Quality & Performance of voice in MANET over AODV, OLSR & TODA routing protocol

[1]Vikram Goel, [2]Er.Rasbir Singh

1M.Tech, Department of Computer Engineering, RIMT university, MGG

Vikram.goel@gmail.com

2Assistant Professor, Department of Computer Engineering, RIMT university , MGG

Rasbir.rai@gmail.com

Abstract—The increase in availability and popularity of mobile wireless devices has lead researchers to develop a wide variety of Mobile Ad-hoc -networking (MANET) protocols to exploit the unique communication opportunities presented by these devices. Devices are able to communicate directly using the wireless spectrum in a peer-to-peer fashion, and route messages through intermediate nodes, however the nature of wireless shared communication and mobile devices result in many routing and security challenges which must be addressed before deploying a MANET. In this paper we investigate the range of MANET routing protocols available and discuss the functionalities of several ranging from early protocols such as DSDV to more advanced such as MAODV, our protocol study focuses upon works by Perkins in developing and improving MANET routing. A range of literature relating to the field of MANET routing was identified and reviewed, we also reviewed literature on the topic of securing AODV based MANETs as this may be the most popular MANET protocol. The literature review identified a number of trends within research papers such as exclusive use of the random waypoint mobility model, excluding key metrics from simulation results and not comparing protocol performance against available alternatives. In this paper, we study the voice performance of different protocols of MANET.

Index Terms—AODV, OLSR,TORA, MANET, routing protocols.

Introduction: Mobile Ad-hoc Networks (MANET) have no fixed access points while every node could be host or router. All nodes are capable of movement and can be connected dynamically in arbitrary manner. These networks are self configurable [14] and autonomous systems consisting of routers and hosts. These nodes are constrained in power consumption, bandwidth, and computational power[2]. MANETs lack central administration and prior organization, so the security issues are different and thus requires different security mechanisms than in conventional networks. Wireless links in MANETs make them more prone to attacks. It is easier for hackers to attack these networks easily and thus gain access to confidential information. They can also directly attack the network to delete messages, add malicious messages, or masquerade as a node. This violates the network goals of availability, integrity, confidentiality, authenticity and authorization[15]. MANET require an extremely flexible technology for establishing communications in situations which demand a fully decentralized network without any fixed base stations, such as battlefields during wars, military applications, and other emergency search and rescue situations at the time of disasters. Routing in ad-hoc networks faces additional problems and challenges when compared to routing in traditional wired networks.

MANET Routing protocol: Routing protocols define a set of rules which governs the journey of message packets from source to destination in a network [4]. In MANET, there are different types of routing protocols each of them is applied according to the network circumstances.
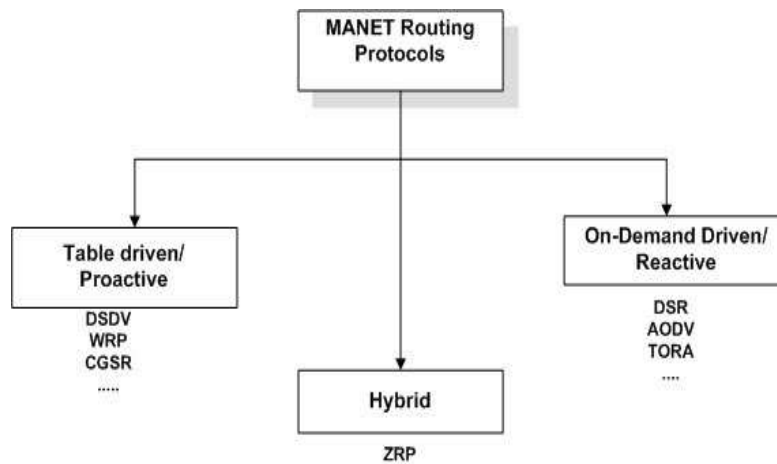
Fig 1: MANET Routing Protocol

1) Proactive Protocols: Proactive or table-driven routing protocols. In proactive routing, each node has to maintain one or more tables to store routing information, and any changes in network topology need to be reflected by propagating updates throughout the network in order to maintain a consistent network view. Example of such schemes is the conventional routing schemes: optimised link state Protocol (OLSR). They attempt to maintain consistent, up to-date routing information of the whole network. It minimizes the delay in communication and allows nodes to quickly determine which nodes are present or reachable in the network.

2) Reactive Protocols: Reactive routing is also known as on-demand routing protocol since they do not maintain routing information or routing activity at the network nodes if there is no communication. If a node wants to send a packet to another node then this protocol searches for the route in an on-demand manner and establishes the connection in order to transmit and receive the packet. The route discovery occurs by flooding the route request packets throughout the network.

