

Performance Evaluation of AODV and DSDV using NS-3

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Abstract: Now a days Mobile Adhoc Network Technology becomes most popular. MANET is a Mobile Adhoc Network in which every node share data with another node without using fixed infrastructure. So it is a infrastructure-less and selfconfiguring network. But it is very difficult to maintain all the devices over the Network. There are so many protocols [4] which are being developed for maintaining the devices over the Network. In this research paper I have compared performance of AODV which comes under the category of reactive protocols with DSDV which comes under the category of proactive protocol using NS-3 [3] simulator. Various parameters for checking comparative network performance between AODV and DSDV are packet delivery ratio, packet lost, throughput, delay, no of bytes

Keywords: MANET; AODV; DSDV; routing protocols; infrastructure.

I. INTRODUCTION

As we know In computing industry MANET becomes very popular technology. In MANET various mobile nodes are dynamically connected with one another. Various protocols are used to carry out communication between these nodes. Goal [1] of using these protocols is to establish efficient and shortest route between two nodes which want to transfer data. Protocols used to carry communication in MANET can be of three types like reactive, proactive and hybrid protocols. Proactive protocols are table driven protocols in which every node maintain table to store information related to routing and any change in topology. Reactive routing protocols are source initiated on demand routing protocols. In this type of protocol route is being established only when sender want to transmit data over the network. In other word there is no fixed route between the sender and receiver. Established route is maintained by route maintenance procedure. MANET is a pervasive technology which donot have any fixed structure and is also self organizing technology. So due to lack of fixed infrastructure there is need to evaluate efficient protocol that transfer data between various nodes in MANET.

II MANET

MANET comes under the category of wireless network in which each node can transfer data to to another without using any base station. Because there is no need of centralized administration so it is also called pervasive technology . This technology has many advantagees like flexibility, rapid deployment, less cost etc. Application areas for MANET are VANET, personal are network, military, education, search and rescue etc.

A. Features of MANET are:

1. Distributed Operation: Because there is no central administration is employed within the network So nodes within the network manage the tasks and acts as relay.

2. Autonomous Terminal: In MANET each terminal acts as host as well as router and switching function is also performed by each node.

3. Multihop Routing: Routing may be single hop or multi hop. In single hop data packets are delivered between two nodes from source to destination. But in multihop routing packets are being transmitted between different links.

B. Properties required for Adhoc Routing Protocol

MANET working group define various properties which are required in routing protocols are described as follows:

1. Security: It is very hard to maintain security in MANET. Because it is based on infrastructureless wireless network so protocols that maintain security are desirable.
2. Distributed operation: In Adhoc network all the operations are distributed over various terminals over the network.
3. Proactive operations: If delays that are occurred in demand based approach are unacceptable then proactive mechanism is to be used.
4. Demand based operation: In adhoc network packets are not uniformly distributed over the network so there exist delay in route discovery.

III ROUTING PROTOCOLS USED IN MANET

There are three types of protocols used in MANET. Table driven, On demand driven and hybrid protocols. In table driven protocol every node maintain routing table prior to sending the data. But in case of on demand driven protocol route is established only at the data transmission. In this paper I have compared features of two protocol AODV and DSDV[2].

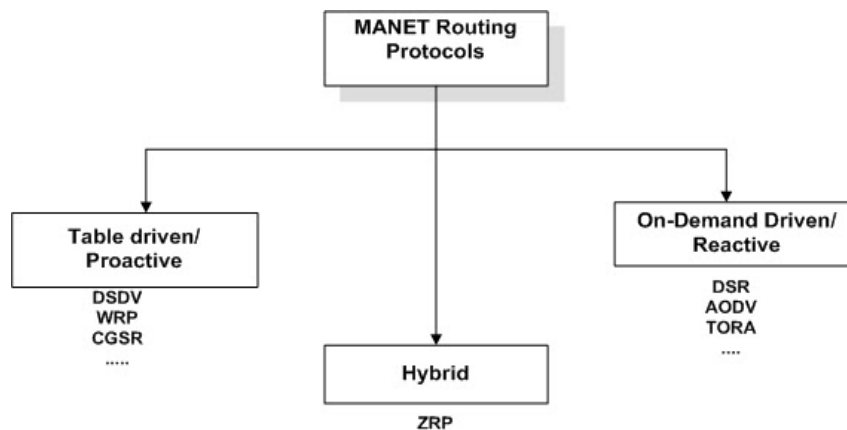


Figure 1. Routing protocols in MANET

A. AODV: AODV is a distance vector routing protocol which comes under the category of proactive routing protocol that is based on conventional Bellman-Ford routing algorithm. This protocol adds a new attribute, sequence number, to each route table entry at each node. Routing table is maintained at each node and with this table, node transmits the packets to other nodes in the network. This protocol was motivated for the use of data exchange along changing and arbitrary paths of interconnection which may not be close to any base station.

