

# Efficient Dynamic-Power AODV Routing Protocol To improve QoS Parameters

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**Abstract:** Mobile Ad Hoc Networks (MANET) are networks established by mobile radio networks with infrastructure building. The versatility of antennas ensures that the network's configuration is constantly evolving. If the radio density is small, the capacity of the network will be decreased due to mutual interference. The Dynamic Power Ad-hoc On-Demand Distance Vector (DP-AODV) was built to resolve this issue. The current research study (DP-AODV) assumed changing transmission power rates of all nodes when transmitting the packet request route to the destination node. It prefers lower transmission power for regions with less density and vice versa. As a result we introduced approach centered on route optimization to boost the QoS requirements for the network.

**Keywords:** MANET, (Quality of Service)QoS, DP-AODV, Firefly optimization, Dynamic power

## I.INTRODUCTION

The wireless network is split into two groups, fewer infrastructure based and less infrastructure. Infrastructure-based networks are also usually termed networks and have a set gateway. All nodes inside this make clear via the nearest base station. Data base stations are needed and differ in shape as per the requirements of the network. Other form of network is less network infrastructure, also named Mobile Ad-hoc Networks (MANETs)[1]. The nodes of MANET are able to wander in any way. There is not really a straight path across the source and the destination. In these circumstances, intermediate nodes are needed. The source node focuses on the intermediate node to identify the perfect path to the destination.

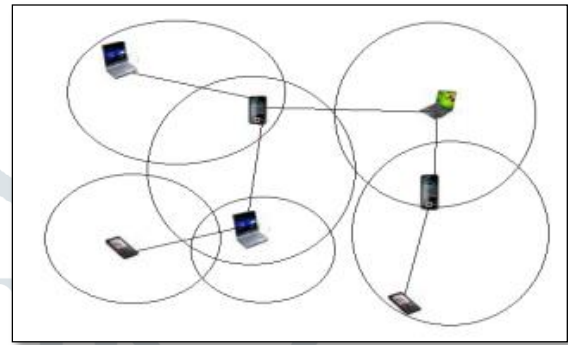


Figure 1: Mobile Ad Hoc Network[2]

QoS in MANETs is very critical and has been limited over the last few decades. Higher QoS is required for real-time apps. Quality of Service ( QoS) is the task of the network to deliver consistent and higher quality services to chosen traffic. Where quality includes data loss, delay or latency, delay variation, effective use of network resources and service implies an application that interacts among each other (i.e. audio , video, e-mail) . The main goals of quality of service are to give priority to this request and to take care of numerous QoS parameters such as dedicated bandwidth, reliability, less latency and latency Variance[3]. The QoS model offers a routing model in which special privileges can be given for various applications in MANETs. Signaling, QoS routing and the MAC layer must be addressed when developing a new routing protocol to produce better QoS [4].

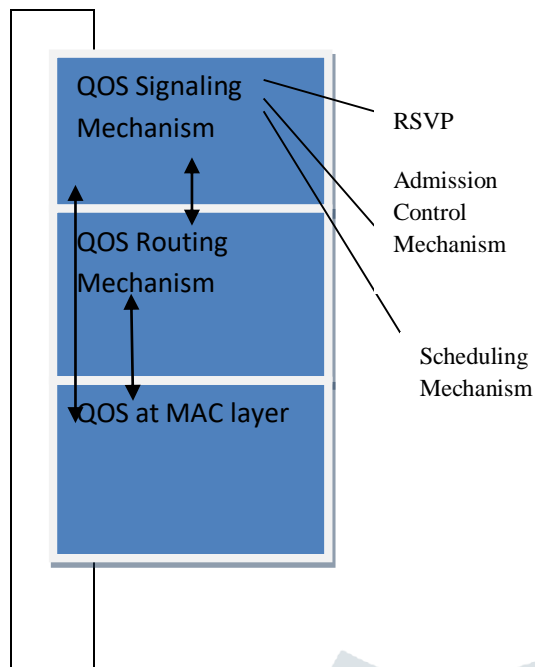


Figure 2 Quality of Service Framework [5]

There are several routing in MANET are:

The routing protocols are designed to determine an acceptable transmission connection among two nodes that would allow packets to be guided to their end location. As the goal criterion for mobile networks is to reduce the number of communications, the criteria for the network vary from those for the wired network. There are primarily two kinds of routing protocols, both proactive and reactive, based on how the routes are managed. Proactive routing helps to extend and preserve routes among all nodes. Reactive routing, on the other side, produces routes only if the source node needs a path.

