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Comparative Analysis of AODV, DSR and DSDV Protocol Using Visual Graphical Simulation.

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Abstract:-In this paper I have done Graphical analysis of Manet Protocol by using different different parameter. I have done comparative analysis in three main manet protocols these are AODV, DSR, DSDV Protocol. I have taken Throughput, good put and routing parameter. I have compared all parameter in these protocol and conclude the result which is best protocol according to different – different parameters.

Keywords— AODV, DSR, DSDV, Throughput, Good put, Visual Simulator Tool - ViSim 1.0

I. INTRODUCTION

Mobile Ad-Hoc network [1] is a wireless network & self Configuring network of moving nodes or routers. The term "Ad-Hoc" implies "can take different forms" and can be "Standalone, mobile or networked". The nodes are free to move randomly & organize themselves arbitrarily, thus, the network's wireless topology may change rapidly and Unpredictably. Mobile Ad-Hoc network is infra-structure less network due to mobile routers. Due to these properties MANET has wide application in industrial and commercial field involving cooperative mobile data exchange, inexpensive alternates to cellular based mobile network infrastructures.

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Fig-MANET INFRASTRUCTURE

2. Visual Simulator Tool - ViSim 1.0

ViSim is a visual simulator tool built to make comparisons among various Mobile Ad-hoc Network (MANET) routing protocols since there are very few prototypes available today for performing such type of task. Most of the available tools are somewhat not user-friendly. Hence, ViSim is built in such a way that even a naive user can be able to use this tool to visualize the background simulations done in ns-2 (that is run with the help of Active Tcl in Windows operating system). ViSim runs .tcl files for three well-known MANET protocols; DSDV, DSR, AODV and extracts the required information from the trace files that are generated. Eventually the graphs are plotted for different performance indicators such as Throughput, Good put, and Routing Loads. ViSim can make the task of a network administrator easy to decide which routing protocol would be better for the particular MANET scenario.

3. MANET ROUTING PROTOCOL

3.1 DYNAMIC SOURCE ROUTING PROTOCOL [2]
Dynamic Source Routing is one of the reactive routing ad hoc protocols that operate on demand and works on two mechanisms i.e. route discovery and route maintenance. The route discovery is initiated if and only if the routes to destinations are not known, for which it initiates a route discovery by Sending a route request (RREQ) to all its neighboring nodes containing the IP address of both sender and receiver in the packet header. When nodes receive the route request, if they are the target, they send back the route reply message else Re-rebroadcast the route request to the next nodes until the destination is found while route

maintenance is to detect any link failure of the route by sending the route reply error message to the sender and removes any route using that link..

3.2 Ad-hoc on-Demand Distance Vector Protocol(AODV)
The Ad hoc on-demand Distance Vector routing protocol does not maintain global routing information for the whole network2. Nodes that do not belong to a route do not need to Maintain information about that route. Such nodes do not send or receive topology-update packets; hence they have information only for their active routes. A node considers a route as active, if it sends, receives or forwards packets for that route and if there is at least one data packet transmitted through this route within a fixed time interval. Hence in AODV, route discovery packets are initiated and broad-casted only when a source desires to contact an intended destination for which is does not have a valid route. Furthermore, changes in network topology must be sent only to those nodes that will need this information. Thus, AODV dynamically establishes route table entries. Every node maintains an increasing counter in order to replace unused or broken routes. A disadvantage of AODV is that it does not support asymmetric links. That is, AODV is capable of supporting only symmetric links between Nodes , both of which are able to send packets to each other.

3.3 Destination-Sequenced Distance Vector (DSDV)
DSDV is one of the most well known table-driven routing algorithms for Manet's DSDV routing protocol maintains a routing table that lists all available destinations, the number of hops to reach the destination and the sequence number assigned by the destination node. The sequence number is used to distinguish stale routes from new ones and thus avoid the formation of loops. So, the update is both time-driven and Event-driven.

