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IMPACT OF DIFFERENT NETWORK SIZE ON MANET ROUTING PROTOCOLS WITH DATABASE & E-MAIL METRICS USING OPNET TOOL

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Abstract: Mobile ad hoc networks is an Auto changeable, self configured network which made up of collection of wireless mobile nodes that communicate with each other without the use of any centralized authority. In MANET network there are many factors that affect the overall network performance like network size, network load, bandwidth. This paper aims to study the impacts of network size variations on the performance of routing protocols in MANETs by simulation experiment. The three well known routing protocols OLSR, AODV and GRP have been utilized under varying network sizes. In this Research paper three different Networks size are implemented with Respective 25,50,75 nodes and Results are obtained from these Networks with Respective Performance Metrics Database query Response Time, E-mail Download Query Response Time , E-mail Upload Query Response. In 25 nodes Network and 50 nodes Networks GRP Provides us best Results with Respective performance metrics –Database query Response Time, E-mail Download Query Response Time , E-mail Upload Query Response. in 75 nodes network Grp is best in Database query Response Time . In E-mail Download Query Response Time , E-mail Upload Query Response OLSR is best .Overall we can say that GRP is the best Protocols among all, because in E-mail Upload Query Response OSLR slightly provides better performance than GRP .so Overall GRP is the best.

Introduction

A Mobile Ad Hoc Network is an self organizingsystem of mobile routers (and associated hosts)connected by wireless links. Ad hoc networks may operate autonomously, or may be connected to the larger Internet.The goal of mobile ad hoc networking is to provide a rapidly deployable means of communication (and computing), independent of a pre-existing infrastructure (e.g., base stations). Such networks will utilize a wireless physical layer consisting of relatively low bandwidth, time-varying links. In current wireless networks, the wireless mobile node is never more than one hop from a base station that can route data across the communication infrastructure. In mobile ad hoc networks, there are no base stations and because of a limited transmission range, multiple hops may be required for nodes to communicate across the ad hoc network. Routing functionality is incorporated into each host. Thus, MANETs can be characterized as having a dynamic, multi-hop and, constantly changing topology. While mobile ad hoc networks can be used without a fixed infrastructure..in this research paper we are taking Reactive and as well as proactive Routing Protocols AODV ,GRP and OLSR .we took three different Network size 25,50,75 Respectively for performance metrics we have choosed Database Query Response Time,E-mail upload Response Time. E-mail Download Response Time.

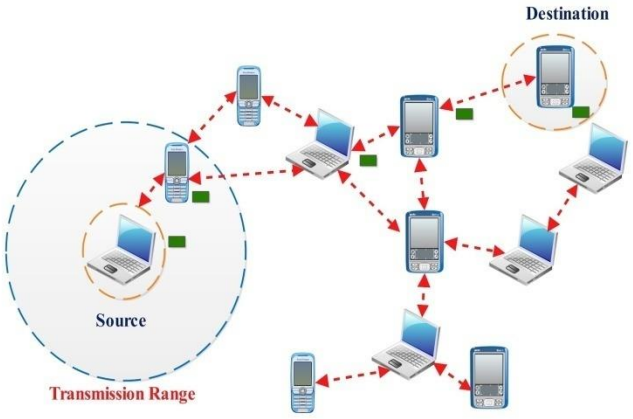

Figure 1.1 MANET NETWORK

2.Manet Routing protocols :
Routing protocols is responsible to deliver the networks packets from source to destination over internet. MANET routing protocol working mechanism is based on its algorithm. In MANET, it has various types of routing protocols each of them is applied according to the network circumstances. on the base of Routing Protocols charchertstic like Reactive ,Proactive and Hybrid .

2.1GRP(Geographic Routing) Protocol also called Geo routing or position-based routing is a routing principle that relies on geographic position information. It is mainly proposed for wireless networks and based on the idea that the source sends a message to the geographic location of the destination instead of using the network address. The idea of using position information for routing was first proposed in the 1980s in the area of packet radio networks and interconnection networks. Geographic routing requires that each node can determine its own location and that the source is aware of the location of the destination. With this information a message can be routed to the destination without knowledge of the network topology or a prior route discovery.

2.2 OLSR (Optimized Link State Routing)
OLSR is a proactive routing protocol. OLSR defines three basic types of control messages.

