Adaptive Multicast Multimedia Transmission Routing Protocol System (ACMMR) for Congestion Control and load Balancing Techniques in Mobile ADHOC Networks

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Abstract
A MANET is a probable solution for this need to quickly establish interactions in a mobile and transient environment. Proposed congestion controlled adaptive multicasting routing protocol to achieve load balancing and avoid congestion in MANETs. The existing algorithm for finding multicasting routes computes fail-safe multiple paths, which provide all the intermediate nodes on the primary path with multiple routes to target node. Routing may let a congestion happen, which is detected by congestion control, but dealing with congestion in this reactive manner results in longer delay and redundant packet loss and requires significant overhead if a new route is needed. Transmission of real-time video typically has bandwidth, delay, and loss requirements. Video transmission over wireless network poses many challenges. To overcome these challenges, extensive research has been conducted in the various areas of video application.

Index terms— multicasting, load balancing, congestion control, ADHOC networks, multimedia streaming.

1 Introduction

mobile ad-hoc network (MANET) is composed of mobile nodes without any infrastructure. Mobile nodes self-organize to form a network over radio links. The goal of MANETs is to extend mobility into the realm of autonomous, mobile and wireless domains, where a set of nodes form the network routing infrastructure in an ad-hoc fashion. The majority of applications of MANETs are in areas where rapid deployment and dynamic reconfiguration are necessary and wired network is not available. These include military battlefields, emergency search, rescue sites, classrooms and conventions, where participants share information dynamically using their mobile devices. These applications lend themselves well to multicast operations [1]. Multicasting can be used to improve the efficiency of the wireless link when sending multiple copies of messages to exploit the inherent broadcast Author ?: Research Scholar, Bharathiar University, Coimbatore, Tamilnadu, India. e-mail: rrajeshkannacbe@gmail.com nature of wireless transmission. So multicast plays an important role in MANETs Unlike typical wired multicast routing protocols, multicast routing for MANETs must address a diverse range of issues due to the characteristics of MANETs, such as low bandwidth, mobility and low power. MANETs deliver lower bandwidth than wired networks; therefore, the information collection during the formation of a routing table is expensive.

One of the challenges faced by multimedia is the limited capacity offered by many wide-area wireless technologies [2]. In general these networks offer less capacity than available in wired networks, and typically utilize sophisticated Radio Resource Management (RRM) methods to dynamically share the available radio bandwidth between a population of users. This can result in networks with limited capacity, and appreciable delay [3].

2 II.

3 Related Work

Shruti Sangwan et al [7] have proposed adaptive and efficient load balancing schemes to get fair routing in mobile ad hoc networks (MANETs). They explain various load balancing mechanisms that controls congestion. Also their efficient optimization techniques help in deciding best route in the ad hoc networks. They mainly focused on presenting a better performance in terms of the processing time of the loads, nodes stability, throughput and lifetime of the network.

Multipath Routing with Load Balancing QoS in Ad hoc Network [8] gives novel protocol for AdHoc routing. It deals with only delay that does not fulfill the bandwidth and energy constraint. But in our paper we take into account bandwidth and energy constraints for selecting best path from source to destination node.

Wu et al. [8] proposed the power-aware method in dominating set-based routing. Their idea is to use rules based on energy level to extend the lifetime of a node in the refining process of reducing the number of nodes in the dominating set. P. P. Tandon et al [9] have proposed a novel load balanced routing method that can efficiently reduce the data collision or route coupling. By this method they reduced the packet loss because of to collision and interference. Next the mechanism requires additional improvement to reduce the amount of flooding as more successive flooding can result in performance degradation. They targeted the route adaptation and maintenance as their future work. Kawak and Song [9] investigate the inherent scalability problem of ad hoc networks which originate from their multi hop nature. They accomplished that the packet traffic at the center of a network is linearly related with radius of the network.

