Enchancing Qos in Manets using Preemptive AOMDV

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Abstract

MANETS is network of mobile devices. They communicate without the presence of any central device. Since nodes are mobile in nature the network has to face many problems like unpredictable link properties, security, battery life and route maintenance that affects the quality of Service (QoS) of the network. Lot of work has been done to increase the QoS of MANETS. In this paper also we will discuss about a new proposed algorithm to increase QoS of the network in terms of throughput and end to end delay.

Index terms— AOMDV, reactive, preemptive, priority, QoS.

1 I. Introduction

ANETs are useful in all those areas where wired networks have failed like in battlefields, disaster operations [1]. Transmission Control Protocol (TCP) provides the reliable data delivery both within and across the MANET. MANETs have low bandwidth as they use batteries to maintain energy efficiency required for maximizing the life of nodes.

AOMDV is an extension of AODV routing protocol whereas AODV is an extension of Dynamic Source Routing (DSR). DSR ? AODV ? AOMDV These protocols follow Reactive topological routing where there exist no pre-established routing tables unlike that is made in Proactive routing. In reactive topology in the process of destination discovery, the active route to reach the target destination is unknown [2]. Every node from source to destination forward the RREQ packet to their neighboring nodes so that packet reach the desired destination.

The basic difference between AODV and AOMDV is that AOMDV is helpful in computing disjoint and multiple loop free paths .This makes AOMDV much better than AODV. This paper is divided into 3 parts: first part contains basic information about MANETs and required routing protocols, second includes proposed algorithm and the third part consists of the simulation results.

2 II. Quality of Service

Various techniques have been surveyed on different routing protocols that support QoS in MANET and affect QoS delivery across the network. QoS consists of DiffServ and IntServ. IntServ are integrated services since they are not scalable so are not used in MANETS. The DiffServ are Differentiated Services works on boundary nodes but MANET is boundary less. So we need to provide proper QoS in MANETs.

3 III. Proposed Algorithm

In this paper we will discuss about the new proposed algorithm Preemptive AOMDV(PAOMDV). This algorithm is based on 3 main factors priority and bandwidth.

4 a) Priority Assignment of Nodes

The question here arises is that how to provide priority to the nodes. It's a very simple and important task. The nodes that are new to the network will be given highest priority as the older nodes can lead to deadlock and can lead to low bandwidth.

5 b) Bandwidth

Suppose we assign by default the bandwidth of network (Bn) =11. So while searching for the route to destination, source node will pass the RREQ message to the neighboring node having bandwidth(Bnn) >=11. As in fig. **??** Source node S has 3 neighbors, if bandwidth from S to node 1 (Bs1)<11, then S will preempt its route and search for new one. Bs2 >11 and Bs3>11 so source has two options to reach the destination.

6 Fig.1: Simple MANET Network

Now S will send RREQ to both node 2 and node 3 and the above process will repeat for both the nodes till the destination is reached.

7 M c) Preemption

Route is required to be preempted whenever the Bnn< Bn. Thus, selection of route further depends on preemptiveness. The route that is preempted least number of times is the first to be accepted for data transmission. In case nodes are preempted equal number of times then route with minimum hop count is selected. If both are same then any random path is selected.

For this we have added two new fields in the routing table, bandwidth and priority respectively as shown in table1 below:Table1: Routing Table for the proposed PAOMDV i. Algorithm

Step 1: Send RREQ from source to sink.

Step 2: If a route exists, add it to the routing table otherwise resend the request. Step 4: When destination is discovered, then choose the route with least/ minimum number of preemptions.

Step 5: While sending RREP packet from sink to source node for choosing the path, data regarding number of hop counts and number of preemptions is seen. a. Least preemptive route is selected, else b. When preemption is same at all flows then route with minimum hop count is selected, else c. If both of them are same, then any random path will be selected.

8 IV. Simulation

The simulation is carried out using Network Simulator 2 (NS2) in two scenarios. Scenario 1 includes 18 nodes whereas scenario 2 includes 25. Results in both scenarios prove that PAOMDV is better than AOMDV.

