WIRELESS REACTIVE ROUTING PROTOCOL ISPLAY ROLES FOR THE ROUTE DISCOVERY AND MAINTENANCE IN NETWORKS

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Abstract:

In this journal paper, we are investigating experimental study of routing overhead for the reactive routing protocols as a Wireless Multi-hop facing in Networks. In this investigation we are choosing the AODV (Ad-Hoc on Demand Distance Vector), and dynamic MA-NETs. We could enhance generalized network models by adding route (links) monitoring overhead in the network. So that we will take different framework and parameters of routing protocols for the variations of route performance in network.In this journal paper my experimental study on above routing protocols with the help of simulation tools (NS-2),which is simulate to the routing protocol as well as give a brief comparison and discussion for routing protocol as a better performance in networks. The AODVs routing protocols are optimizations route to prevent flooding of network during route discovery as well as control TTL (Time 2 Live) of RREQs to search incrementally larger areas of the network. The advantage of this excremental topic is less overhead, when successful and repair links with less overhead delay and packet loss.The disadvantage is longer delay if route not found immediately and longer delay and also it will greater packet loss when unsuccessful in networks environment.

KEYWORD

MA-NETs, AODVs, DSRs, Simulation (NS-2Tools), RREQs (Route-Request) packets and RREP (Route-Reply) packets

