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Quality of Services for Reactive Routing Protocol in Mobile Ad-hoc Network

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Abstract: *MANETs can support several real-time applications like emergency rescue, and disaster relief operations which require minimum Quality of Service (QoS) to handle high traffic. Providing QoS for multimedia and group-oriented computing in MANETs becomes a real challenge due to the wireless medium and the mobility of operating nodes. Therefore, an investigation of routing protocols for one-to-many or many-to-many computing is important that supports acceptable QoS in MANETs. Numerous QoS metrics have been considered for the assessment like packet delivery ratio, latency, packet loss rate, control overhead, and throughput. In this work we study and evaluate the quality of services parameters for reactive routing protocol such as AODV and DSR.*

Keywords: *Mobile Ad-hoc network, Throughput, AODV, DSR, Network simulator, Access point*.

1. INTRODUCTION

A MANET is a temporary auto-configuration network that supports users continuously and dynamically changes its network topology. This means the nodes communicate without administration and may connect to the Internet or operate as standalones. In MANETs, routing protocols are essential to finding the right path between the source and the destination. There are many challenging factors for the routing protocols of MANETs. In some situations, the mobility of the nodes may create a significant challenge to the routing protocol because some of the nodes will be out of the transmission range, which will require finding an alternative path to the destination. In a real network, the node is affected by power constraints, as the node is operating with a limited battery, which will affect the lifetime of the nodes [15].

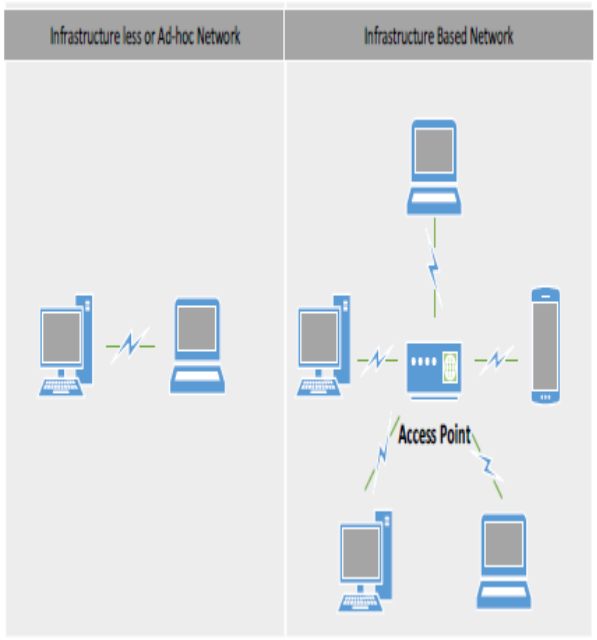

Figure 1: Ad-hoc Network and Infrastructure Network [13].

A small wireless network with network is shown in below figure a wireless infrastructure less network is shown where A, B, C, D, E, F, G are nodes connected wirelessly with each other. As it is known that data is transmitted via routing protocols & these routing protocols are responsible for path establishing between nodes. Routing comes in action because of regular change in topologies of nodes as nodes are movable so routing protocols need to manage the flow of data among nodes which is a challenging task along with ensuring that the path is regularly available to be engage [16]. There is no centralized control in it therefore nodes itself do everything, nodes can act as host or router. Routing algorithm incorporated within mobile nodes.

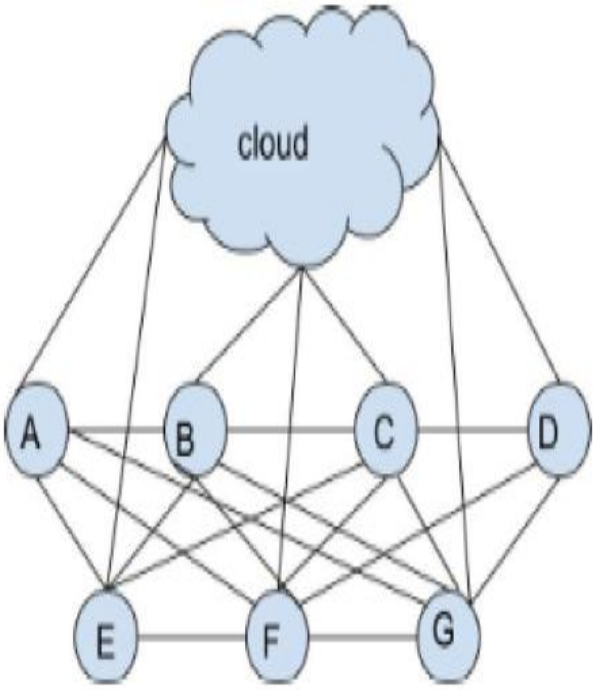

Figure 2: A wireless infrastructure network is shown in which all the nodes (A to G) are connected with a cloud service provider.

