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Analyzing the Impact of Offer Load, Mobility and Energy Related Issues on Simulation Areas of Reactive and Proactive Routing Protocols in Manets

N.Rahul Pal
M.Tech
Department of Computer Science Engineering
Andhra University
rahul_pal557@yahoo.com

D. Dasu
M. Tech
Department of Computer Science Engineering
Adikavi nannaya University.
Dasudasari@gmail.com

Abstract - MANETS is a collection of Independent mobile nodes that can communicatethrough each other via radio waves. The mobile nodes that are in radio range can directly communicate where as the other needs the aid of intimidate node to route the packets. These networks are fully disturbed and can work with any place without the help of any Infrastructure this property makesthese networks highly flexible and robust. In this Project we analyzed the impact of offer load, mobility and energy related issues with respect to simulation areas for reactive and proactive routing protocols for MANETS by using NS2 simulator to measure the different parameters like Routing Overhead, Rout load, packet delivery ratio energy consume, energy remaining.

Keywords *– Ad hoc networks, Energy, Performance*

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I.INTODUCTION

A Mobile Ad-hoc Network (MANET) is a collection of wireless nodes that can dynamically form a network to exchange information without using any pre-existing fixed network infrastructure.

MANET is a self organized and self configurable network where the mobile nodes move arbitrarily. The mobile nodes can receive and forward packets as a router. Each node operates not only as an end system, but also as a router to forward packets. The nodes are free to move about and organize themselves into a network. These nodes change position frequently. For relatively small networks flat routing protocols may be sufficient. However, in larger networks either hierarchical or geographic routing protocols are needed. The protocols have to be chosen according to network characteristics, such as density, size and the mobility of the nodes.

MANET does not require any fixed infrastructure, such as a base station; therefore, it is an attractive option for connecting devices quickly and spontaneously. In this three routing protocols AODV (Ad- Hoc On-Demand Distance Vector), DSDV (Destination Sequenced Distance-Vector) and DSR (Dynamic Source Routing Protocol) are compared. Most of the previous traditional systems on MANET routing protocols have focused on simulation study by varying various parameters, such as speed, number of nodes etc.

In mobile ad-hoc networks where there is no infrastructure support as is the case with wireless networksand since a destination node might be out of range of a source node transmitting packets; a routing procedure is always needed to find a path so as to forward the packets appropriately between the source and the destination.

A. ADHOC NETWORKS PARAMETERS

In This Paper the performance of these routing protocols is analyzed in terms of their Packet Delivery Fraction, Average End-to-End Delay, Routing Overhead, Routing Load and also Energy Consumed their results are shown in graphical forms. The comparison analysis will be carrying out about these protocols and in the last the conclusion will be presented, that which routing protocol is the best under different simulation areas one for mobile ad -hoc networks.

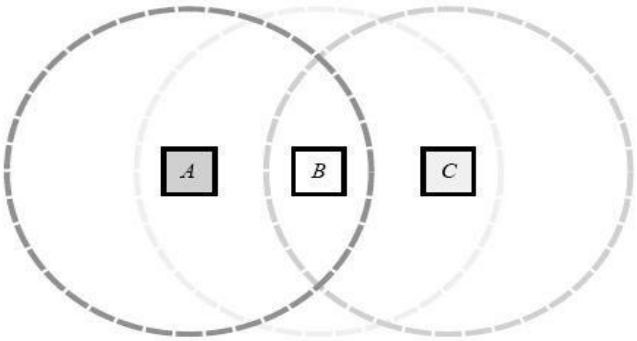

Fig1. A Simple Ad Hoc Network with Three Nodes.

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Proactive protocols: Routes are readily available when there is any requirement to send packet to any other mobile node in the network. Quick response to Application program.

Reactive protocols: These are bandwidth efficient protocols. Routes are discovered on demand basis. Less Network communication overhead is required in this protocol.