Examples of reactive routing protocols are the Ad-hoc On-demand Distance Vector routing (AODV)[11] and Dynamic Source Routing (DSR).

3) Hybrid Protocols: They introduce a hybrid model that combines reactive and proactive routing protocols. The Zone Routing Protocol (ZRP) is a hybrid routing protocol that divides the network into zones. ZRP provides a hierarchical architecture where each node has to maintain additional topological information requiring extra memory.

Simulation: We have created a network with AODV, OLSR & TORA protocol in OPNET & checked the voice performance of the entire network. In this, we create 3 scenarios; in the first scenario we create MANET Network with AODV protocol & in the second scenario we create a network with OLSR Protocol and in the last scenario we create a network with TORA in the MANET. After that we compare the performance of all the three scenarios & check the performance of the network.
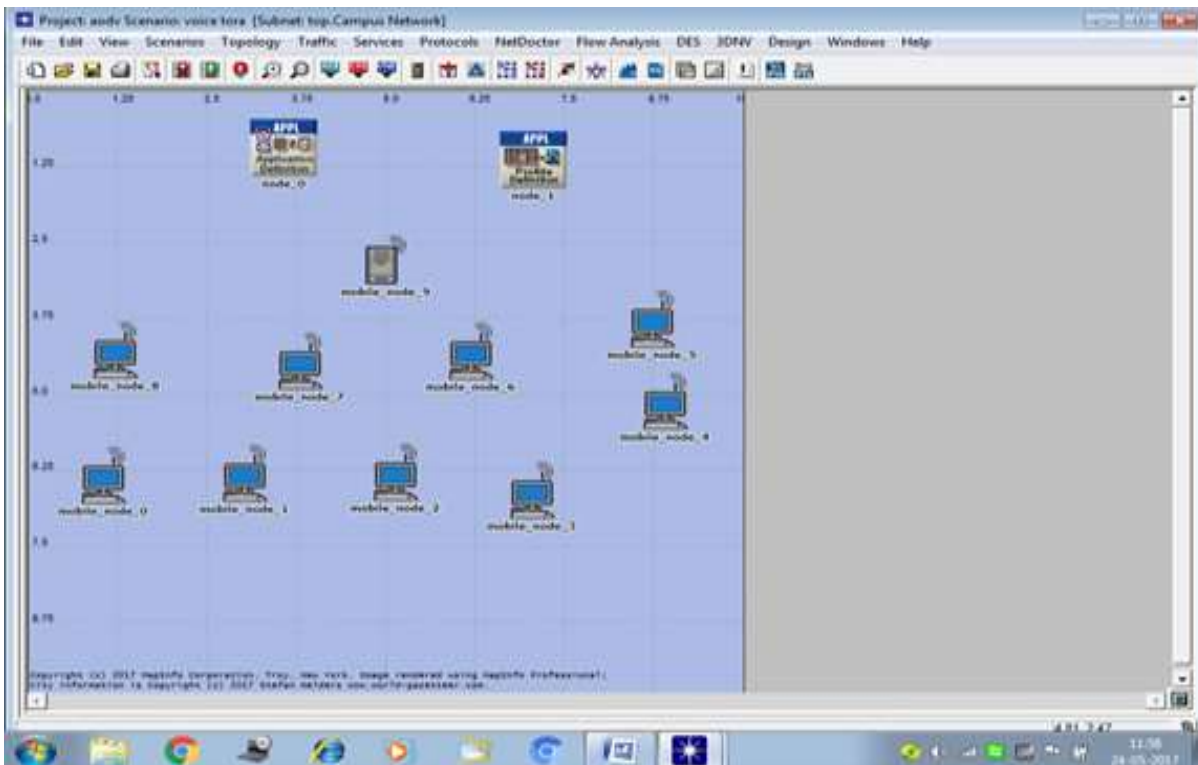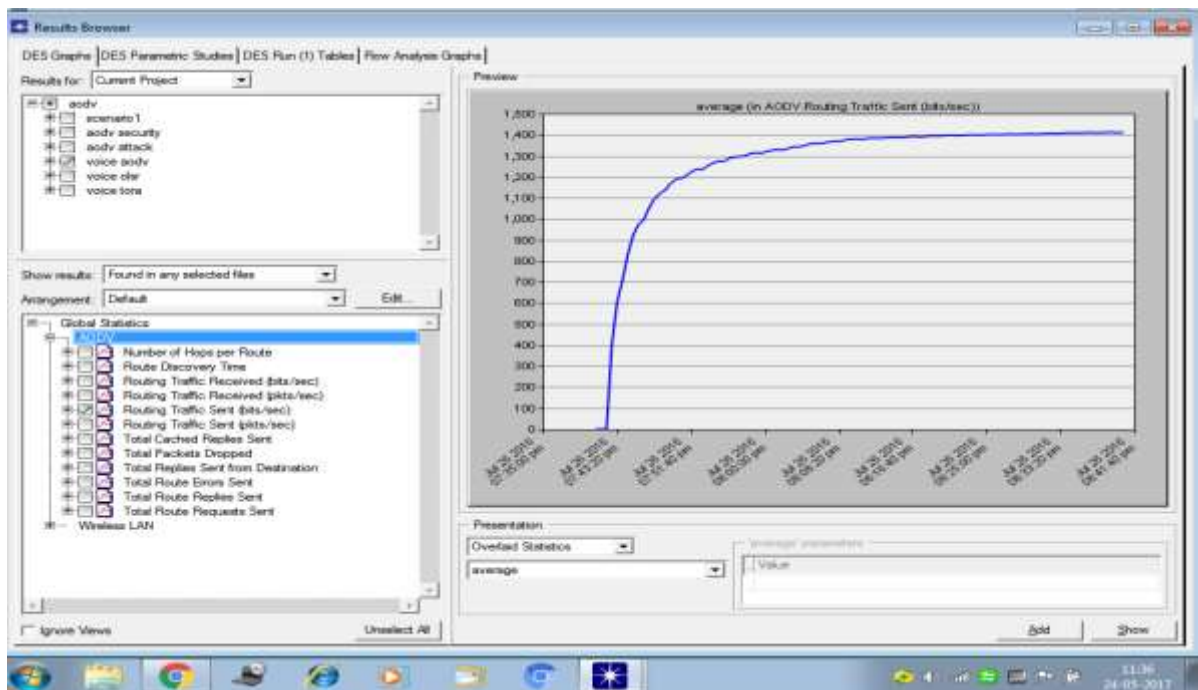
Fig 2: MANET Network

