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XGRAPH & GNUPLOT IMPLEMENTATION OF AODV & DSDV ROUTING PROTOCOL IN MANET USING NS2

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Abstract: The Mobile Adhoc Network also called as MANET is basically wireless network without any fixed infrastructure. It has wireless mobile nodes which are randomly moving in given network topology. It supports dynamic topology where set of mobile nodes communicate each other with the help of routing protocols. A routing protocol decides how packets can be forwarded from source node to destination node via some intermediate nodes by distributing routing information to enable best possible route on a computer network. Therefore, routing protocol plays a important role for providing best route between nodes and establish communication within network. In this paper we have evaluated performance of two routing protocols- AODV(Ad-hoc On-demand Distance Vector) & DSDV (Destination-Sequenced Distance-Vector) using NS2.35 based on different network metrics. Also we have implemented Xgraph & Gnuplot utility of NS2.35, which is inbuilt function for plotting graphs.

Index Terms **- MANET, AODV & DSDV**

1. INTRODUCTION :

MANET Wireless ad-hoc networks consist of self- managed autonomous nodes without any fixed infrastructure. They have dynamic topology , that implies nodes can without much of a stretch join or leave the organization at some random moment [6-7]. This makes them very useful in various applications, like in military for connecting soldiers on the battle field and in disaster situation like earthquake for establishing a temporary network in place of a existing network which crash after a disaster. Ad-hoc networks are well suited for region where we want to have temporary network without any fixed infrastructure. Nodes in MANET communicate with each other by forwarding packets within themselves without an infrastructure.

MANET are alluded to be self getting sorted out and arranging remote organization network . For the information exchange purpose, nodes make use of wireless channel & forwards the information. In MANET, every node is acting as host or router that forwards data to other nodes or receives data from other nodes. Here in this type of network scenario if the collector hub is out of inclusion region from the sending hub who is communicating the information , then a routing calculation is constantly expected to figure out the best way between sender node and receiver node so that the packets reaches to its intended destination successfully To Support the process of connectivity & transmission , nodes makes use of routing protocols such as Destination-Sequenced Distance-Vector & Ad-hoc On-Demand Distance Vector [5].

2. ROUTING PROTOCOLS:

Routing is nothing but way of exchanging data from source node to destination node in the network via intermediate node. Due to short range of nodes, the remote divert directing routing channel in MANET is generally executed through multi-hop, where the message is ordinarily sent by the transitional intermediate mobile nodes. The directing conventions that are utilized in MANET characterizes the route and trade the packets in the nodes, from Source node to intended Destination node.

In this paper, we are going to provide brief idea about two basic types of routing protocols in MANET such as Destination-Sequenced Distance-Vector Routing & Ad-hoc On-demand Distance Vector Routing . Also we are going to evaluate performance of these two protocols using Xgraph & Gnuplot utility in NS2.35.

2. 1 Ad-hoc On-demand Distance Vector (AODV)

AODV is a type of reactive routing protocols, where routes are established on-demand. It follows principle of hop-to-hop routing which is used to find a route between the source and destination node as needed. For laying out a way from the source to the destination AODV utilizes control messages like Route Request (RREQ) and Route Reply (RREP)[5].

At the point when the source node needs to lay out an association with the destination node, it utilizes a control message-RREQ. This RREQ message is send by source to its neighboring nodes (intermediate nodes). In this way source broadcast RREQ message to its neighbors. The intermediate nodes then broadcast the RREQ message to their neighbors. This process of broadcasting RREQ message goes on repeat until the packet is received by destination node or an intermediate node that has a latest route entry for the destination in its routing table. Latest route entry means a valid route to the destination.

During this cycle middle of these intermediate nodes forward the route demand and simultaneously, these transitional nodes denotes a converse route to reach back to source node . At the point when the node gets the solicitation that has the route to the destination, it lays out a Route Reply (RREP) which incorporates number of jumps which are expected to arrive the destination [2]. Every node that aides in sending this answer to the source node. Basically RREP is unicasted from destination to source node. This complete process is called as route discovery in AODV. In the RREP messages Sequence numbers are likewise utilized and they act as time stamps. This permit nodes to analyze how new their data on the other node is. As per working algorithm of AODV, node increases its own sequence number, whenever is sends any control message like RREQ, RREP, RERR etc. Higher sequence number more accurate is the information . The node that sends the highest sequence number, its information is considered most up to date and route is established over this node by the other nodes. The significance of RERR message is when a link failure in an active route is detected, a RERR message is used to inform other nodes that link failure has been take place. We can say RERR message is used for route maintenance purpose.