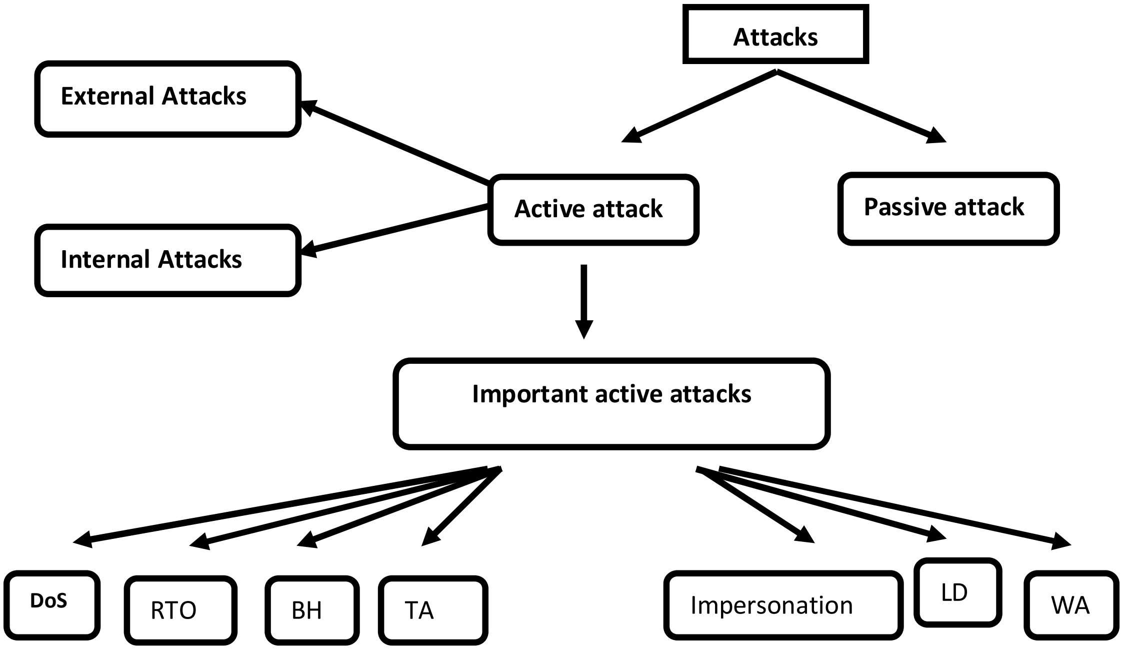
1. INTRODUCTION

My experimental study of this journal paper is very clear of Wireless AODV routing protocol is very nice performance showing among network community and simulation tool (NS-2). The simulate these protocol, which is very important. My experimental implementation of the AODV routing protocol is part of SWANS (scalable wireless ad hoc network simulation). It is built upon a fresh Java-based simulation framework called JiST. The MA-NETs consists of a set of wireless device, which is capable of free movements and cooperate packet massage to another in the networks. It is not needed any centralized administration, or static infrastructure. It could be self- healing. We can use it in field like military tactical communications recovery and collaborative group meeting.The routing protocol each node will be act as both router and host, that means mobility node can receive packet massage and forward it to another link nodes in the network.

So that, it is due to increasing demand of mobile devices for the effective use of available bandwidth has been a challenging problem in the networks. Now day mobile devices is rapid developments and growing interest communication for the mobiles,and day to day there are several existing routing algorithms available for the solving problems for the broadcasting. It is blind flooding in which each mobile node will be forced to rebroadcast the packet massages. Whenever this is receive the same for the first time in the network. The routing protocol AODV routes need not be included in packet headers except DSRs. Its Nodes maintain routing table data whichis containing entries only for routes are in active use.The AODV routing protocol each node at most one next-node per destination maintained at each node. It is sequence number used for the routes or path freshness as well as routes prevention in the network. Also it can be used to reduce packet massages overhead, route discovery cycle and increase scalability. The Ad-Hoc network is new of standard of wireless communication and use it for the massage communication in networks, because it is more and more popular. The uses of ad-hoc network has some pivotal advantages is speedy and easy development, no infrastructure require that means robustness as well as self-organized network. Every nodes operation of Ad-hoc networks is not only as a host but also as a router in tne mobile ad hoc networks.

2. RESEARCH METHODOLOGY

2.1. RESEARCH METHODOLOGY ATTACKS OF AD HOC WIRELESS NETWORKS



2.2. ACTIVE ATTACKS:

If we are looking active attack routing protocol is must be able to delete, inject and modify messages in the network communication. It is not monitoring massage communication traffics but it is attempting to terminate /break services by modifying packets massages or by sending false information in the Ad Hoc network.

2.2.1. External Attacks

It is caused by a mobility node which isdoing belong to the network. These attacks can be defended by using firewalls, encryption and source authentication.

2.2.2. Internal Attacks

This is a type of attacks caused by compromised nodes which is part of network. It is generally much more severe and also hard to detect because the malicious nodes are already part of the network as authorized parties.

2.2.3. Important active attacks:

i. DoS (Denial of service): These types of active attack are to make system failure unavailable to its intended users.An Ad Hoc wireless network is open to Denial of service (DoS) attacks due to its dynamic topology as well as distributed protocols. The standard way to create a Denial of service attack is to flood any centralized resources. Therefore it is no longer operates correctly or crashes.

ii. **IA (Impersonation attack):**This type of attack iscompromise node may access to the networkand send false routing information and also copy as some authorized nodes. Its authentication can be used to stop attacks by impersonation attack in the network.

iii. **RTO (Routing table overflow):** There are malicious node floods with bogus route creation packets massage data in order to consume resources of the participating nodes, as well as prevent the firm of legitimate routes.

iv. **BH (Black hole):**It is a malicious nodeinjects false route information responses to the route requests. It is also receives advertising itself as shortest path to a destination nodes. The attacker can't only perform a DoS attack by dropping all received packets massages. Butalso it can be collect activity of the nodes in the network.

v. **LD (Location disclosure):** An attacker can get locations of nodes / structure of the network using a location disclosure attack. The information gained might be reveal, which are the other nodes adjacent to target nodes or the physical location of the nodes.

vi. **WA (Wormhole attack):**Itis an attacker receives packets massages at one node in the network. It is also tunnel them to another node in the network, and resent packet massages into the network. This tunnel is called "wormhole" and the wormhole can drop packet massages to the cause network disruption.Itcan be selectively forward packet massages to avoid detection in the networks.

vii. **Tunneling attack (TA):**It is two or more nodes collaborate and exchange encapsulated packets message along with existing data routes. Example, if the(RRPs) Route Request packets are encapsulated and sent between two attackers. The packet massages will not contain path traveled between the two attackers find the networks. It would be falsely make receiver concluded path containing attackers are shortest path available in the network.

