

# Performance Evaluation of Dynamic Source Routing Protocol

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**Abstract:-** Mobile Ad Hoc Network (MANET) is an infrastructure less network where the nodes doesn't required any fixed infrastructure or base station to transmit data. Nodes are self-organizing and self-configuring. The routing protocol is used in such a network to find a proper link through which packets will be transmitting from its source to destination. An ad-hoc network routing protocol aims to meet the challenges of dynamically changing topologies in a network and handle a lot of nodes with limited resources. It is a challenging task to design routing protocols for these types of networks due to their dynamic nature In this research work we have analyzed Dynamic Source Routing protocol with FTP traffic over the network. For simulation we have used NS2 simulator through which we have created network design model and simulate the result. We have evaluated delay, network load, packet delivery ratio (PDR), route discovery time and throughput of the network as performance metrics.

**Keywords:-** MANET, DSR, Delay, PDR, Network load, Throughput.

## I. INTRODUCTION

Mobile Ad-Hoc Networks can transfer data packets between two nodes without using any fixed infrastructure [1]. Nodes act as both hosts and routers in these types of networks. Nodes can join or move out of the network freely. A node can communicate with any other node directly if they are both within transmission range and can communicate with the nodes outside transmission range using intermediate nodes. Routing is much more difficult in these types of networks as topology keeps changing dynamically. So routing protocols need to be more dynamic in these networks to respond as fast as to change the topology [2]. Routing protocols in MANET establish an optimum and efficient link to transmit data packets from the source node to the terminus node. Fig.1 shows MANET architecture.

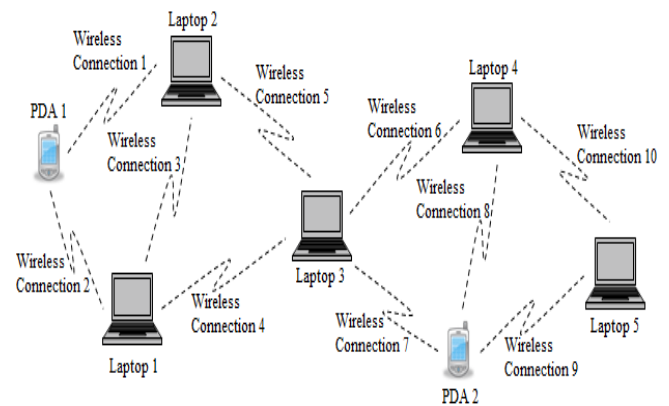


Fig. 1: Architecture of a mobile ad hoc network

Performance evaluation of DSR routing protocol has done in this research. We have experimented the performance of AODV by performance parameters of delay, network load, packet delivery ratio, packets dropped, route discovery time and throughput. We have used NS2 as network simulator.

## II. DSR ROUTING PROTOCOL

In the features of DSR protocol there is no need to contain periodic routing information messages in routing table as like table-driven approach. DSR protocol bound the limit of bandwidth consumed by packets. It is signal-less routing protocol. Two main mechanism are maintained in dynamic routing protocol (DSR): Route discovery and Route maintenance. This two mechanism provides a complete structured mechanism together to find out, justify and maintain the optimal route.

### A. Advantages of DSR:

- Since full routing table is not needed to check, less memory storage is enough for each node.
- Periodic messages are not necessary. So, lower overhead is needed.

### B. Disadvantages of DSR:

- Transmission process is comparatively slower than other routing protocols.
- There has possibilities to link change frequently. If it is there, stale routes can occurs.

### III. METHODOLOGY

We have discussed the performance of DSR routing protocol along with different parameters that are considered as performance metrics to implement the result below.

#### A. Network setup

We have used NS2 simulator to execute the DSR routing protocol performance with different parameter.. We have created a wireless network with 20 numbers of nodes. We have used TCP as source agent and TCP sink as destination agent. FTP application is created to the nodes. The network scenario generated by NS2 simulator is given below.