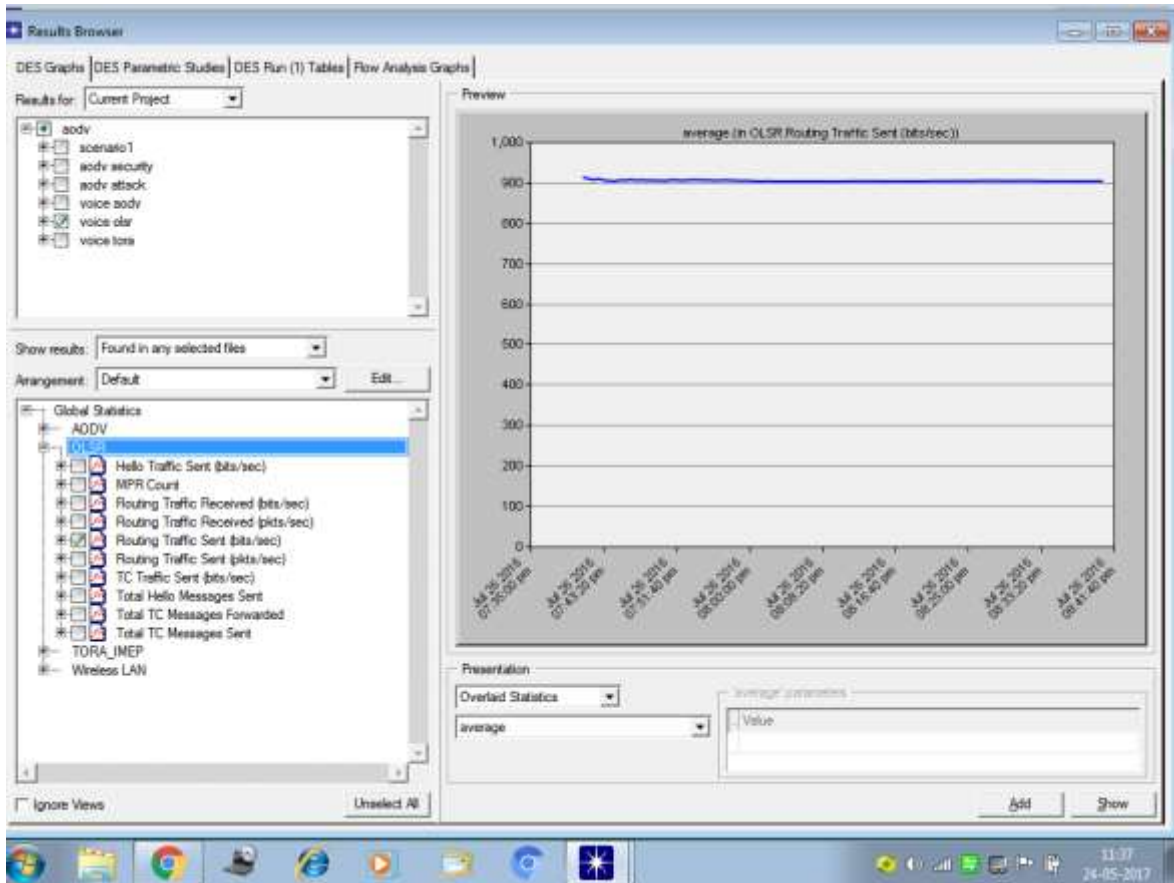**Fig 3: Voice traffic of AODV protocol in MANET**

