ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 4, Issue 9 , September 2017

Performance Analysis of OLSR, DSDV and AODV Routing Protocol Using NS3

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ABSTRACT: An ad-hoc Network has become very popular in last few years Ad-hoc network operates infrastructure & survive fast changes in N/W topology. In this paper, we have a tendency to analysis the performance of 3 protocols AODV, DSDV, OLSR. The performances of planned network are evaluated in term of packet delivery ratio & throughput, delay per packet Using NS3.During this paper OLSR shows higher performance over two protocols that's DSDV & AODV.

KEYWORDS: OLSR; DSDV; AODV Throughput; MAC; Packet; Wireless Network.

1. INTRODUCTION

MANET stands for Mobile Ad- hoc network during this system no want of central purpose. MANET'S network is not a permanent structure it is a self-adjustable without any topology because MANET'S is group of self-determining nodes likeMobile, laptops, pads etc. Which have restricted battery power consumption and bandwidth, MANET'S network is free form topology network that's means that all node in system Move dynamically and topology of network is changed. Nodes in mobile ad hoc networks are free to move in the network and they can establish themselves in an absolute manner. These elements build MANETs extremely reasonable and its arrangement is easy in spots where existing foundation isn't sufficiently good to allow correspondence, for example, in a debacle zones, or infeasible to convey areas. Routing protocol be determined by the quickness of the link metric that works on that. Its important value that's relegated to every route path and this value are utilized by the routing procedure to choose one or a lot of route path, route path is finding out by protocol from set of routes. These values normally reproduce the cost of using a bound route with respect to some optimization objectives like throughput, delay, Energy consumption and data delivery**.** It is act as each router and hosts. There are quite a number of uses for example, the military, for transmitting any information or information like audio video or any data from one node to other.

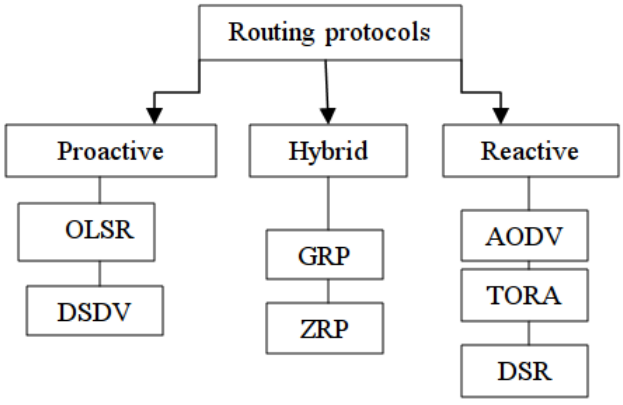

Figure 1 Routing Protocol

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 4, Issue 9 , September 2017

Proactive routing protocols are table driven routing protocol & they always maintain current up to date routing information by sending control message periodically between the hosts which update their routing table.

The proactive routing protocols use link state routing algorithm which frequently flood the link information about its neighbors.

Reactive or on demand routing protocols create routes. When they are needed by source host & these routes are maintained while they are needed.

Hybrid protocol is both the above protocols using the OLSR & DVR algorithm. There are existing hybrids protocols are ZRP, GRP.

Our goal is to carry out performance study of three routing protocols for Ad-Hoc. Namely Ad-Hoc on demand distance vector (AODV) Routing protocol, Destination-Sequenced Distance Vector (DSDV) and Object Link State Routing Protocol (OLSR).

I. OVERVIEW OF PROTOCOLS

The paper measure the performance between the three protocols two from the proactive routing protocols i.e. optimized link state routing algorithm, DSDV Destination-Sequenced Distance Vector and other reactive routing protocols (AODV).

A. OPTIMIZING LINK STATE ROUTING PROTOCOLS (OLSR)

OLSR is a proactive routing protocol for mobile ad-hoc networks. The protocol inherits the stability of a link state algorithmic rule and has the advantage of having routes immediately available once needed due to its proactive nature.

OLSR is meant designed to work in a completely distributed manner and doesn't depend on any control entity.OLSR is developed for mobile ad- hoc network operates as a table driven, proactive protocol, i.e. Exchange topology information with other nodes of the network regularly. each node selects a collection of its neighbor nodes as 'Multi point-Point- Relay' (MPR). In OLSR, only nodes selected as such as MPRs are responsible for forwarding control traffic, intended for diffusion into the entire network.

MPRs provide an efficient management for flooding management traffic by reducing the number of transmission required.

The 3 types of control messages used are Topology control (TC) and Hi messages and Multiple Interface Declaration (MID). The Hi messages are steady flooded throughout the network to the neighboring nodes to maintain the routing table; TC includes MPR Selector List that broadcast the data about its publicized neighbors and mid permits multiple OLSR Interfaces in a network.