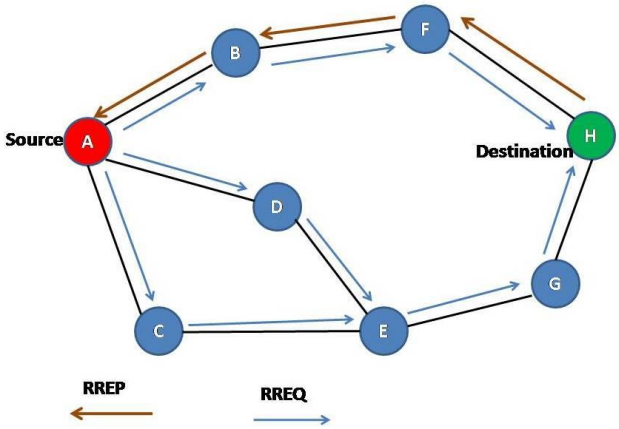

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Fig -1: RREQ and RREP in AODV

2.2 Destination Sequenced Distance Vector (DSDV)

DSDV is one of the popular table-driven or proactive routing protocols used in MANETs . In DSDV routing tables are maintained continuously in the network. DSDV works on principle of modified Bellman Ford Algorithm and uses basic concepts of Distance Vector Routing. In Distance Vector Routing (DVR), every node maintains vector table based on its distance to immediate nodes (neighbors).In sharing phase of DVR algorithm the other nodes broadcasts the updated routing information. Here the nodes which are not directly connected (not immediate neighbors) are marked as “infinite”. But, in DVR algorithm the updation of routing tables takes place in predetermined interval of time, which result an infinite loop which is known as Count-To-Infinity problem. To overcome this problem of count to infinity DSDV algorithm can be used by implementing sequence numbers in the routing table.

The working of DSDV is same as that of Distance Vector Routing but an additional field of sequence number is added. As per principle of DSDV, every node in the network has its own routing table which consist of information like: destination node, number of hops, metric and sequence number associated with it that helps to avoid the routing loops [1]. The sequence number is increased each time a node sends a refreshed message. Directing tables are occasionally refreshed when the geography of the network changes and are shared all through the network to keep legitimate data all through the network organization. At the point when the topology change happens, an identifying node sends an update packet to its adjoining nodes and the adjoining node then extracts the information from the packet and updates its directing table.

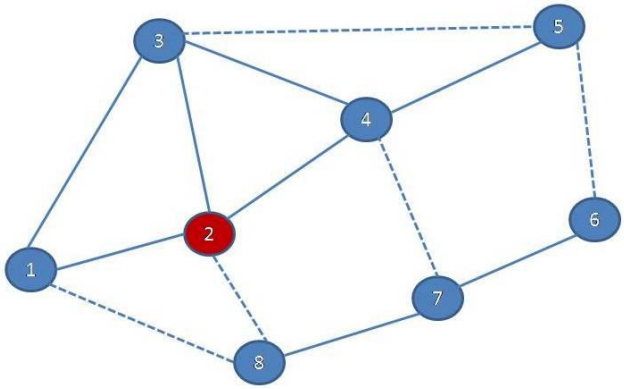

Fig -2: DSDV Network

Destination	Next Hop	Metric	Dest.Seq. No.
1	1	1	129
2	0	0	567
3	3	1	273
4	4	1	171
5	4	2	357
8	1	INF	441