- **Ad hoc On-Demand Distance Vector(AODV)**

An illustration of a reactive routing protocol is the AODV that Perkins and Royer[6] developed to improve the DSDV routing protocol. It facilitates unicast, multicast and broadcast delivery of information. The key advantage of the AODV method is that it is hop-by-hop, meaning that any intermediate node in the network will make a decision on the propagation of the data packet. The benefits [7] of such routing include low overhead, overhead memory, fast modification of complex network adjustments, and low processing.

- **DSDV:** This is a constructive routing protocol. It overpowers the looping challenge in the event of split ties. Bellman-Ford routing protocol functions well in a wired network, but due to topology control in MANETs, the number to infinity issue is generated

and cannot work effectively. DSDV adjusts the updated accordingly port number in the routing table to resolve this problem. Using this attribute in the DSDV routing table, distinguish between both the old route and the new route and solve the question of count to infinite. Each node using DSDV preserves a routing table containing all possible destinations, metrics and the next hope to achieve them together with the sequence number created by the destination[8]. Every node regularly promotes the routing table and upgrades its routing table with freshly information obtained.

- **Dynamic Power- Ad hoc On-Demand Distance Vector (DPAODV)**

In the case of DP-AODV, the transmission power is split into 3 rates (low , medium and high) dependent on node density[9]. Node density is expected to be significant as there are more than 15 neighbors. When there are fewer than 7 neighbors, the density is small. The goal of using three different privileges is to retain sufficient connections while at the same time reducing energy demand and intervention. The intention of the DP-AODV network is to send a data packet with a minimal amount of energy.

- **ZRP:** The zone-based routing is a hybrid routing protocol. This takes full advantage of both constructive and reactive network architectures. The key concept and behind ZRP is to get ahead of overhead routing and long-distance requests to slow reactive and constructive routing mechanism. The entire network can be categorized into specific routing areas[10].

The remainder of the paper is structured as follows: Section 2 includes a literature analysis of DP AODV and MANET, Section 3 explains the suggested DP-AODV process, and Section 4 describes the Simulation environment , performance measures, and analysis. Eventually, the conclusion is set out in Section 6.

## II.LITERATURE SURVEY

**Sanjeev et al.,[11]** Introduce a new QoS based routing protocol AODV-QSRP (QoS routing protocol based AODV)

for Mobile Adhoc Network. AODV-QSRP is based on current AODV and is of a reactive (on-demand) type. AODV-QSRP aims to produce quality QoS for real-time apps when identifying multiple essential QoS requirements such as Bandwidth, Delay, Connection Performance and Battery Power for route selection. Modeled and contrasted the output of AODV-QSRP with QAODV, AODV, OLSR, DSDV and ZRP. The network simulator-2 (NS-2.32) is used to introduce and model the platform, and is an event-driven and real-time simulator.

**Bamhdi et al.,[12]** In this paper, present several findings on the efficiency of DP-AODV comparing the results with the standard protocols AOMDV, AODV and DSR. Simulation results indicate that DP-AODV showed better performance than AODV and DSR in all cases, but AOMDV provides good delay than all others.

**Kumar et al.,[13]** This paper proposes a novel approach centered on a firefly algorithm (a swarm intelligence integration) to boost connectivity efficiency in terms of transmission accuracy and increased communication. The suggested methodology uses the principles of an ad-hoc vehicle optimization algorithms that improves the efficiency of routing by effective packet transmission from the source channel to the distribution channel.