B. DESTINATION-SEQUENCED DISTANCE VECTOR (DSDV)

DSDV Routing Table: each node will maintain a table listing all the other nodes it's known either directly or through some neighbors. Every node includes a single entry in the routing table. The entry can have information about the node's IP address, last known sequence number and the hop count to reach that node. Along with these details the table

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
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also keeps track of the next hop neighbor to reach the destination node, the timestamp of the last update received for that node.

The DSDV update message consists of 3 fields, Destination Address, Sequence number and Hop Count. Each node uses two mechanisms to send out the DSDV updates. They are

Periodic Updates: -

In this update the node broadcasts out its entire routing table.

Trigger Updates:-

Trigger Updates are small updates in-between the periodic updates. These updates are sent out whenever a node receives a DSDV packet that caused a modification in its routing table.

C. AD-HOC ON DEMAND DISTANCE VECTOR ROUTING PROTOCOL (AODV)

AODV may be a kind of reactive routing protocol that Implements the bellman ford distance vector routing algorithm to see the existing shortest path from source to destination node during a wireless Routing.

Ad-Hoc on demand distance vector routing protocol supports each unicast & multi-cast routing. basically route request (RREQ) is used to request the route whereas route reply (RREP) is used for the reply & Route error (RERR) are control message used.

Whenever there's no predefine path from source to destination the source node floods a RREQ control message throughout the network that contains source ip address, Route Request ID (RREQ) that along uniquely identifies a (RREQ) & sequence number of source & destination nodes.

Every intermediate node compares its sequence range with the destination sequence range of (RREQ).Control message & the ensuing shortest path reply is made through the destination node.

Sometimes is also multiple replies through RREP control message as there are multiple routes from source–to - destination the most effective path chosen through route discovery. AODV receives the numerous benefits of less overhead, unicast and multi-cast transmission, Response to topological changes & on demand route discovery.

Disadvantage: End time for source to destination node is arduous the growing size of AODV affects the overall performance.

III.DATA DELIVERY METHODOLOGY

This planned knowledge delivery methodology indicates that the node info and location found from the broadcasting of the packet and ACK Packet received by the source Node; this packet includes destination node info, supply scientific discipline info and site of destination node. The forward lists are maintained by the supply node those nodes WHO transfer the information to the destination node.

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
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IV. NEIGHBOR AND MEMORY INFORMATION

The neighbor information may be fetch from the Network simulator (NS3) and the proposed scenario detail is access by the properties of this Network Simulator (NS3). in this wireless network scenario 3 routing protocols are used. OLSR Protocol targets on achieving maximum possible net throughput. OLSR protocol results in significant throughput gains over DSDV and AODV protocol for follow same network scenario.The 40 MB memory usage by the scenario and average 70,211 events per second occurred in 60 seconds.

Table 1: SIMULATION PARAMETERS AND PERFORMANCE METRICS.

NODE	METRICS	OLSR	DSDV	AODV
40	Transmitted Packets	3752	3975	8517
	Total Byte Transmitted	348184	365700	478598
	Received Packets	3427	2511	7589
	All Received Byte	315284	231012	415842
	Lost Packet	298	1301	784
	Drop Packet	325	1464	998
	Total Delay	85.4067	106.609	456.898
	Delay Per Packet	0.022763	0.0268199	0.0532082
	Throughput (bit/sec)	2463.16 Kbps	1804.78Kbps	248.77kbps
	Packet Delivery Ratio	92%	63%	88%
Network Simulator		NS3		
Simulation Time		225 Sec		

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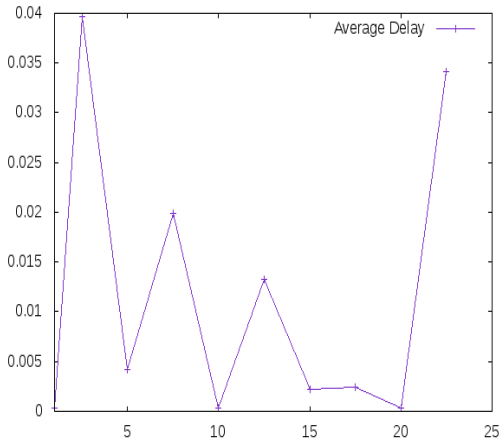
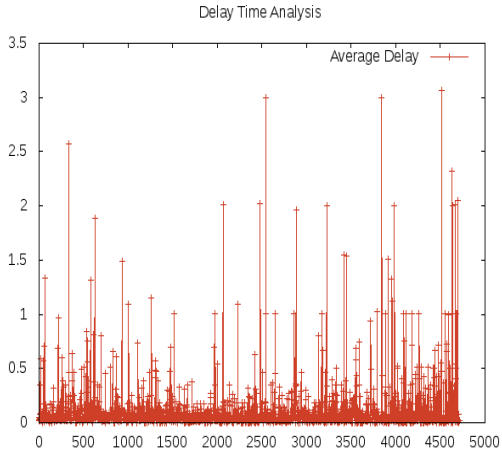
V. SIMULATION&RESULT