Fig -3: Node 2 Routing Table in above DSDV network

3. SIMULATION RESULTS

3.1 AODV Network Simulation

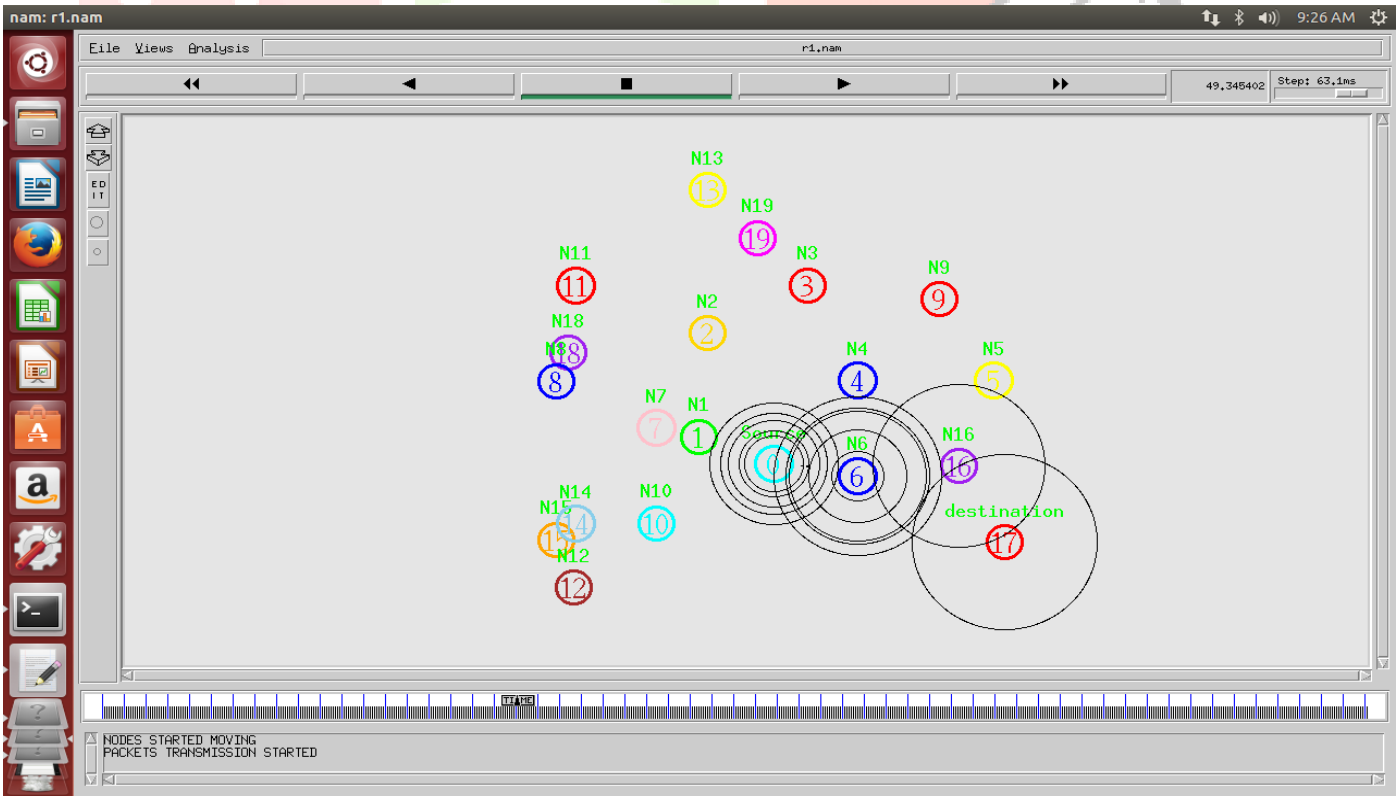

Fig -4: AODV Network with 20 nodes in NS2

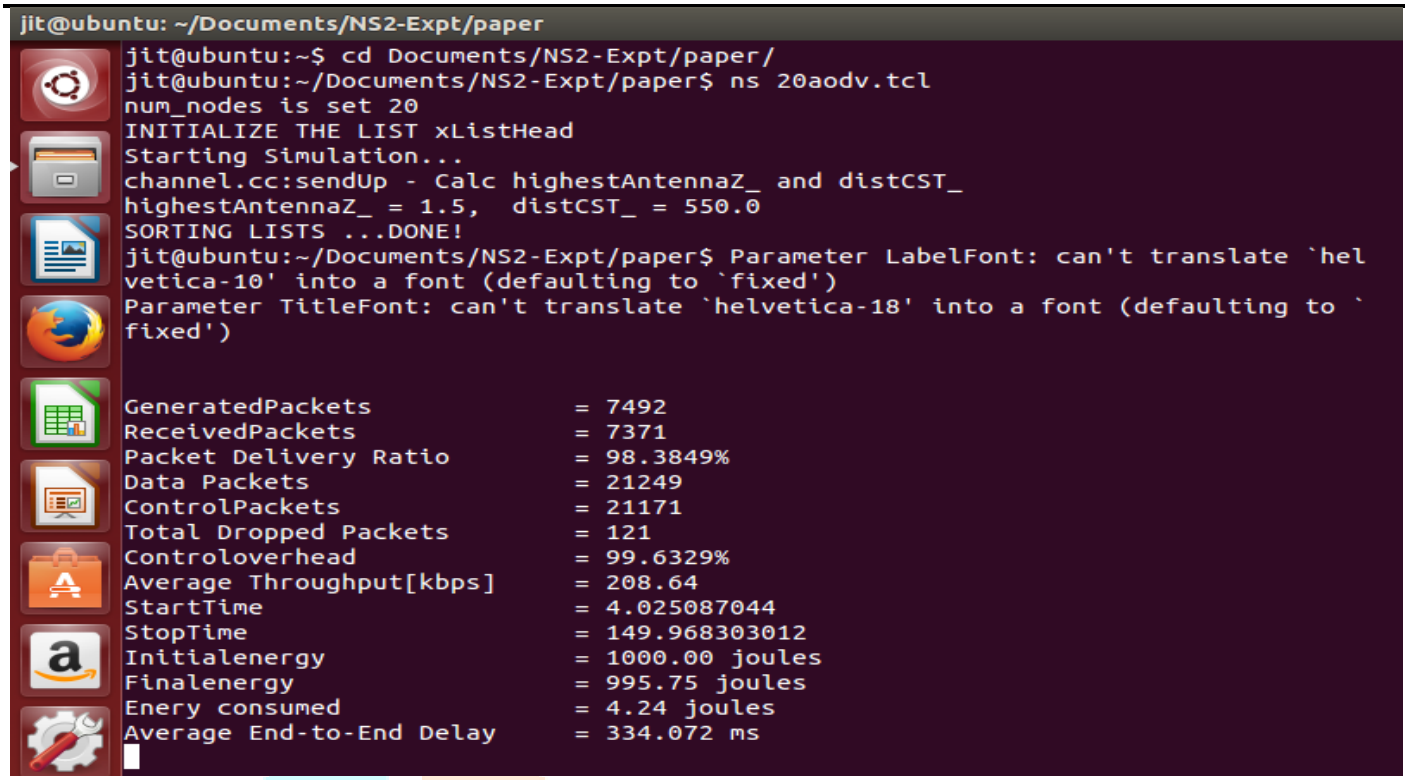

Fig -5: Performance Parameters of AODV Network

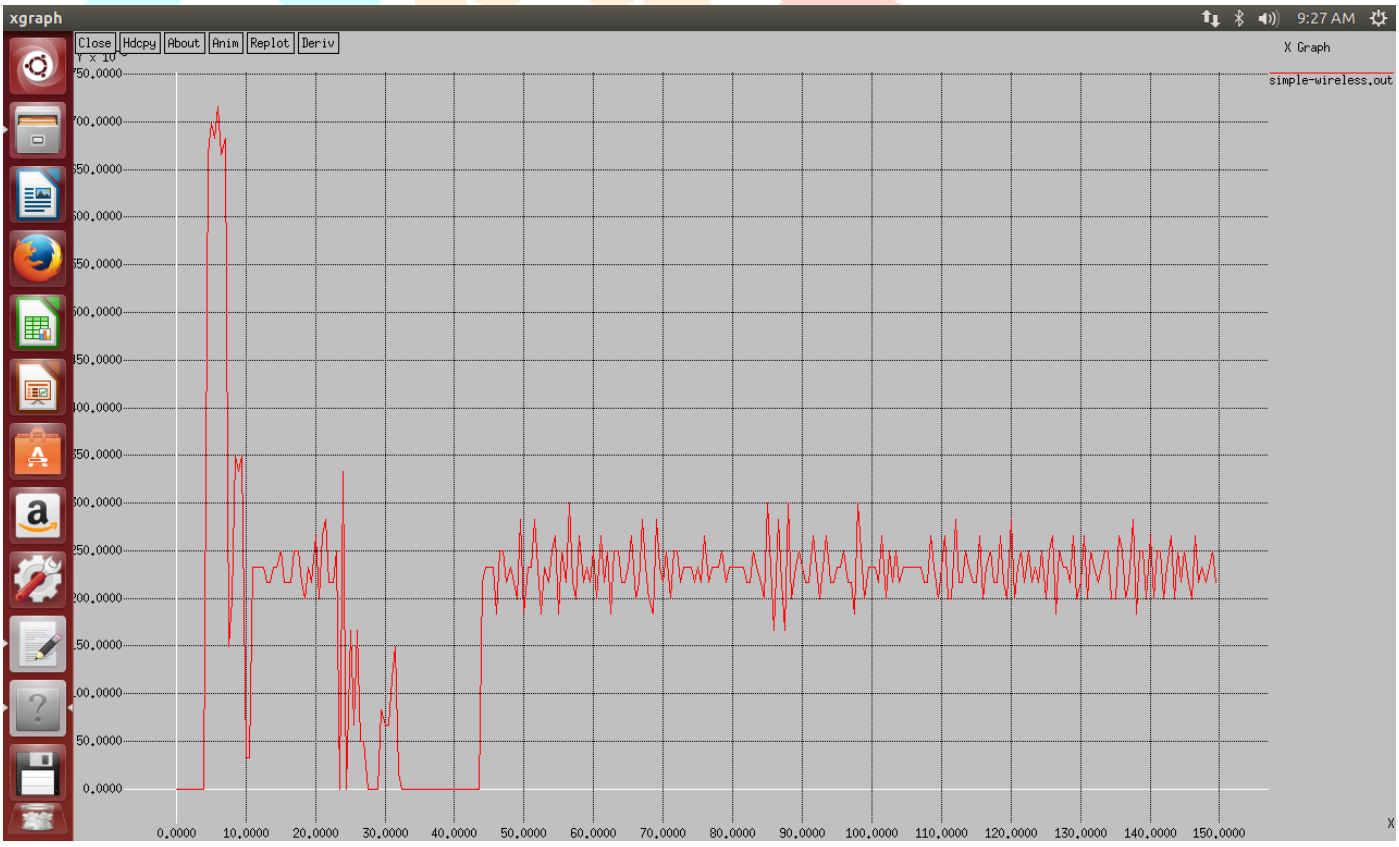

Fig -6: Xgraph of Packet Transmission in AODV Network with 20 nodes in NS2

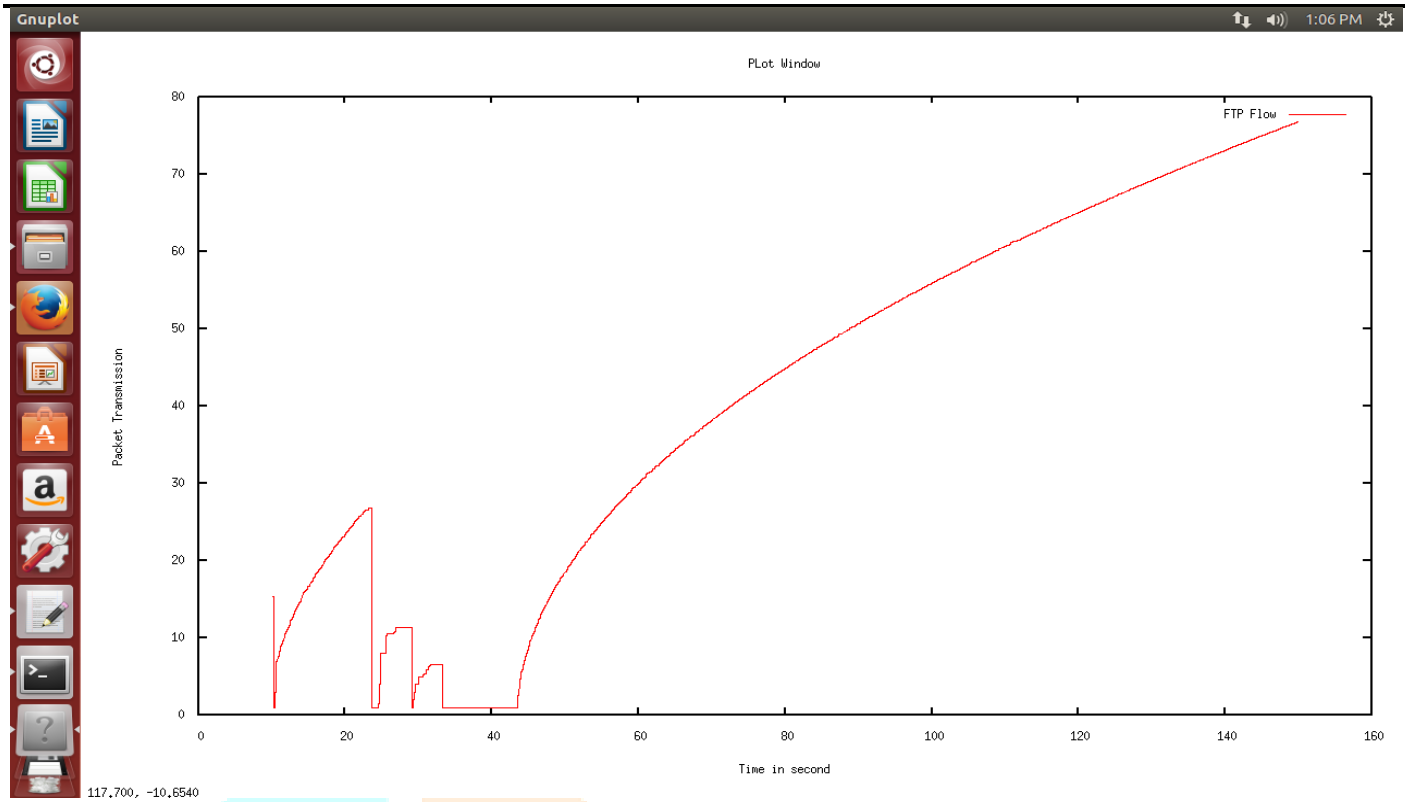