2.3. PASSIVE ATTACKS:

We are looking passive attacker there are no changes to the network system data because an unauthorized attacker intercepts data, which is being communicated in the network.Its goal is to gather precious information about the network. Becauseit is activity makes detecting as well asprotecting against attacks not easy, since the attacker doesn't work malicious actions actively.

3. ROUTING PROTOCOLS

3.1. Proactive

The DSDV routing protocol is routes to all destination node, which is maintained by sending packet massage as a periodical control. If we are looking,it is unnecessary bandwidth wastage for sending control packets massage in the networks. It is not suitable for larger network and also need to maintain route information for the every node's by routing table in the networks. Because it is causes by causes more overhead packet massages leads to consumption of more bandwidth.

3.2. Reactive

The AODV is routing protocol routes are found,whenever its need on demand and reduces routing overhead in network. It could not need to search for the maintain routes, where no route request in the networks. It is very pretty in the resource limited environment. Therefore the source node should bewaitunless until a route to destination nodes are discovered. This approach is very nice suitable, whenever the network is static as well as traffic is very lightin networks for example AODV etc. The RREQ is widelyuses in reactive routing protocols because whenever, it is needed as an on demand in the networks. This experimental journal paper is simulation based performance study to find performance comparison ofboth the AODV and DSDVsare carried out with varying network load and pause time. These are depending on the RREP, RERR, RREP ACKs packets massages and HELLO messages in the networks (RREP - Route Reply Message, RERR - Route Error Message, RREP- Route Reply Acknowledgment.

A. **Route discovery:**

Route discovery from source nodes are sending packet massage to destination nodes, if it is valid routes to destination nodes in the networks. It will initiate a path discovery process to locate other mobility nodes.Its broadcast is RREQ (route-request) control packet massages to its neighbor's nodes in network.This is forward the request to their neighbor's nodes and so on in the networks. The AODV routing protocol is utilizing destination nodes sequence numbers. To ensure that all routes (links) are contain the most recent route information in networks.If once time, when route request RREQ will be reaches the destination / an intermediate node with the help of fresh sufficient routes or the destination / or the routes intermediate nodes are responses by un-icast control packet massages of RREP – route reply , which is back to its neighbor's nodes, these one is first received the route request- RREP.

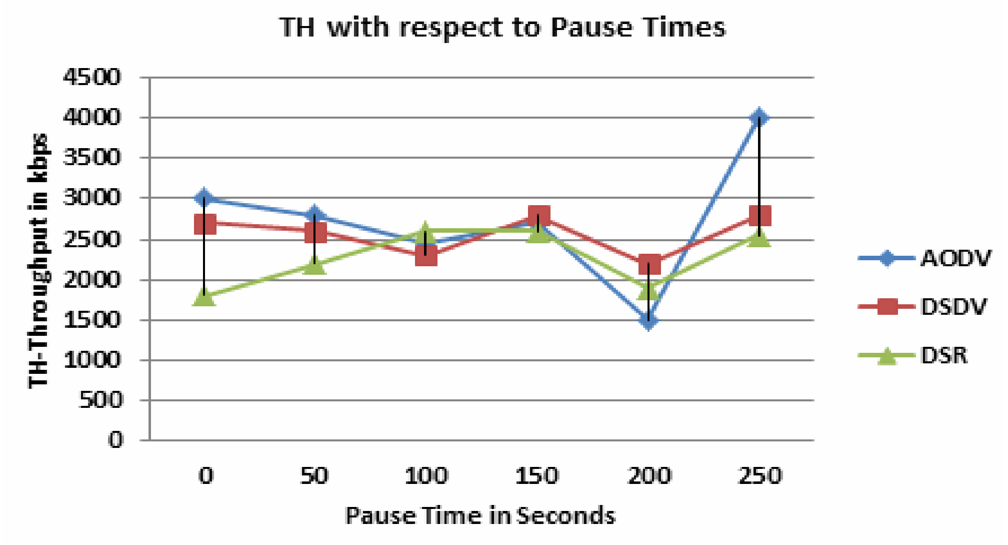
B. Routes maintenance:

The Routes maintenance is a routes discovery from between source to destination nodes that is as a long needed by the source nodes in networks.The someone destination mobility nodes / intermediate nodes are move as a upstream break initiates as packet massages RERR- route error to the affected upstream active nodes neighbor's'.Therefore it is broadcast as a RERR-request route to their successor nodes in the networks.This type process are continues until unless the source nodes reaches whenever request routes – RERR is received by the source nodes in networks.It is focus on either could be stop sending packet massages or reinitiate route paths discovery mechanism through sends a new route request-RREQ packet massages, it will be, if routes nodes are still required in the networks.

C. Network Settings: We could generally simulate of Ad hoc network as a following three methods:

i. Pause times:

It is refers to the rest time of the nodes and change between speed directions in the networks. Whenever it isbegins by staying in one location for a certain period of time is called pause time. If these times are expired than nodes will chooses random destination nodes in the simulation environment area. The speed, which is uniformly distributed between as a min speed, max speed in network,thenodes are travels towards newly chosen destination nodes at selected speed. When arrival nodes pauses for the specified time period previously start the process again. By my experimental simulation, we are considered 20 m/sec as an average nodes speed, 20 SDPs (Session Description Protocols) as offered load, random waypoint as motilities model as well as 0, 1000,2000,3000,4000seconds as pause time. Where, 0's pauses time represent continuous mobility node and 4000 pause time represents static in the mobile Ad hoc network.



ii. Load offered:

That is number of SDPs and also the number of source to destination nodes pairsfor the involved in data transfer in networks. Example with 20 SDPsbetween 50 nodes, 20 source nodes and 20 destination nodes (i.e. that is total 40 nodes) will be involved in data transfer. Therefore throughout this transfer process of data massages. It will be all of the 50 nodes and above more than 20 nodes could operate in the background for providing necessary supportto the continuing communication process in network. My experimental simulation are considered 20 m/s as a Average speed as well as 0spause time with offered load (i.e. SDPsnumber) varied as the 20,30,40 and 50 pairs.

iii. Speed of nodes:

The speed of nodes is referring to the Average speed, which those nodes could be moves in the simulation area environments as a RWMM- Random Waypoint Mobility Model. It is widely using in mobile Ad-hoc networks. If Random Waypoint Mobility Modelto the nodes are moves at a speed consistently distributed nodes as a min & max speed in the networks. My experimental simulation area environments are considered 20 SDPs for packet massage data transfer and average nodes speed considered as a 10,20,30,40,50 m/s. In the networks each mobilizes nodes are begins simulation by moving towards a randomly chosen destination nodes.

If we are choosing destination nodes for reset the pause time, than it will choose a new destination nodes and moves towards the same to destination nodes. This types of process could be repeated until unless the end of the simulation time. If we are looking this scenario, the pause time will be set at 0s that means continuously node moves all over the simulation periods in the networks. This is done experimental study in worst case scenario, which is impact to continuous nodes mobility on the network performance.In this journal paper my experimental study, which present the results obtainedthrough simulations followed by analysis. The PDR-Packet Delivery Ratio, AE2ED - Average End-to-End Delay, TH- Throughput, and RMO- Routing Message Overheadis the metrics,which using to evaluate as well as analyze experimental results performance of the reactive and proactive routing protocols (AODV, DSR and DSDV) under different types of traffics like (TELNET, CBR and FTP).