Vinh Dien HOANG et al **??**10] have proposed a new load balancing solution in MANET. The major idea in this solution is the probe packets used for bandwidth estimation are sent by the destination node. By doing so, these packets only have to go one time on the path, which will minimize consumed network resource and increase the accuracy of the estimation. A new formula for available bandwidth judgment in IEEE 802.11 network based on the gaps between probe packets is also presented.

Asis Nasipuri et al **??**11] illustrate how intelligent use of multi-path technique in DSR protocol can reduce the frequency of query floods. They also developed an analytic modeling framework to find out the relative frequency of query floods for various techniques.

4 III.

5 Proposed Solution

Most of the protocols give solutions to load balancing or congestion or fault-tolerance, alone. So a joint protocol is essential, in order to present solutions for all the problems. In this paper, Proposed adaptive congestion controlled multicast multimedia routing protocol (ACMMR) to achieve load balance and avoid congestion in mobile adhoc networks. The average load of an link increases beyond a threshold and residual battery power of a node decreases below a threshold, it distributes the traffic over disjoint multicast routes to reduce the traffic load on a congested link. This proposed method for finding multi-path routes computes fail-safe multiple paths, which present all the intermediate nodes on the primary path with multiple routes to target node. The fail-safe multiple paths include the nodes with least load and residual power. Cells of this type are delay-insensitive, but they are loss-sensitive. All cells must be delivered.

6 EB (Effective Bandwidth) is the criterion used for call

acceptance. There exists a separate EB for each type of traffic and for each node. EB is a twoelement vector with the format of EB = (x, y).

The EB of a node is defined as follows: The EB of a RT traffic is defined as:EB i = (C AVAIL i , M i)**(1)**EB RT i,j = (B RT i , D RT i,j)**(2)**

Where EB RT i,j = the EB of the i th RT traffic at node j B RT i = the pre-specified mean bit rate of the i th RT traffic D RT i,j = the allowable maximum node delay of the i th RT traffic at node j, and ART connection request is granted only if its EB can be satisfied by all intermediate nodes on the route; i.e., RT i can be granted its connection request only if O(EB j , EB RT i,j) = 1 is true for all j's on the routes. A DT traffic is also connection-oriented. However, a DT connection request is always granted. From the EB definition for DT traffic (Definition 3) we know that acceptance is instantaneous. In this case, a route can be selected randomly by the entrance node.D RT i,j = D RT i,pred(i,j) -M pred(i,j)

EF the major criterion used to grant cell transfer requests for DT traffic from node to node. There exists a separate EF for each DT cell transfer request and for each node. EF is a scalar quantity. The EF of a node i is defined as follows:

EF i = the available (unallocated) buffer at node i (5)

The EF of a DT cell transfer request is defined as follows: EF DT i = the buffer requirement of the current DT cell transfer request at node i (6)

The operation of EFs is defined as follows:O EF EF if EF EF otherwise (,) 1 2 1 2 1 0 = ? ? ? ? (7)

A transfer request to node j from node i is granted only if O(EF j , EF DT j) = 1. We assume that there exists at the entrance node a device that can mark all cells of this traffic before they enter the input buffer. It is obvious that DT transfer requests are done on a nodeby-node basis, subject to the availability of EF at the next node. More precisely, this is a receiver creditbased windowing mechanism -it is up to the receiver to decide the number of cells allowable for transfer dynamically.

V.

7 Simulation

Figure **??** shows the packet delivery fractions for variations of the pause time for ACMMR, AODV, and OLSR. Note that the packet delivery fractions for ACMMRR, AODV, and OLSR are very similar for both 10 and 25 sources. With 50 and 100 sources, however, ACMMR outperforms AODV and OLSR.

In fact, ACMMR achieves the highest packet delivery fraction all pause time values. For 50 sources, ACMMR achieves up to 20% higher packet delivery fractions than both AODV and DSR. This is mainly because of redundant route information that is stored in destination node to provide aid in routing, which eliminates the necessity of source reinitiating of route discovery. Similarly, ACMMR has superior performance to both AODV and OLSR in the case of 100 sources, in terms of the packet delivery fraction.