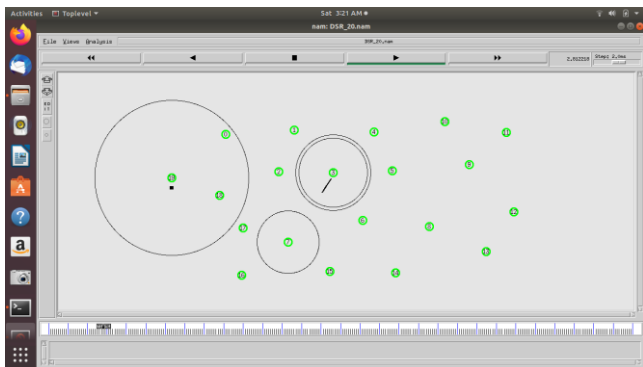


Fig. 2: Animation of the network

#### B. MANET Performance Metrics

We have used the following network performance parameters in our research work.

**Delay:** It means the total time required for a packet to be transmitted from its source to destination node through the network.

**Throughput:** Total number of packets transmitted per second through a communication medium or system. It can also be measured as the amount of packets successfully delivered per second taken away source to terminus node in the network.

**Network Load:** It defines the consumption of link capacity across mobile nodes through the network. That means the number of data traffic transmitting through the link per second.

**Packet delivery ratio:** It means the ratio between the numbers of packets successfully received by the total number of packets sent by sender.

**Route discovery time:** The time required to find a path to transmit packets to its specific destination.

**Data packet dropped:** It means the number of packets fails to reach intended destination.

### IV. RESULT AND DISCUSSION

#### A. Delay:

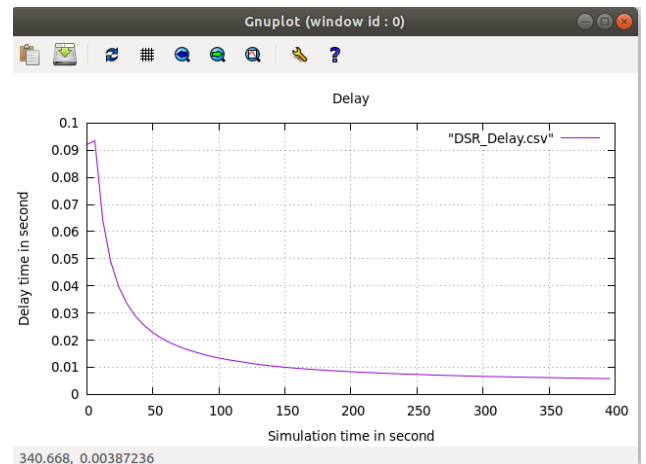


Fig. 3: DSR delay

From figure 3 we have found that initially or at the starting of the network delay is high. It is reduced and goes to a stable state after certain time. Initially the network doesn't have established connection to send packets from source to its destination. Nodes have to search a route for packet transmission and delay occurs. But when routs are established after some interval it requires less route discovery time which reduced delay.

#### B. Network load:

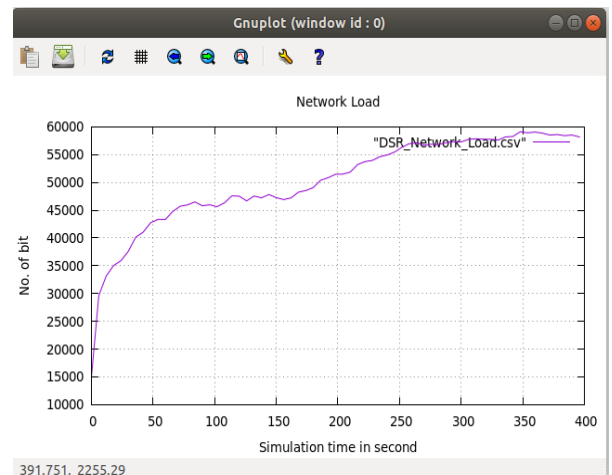


Fig. 4: DSR Network load

From figure.4 we can say that the network load increases with the increasing of simulation time. As the network creates more established route for packet transmission with the increasing of simulation time, more packets are transmitted which increases the network load.