II. DSR-DYNAMIC SOURCE ROUTING

DSR is one of the most well known routing algorithms for ad hoc wireless networks. It was originally developed by Johnson, Maltz, and Broch. DSR uses source routing, which allows packet routing to be loop free. It increases its efficiency by allowing nodes that are either forwarding route discovery requests or overhearing packets through promiscuous listening mode to cache the routing information for future use. DSR is also on demand, which reduces the bandwidth use especially in situations where the mobility is low. It is a simple and efficient routing protocol for use in ad hoc networks. It has two important phases, route discovery and route maintenance.

III. AODV - THE ADHOC ON-DEMAND DISTANCE-VECTOR PROTOCOL

AODV is another routing algorithm used in ad hoc networks. Unlike DSR, it does not use source routing, but like DSR it is on-demand. In AODV, each node maintains a routing table which is used to store destination and next hop IP addresses as well as destination sequence numbers. Each entry in the routing table has a destination address, next hop, precursor nodes list, lifetime, and distance to destination. To initiate a route discovery process a node creates a route request (RREQ) packet. The packet contains the source node's IP address as well as the destination's IP address. The RREQ contains a broadcast ID, which is incremented each time the source node initiates a RREQ.

The broadcast ID and the IP address of the source node form a unique identifier for the RREQ. The source node then broadcasts the packet and waits for a reply. When an intermediate node receives a RREQ, it checks to see if it has seen it before using the source and broadcast ID's of the packet. If it has seen the packet previously, it discards it. Otherwise it processes the RREQ packet. To process the packet the node sets up a reverse route entry for the source node in its route table which contains the ID of the neighbor through which it received the RREQ packet.

In this way, the node knows how to forward a route reply packet (RREP) to the source if it receives one later. When a node receives the RREQ, it determines if indeed it is the indicated destination and, if not, if it has a route to respond to the RREQ. If either of those conditions is true, then it unicast a route reply (RREP) message back to the source. If both conditions are false, i.e. if it does not have a route and it is not the indicated destination, it then broadcasts the packet to its neighbors.

V. DSDV - THE DESTINATION SEQUENCED DISTANCE VECTOR PROTOCOL

DSDV is one of the most well known table-driven routing algorithms for MANETs. It is a distance vector protocol. In distance vector protocols, every nodemaintains route for each destinationa set of distances for each nodethat is a neighbor of Nodetreats neighbors as a next hop for a packet delivery. The succession of next hops chosen in this manner leads to the shortest path.

DSDV is a distance vector algorithm which uses sequence numbers originated and updated by the destination, to avoid the looping problem caused by stale routing information. In DSDV, each node maintains a routing table which is constantly and periodically updated (not on-demand) and advertised to each of the node's current neighbors. Each entry in the routing table has the last known destination sequence number. Each node periodically transmits updates, and it does so immediately when significant new information is available.

The data broadcasted by each node will contain its new sequence number and the following information for each new route: the destinations address the number of hops to reach the destination and the sequence number of the information received regarding that destination, as originally stamped by the destination. No assumptions about mobile hosts maintaining any sort of time synchronization or about the phase relationship of the update periods between the mobile nodes are made.

VI. SYSTEM ANALYSIS

Existing System:

There are many routing protocols in Mobile Ad Hoc NET works, the popular ones being AODV, DSR and DSDV. Although a lot of research work is done on individual protocols but not enough research is done on comparing these protocols under different environments such as speed, number of nodes, motilities, areas. This is essential considering the fact that these protocols behave differently or perform differently in different environments. By analyzing how a protocol performs under a certain environment, still the shortcomings of the protocol can be found out and more research could be done on removing those shortcomings. Further, this work also helps in choosing a protocol best suited to particular conditions by finding out the tested protocols.