8 a) Performance Evaluation

There are number of qualitative and quantitative metrics that can be used to evaluate in these protocol. These are comparing with use of NS-2 simulator.

9 b) Routing overhead

This metric describes how many routing packets for route discovery and route maintenance need to be sent so to as propagate the data packet. The EB of a DT traffic is defined as:EB DT i,j = (0 DT i , D + DT i,j)**(3)**

Where EB DT i,j = the EB of the i th DT traffic at node j 0 DT i = the prescribed mean bit rate of the i th RT traffic is zero D + DT i,j = a quantity that is larger than the allowable maximum node delay for the i th RT traffic at node j The operation of EBs is defined as follows:? ? ? = ? ? otherwise y y and x x if EB EB O 0 1) , (2 1 2 1 2 1

Where pred(i,j) = the predecesor of the j th node of the i th traffic In this paper, a proposed new multipath ACMMR routing protocol for MANET with load balancing mechanism. There are two main contributions in this work. One is load balancing mechanism to honestly distribute the traffic on different active routes; the other is the route discovery mechanism parameters such as. Delivery Rate and Packet lost Rate. First, we have proposed a new multipath routing protocol called ACMMR with a new metric which is the buffer size to select the less congested routes. The goal of our scheme to find a congestion less path. Performance evaluation has been done using NS2 simulator tool and comparison with AODV,OLSR, ACMMR shows that our of the art in the area of multimedia transmission over MANETs which is a promising application area.

10 Global

[1] [2]

[2]Adaptive Multicast Multimedia Transmission Routing protocol system (ACMMR) for congestion control and load balancing techniques in Mobile ADHOC networks

Figure 1:

1

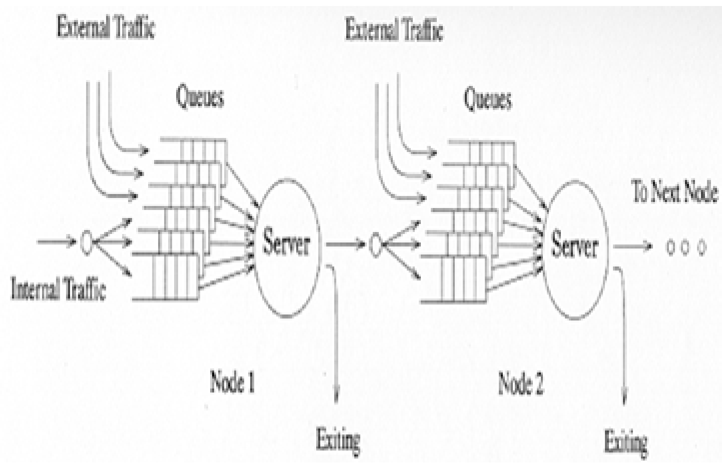

Figure 2: Figure 1 :