C. Packet Delivery Ratio (PDR):

V. CONCLUSION

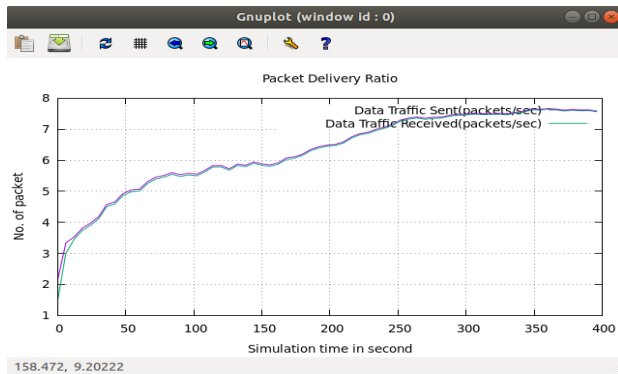


Fig. 5: DSR Packet delivery Ratio

From figure.5 we have found that total 422.71 packets are sent through the network whereas a total of 418.92 packets are received by the network. So PDR of the network is 0.991047.

D. Route Discovery Time:

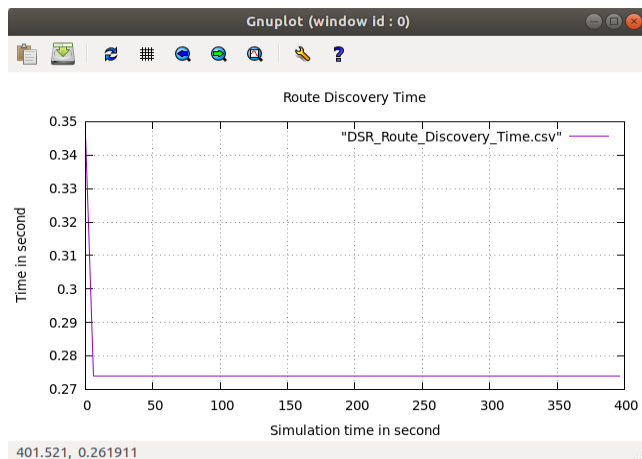


Fig. 6: DSR Route Discovery Time

E. Throughput:

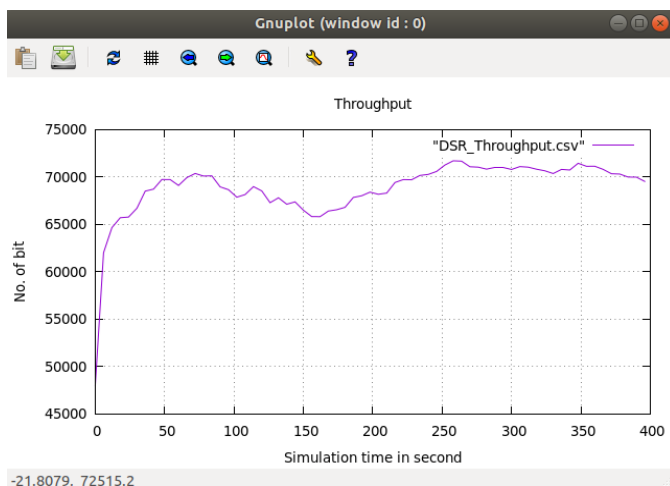


Fig. 7: DSR Throughput

From fig.7 we can say that throughput of the network increases with the increasing of network simulation time. The average throughput of this network is 7682.114 bits per second.

In this research we have analyzed the AODV routing protocol performance. We have applied FTP traffic in our design network. We know that data packets are transmitted throughout the network according to routing protocol. That's why it is a challenging work to choose an ideal protocol for the particular network. In future we will be continuing our research work to evaluate the performance of MANET other routing protocols along with Ftp traffic.

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