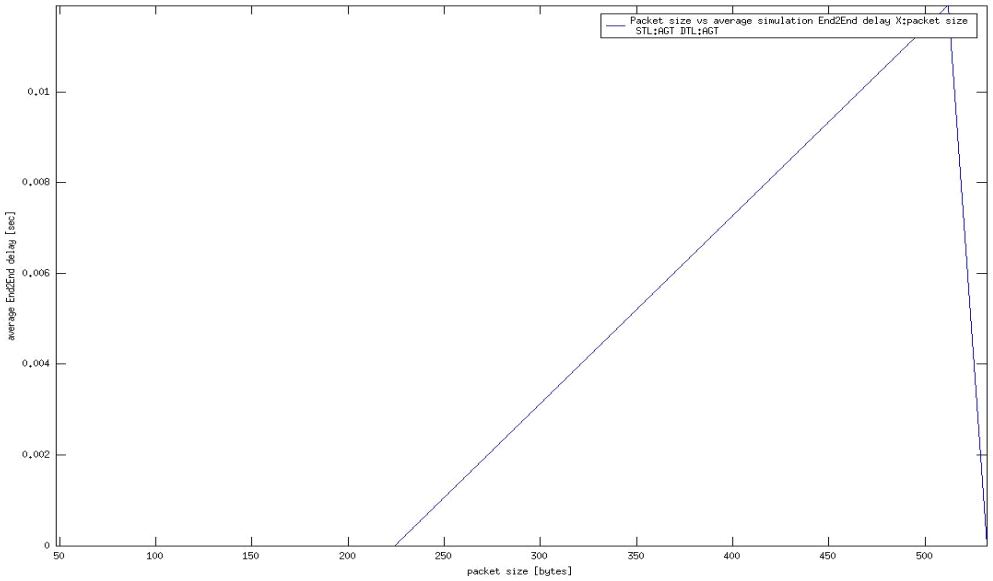
For DSDV



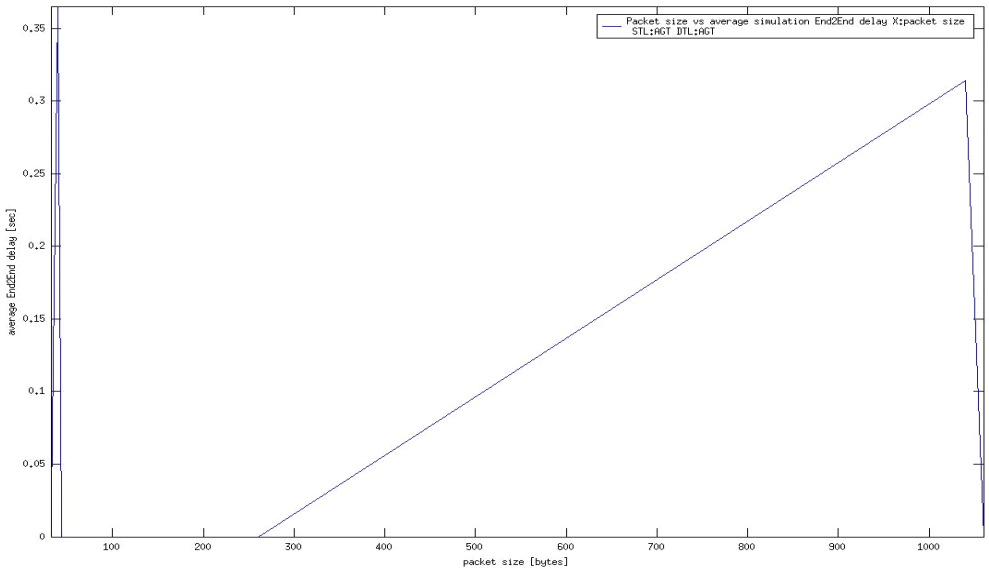
In case of 30 nodes as the packet size is increasing throughput of Olsr is higher than throughput of dsdv.