D. MODE OF TRANSMISSION DATA

Supposed mobility nodes is transmission mode, so that it communicates packet massages data to other nodes in the network. These mobility nodes needed energy, which will be transmit packet massages data such energy is called transmission energy of that mobility nodes. Whenever mobility nodes sends sizes of packet massages data, it is depends on transmission energy. If packet massages data size increases for sending packet data from one to other nodes then the required transmission energy is also increased. Whenever the amount of energy spent at a time of packet massages data transferred from source to next nodes, these one calculated by following equations, which is given below.

$$\mathrm{TE} = \frac{(330 \times \text{Sizes of packet})}{2 \times 106}$$

$$\mathrm{RE} = \frac{(230 \times \text{Sizes of packet})}{2 \times 106}$$

Where TE = Transmission Energy, RE = Reception Energy and sizes of packet data is specified as a bits.

E. MODE OF RECEPTION DATA

Whenever receives nodes are receive packet massages data from other nodes then it is called Reception mode (RM). If it wills takes energy at a time receives packet massage that is called (RE) Reception energy.

$$\mathrm{RE} = \frac{(230 \times \text{Sizes of packet})}{2 \times 106}$$

$$\mathrm{PR} = \frac{\mathrm{RE}}{\mathrm{TT}}$$

Where RE = Reception Energy and PR = Power Reception, TT = Time Taken to receive packet massage data.

F. METRICS PERFORMANCE EVALUATION

My experimental studies are to metrics performance evaluation for the routing protocols of various quantitative metrics are practiced. According to my experimental study, there are different quantitative metrics have been used to compare the performance of routing protocols against mobility node as well as traffic load condition in the network.

a. TH (Throughput)

It is how fast measure of actual data packet massage can be sends through networks and also the number of datapackets massages delivered to receiver as well as receiver provides throughput of the network.

$$\mathrm{THs} = \frac{\mathrm{RPs}}{\mathrm{FPs}}$$

Where THs = throughput, RPs = total numbers receives packets data and PRs = total numbers forwarded packets massages data. It is define as the way of total amount of packet massage data receiver, and actually receives from the sender divided by the time. It could be takes for receiver to get the last packet massages data in the networks.

b. PD or L – PACKETS DROPPED or LOSS

$$\mathbf{PLs(\%)} = \left(1 - \frac{\mathbf{RPs}}{\mathbf{SPs}}\right) \times 100$$

Where RP = total number of received packets massages data, SP = total numbers sent packet massages data.

c. PDR-PACKET DELIVERY RATIO

$$\mathbf{PDR} = \left(\frac{\mathbf{RPs}}{\mathbf{SPs}}\right) \times 100$$

Where PDRs = packet delivery ratio, RPs = total received packet massages data, SPs = total packets massages data sent in the networks. It is find ratios of packet massages data delivered from sources to destinations nodes to those one will be generated by CBRs sources. It could be fraction of sent packet massages data by applications are received by receivers. Packet delivery ratio is calculates by dividing the numbers of destinations nodes received packets massages by the number of packet massages data originated from the sources nodes in the networks.

d. NROs- NORMALIZED ROUTING OVERHEADs

It is the number of routing packets massages transmitted per data packets delivered at the destination nodes in networks. It is describes that how routing packets massages data sent to the route discovery and need of route maintenance in order to propagate the packets massages data in the networks.

$$\mathbf{NROs} = \frac{\mathbf{RPs}}{\mathbf{RPs}}$$

NROs = normalized routing overheads, that means overhead is the number of RTR (routing transmission received) packets or NRL, RP = Routing Packets, RP = Received Packets.

e. E2ED (END-TO-END DELAY)

$$\mathbf{E2ED} = (\mathbf{RT} - \mathbf{ST})$$

Where E2ED = End to end delay, RT = Receive time, and ST = sent time in the networks. It is indicate that how long delay took for packet massages data travel from source to destination nodes. That means the total time taken by each packet massages to reach the destination nodes. The avg end to end delay of packet massages data is included to all possible delays, which is caused by buffing during route discovery as well as retransmission delays at MAC, transfer time and propagations.