Fig -7: Gnuplot of Packet Transmission in AODV Network with 20 nodes in NS2

3.2 DSDV Network Simulation

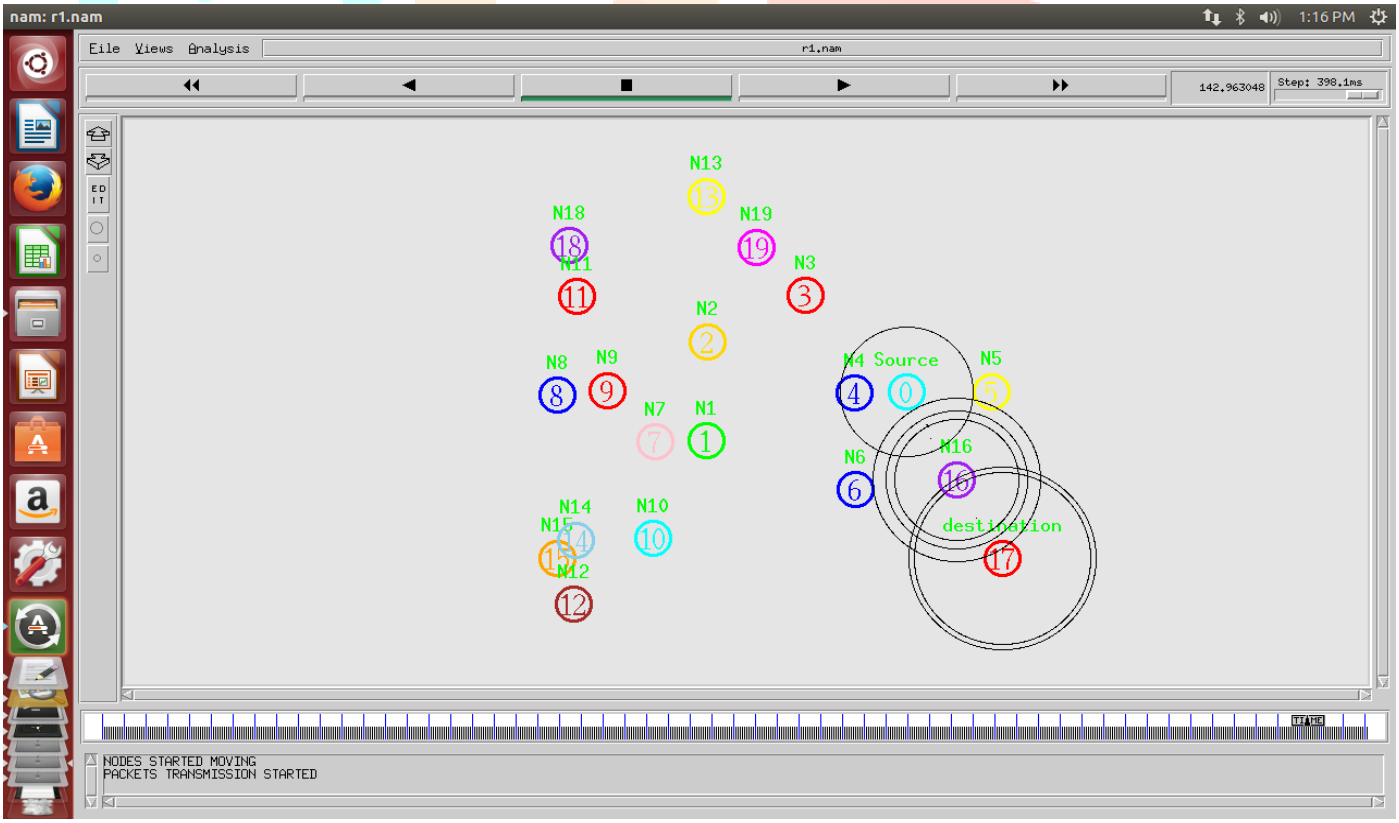

Fig -8: DSDV Network with 20 nodes in NS2

```
jit@ubuntu: ~/Documents/NS2-Expt/paper
jit@ubuntu:~$ cd Documents/NS2-Expt/paper/
jit@ubuntu:~/Documents/NS2-Expt/paper$ ns 20dsdv.tcl
num_nodes is set 20
INITIALIZE THE LIST xListHead
Starting Simulation...
channel.cc:sendUp - Calc highestAntennaZ_ and distCST_
highestAntennaZ_ = 1.5,  distCST_ = 550.0
SORTING LISTS ...DONE!
jit@ubuntu:~/Documents/NS2-Expt/paper$ Parameter LabelFont: can't translate `hel
Parameter TitleFont: can't translate `helvetica-18' into a font (defaulting to `


GeneratedPackets              = 6811
ReceivedPackets               = 6283
Packet Delivery Ratio         = 92.2478%
Data Packets                  = 12164
ControlPackets                = 12093
Total Dropped Packets         = 528
Controloverhead               = 99.4163%
Average Throughput[kbps]      = 176.668
StartTime                     = 4.007601333
StopTime                      = 149.978617067
Initialenergy                 = 1000.00 joules
Finalenergy                   = 997.49 joules
Enery consumed                = 2.51 joules
Average End-to-End Delay      = 238.434 ms
```