B) Graphs for packet size vs average simulation end to end delay

For OLSR



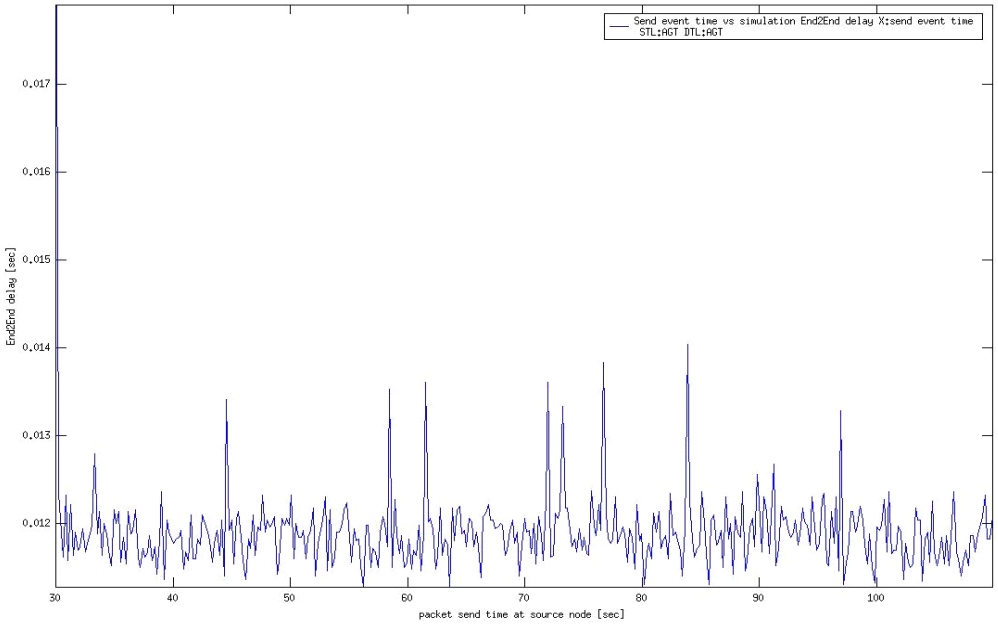
For DSDV



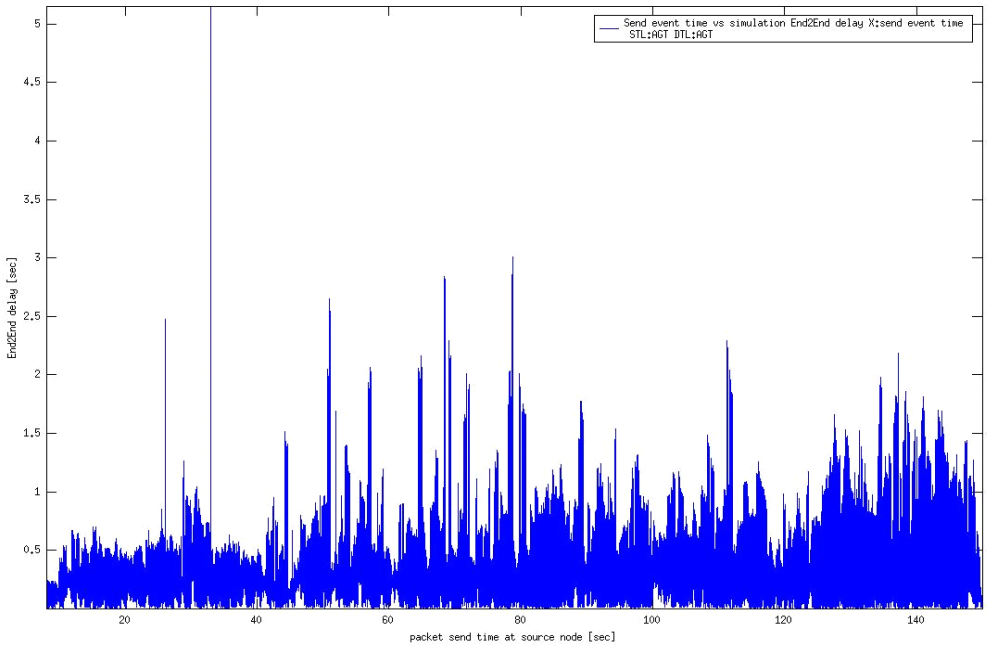
In case of 30 nodes as the packet size is increasing end to end delay of dsdv is higher than olsr.

C) Graphs for packet send time vs simulation end to end delay

For OLSR



For DSDV



In case of 30 nodes we observe that as the packet sent time is increasing end to end delay of dsdv is much higher than olsr.

