Quality & Performance of voice over MANET with various routing protocol: A survey

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Abstract: Mobile Ad hoc Networks (MANETs) may provide a good platform for the fast deployment of VoIP service in many application scenarios. The luck of infrastructure, flexibility and low cost are the main characteristics of MANETs. Otherwise, its present a considerable complexity that makes the transmission of real-time applications like VoIP a great challenge due to Quality of Service (QoS) requirements. This paper investigates the performances of various routing protocols (AODV, OLSR) MANETs carrying VoIP traffic. In this paper we study that how routing protocol effect the network performance of the MANET Network.

Keywords: MANET, Routing Protocols, QoS.

Introduction: The mobile ad hoc network MANET permits a more Flexible communication model than traditional wire line Networks since the client is not restricted to an altered physical area [1]. It is another unique network that does not have any fixed wired communication framework or other network supplies. With no previous settled infrastructure, MANETs are increasing expanding notoriety because of their simplicity of organization and ease of use.

Based on the method of delivery of data packets from the source to destination, classification of MANET routing protocols could be done as follows:

• **Unicast Routing Protocols**: The routing protocols that consider sending information packets to a single destination from a single source [2].

• **Multicast Routing Protocols**: Multicast is the delivery of information to a group of destinations simultaneously, using the most efficient strategy to deliver the messages over each link of the network only once, creating copies only when the links to the destinations split. Multicast routing protocols for MANET use both multicast and unicast for data transmission [3].

Fig 1. MANET Network

Challenges of Mobile Ad-Hoc Network: Regardless of the variety of applications and the long history of mobile ad hoc network, there are still some issues and design challenges that we have to overcome. This is the reason MANET is one of the elementary research field. MANET is a wireless network of mobile nodes; it's a self-organized network. Every device can communicate with every other device i.e. it is also multi hop network. As it is a wireless network it inherits the traditional problem of wireless networking [4].

• The channel is unprotected from outside signal.

• The wireless media is unreliable as compared to the wired media.

• Hidden terminal and expose terminal phenomenon may occur.

• The channel has time varying and asymmetric propagation properties.

Mobile Ad-hoc Routing Protocols: The main problem with ad-hoc networking is how to send a message from one node to another with no direct link. The nodes in the network are moving around unpredictably, and it is very challenging which nodes that are directly linked together.. The topology of an ad-hoc network is constantly changing and it is very difficult for routing process. There are two main approaches for routing process in ad hoc networks. The first approach is a proactive approach which is table driven and uses periodic protocols. This means that all nodes have tables with routing information which are updated at intervals. The second approach is re-active, source-initiated or on demand. This

means that every time a message is sent it first has to find a path by searching the entire network. There are many different protocols that are in accordance with the two different routing approaches. Different protocols are specialized in different aspects of the routing. Other aspects than finding a short path are low overhead communication and load-balancing [5].
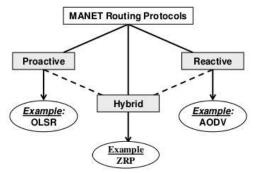

Fig 2: MANET Routing Protocols

Proactive (Table-Driven) Routing Protocols: These routing protocols are similar to and come as a natural extension of those for the wired networks. In proactive routing, each node has one or more tables that contain the latest information of the routes to any node in the network. Each row has the next hop for reaching a node/subnet and the cost of this route. Various table-driven protocols differ in the way the information about a change in topology is propagated through all nodes in the network. There exist some differences between the protocols that come under this category depending on the routing information being updated in each routing table. Furthermore, these routing protocols maintain different number of tables. The proactive protocols are not suitable for larger networks, as they need to maintain node entries for each and every node in the routing table of every node. This causes more overhead in the routing table leading to consumption of more bandwidth. Examples of such schemes are the conventional routing schemes, Destination Sequenced Distance Vector (DSDV)[6].

Reactive (On-Demand) Protocols: Reactive routing is also known as on-demand routing protocol since they don't maintain routing information or routing activity at the network nodes if there is no communication. These protocols take a lazy approach to routing. They do not maintain or constantly update their route tables with the latest route topology. 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 usually occurs by flooding the route request packets throughout the network. Examples of reactive routing

protocols are the dynamic source Routing (DSR), ad hoc on-demand distance vector routing (AODV)[7].

Hybrid Routing Protocol: Most of the protocols presented for MANET are either proactive or reactive protocols. There is a trade-off between proactive and reactive protocols. Proactive protocols have large overhead and less latency while reactive protocols have less overhead and more latency. So a Hybrid protocol is presented to overcome the shortcomings of both proactive and reactive routing protocols. Hybrid routing protocol is combination of both proactive and reactive routing protocol. It uses the route discovery mechanism of reactive protocol and the table maintenance mechanism of proactive protocol so as to avoid latency and overhead problems in the network. Hybrid protocol is suitable for large networks where large numbers of nodes are present. In this large network is divided into set of zones where routing inside the zone is performed by using reactive approach and outside the zone routing is done using reactive approach. There are various popular hybrid routing protocols for MANET like ZRP, SHRP[9].

Quality of Services Parameters: Performance evaluation of the MANET network under different routing protocols. These parameters have different behaviors for overall network performance [8]. We study three parameters in our study on overall network performance. These parameters are delay, network load, and throughput.

- Delay The packet end-to-end delay is the time from the generation of a packet by the source up to the destination reception, so this is the time that a packet takes to go across the network. This time is expressed in seconds (sec) [8].

- Network Load Network load represents the total load in bit/sec submitted to wireless LAN layers by all higher layers in all WLAN nodes of the network [20]. When there is more traffic coming into the network, and it is difficult for the network to handle all this traffic it is called the network load. An efficient network can easily cope with large traffic coming in, and to make the best possible network, many techniques have been introduced [8].

- Throughput: Total data traffic in bit/sec successfully Received & forward to the higher layer.

Conclusion: In this paper an effort has been made on the comparative study of Reactive, Proactive and Hybrid routing protocols. There are various

shortcomings in different routing protocols and it is difficult to choose routing protocol for different situations as there is tradeoff between various protocols. The field of mobile adhoc networks is very vast and there are various challenges that need to be met, so these networks are going to have widespread use in the future. Our aim is to increase the quality of voice using different routing protocols.

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