Fig -9: Performance Parameters of DSDV Network

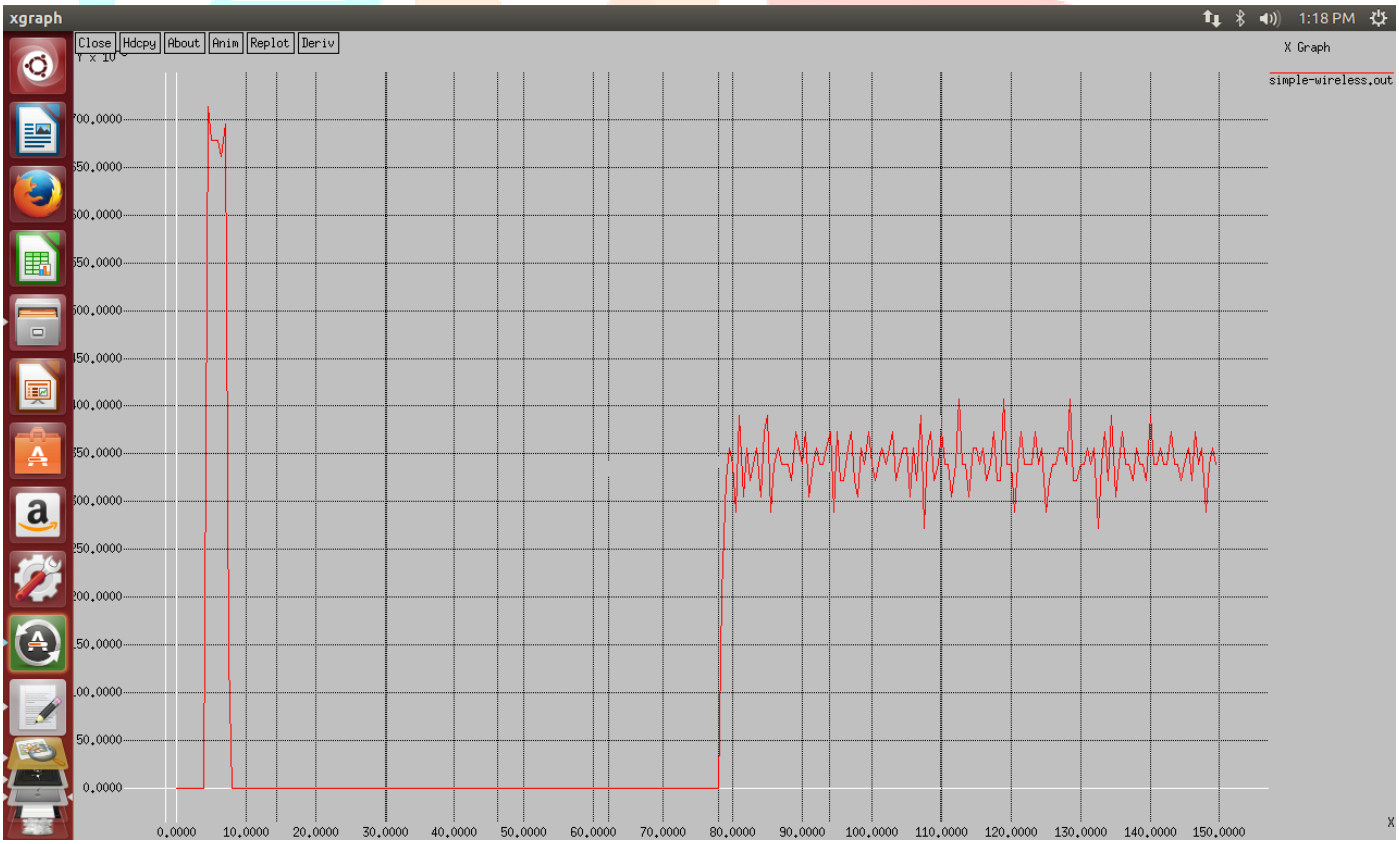

Fig -10: Xgraph of Packet Transmission in DSDV Network with 20 nodes in NS2

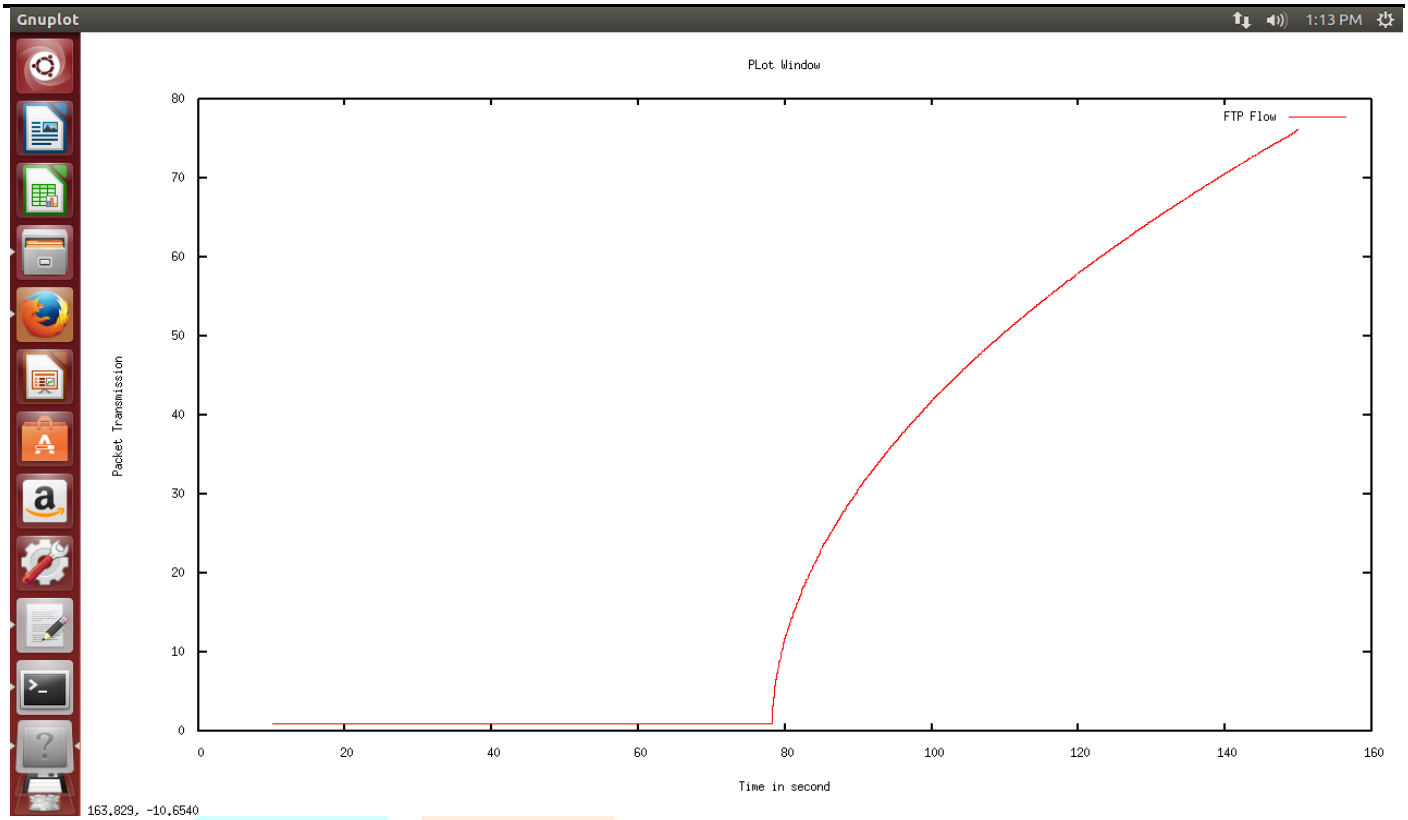

Fig -11: Gnuplot of Packet Transmission in DSDV Network with 20 nodes in NS2

Table 1 – Performance Metrics

Parameters	**Number of Nodes= 20**	
	AODV	**DSDV**
Generated Packets	7492	6811
Received Packets	7371	6283
Packet Delivery Ratio %	98.38%	92.24%
Data Packets	21249	12164
Control Packets	21171	12093
Total Dropped Packets	121	528
Control Overhead %	99.63%	99.41%
Average Throughput (Kbps)	208.64	176.668
Average End-to-End Delay (ms)	334.072	238.434

4. CONCLUSIONS

In this paper we have presented the performance analysis between Destination Sequenced Distance Vector Routing as a proactive routing protocol and Ad hoc on demand distance Vector Routing as reactive routing protocols on basis of performance metrices such as packet delivery ratio, average throughput, average end to end delay etc. For simulation , Network Simulator (NS) version 2.35 is used and also we used xgraph & Gnuplot utility to plot graphs for better understanding.
From analysis, if overall bandwidth is considered then AODV is better than DSDV. Because DSDV algorithm periodically broadcast routing table. Also average throughput & packet delivery ratio of AODV is better than DSDV.