- **Hello** -hello messages are transmitted to all neighbors. These messages are used for neighbor sensing and MPR calculation.
- **Tc**- Topology Control messages are the link state signaling done by OLSR. This messaging is optimized in several ways using MPRs.
- **Mid** - Multiple Interface Declaration messages are transmitted by Nodes running OLSR on more than one interface. These messages list all IP addresses used by Nodes.

2.3 AODV (The Ad hoc On Demand Distance Vector)

AODV is a routing protocol designed for ad hoc mobile networks. AODV is capable of both unicast and multicast routing. It is an on demand algorithm, meaning that it builds routes between nodes only as desired by source nodes. It maintains these routes as long as they are needed by the sources. Additionally, AODV forms trees which connect multicast group members. The trees are composed of the group members and the nodes needed to connect the members. AODV uses sequence numbers to ensure the freshness of routes. It is loop-free, self-starting, and scales to large numbers of mobile nodes. AODV builds routes using a route request / route reply query cycle. AODV all fucntionality dependes on RREQ,RREP,RERR. RREQ Means first of all Route Request will be delevierd to all nodes of Networks then Route Reply will be send to source node ,if links would be disconnected of any causes then Route Error termnology will be introduced in AODV Network.

3. Simulator: In this paper, network simulator,Optimized Network Engineering Tools (OPNET)modeler 14.5 has been used as a simulationenvironment. OPNET is a simulator built on top of discrete event system (DES) and it simulates thesystem behaviour by modelling each event in the system and processes it through user definedprocesses. OPNET is very powerful software to simulate heterogeneous network with various protocols. The protocols used in this thesis are AODV,OLSR ,GRP Manet routing protocol. The proposed routing protocols are compared and evaluated based on some quantitative metrics such asE-mail Download Response Time , E-mail Upload Response Time, Database Query Response Time.Different Network size with Mobile Nodes are taken like for small mediam and large Network as 25,50,75 Nodes

4 Resluts Network (25 Nodes)

4.1 Database Query Response Time: GRP protocol gives us best Response among others protocols.OLSR Response Time is worst which is over 8 seconds . Aodv protocols Response Time is better than OLSR .we obtained that GRP Response Time is 0.27 seconds that is best among others Protocols.

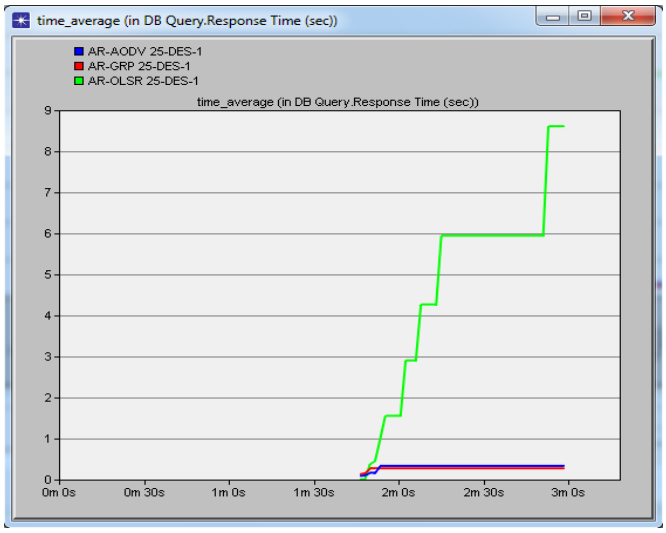

Figure 4.1 Database Query Response Time

4.2 E-mail Download Response Time

GRP protocol gives us best Response among others protocols. AODV Response Time is worst which is over 6 seconds . OLSR protocols Response Time is better than AODV .we obtained that GRP Response Time is 2.4 seconds that is best among others Protocols.