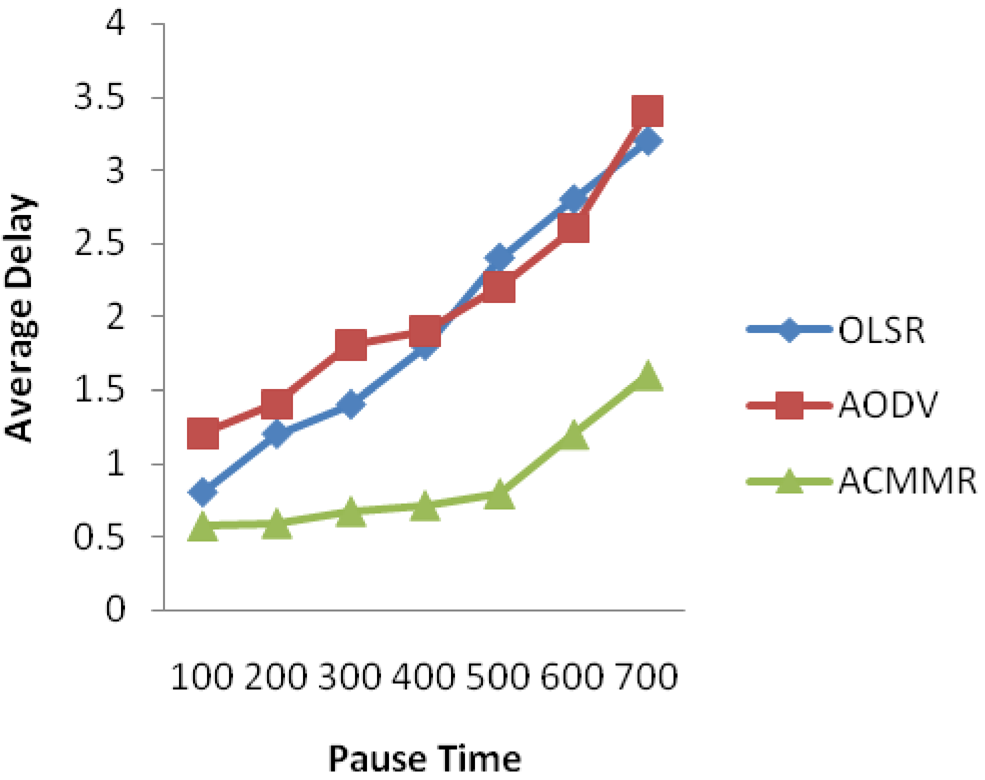

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Figure 3: Adaptive 1 =

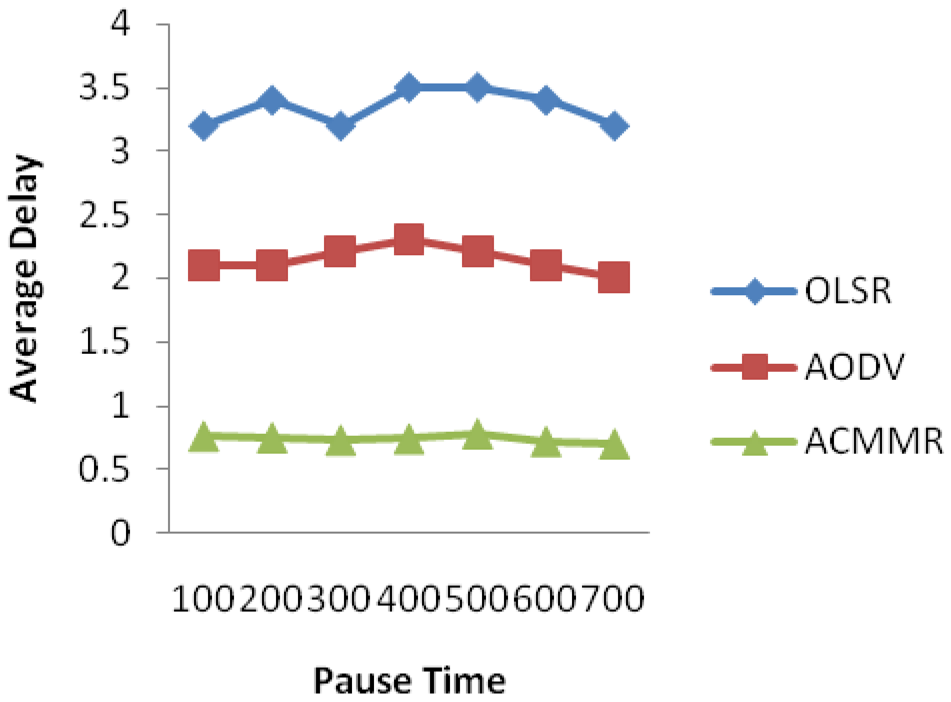

Figure 4:

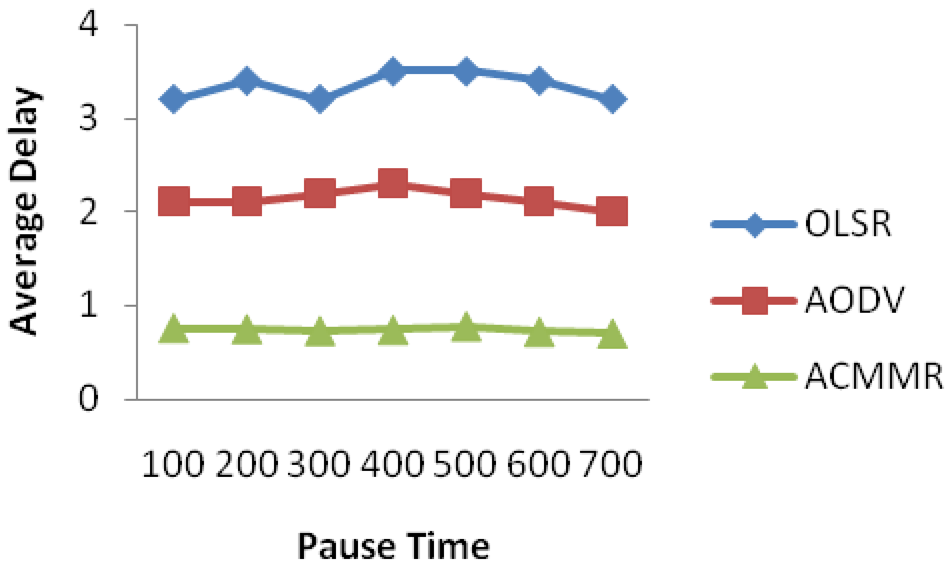

Figure 5:

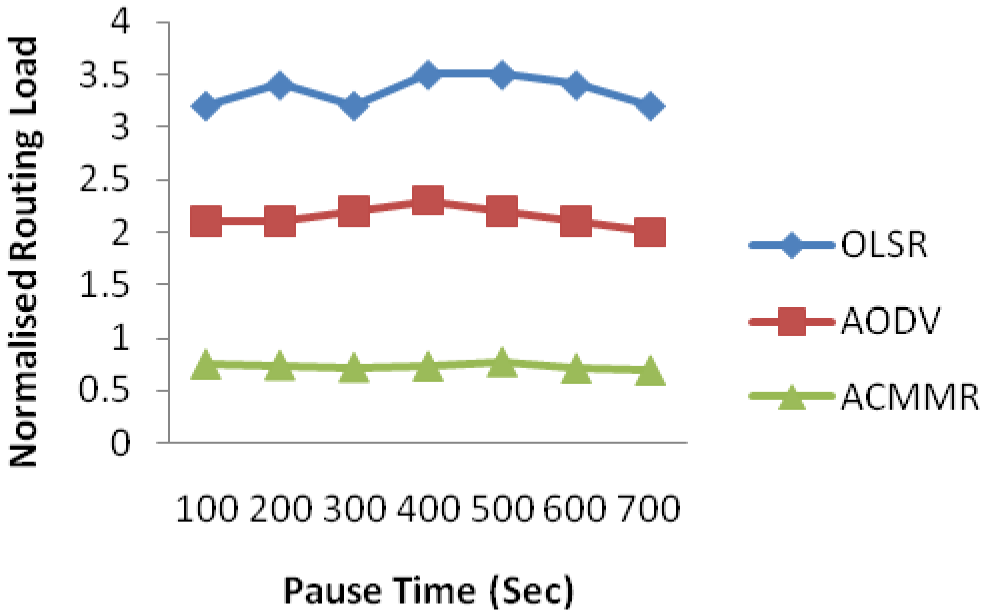

Figure 6:

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