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Efficient Flooding Mechanism for Routing In MANET

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Abstract*—Flooding in MANETs is not only a legitimate candidate for unicast routing protocols e.g. AODV in mobile scenarios, but also is an important part of a number of other, multicast routing protocols. Simple flooding is the simplest form of broadcasting, where the source node broadcasts a packet to its neighboring nodes. Each neighboring node receiving the flood packet for the first time refloods it. As a result, the flooding propagates outwards from the source node, eventually terminating when every node has received and transmitted the flooded packet exactly once. The main problem in flooding is how to minimize the number of nodes that rebroadcast the AODV RREQ packets while maintaining a high degree of reachability in order to discover routes to the destination. Flooding a large number of RREQ packets may guarantee a high chance of discovering routes to destinations. However, this method of discovering destinations may result in an inefficient use of limited system resources such as the communication bandwidth and battery power. The proposed extended AODV protocol uses a special timing based route discovery mechanism in order to reduce unnecessary flooding. Here special flooding prevents AODV protocol is proposed and implemented. Modifies done in AODV route discovering mechanism by considering special timing based mechanism. Simulation results take in Network Simulator 2 (NS2).*

Keywords: MANETs, AODV, flooding

I. INTRODUCTION

A. Introduction of manet.

Mobile ad hoc network is a one of the most superior kind of wireless network environment. Fundamentally it is different from the traditional wireless networks. MANET consists of varied mobile devices like Notebook, cell phone, hand-hold device etc. all devices are known as mobile node (MN).As MANET is different from the traditional network MANET does not require established infrastructure network. If two mobile nodes are in each other's radio range, still they can send messages. Packets can be transmitted by intermediary nodes; hence MANET is very suitable and flexible. The topology of MANET can be simply arranged with rare limitations [1].

B Applications Of Manet

Below signifies an application of MANET. Typical applications include [2]:
a) Military battlefield
b) Commercial Sector
c) Local level
d) Personal Area Network (PAN)

C. Challenges of Manet

The following list of challenges demonstrates the inadequacies and limitations that have to be overwhelmed in a MANET environment [2]:
a) Limited wireless transmission range
b) Routing Overhead
c) Battery Constraints
d) Asymmetric Links
e) Time-Varying Wireless Link Characteristics
f) Broadcast Nature of the Wireless Medium
g) Packet losses due to transmission errors
h) Mobility-induced route changes
i) Potentially frequent network partitions. Routing [3] is the process in which a route from a source to a destination node is identified. In order to simplify communication within MANET, a routing protocol is used to discover routes between nodes. The routing protocols for mobile ad hoc network can be categorized on the basis of how routing information is learned and sustained by mobile nodes [3] into three categories as tails:

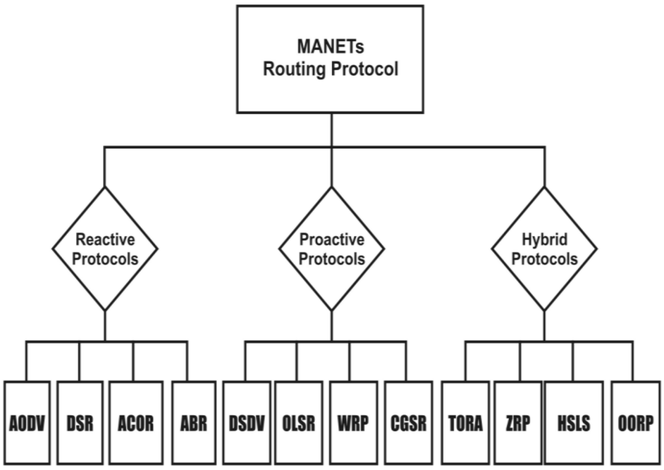

Figure 1. Routing Protocol

- Proactive routing or Table driven routing
- Reactive routing or On demand routing
- Hybrid routing

(1) Proactive routing protocol.

- Table driven routing.
- All routes are maintained all the time.
- Disseminates routing information continuously.
- A route is available when needed.
- Example Protocols: DSDV, OLSR [4].

(2) Reactive routing protocol

- On demand routing
- Routes discovered when needed
- Only active (or cached) routes are known
- Reacts quickly to topology changes
- Example Protocols: DSR, AODV [4].

(3) Hybrid routing protocol.

- Advantage of Proactive and Reactive
- Example Protocol: ZRP [4].