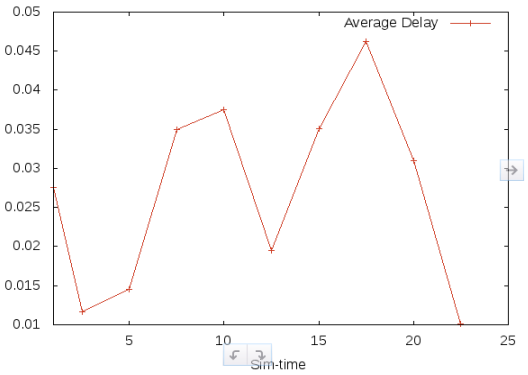


1. OLSR Average Delay Time

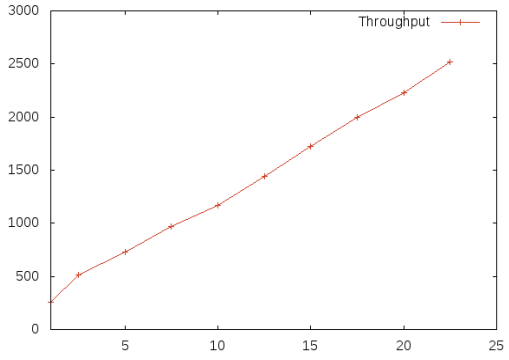


2.AODV Average Delay Time

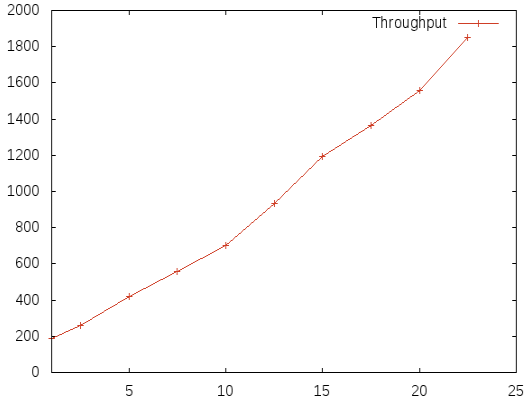
$$\text{Delay per Packet} = \frac{\text{Total Delay}}{\text{All Transmitted Packets}} \quad \text{Packet Delivery Ratio} = \frac{\text{Received Packets}}{\text{All Transmitted Packets}}$$



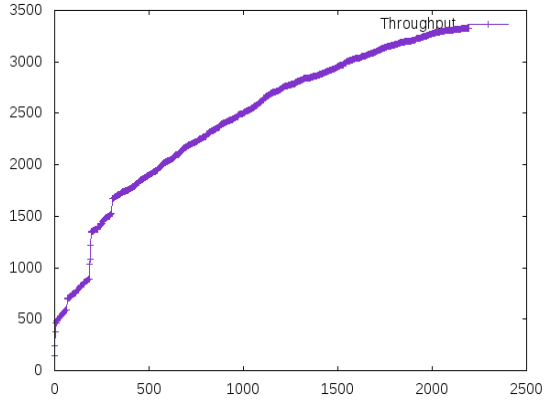
3.DSDV Average delay



4. OLSR Throughput



5. DSDV Throughput



6.AODV Throughput

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

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VI. CONCLUSION

We have measured the performance MANET'S network in OLSR and DSDV and AODV protocols using different perimeters such as Average Delay, Packet and Throughput. The performance of AODV and OLSR routing is evaluated .Practical result shows OLSR have less end to end delay compared to DSDV and AODV because OLSR updates routing information on each node regularly while DSDV and AODV network updates whenever need. In AODV routing more overhead due to more control packets required in frequent routing table updating so that it shown that due to increasing of link with speed of node, PDR of MANET'S decreases.

VII.FUTURE WORK

The quality and density of the network by directly modifying the speed and therefore the range of nodes. Power will increase the impact of quality decreases and therefore the effective density increases. Alternative new protocols performance may be improve the packet delivery ratio in network.

VIII. ACKNOWLEDGEMENT

We would like to express our sincere gratitude to our CSE Department for the academic support and the facilities provided to carry out the research work at the Department Computer Science,**GURU JAMBHESHWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY, HISAR.**

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