B. DSDV: DSDV is a table driven protocol and it is based on Bellman-Ford routing algorithm. It was developed in C language. Basic function of this protocol is to solve routing loop problem. Each entry contains sequence number in routing table. Sequence number depends upon the state of link if it is present then link will be even else sequence number will be odd.

IV.PERFORMANCE COMPARISON OF AODV AND DSDV

We have used NS-3 simulator for performance[5] evaluation between AODV and DSDV. Various parameters which are used during simulation are described below.

Simulation Area	500*500
Simulation Time	Start-10s,stop150s
No of Mobile nodes	Minimum 7 nodes
Antenna used	Omni directional Antenna
Traffic type	CBR
Protocols	DSDV,AODV
Queue length	50

Table 1. Simulation Parameters

V.SIMULATION RESULTS

1.Throughput

Throughput is also known as packet delivery fraction, which is number of bits transferred per second from sender to receiver. DSDV has poor throughput because table updating mechanism used in DSDV is poor.

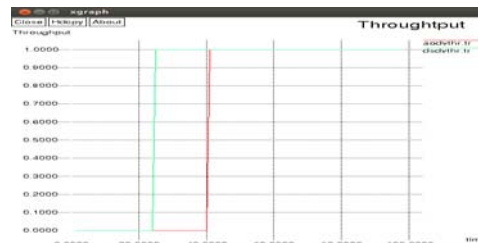


Figure 2. Throughput vs Pause time

2.Delay

Delay is effected by higher mobility. Performance of AODV is best when traffic load becomes high. But performance of DSDV becomes degraded when no of nodes increases as load exchange in routing table also becomes high.

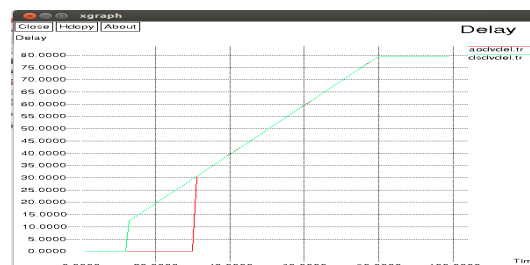


Figure3.Packet delay vs No of nodes

3.Packet Loss

Pause time is related with degree of mobility. In DSDV packet loss is more instead of AODV when pause time is small but packet loss increases with increase in pause time.

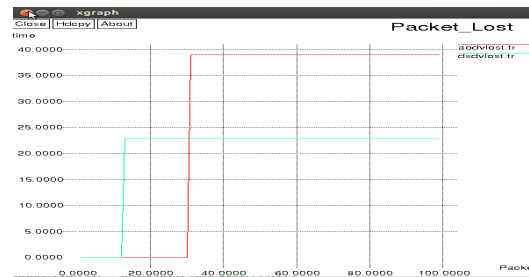


Figure4.Packet loss vs pause time

4. Packet delivery ratio

It is defined as ratio of the no of data packets to be received by destination node to number of data packets that are sent by the source node. So as shown in graph packet delivery ratio of AODV is maximum as compared to DSDV.

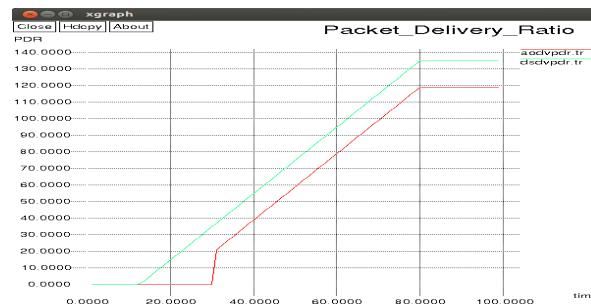


Figure5.Packet delivery fraction vs Pause time

VI. CONCLUSION

In this research paper detailed comparison of performance between proactive and reactive protocol is presented. From simulation results it is concluded that AODV protocol has better performance under high mobility than DSDV protocol. DSDV creates frequent link failures in high mobile area as a result degradation in performance occurs.

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