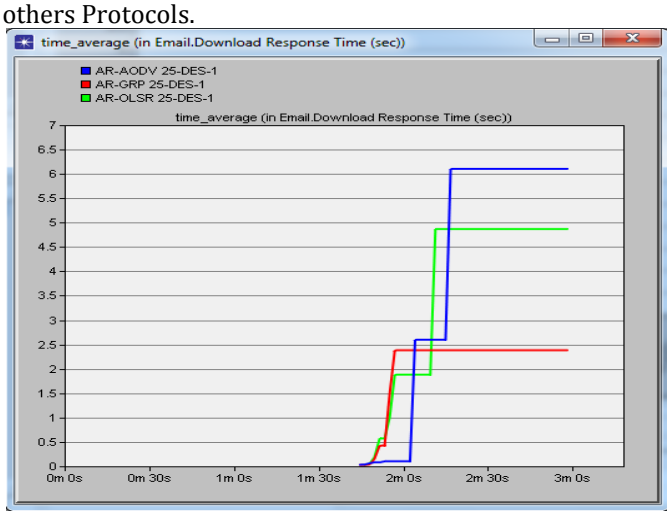

Figure 4.2 E-mail Download Response Time

4.3 E-mail Upload Response Time:

In E-mail Upload Response Time GRP and OLSR protocol gives us best Response Time both among others protocols. AODV Response Time is worst which is over 3 seconds we obtained that GRP and OLSR Response Time is 1.8 seconds that is best.

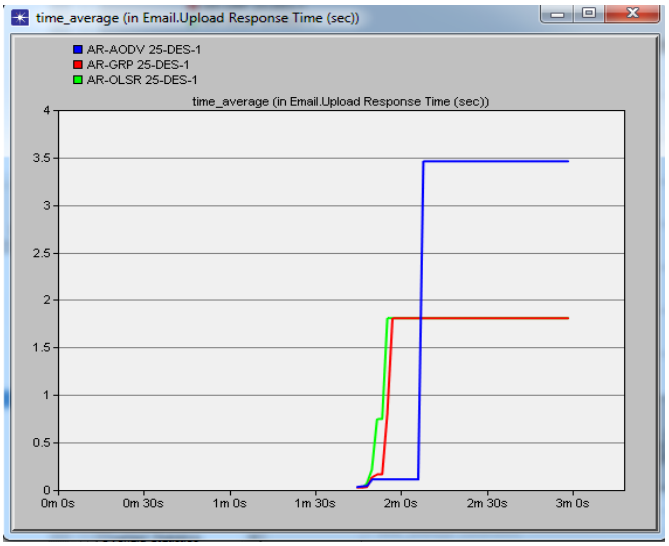

Figure 4.3 E-mail Upoad Response Time

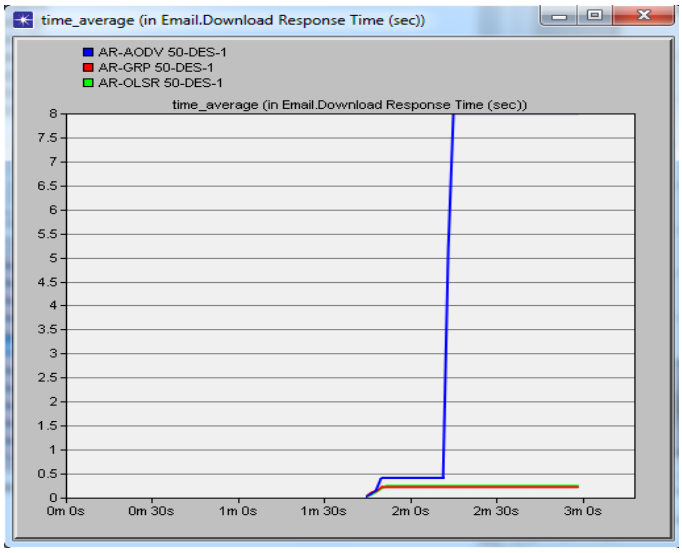

Figure 5.2 E-mail Download Response Time

5 Resluts Network (50 Nodes)

5.1 Database Query Response Time: GRP protocol gives us best Response among others protocols.OLSR Response Time is worst which is over 14 seconds . Aodv protocols Response Time is better than OLSR .we obtained that GRP Response Time is 0.9 seconds that is best among others Protocols.