4. NETWORK- SIMULATOR-2 (NS-2)

It is way roles of a network Simulator for the creation event scheduler &creates networks. Because it will be for the create event scheduler, to create traffic, to create a network, to create connections and also computing routes in the network. It could be useful for the tracing packets massages data and inserting errors be done. If we are looking for the tracing packet massages data on all nodes links by function all trace and packets massages data tracing on all nodes links in nam format, which is use the function nam-trace-all.

4.1. THE FOLLOWING BELOW IS AS SIMULATION ENVIRONMENT

Parameter	Values
Traffic types	CBRs
Simulation times	200 seconds
Nodes Num	200
Pause times	0, 50,100,150,200 sec
Maxi. Connections	30,60,90
Maxi. Nodes speeds	20 meters per seconds
Rate transmission	20 packet per sec
Network areas	1000m × 1000m

Simulation scenario of AODV & DSDV

Parameter	Values
Node's number	1^{st} case 20 nodes 2^{nd} case 40 nodes 3^{rd} case 60 nodes 4^{th} case 80 nodes 5^{th} case 100 nodes
Time of Simulation	200
Pause time	2 sec
Environment size	800 × 500
Packets size	512 bytes
Maxi speed	10 min per sec
Queue length	50
Mobility model	RWM

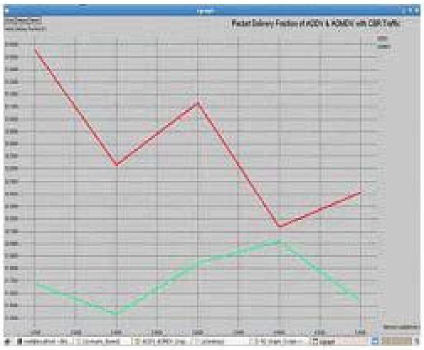
No of nodes	Packet delivery ratio	Throughput (kbps)	Routing overhead
20	99.21	48.10	2.33
40	99.17	47.73	2.09
60	97.97	42.01	2.38
80	98.05	48.85	2.32
100	98.45	58.21	2.20

Parameter	Values
Parameter	AODV, DSDV, DSR
MAC layers	802.11
Packet size	512 bytes
Sizes of terrain	1000m × 1000m
Nodes	100
Mobility model	MGMM
No. of horizontal Street	3
No. of Vertical Street	3
Traffic data	CBR, TCP
No. of source	20,60
Simulation time	900 sec
Maxi speed	0-60 m/s (interval of 20s)

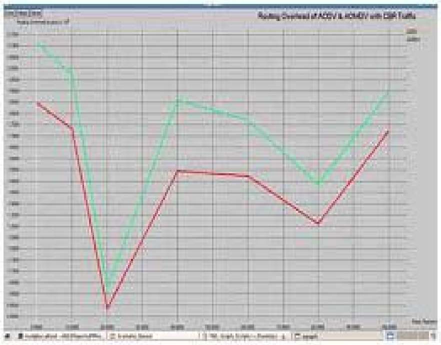
Routing protocol AODV various performance number of nodes with 30 connection field

Parameter name	Values
Topology	800 × 800, 1000 × 1000, 2550 × 2550, 3000 × 3000 (miters)
Nodes number	100,200, 300, and 600
Mobility model	Two ray ground
Simulation time	55 sec
Pause time	5
Connection No.	20
Length of Buffer	60
MAC protocol	IEEE 802.11
Size of packets	512 bytes
Traffic type	CBR
Mobility speed	5 min psec
Traffic rate	4 packets per sec.