4. Related Work

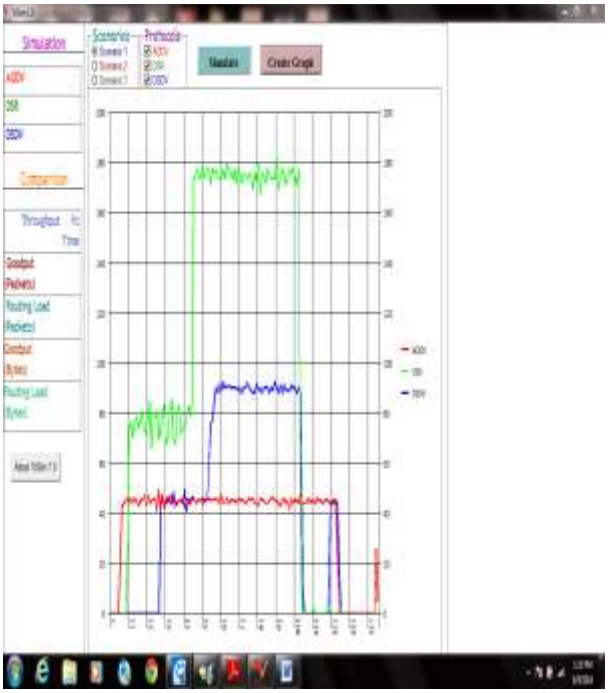
4.1ROUTING PERFORMANCE COMPARISON

(1)Throughput Comparison

Throughput [4]: the ratio of successfully transmitted data per second.

T=L-C/L Rf(y)

Where L-C/L Rf(y) is the payload transmission rate, (*R*)*b*/*s* Binary transmission rate, (*L*) Packet size, and f(y) is the packet success rate defined as the probability of receiving a packet correctly. This probability is a function of the signal-to-noise ratio (y).
In communication networks, such as Ethernet or packet radio, throughput or network throughput is the rate of *successful* message delivery over a communication channel. This data may be delivered over a physical or logical link, or pass through a certain network node. The throughput is usually measured in bits per second (bit/s or bps), and sometimes in data packets per second or data packets per time slot.
The system throughput or aggregate throughput is the sum of the data rates that are delivered to all terminals in a network. Throughput is essentially synonymous to digital bandwidth consumption.



EXPLANATION:-According to the graph DSR's throughput is highest and AODV'S Throughput is lowest. We see that the throughput of DSDV is lies between DSR and AODV Protocol. Thus by seeing it we can say that DSR Protocol is the best protocol in case of maximum throughput.

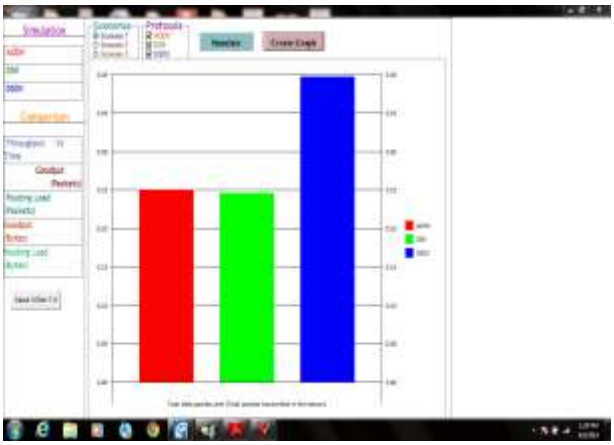
Factors affecting throughput [5]
1. Analog limitations
The maximum achievable throughput (the channel capacity medium) is affected by the bandwidth in hertz and signal-to-noise ratio of the analog physical.