II. INTRODUCTION OF FLOODING

Simple flooding algorithm intensifies a high number of unnecessary packet rebroadcasts, causing contention and packets collisions [5]. There are five flooding schemes in MANETs are known as (i) probabilistic,(ii) counter-based,(iii) distance-based, (iv)location-based and last (v) cluster-based. When receiving a broadcast message for the first spell in probabilistic solution, a host rebroadcast the message with a fixed probability P. Counter-based solution hinders the rebroadcast if the message has previously been received for more than C times. In the distance-based solution between the sender and the receiver is larger than a threshold D. the location-based solution rebroadcast the message if the additional coverage due to the new emission is larger than a bound A. the cluster based solution uses a cluster selection algorithm to create the clusters and gateways [5].

III. LITERATURE REVIEW

Generally most of the algorithms work for the static MANET environment. But this algorithm particularly is suitable for a dynamic MANET environment. This algorithm is modest and competent. The size of CDS is not the only factor to study in an algorithm for the broadcast storm problem. In a dynamic MANET along with the message cost the delivery ratios are also crucial factors. The further scope of the research in this area is to make more reliable and stronger virtual spine network in MANET [1]. This paper offered Nodes move according to way point mobility model and compare it with simple flooding AODV and fixed probabilistic scheme. The result of this paper can generate less rebroadcasts than the fixed value probabilistic approach, dynamic and adjusted probabilistic, while keeping the reachability high [5]. Based on the study of paper it is elaborated in this paper proposed a novel flooding algorithm can effectively reduce the number of broadcast packets and collision. Node has the more child nodes and the less sibling nodes, the higher retransmission probability it has. This method can be easily adjusted to numerous types of networks [6]. Based on the study of present paper the proposed simple probabilistic based algorithm contributes to extended network lifetime, smaller number of dead nodes with time, higher throughput and less redundant REQUEST packets for both static and mobile network situation. Based on the study of present paper it is accessible in a simple probabilistic based algorithm which has been proposed address the issue of broadcast storm problem with the use of flooding techniques in MANETs. Simple flooding techniques higher number of dead nodes, higher number of REQUEST packets generated that will not reach the destination make more nodes to die without fulfilling the communication. This paper proposed static and mobile network situation for varying node density and the performance compared with simple flooding technique under the same conditions. [7]. Percolation theory is used in this paper which is purely based on flowing of fluid in random media and author has used this concept for controlling broadcast / flooding. But model seems very complex and confusing as MANET cannot have sufficient energy or power. Dynamic adjustment of probability P based on local graph information can be considered as future work [8].

IV. PROPOSED ALGORITHM

1. Sender node S sends hello message to its neighbors
2. All neighbors immediately reply to the hello message to Sender node S
3. Sender calculates one way estimated time to reach at any neighbor,
   T = (average traveling time of hello messages) / 2
4. Sender starts route discovery by broadcasting RREQ message with
   Time Stamp = Current time + T * *i* ,
   Where *i* is no. of hops & initial value is 1
5. If (destination entry found in neighbors RT == true) {
   Neighbor reply RREP towards sender
   Return
   }
6. Neighbor compares its current time with appended Time Stamp
7. If (current time > appended time stamp) {
   Neighbor doesn't forward RREQ
   Sender waits for RREP until (T*2) + Processing Time
   If (Reply received == true) {
   Start Communication to Destination
   }
   Else {
   Increment *i* by 1; *i* = *i* + 1
   Goto step 4.
   }
   }
   Else {
   Forward RREQ to next neighbor
   Goto step 5.
   }