MANET network suffers from many challenges such as low bandwidth, high power consumption, low memory, processing limitation and mobility pattern changes since nodes in MANET are various in transmission range and have limited power resource that cannot be recharged or replaced usually such as mobile phones, PDA, Digital Cameras, earphone, wristwatch, iPad or laptop. Mobility pattern challenge leads to frequent changes in the network topology [17]. Unlike Wireline networks, the wireless connection is different due to interfering, intra-flow, inter-flow, fade problems. Nodes communicate with each other in peer-to-peer requests in the absence of a centralized node. Therefore, data need to be forwarded via intermediate nodes, introducing routing as a key challenge in a mobile ad hoc network. MANET with such characteristics meet most of the requirements of disaster area scenario, therefore, emphasis on routing in MANET: presenting routing protocols principles, pros, and cons to displaying their suitability's in calamity scenarios. Routing can be defined as a process of establishing a route from the sender node to the receiver node. Upon the absence of centralized control node, each sender node sends data packets to the destination node directly if they both in range. Otherwise, the routing protocol should forward packets through intermediate nodes to reach the destination node. Nodes mobility creates and breaks links frequently results in building /degrading paths each time subsequently finding a specific path is a critical issue. Some routing protocols require nodes to be familiar with their neighbors using diverse techniques, for example, Multicast and broadcast. Such techniques result in another challenge which is a multi-cast tree and load balancing [18]. Upon dynamic topology and diverse transmission range, a network-partitioning problem appears. Hence, it is indispensable to detect the critical links/nodes, which their failure causes network partitioning periodically, reduces packets loss as well as route discovery time [12].

The rest of this paper is organized as follows in the first section we describe an introduction of mobile ad-hoc network. In section II we discuss the classification of MANET routing protocol. In section III we discuss experimental work study for reactive routing protocol such as AODV and DSR with quality of services parameters, finally in section IV we conclude our research work.

2. MANET ROUTING PROTOCOLS

Mobile ad-hoc wireless networks give us the high probability and high properties to create networks, without any central management or infrastructure, independent and temporary network, that is means wide ubiquitous networks. The intermediate nodes should be able to communicate between them to send and receive the data with ability using at anytime and anywhere, the mobility of the intermediate node between the source and destination gives us unstable topology maybe the connection between the nodes will be break often. Therefore, the strategies to design any wireless depend on path routing and protocol selection. MANET routing protocols may classify into three categories, as shown in below figure: Reactive (On-demand), Proactive (Table-

driven), and Hybrid. This work will focus on evaluating the performance of three types of reactive protocols: Dynamic Source Routing (DSR), Ad-hoc On- Demand Distance Vector (AODV), and Dynamic MANET On-Demand (DYMO).

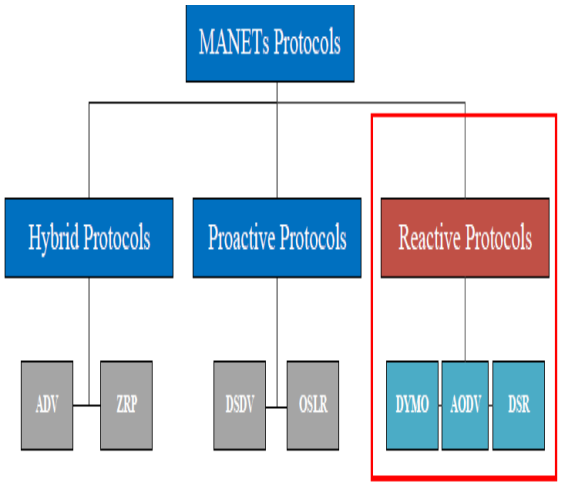

Figure 3: Protocols Categories of MANETs [13].

3. EXPERIMENTAL WORK

Performance evaluation of Mobile Ad-hoc Network (MANET) routing protocols is essential for selecting the appropriate protocol for the network. Many routing protocols and different simulation tools were proposed to address this task. This paper will introduce an overview of MANETs routing protocols as well as evaluate MANET performance by using two reactive protocols Dynamic Source Routing (DSR), and Ad-Hoc On-demand Distance Vector (AODV).