Proposed System:

The objective of this project is to analyze, simulate and do a comparative analysis of three MANET routing protocols namely AODV (Ad Hoc On Demand Distance Vector), DSR (Dynamic Source Routing) and DSDV (Destination Sequenced Distance Vector) under different environments such as simulation areas, nobilities, offer load . These three protocols have different properties and based on the way they are designed, they behave differently in different environments. Therefore it becomes essential to analyze each protocol by simulating it in an ideal environment and find out how it performs, so that appropriate methodologies could be

 ISSN: 2454-4248
95 – 98

followed in the future research works to improve on the areas where a protocol is lacking.

The offer load is varied in the network for different environments for every simulation area load is varied from 10 to 50 for the three routing protocols and parameters like routing load, packet delivery ratio, end to end delay and additionally energy consumption is considered for different environments for the three routing protocols.

VII. RESULTS

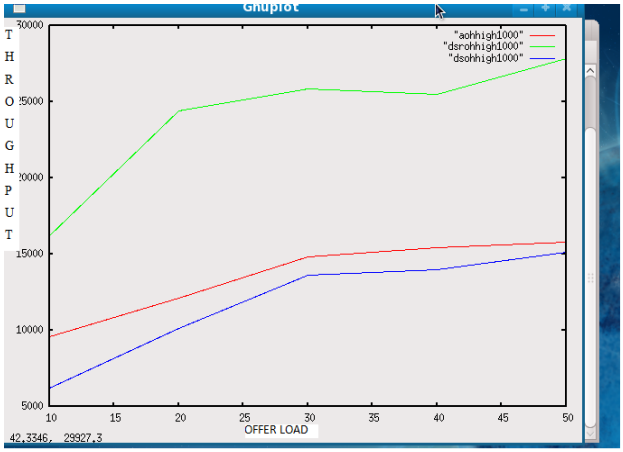

Fig 1. Routing Overhead

Routing overhead is the process of selecting paths in a network along which to send network traffic. DSDV gives low overhead and gives better performance to improve the efficiency of network than the AODV and DSR under simulation area 1000*1000 and high mobility.

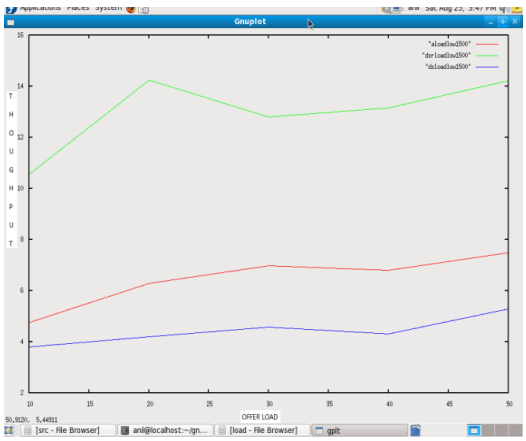

Fig 2. Routing Load

The number of routing packets transmitted per data packets delivered at the destination each hope wise transmission of routing packets is computed. DSDV uses more number of packet transmissions so as provide optimized route to the shortest path than the AODV, DSR under simulation area and mobility.

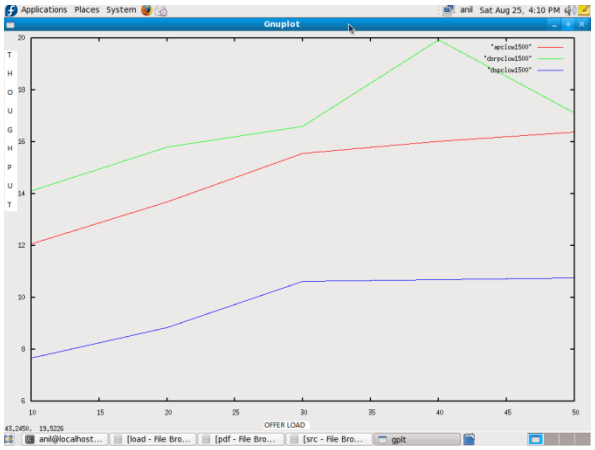

Fig 3. Power Consumption

In this graph DSR performs worse than AODV. DSR uses the longest path for forward packets. DSR achieve poor aggregate throughput, Power consumption is high as compared to AODV.DSDV in simulation area 1500*1500 and mobility.