**Ali et al.,[14]** This research paper analyzed various QoS metrics of various reactive algorithms such as TORA, AODV, and DSR. The metrics used when considering node density and version of IEEE 802.11 g WLAN Standard are Network Load, Retransmission tries, End to End Delay, Media Access Delay, Throughput, and so on. Analysis indicate that each protocol appears different from the others in various formats as there are various factors that have been used in particular scenarios. Therefore, as per the findings of our simulation, conclude that AODV outclasses others.

**Hazzaa et al., [15]** The cellular networks are the most important network in these times. These channels have a number of roles and purposes. For instance, mobile ad-hoc networks (MANETs) are a series of mobile networks connected to radio connections. The MANET entire network is not developed and hierarchical control is not feasible. Ad hoc network with multiple voice traffic nodes has been modeled and various results were achieved to enhance the effect of node density on QoS. The experiments are done and

tested in each case to calculate the delay. All of these explanations demonstrated the specifications of QoS.

### III. PROPOSED METHODOLOGY

#### • EXISTING PROBLEM

The current research study (DP-AODV) assumed changing transmission power rates of all networks when transmitting the packet request route to the destination node. It prefers lower transmission power for nodes with much less density and conversely. But, due to the continuous movement of the nodes, the relations with them are unreliable. The method of route optimization has not been found in the present study. Unpredictable connections can contribute to drops of packets. Therefore, in the proposed model, must concentrate on route planning to boost the network QoS metrics.

#### • OBJECTIVES

1. To research different strategies relevant to the development of QoS for MANETs.
2. To introduce and study the effectiveness of DP-AODV in NS2.35.
3. Design and evaluate DP-AODV dependent alteration of Firefly optimization to boost QoS requirements.
4. Evaluate the results of DP-AODV and FDP-AODV centered on end-to-end latency, bandwidth and packet delivery ratio.

#### • RESEARCH METHODOLOGY

When the source node passes the RREQ packet to its neighbors to seek the path to the destination network, the neighbor node measures the transmitted signal power. The neighbor must determine the attraction factor from the obtained signal power. In the routing table, the popularity factor together with the time stamp on which the packet was obtained will be established for each connection. Growing node must follow the same path for transmitting the RREQ packet and calculating the attraction price.

Once the destination module gets all RREQ packets, all routes to the source node will be formulated.

The Euclidean distance of the routes will be determined and the total Euclidean distance also will be measured.

For routes where the Euclidean distance is far more than the standard, and for routes where the Euclidean distance is less, the Route Answer Step will be implemented.

Mostly during route reaction, the nodes will measure the obtained signal intensity and also the popularity factor. It will be processed against the time stamp once.

The rate of increase in the quality of the ties will be determined at the source node. The minimal rate of change would mean that the networks are not fairly moving and that the relation among them is very constant. And for the nodes, if the speed of development is high, it means that the nodes move fairly faster, and the relation behind them is very unpredictable.

The source node will determine the best connection for each route by testing the maximum rate of change of attraction for each connection.

A global minimal that means the best relation will be identified from the best calculated value. The source node must select the route forwarding data to the destination node.

#### IV.RESULTS

In our research, simulation and quality progression are focused on the use of the Network Simulator version 2 (NS-2.35) which is commonly used during the simulation of sensor networks in use in ad-hoc networks. Modeling is used to evaluate the method because, unlike real-life tests, it is easy to perform, less costly and allows conditions to be modified for multiple situations.

The findings of the study carrying out include a simple example of the benefits of the DP-AODV upgrade relative to the current DP-AODV base paper. The contrast of the results of the study is more practical and reliable, since both routing algorithms used single-track transmission in research scenarios. Various locations and traffic flow scenario files were tested with both network architectures.