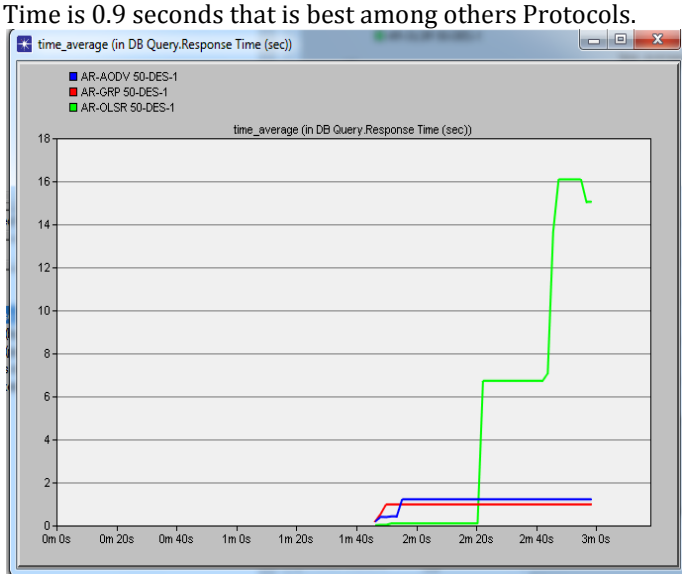

Figure 5.1 Database Query Response Time

5.2 E-mail Download Response Time GRP protocol gives us best Response among others protocols. AODV Response Time is worst which is over 8 seconds . OLSR protocols Response Time is better than AODV .we obtained that GRP Response Time is 0.21 seconds that is best among others Protocols.

5.3 E-mail Upload Response Time

GRP protocol gives us best Response among others protocols. AODV Response Time is worst which is over 6 seconds . OLSR protocols Response Time is better than AODV .we obtained that GRP Response Time is 0.29 seconds that is best among others Protocols.

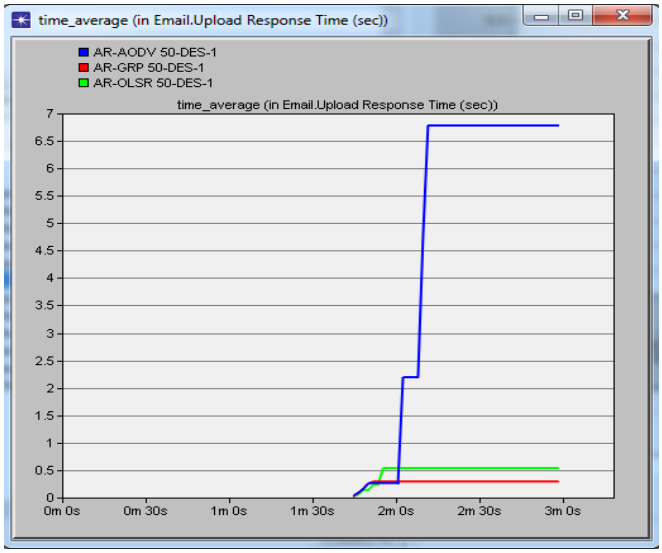

Figure 5.3 E-mail Upload Response Time

6.1 Database Query Response Time: GRP protocol gives us best Response among others protocols.AODV Response Time is worst which is over 2.5 seconds . OLSR protocols Response Time is better than AODV .we obtained that GRP Response Time is 1.26 seconds that is best among others Protocols.

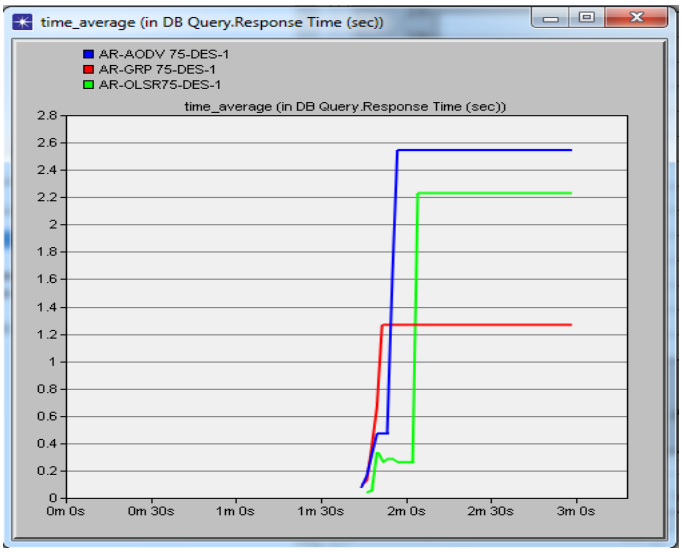

Figure 6.1 Database Query Response Time

6.2 2E-mail Download Response Time

OLSR protocol gives us best Response among others protocols. GRP Response Time is worst which is 5 seconds . AODV protocols Response Time is better than GRP .we obtained that OLSR Response Time is 0.7 seconds that is best among others Protocols.

