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Improved Quality of Service in AODV Routing Protocol (Contd.)

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Abstract - ***AODV is Ad hoc on Demand Distance Vector Routing Protocol, which provides best routes to packets. QS AODV is proposed in my previous paper which is based on AODV. It tries to create routes according to QoS requirements of ad hoc applications. It is shown in this paper that QS AODV gives higher packet delivery ratio and lower routing overheads under heavy traffic at a cost of slightly longer end to end delays as routes taken in QS AODV are not always considered as shortest paths.***

Keywords- ***MANET, AODV, Quality of Service, Packet Delivery Ratio, Routing Overheads.***

I. INTRODUCTION

Over the last few years, wireless computer networks have evoked great interest from public. Wireless networks are generally classified into two main categories:

1. Wireless networks with fixed and wired gateways.
2. Wireless networks that can be set up in an ad-hoc fashion.

A mobile ad hoc network (MANET) is a wireless network in which all nodes can freely and arbitrarily move in any direction with any velocity. Routing takes place without the existence of fixed infrastructure.

II. *RESEARCH GOALS*

The aim for this research is to address delay concerns about Quality of Service in Ad hoc networks [1]. Since QoS in ad-hoc networks involves every network component, our work focuses on Quality of Service perspective only.

The proposed protocol provides Quality of Service assurance based on AODV which means higher quality rates can be achieved while transmitting multimedia files and other data in critical situations also where there is either no centralized infrastructure or existing infrastructure is damaged or destroyed.

III. *SIMULATION*

Parameter Monitored*:*

- *End to End Delay: This delay not only includes the delay in transmitting data packets through the wireless channel, but also the delay in the network interface queue due to network congestion. It is a measure of routing protocol effectiveness*

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Evaluation:

- **Varying the number of sessions and traffic loads** :

As it is already seen in previous paper that QS AODV has almost identical packet delivery ratio to that of AODV under light traffic conditions.
When traffic load is increased, AODV performance drops quickly and QS AODV outperforms in this case. Under heavy traffic, with number of sessions increasing to 20, QS AODV has better performance than AODV. Packet delivery ratio of AODV is lower than QS AODV by 1 to 7%.
Also, QS-AODV needs more routing overhead than AODV because in this RREP can only be generated by destination which leads to more routing overhead and longer time to find a route as compared to AODV which stores routing information in intermediate nodes.
The cost of this good performance is longer end-to- end delay because some QoS routes are not the shortest.

- **Effect of number of nodes and network size**:

By decreasing the network size from 1500*300 m to 500*500 m and number of nodes from 50 to 20, there is a decrease in delay for both QS AODV and AODV.

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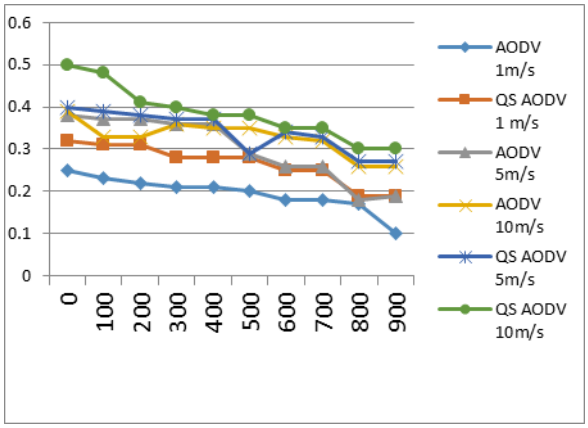