- Packet Delivery Ratio

PDR is the total packets successfully delivered to the destination against the total sent packets.

$$PDR = \frac{\text{Total Packets Received}}{\text{Total Packets Sent} * 100}$$

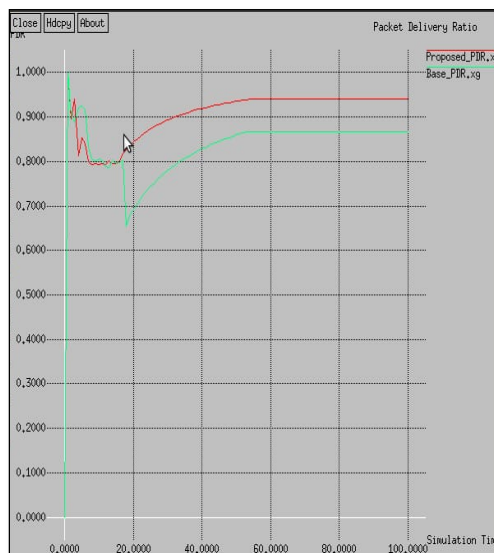


Figure 3:Packet delivery Ratio

- Throughput

Throughput is the avg. amount of data in bits/sec. is transferred in a specific amount of time from source to the destination.

$$\text{Throughput} = \frac{\text{Total Packets Sent}}{\text{Data Duration}}$$

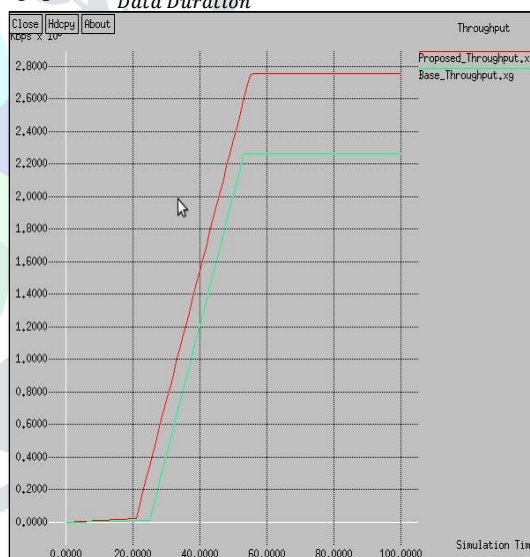


Figure 4: Proposed Throughput and Base Throughput

- Packet delay variance (Jitter)

Packet delay variance is the average variation in the arrival times between consecutive packets. It is due of congestion in the network or different packet arrives from different paths.

$$\text{End-to-End Delay} = \sum_{i=1}^n \frac{\text{Delay}_i - \text{Delay}_{i-1}}{n-1}$$

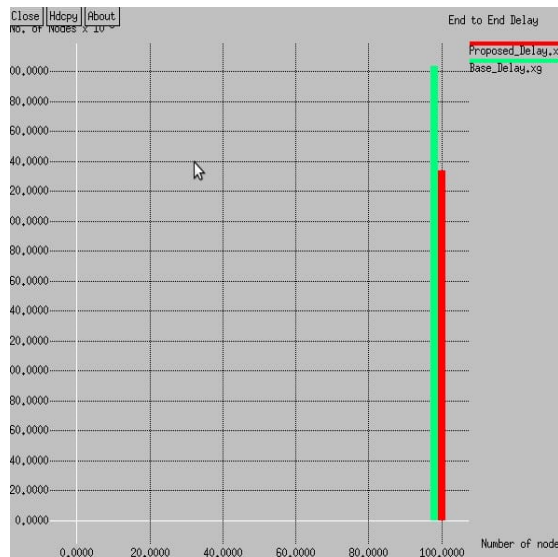


Figure 5: of Proposed Delay and Base Delay

## V.CONCLUSION

The Mobile Ad Hoc Network (MANET) is refers to as a network-less self-configuring system. Ensuring greater QoS in MANETs for real-time communication is a really difficult problem due to the extreme numerous difficulties presented by MANETs. This Paper introduced an effective DP-AODV based scheme to boost QOS performance and support real-time implementations in MANETs. Through comparing the efficiency of DP-AODV and FDP-AODV Centered on end-to - end delay, latency and packet delivery. This indicates that the quality of the research is higher than the current research.

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