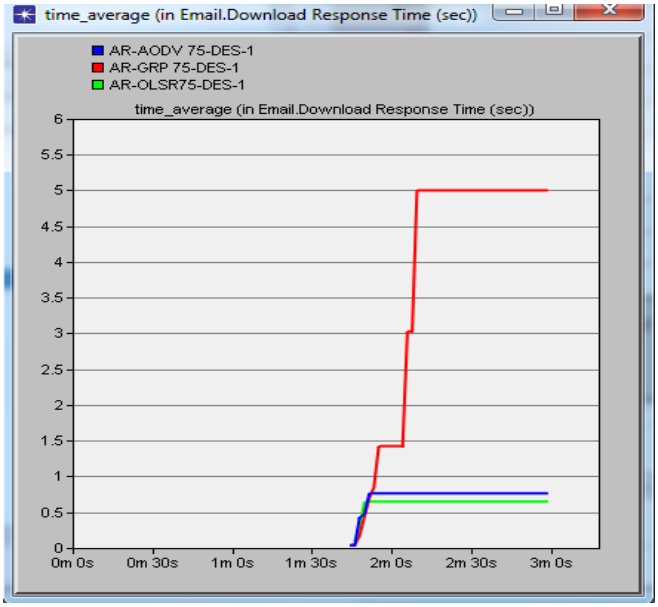

Figure 6.2 E-mail Download Response Time

6.3E-mail Upload Response Time

OLSR protocol gives us best Response among others protocols. AODV Response Time is worst which is over 7 seconds . GRP protocols is quite similar with OLSR but OLSR having 0.6 second Response time. Grp Response time is 0.7

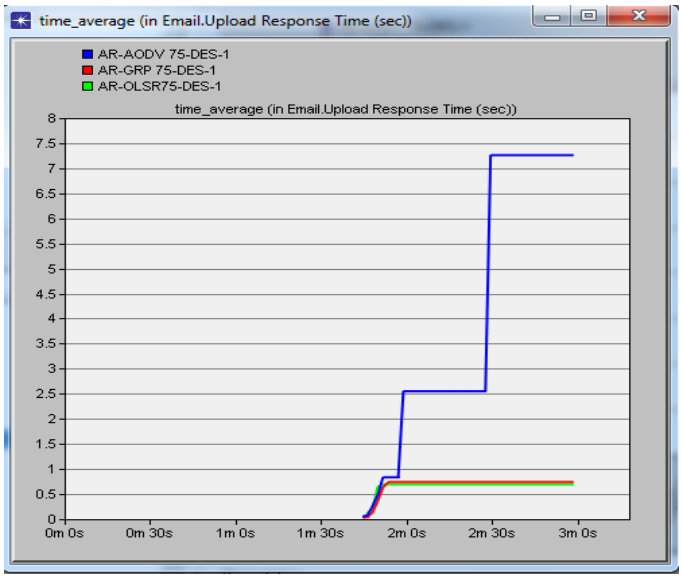

Figure 6.3 **E-mail Upload Response Time**

7. CONCLUSION AND FUTURE WORK

In this paper, we have presented a comparative analysis of selected routing protocols such as AODV,GRP,OLSR . The comparative analysis has been done Respectively 25 ,50, 75 Nodes Networks in the same network with different protocols for real time applications. Performance has been measured on the basis of some parameters that aimed to figure out the effects of routing protocols. In our paper work, The simulation result has shown that In 25 nodes and 50 nodes Networks GRP Provides us best Resluts with Respective performance metrics –Database query Response Time, E-mail Download Query Response Time , E-mail Upload Query Response. in 75 nodes network Grp is best in Database query Response Time Time. In E-mail Download Query Response Time , E-mail Upload Query Response OLSR is best .Overall we can say that GRP is best Protocols among because in, E-mail Upload Query Response OSLR is slightly provides better performance than GRP .so Overall GRP is best. In future, a research work can be done on the hybrid protocols also and others Performance metrics also can be taken .

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