V. SUMMARY

Both types of protocol are table driven. In this ns-2 simulation tool is used and the graphs are drawn using a utility-Tracegraph.
Three types of metrices are used namely-
a) Packet size vs throughput
b) Packet size vs delay
c) Sent time vs delay
Tcp connection is used containing 15 and 30 nodes.
1000 is taken as maxixum packet size.
The dsdv and olsr protocol will not transfer the packets if the size of packets exceeds 1000 due to the high traffic.
Following factors are used in tcl file:

- initial position of node,
- final position of node,
- total number of nodes,
- connection between nodes and
- simulation time.

The path taken by nodes to travel from source to destination is decided by nodes themselves.

VI. CONCLUSION

In this paper we have done performance comparison of two table driven routing protocols .ie. DSDV and OLSR. We come to know that the control overhead is very high while using olsr because of the large number of tables maintained. In case of olsr, the broadcast messages are very high in comparison with dsdv. A simulation tool known as ns-2 is considered to analyse the performances of both the protocols. To develop the graphs, an intelligent graph utility known as Tracegraph is used .For the comparison of dsdv and olsr, three parameters are taken into consideration namely packet size vs average throughput of generating packets ,packet size vs average simulation end to end delay and packet sent time vs simulation end to end delay. Comparison and analysis is done using 30 nodes.For analyzing, different types of connections are developed among nodes. According to these metrices,table2 is drawn.
It is observed that the throughput of olsr will be much better than the dsdv if number of nodes in the network increases.During dsdv, end to end delay is always better but not during olsr because the broadcast messages are very less in case of dsdv. Here we concluded that if density of network means no. of nodes increases then the delay also increases in dsdv. Thatswhy, dsdv is good to use only when the network has less number of nodes.

Table 2: Analysis of performances of olsr and dsdv

Metrices / No. of nodes	Packet size vs Throughput ↓			Packet size vs end to end delay			Packet sent time vs end to end delay		
15	OLSR	<	DSDV	OLSR	<	DSDV	OLSR	<	DSDV
30	OLSR	>	DSDV	OLSR	<	DSDV	OLSR	<	DSDV

VII. FUTURE WORK

Ns-3 and opnet tools can also be used to analyse the performances of the two table driven protocols .i.e dsdv and olsr. For developing graphs, some other graph utilities can be used like Xgraphs.To solve out the problem of control overhead in these protocols, some strict measures must be taken.But no well known solution is available till today to this problem, so it has wider scope for future work. All the proactive protocols are useful in the network which changes its topology again and again.

REFERENCES

[1]. Sakil Ahmad Ansari & Prof.Saoud Sarwar,"An Analytical Approach for Security Measures Issues in MANET", International Journal of Advanced Research in Computer Science and Software Engineering ,Volume 4, Issue 2, February 2014, ISSN: 2277 128X for Ad Hoc Networks
[2]. Kiranveer Kaur,Surinderjit Kaur & Vikramjit Singh," A Comprehensive Performance Analysis of Proactive and Reactive MANET Routing Protocols", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, Issue 2, February 2014 ,ISSN: 2277 128X
[3]. Gurpinder Singh & Asst. Prof. Jaswinder Singh," MANET: Issues and Behavior Analysis of Routing Protocols ",International Journal of Advanced Research in Computer Science and Software Engineering, Volume 2, Issue 4, April 2012, ISSN: 2277 128X
[4]. Ramandeep Kaur & Chandan Sharma,"Review paper on performance analysis of AODV, DSDV, OLSR on the basis of packet delivery",IOSR Journal of Computer Engineering (IOSR-JCE) ,Volume 11, Issue 1 (May. - Jun. 2013), e-ISSN: 2278- 0661,p-ISSN: 2278-8727
[5]. Rutuja Rajan More & S. V. Sankpal," Performance Evaluation of An Efficient DSDV Routing Protocol For AdHoc Networks ",ITSI Transactions on Electrical and Electronics

Engineering (ITSI-TEEE), Volume -1, Issue -4, 2013, ,ISSN (PRINT) : 2320 – 8945

[6]. NehaSingla & Ruby Gupta,"A Review of Performance Evaluation of the Routing Protocols in MANETs",International Journal of Innovative Research in Computer and Communication Engineering,Vol. 2, Issue 11, November 2014,ISSN(Online): 2320-9801 ISSN (Print): 2320-9798

[7]. Priyanka Goyal, Vinti Parmar & Rahul Rishi," MANET: Vulnerabilities, Challenges, Attacks, Application",IJCEM International Journal of Computational Engineering & Management, Vol. 11, January 2011 ,ISSN(Online): 2230-7893