V. EXPERIMENT

Simulation Graph for 60 Nodes of Normal AODV and Efficient AODV

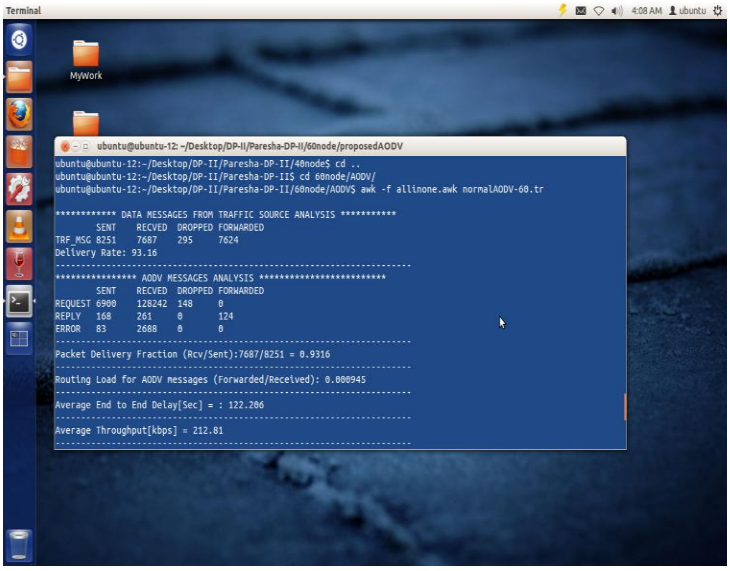

Figure 2. Reading of Normal AODV Protocol

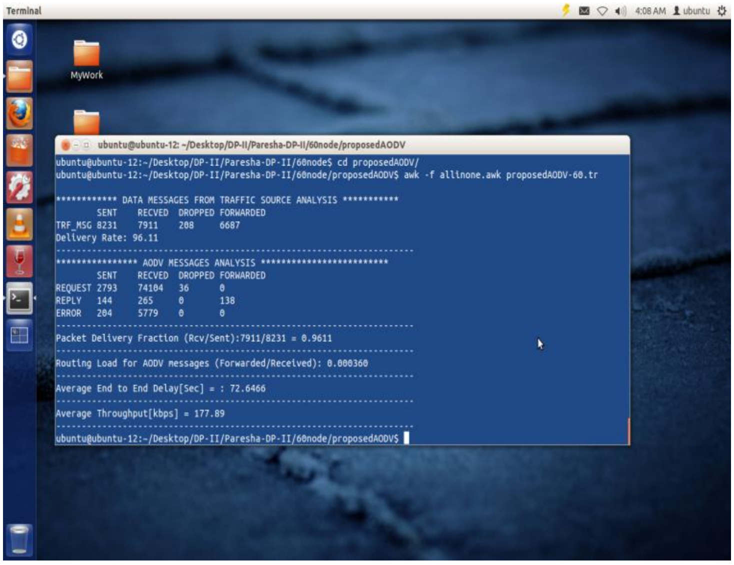

Figure 3. Reading of Efficient AODV Protocol

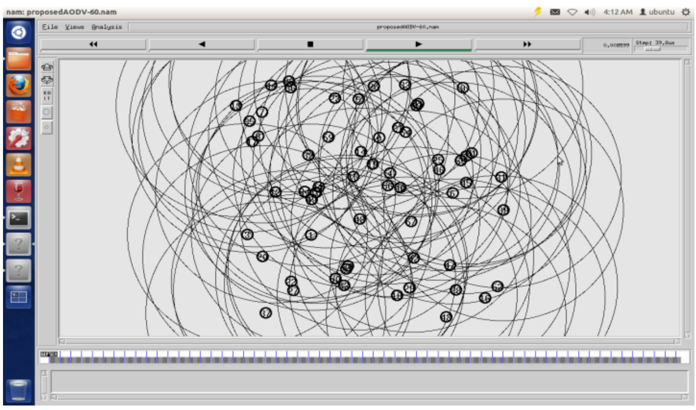

Figure 4. Simulation of NAM file of Efficient AODV

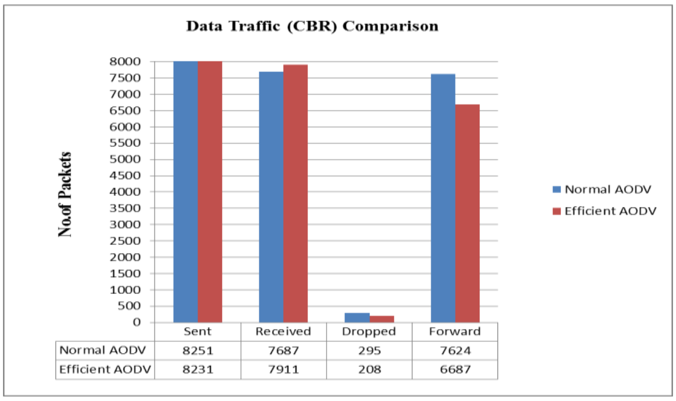

Figure 5. Data Traffic Comparison of Normal AODV with Efficient AODV

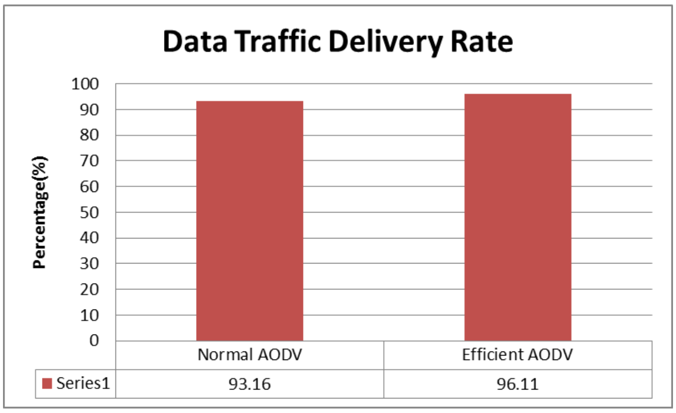

Figure 6. Data Traffic Delivery Rate of Normal AODV with Efficient AODV

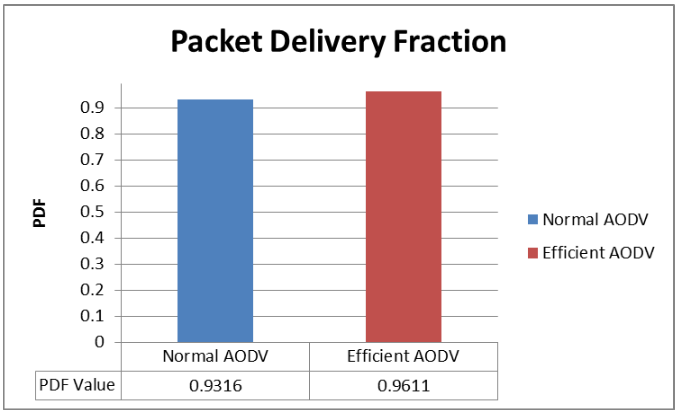

Figure 7. Packet Delivery Fraction of Normal AODV with Efficient AODV

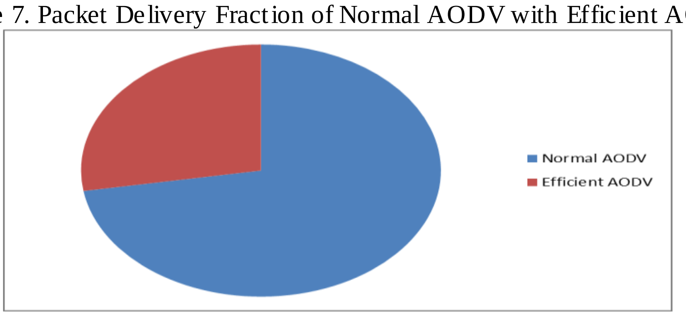

Figure 8. Routing Load for AODV Messages of Normal AODV with Efficient AODV

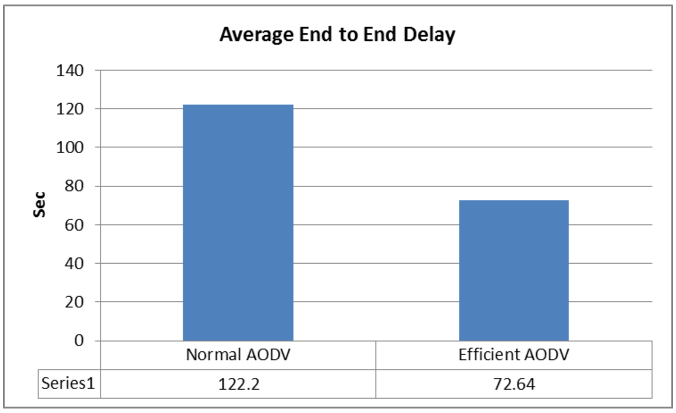

Figure 9. Average End to End Delay of Normal AODV with Efficient AODV

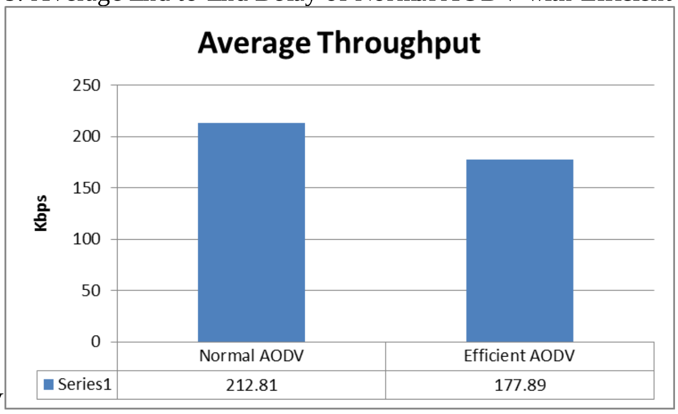

Figure 10. Average Throughput of Normal AODV with Efficient AODV

VI. CONCLUSION AND FUTURE WORK

The simple packet flooding without a careful decision of a controlled rebroadcasting may produce an excessive redundancy of incoming packets, greater channel contentions, and a higher collision rate. This work presented various techniques to limit the influence of the problem of broadcast storm in mobile ad hoc networks.
Many protocols are being used in MANETs rely on the broadcasting capability, especially when performing a route discovery process. To alleviate the broadcast storm problem several solution are already available. The most promising are the: counter-based, distance-based, and location-based schemes.
Considering all simulation results in observance here conclude:

1. Simulations are being taken for innumerable mobility models, traffic models and varying connection pairs.
2. Simulations are being also taken for numerous pause times and large number of nodes.

Here also evaluates the application and performance cost of the bounding algorithm on standard MANET routing protocols like AODV using NS2 simulator.

Future work- Our mechanism can be implement in DSR, DSDV, RAODV etc. Protocols also we can propose our work in WSN and VANET.

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