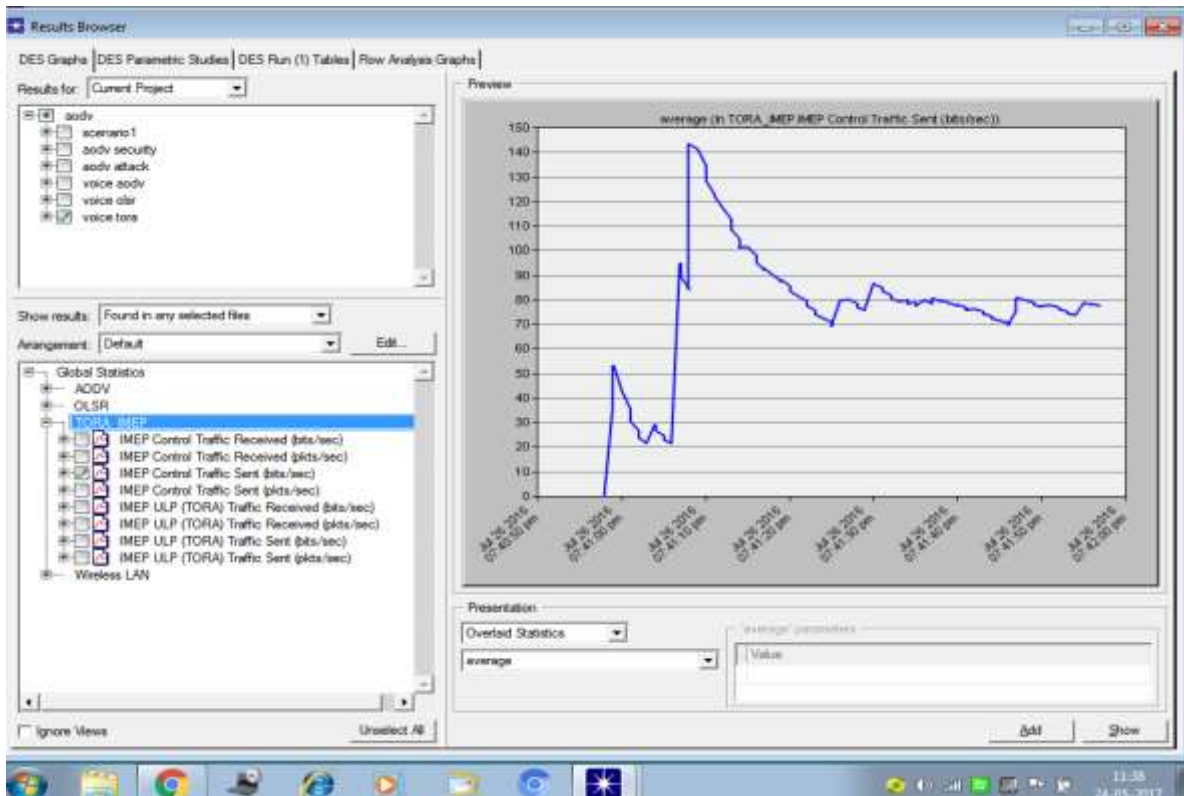**Fig 4: Voice traffic of OLSR Protocol in MANET**

Fig 5. Voice Traffic of TORA Protocol in MANET

As shown in above fig we see that the voice traffic of AODV is more than that OLSR & TORA. The traffic sent by AODV is 1400b/s. The data sent by OLSR is 900b/s & by TORA its only 80b/s. So we conclude from above we say that AODV protocol is better than other protocols.

Conclusion: In this paper, we see that the reactive protocols are better for voice traffic. We can further improve the network performance by applied various protection schemes.

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