9 V. Conclusion

Providing a best QoS from source to destination is the objective of our modified QoS AOMDV protocol called PAOMDV. The constraints are the number of preemption required and maximum priorities using probability for transmission of data. The study of this scenario has shown comparison of PAOMDV and AOMDV routing protocol is done using the performance metrics like end to end delay, throughput to show that the former outperforms the latter to be better performing protocol. [1] [2]

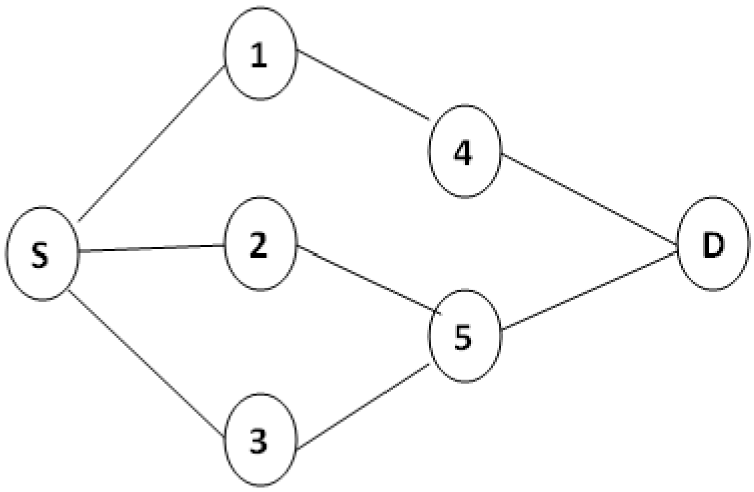

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Figure 1: Step 3 :

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Dest.	Seq. num	Advertised Hop count	Route list					
			Next_ hop1	Last_ Hop1	Hop_ Count1	Timeout 1	Node_ Bandwith1	Node_ Priority1
			Next_ hop2	Last_ Hop2	Hop_ Count2	Timeout 2	Node_ Bandwith2	Node_ Priority2

Figure 2:

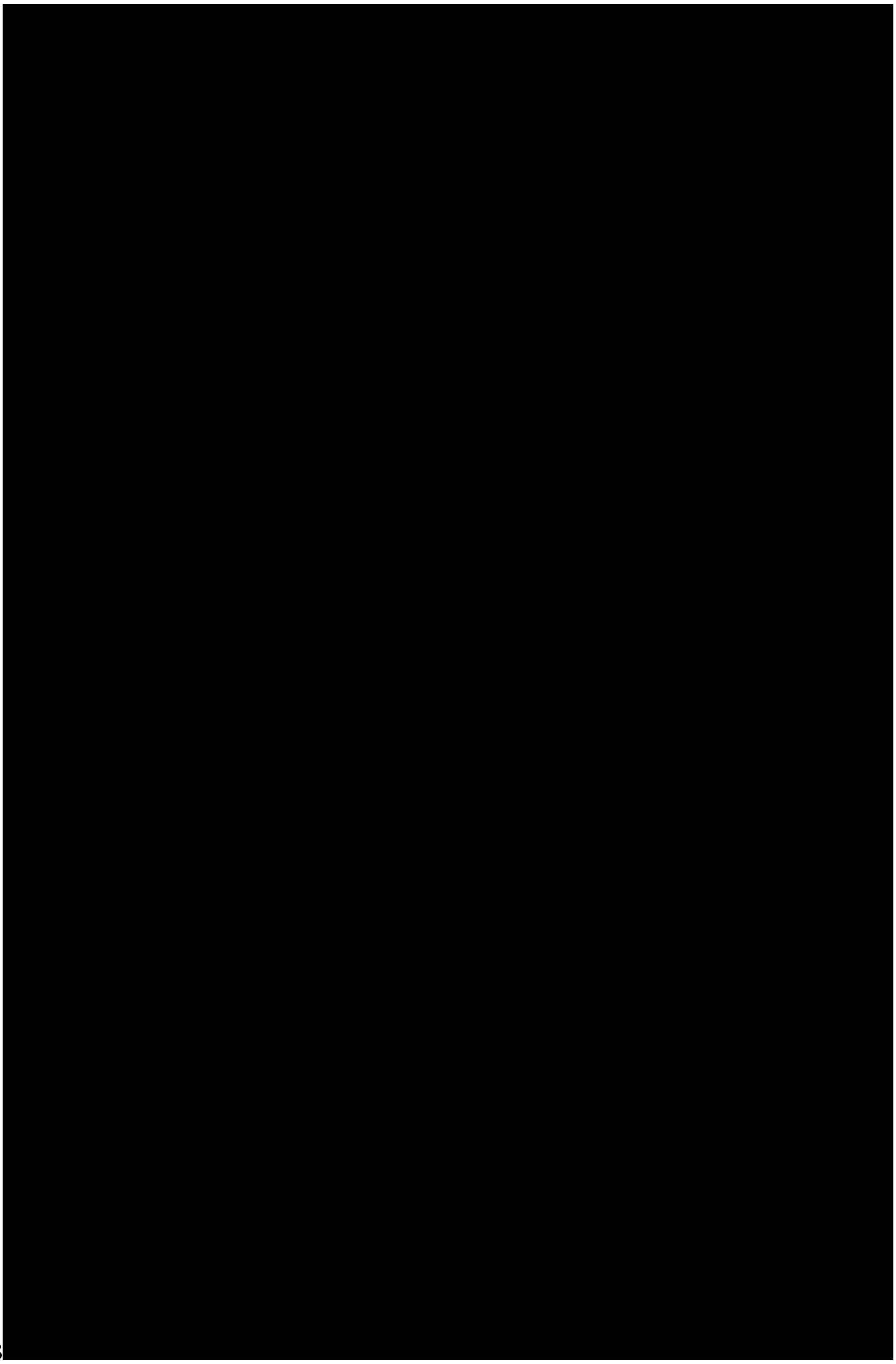

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Figure 3: Fig. 2 :Fig. 3 :

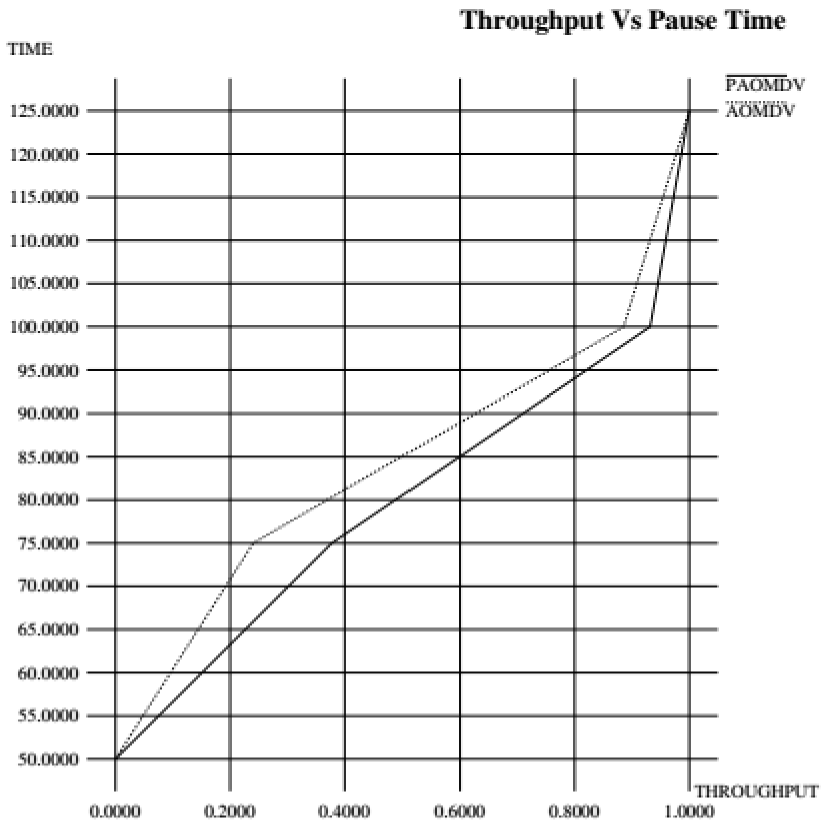

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Figure 4: Fig. 4 :Fig. 5 :

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Figure 5: Table 2 :

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Pause Time	Throughput	ETE Delay	PDR
50	49.15	0.00731	1.96
75	53.48	0.00469	2.15
100	65.10	0.00226	2.79
125	67.16	0.00214	2.95

Figure 6: Table 3 :

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Pause Time	Throughput	ETE Delay	PDR
50	80.27	0.00617	3.38
75	81.51	0.00171	3.45
100	86.01	0.00064	3.90
125	86.17	0.00076	3.92

Scenario 2: At 25 nodes

Figure 7: Table 4 :

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Pause Time	Throughput	ETE Delay	PDR
50	88.27	0.00423	3.51
75	87.72	0.00286	3.52
100	91.21	0.00153	3.90
125	92.89	0.00166	4.08

Figure 8: Table 5 :

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