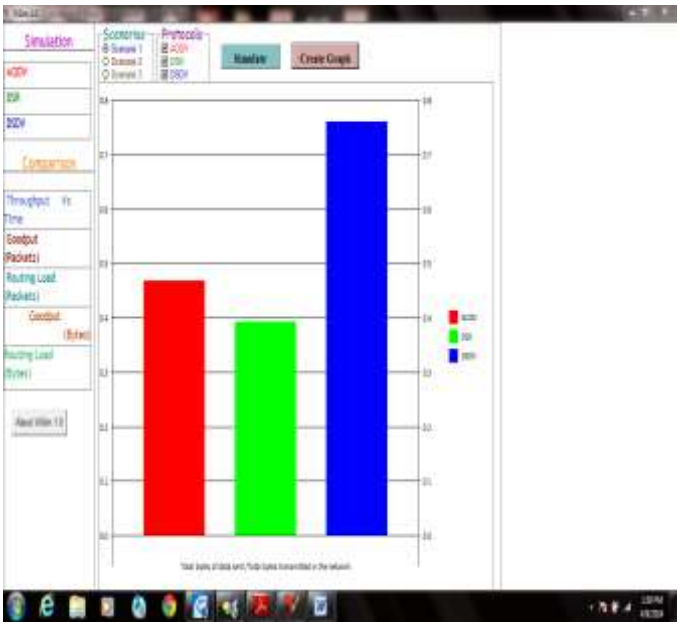
2. IC hardware considerations
Computational systems have finite processing power, and can drive finite current. Limited current drive capability can limit the effective signal to noise ratio for high capacitance links.

3.Multi-user considerations
Ensuring that multiple users can harmoniously share a single communications link requires some kind of equitable sharing of the link.

(2) GOODPUT
The "goodput" is the amount of useful information that is delivered per second to the application layer protocol. Dropped packets or packet retransmissions as well as protocol overhead are excluded. Because of that, the "goodput"[3] is lower than the throughput. Technical factors that affect the difference are presented in the "goodput" article.
In computer networks, goodput is the application level throughput, i.e. the number of useful information bits delivered by the network to a certain destination per unit of time. The amount of data considered excludes protocol overhead bits as well as retransmitted data packets. This is related to the amount of time from the first bit of the first packet sent (or delivered) until the last bit of the last packet is delivered, see below.

For example, if a file is transferred, the goodput that the user experiences corresponds to the file size in bits divided by the file transfer time. The goodput is always lower than the throughput (the gross bit rate that is transferred physically), which generally is lower than network access connection speed (the channel capacity or bandwidth).





Explaination- According to the graph DSDV'S goodput is highest and DSDV and DSR both have equal goodput.As we know that The "goodput" is the amount of useful information that is delivered per second to the application layer protocol. Dropped packets or packet retransmissions as well as protocol overhead are excluded. Because of that, the "goodput" is lower than the throughput.Thus DSDV Protocol is the best protocol in case of goodput.

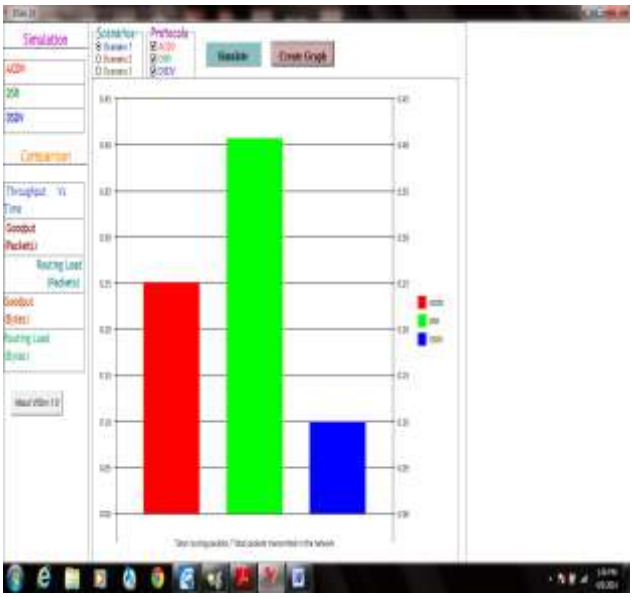
Examples of factors that cause lower goodput than throughput are:

- *Protocol overhead;* Typically, transport layer, network layer and sometimes datalink layer protocol overhead is included in the throughput, but is excluded from the goodput.
- *Transport layer flow control and congestion avoidance*, for example TCP slow start, may cause a lower goodput than the maximum throughput.