REFERENCES

[1] Prof. B.N. Jagdale[1] , Prof. Pragati Patil[2] , Prof. P. Lahane[3] , Prof. D. Javale[4], "*Analysis and Comparison of Distance Vector, DSDV and AODV Protocol of MANET*", International Journal of Distributed and Parallel Systems (IJDPS) Vol.3, No.2, March 2012.

[2] Fahad Taha AL-Dhief1, Naseer Sabri2, M.S. Salim3, S. Fouad4, S. A. Aljunid2 , "MANET Routing Protocols Evaluation: AODV, DSR and DSDV Perspective", MATEC Web of Conferences 150, 06024 (2018).

[3] 1Anuj Gupta, 2Navjot Kaur, 3Amandeep Kaur, "A Survey on Behaviour of AODV and OLSR Routing Protocol of Manets under Black Hole Attack", IJCST Vol. 2, Issue 4, Oct. - Dec. 2011.

[4]Radha Raman Chandan , Bindeshwar Singh Kushwaha, Pramod Kumar Mishra "Performance Evaluation of AODV, DSDV, OLSR Routing Protocols using NS-3 Simulator" , I. J. Computer Network and Information Security, 2018, 7, 59-65.

[5] C. E. Perkins, E. Beliding-Royer, and S. Das, "Ad hoc on-demand distance vector (AODV) routing," IETF Internet Draft, MANET working group, Jan. 2004.

[6] Singh, G. and A. Singh, "Performance Evaluation of Aodv and Dsr Routing Protocols for Vbr Traffic for 150 Nodes in Manets" International Journal of Computational Engineering Research. 2(5). (2012)

[7] Kaur, R. and M.K. Rai, "A novel review on routing protocols in MANETs". Undergraduate Academic Research Journal (UARJ), ISSN, 2278: p. 1129. (2012)