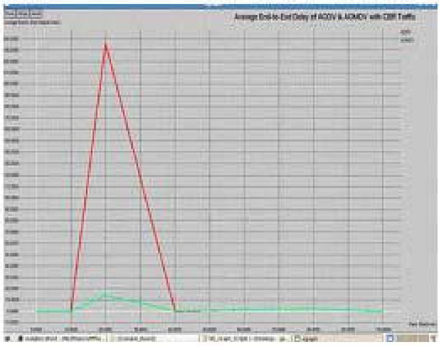
No of nodes	Packet delivery ratio in %	Throughput in kbps	Routing overhead
20	98.44	43.74	2.33
40	98.22	41.96	2.27
60	96.48	44.67	2.76
80	97.37	45.23	2.36
100	97.79	57.75	2.41



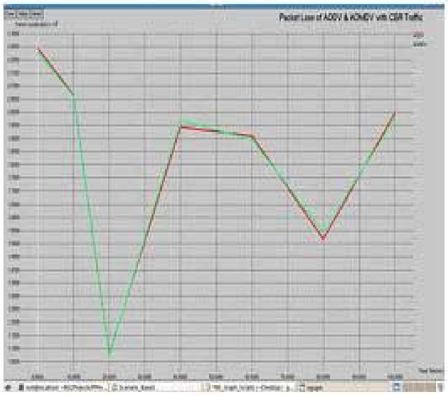
Packet Delivery Ratio



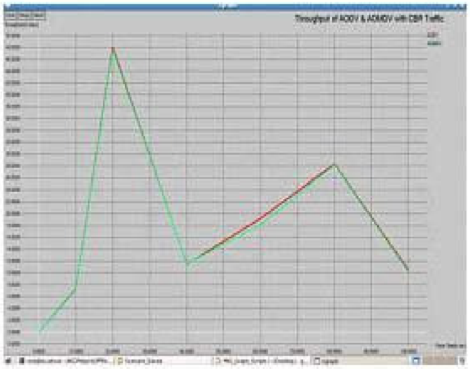
Routing over head



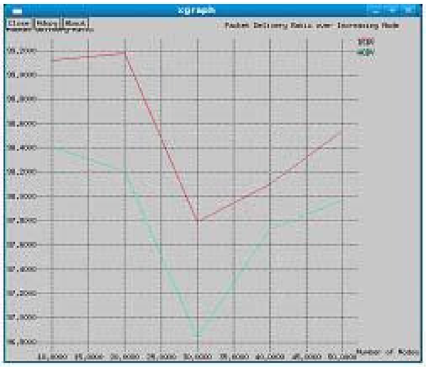
End to End Delay



packet Loss



Throughput



Increasing nodes and loss

Fig: - A Simulation result of routing protocol is under various conditions evaluated.

5. EXPERIMENTAL STUDY FOR RESULTS

According to my experimental study is simulation results for the AODV, ADSV and DSR under various conditions evaluated. This experimental study is focus on routing protocols (AODV, DSDV and DSR),which is evaluates at random some important examples in terms of some performance metrics, THs, E2EDs, PDs, DPRs and ROLs. My simulation structure showing for use number20 for the LDP (loss dependent parameters),RM (retrieve maximum)and MDP (minimum dependent parameters)

6. CONCLUSIONS & FUTURE WORK

The protocols (AODV, DSDV and DSR) are compared in terms of variation as a pause time and network load in CBRs traffic under RWM- Random Waypoint Mobility, because of randomness in mobility node. The random waypoint mobility as well as CBR is selected as scenario parameters. The AODV routing protocol is giving better performance compare than DSDV routing protocol for most of performance parametric measures.My future plane of these topicksis weighted rough set based routing that means routing protocol a route is established using the neighbor node information. Its future planned is to change takes place in the topology, if nodes are required to send any control information to the next neighbornodes in the networks.

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