Retransmission of lost or corrupt packets due to transport layer automatic repeat request (ARQ), caused by bit errors or packet dropping in congested switches and routers, is included in the datalink layer or network layer throughput but not in the goodput

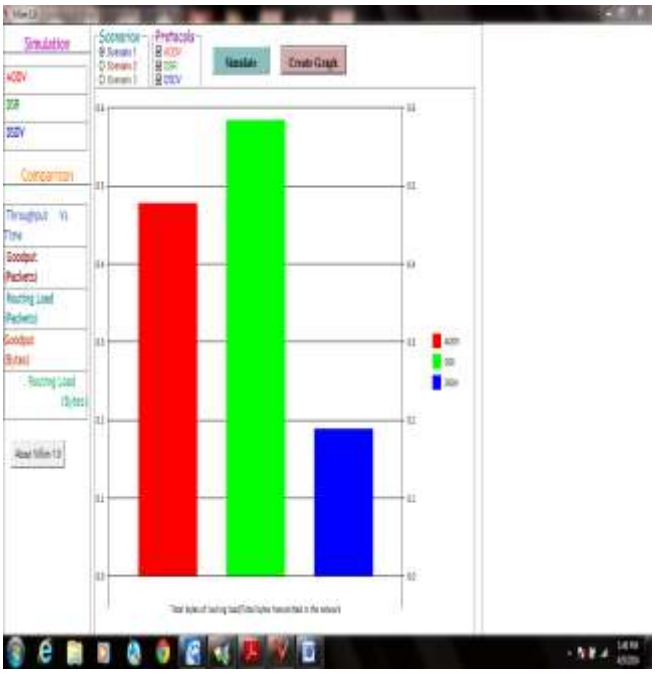
GOODPUT BYTES:-It shows that maximum useful data deliver per sec to the application layer in terms of Bytes.Thus
According to the graph DSDV Goodput per byte is maximum and DSR Goodput per byte is minimum and AODV Goodput is lies between DSDV and DSR Goodput. Thus In this case DSDV is the best protocol.

(3) *Routing overhead*: The routing overhead describes how many routing packets for route
discovery and route maintenance need to be sent in order to propagate the CBR packets.
It is an important measure for the scalability of a protocol. It for instance determines, if a
protocol will function in congested or low-bandwidth situations, or how much node battery
power it consumes. If a protocol requires to send many routing packets, it will most likely
cause congestion, collision and data delay in larger networks.



ROUTING LOAD PACKETS

Explanation-According to the graph DSR Routing load packet is highest and DSDV Routing load packet is lowest..AODV Routing load packet is lies between DSR and DSDV Protocol. Thus DSR Protocol is the best protocol in case of Routing load packet in MANET.



Explanation-This graph shows Routing load per byte and in this case DSR is the highest byte so it is the best protocol

5.Conclusion

Thus here we have three conclusions we prove that which protocol is best according to different-different parameters.

- According to the graph DSR's throughput is highest and AODV'S Throughput is lowest .We see that the throughput of DSDV is lies between DSR and AODV Protocol. Thus by seeing it we can say that DSR Protocol is the best protocol in case of maximum throughput..
- According to the graph DSDV'S good put is highest and DSDV and DSR both have equal good put. As we know that The "good put" is the amount of useful information that is delivered per second to the application layer protocol. Dropped packets or packet retransmissions as well as protocol overhead are excluded. Because of that, the "good put" is lower than the throughput. Thus DSDV Protocol is the best protocol in case of good put.
- According to the graph DSR Routing load packet is highest and DSDV Routing load packet is lowest..AODV Routing load packet is lies between DSR and DSDV Protocol. Thus DSR Protocol is the best protocol in case of Routing load packet in MANET. Thus by using the graph I prove which protocol is best in different- different parameter.

6. Reference

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In this research paper I have done comparison in AODV,DSR and DSDV Manet's Routing Protocols using different different parameter like Throughput,Goodput,Routing Load etc and proof which is the best protocol in different different application.