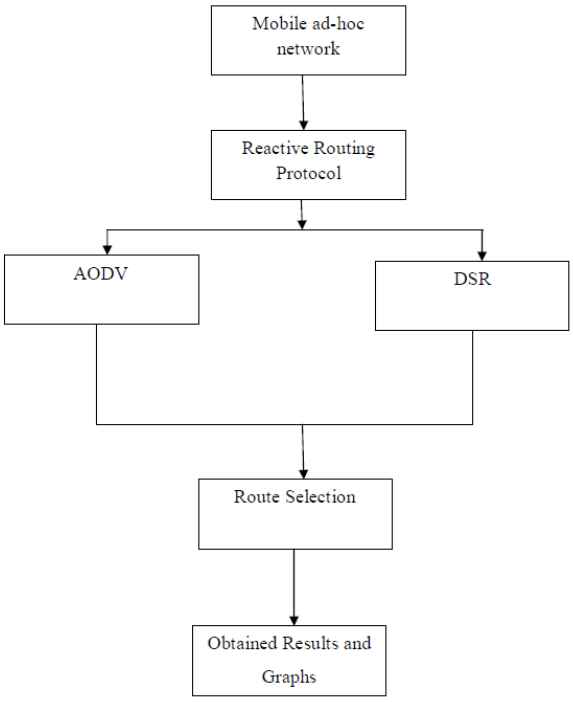

Figure 4: This figure represents proposed model work flow.

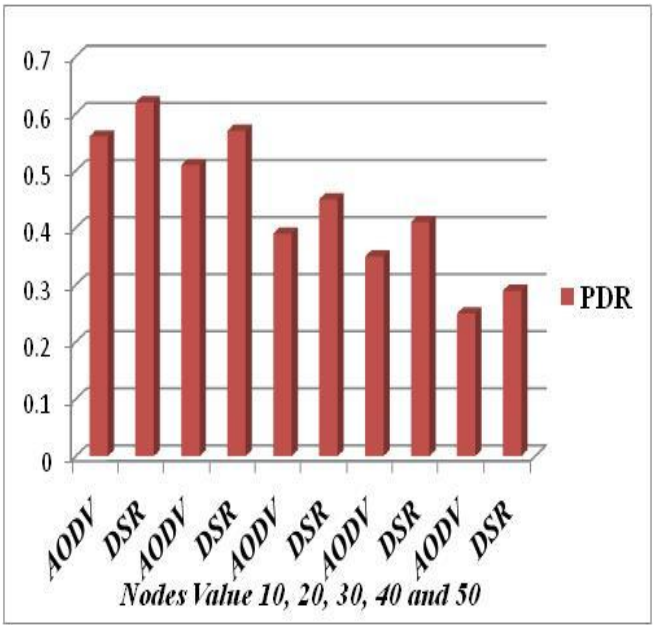

Figure 5: This figure represents proposed model work using PDR parameters.

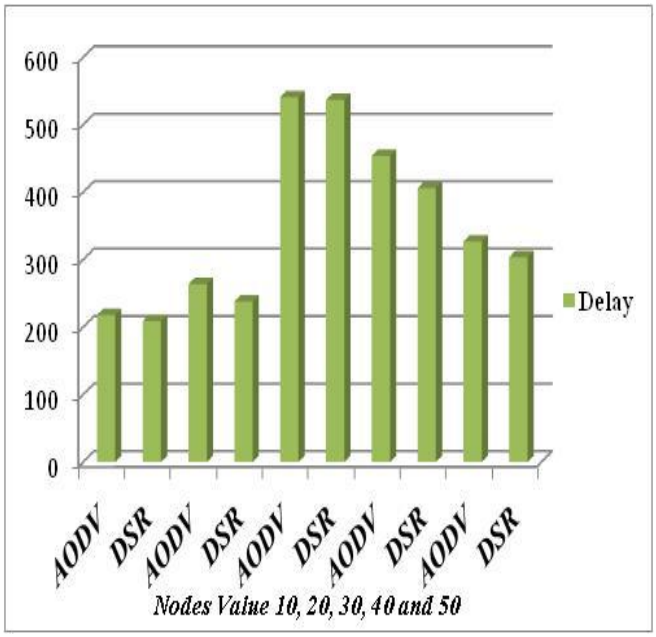

Figure 6: This figure represents proposed model work using Delay parameters.

4. CONCLUSION

Routing protocols are designed to adapt dynamic topological configuration. A Mobile Ad-hoc network is a combination of different nodes, created for communicating each other without any infrastructure. Transmitting of packets from source to destination is one of the greatest challenges because the packet should reach the destination without disturbances like delay, packet loss. In this paper we present experimental study for reactive routing protocol using dynamic source routing protocol and ad-hoc on demand distance vector routing protocol. Here we improve the performance for this quality of services parameters like end to end delay, throughput and packet delivery ratio.

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