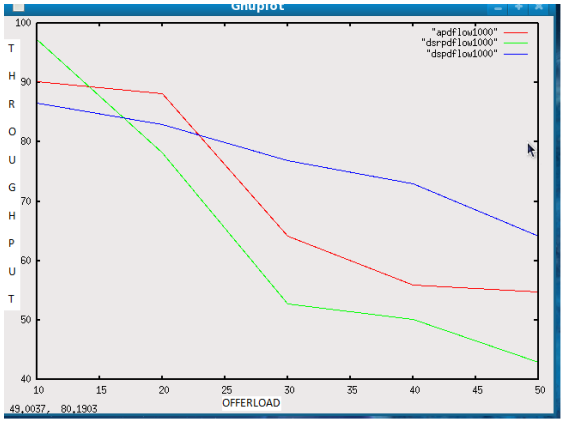

Fig 4. Packet Delivery Ratio

The ratio of data packet delivered to the destination to those generated by the CBR source is packet delivery fraction. This graph shows less packet delivery fraction for DSDV than DSR and AODV gives the best delivery ratio.

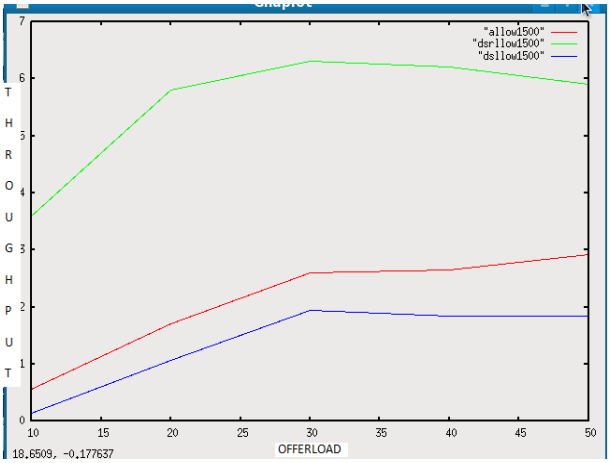

Fig 5 Latency

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95 – 98

In terms of Latency DSR routing protocol will result in high amount of latency with respect to high and low mobility and simulation areas. AODV will give low result in the simulation area of 500*500m with respect to low mobility. DSDV results low latency when simulation area increases.

XI. CONCLUSIONS AND FUTURE WORK

Conclusions

In this work we analyze the impact of offer load ,mobility, energy on simulation areas of Proactive and Reactive Routing Protocols by varying the pause time and simulation areas like 500,1000,1500 and obtained results for different parameters like routing overhead, routing load ,packet delivery ratio ,avg end to end delay ,energy consumed ,energy reaming and latency.

It is observed that the routing overhead in DSDV and AODV is consistently low when compared with DSR especially for large simulation area and nobilities. This is due to the fact that in DSDV the routing table exchanges would decrease with high offer load. The poor delay and packet delivery ratio of DSR is mainly due to caching and lack of mechanisms to expire stale routes. Whereas the AODV gives the best packet delivery ratio though routing overhead is high when compared to DSDV and it is also observed that consumption of energy is also consistently low under different simulation areas. The latency of DSDV and AODV are consistently low and varies in a low range when compared to DSR. Hence we conclude that any of the single protocol does not supersede the other one. There performance depends upon the different scenarios.

Future Work

In this Project work, three ad hoc routing protocols i.e. AODV, DSR and DSDV have been analyzed and compared, the results of which could be useful in many situations. However there are other protocols also in MANETs such as TORA, ZRP, and AOMDV etc. The future scope is the extensive comparisons between the above said protocols. With different Parameters and change of traffic from udp to tcp. Research on new simulation environments similar to ns2 could also be done, resulting in the development of new features such as more detailed graphs. In addition to this improving packet delivery efficiency is the challenging area to be explored more.

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