Figure 1: Delay with 50 nodes,30 sessions and 4 packets/s

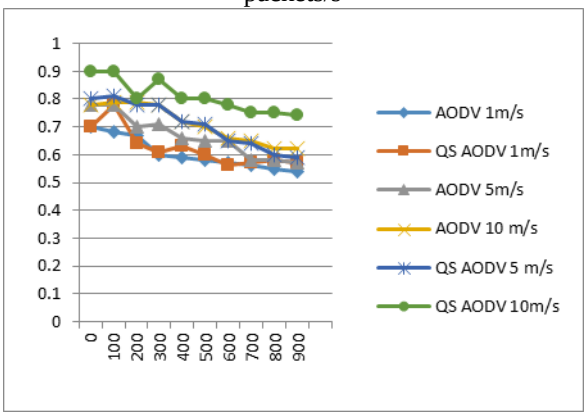

Figure 2: Delay with 50 nodes, 30 sessions and 8 packets/second

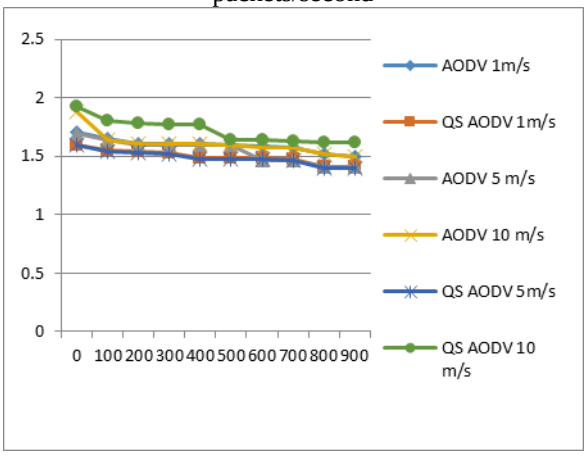

Figure 3: Delay with 50 nodes, 30 sessions and 20 packets/second

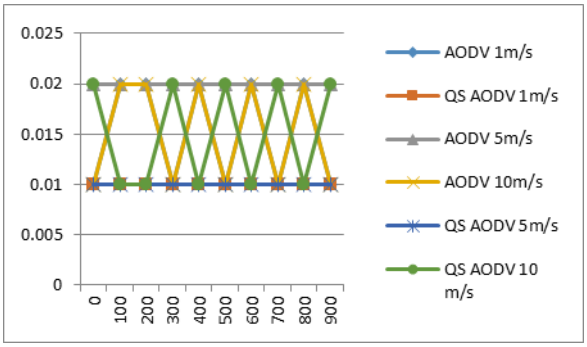

Figure 4: Delay with 20 nodes, 20 sessions and 4 packets/second.

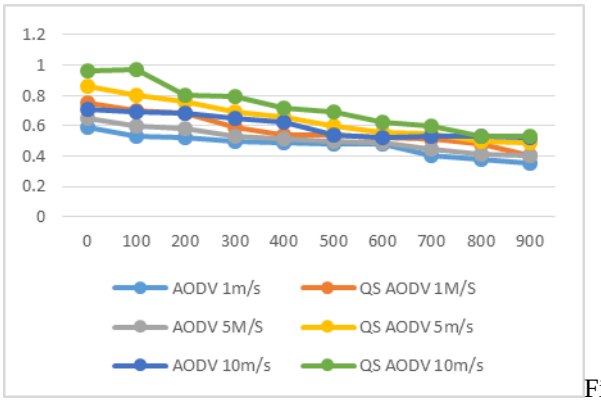

Figure 5 : Delay with 20 nodes , 20 sessions and 20 packets/second

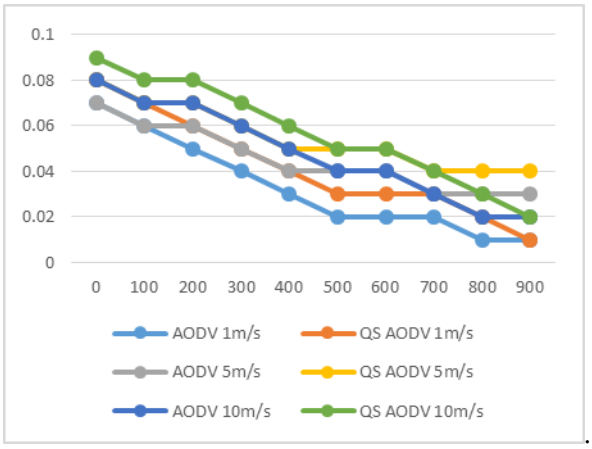

Figure 6 : Delay with 20 nodes, 20 sessions and 8 packets/second.

CONCLUSIONS

In ad hoc networks all nodes are mobile and can be connected dynamically in an arbitrary manner. All nodes of these networks behave as routers and take part in discovery and maintenance of routes to other nodes in the network. Due to these factors, it is a difficult task to provide QoS assurance in these networks.

In this research paper, the delay factor of proposed QoS AODV routing protocol is studied and evaluated against AODV routing protocol.

QS-AODV is simulated and compared with AODV using ns-2 network simulator. The results obtained were good. QS-AODV requires less routing overhead to find and maintain routes, and the packet delivery ratio is 2 - 12% higher than with AODV at the cost of slightly longer delay.

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