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Prevent congestion in MANET using Neighbor Probability and Shortest Path

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Abstract: In mobile ad hoc network (MANET) the regular link failures scenario which ultimately bring the path down and so as the path discovery. Post failures we need to resend the packets unless it has route to destination which termed as rebroadcasting, nothing but the overhead to the route in the network, as it creates the transmission storm. Neighbor Coverage-Based Probabilistic Re-broadcast Protocol (NCPR) is the innovative technique to overcome routing congestion in MANET. Using this protocol each node gains the knowledge of its neighbor exposed. It also uses re-broadcast delay to determine the order of re-broadcasting, precise surplus exposure ratio by identifying neighbor information. It also needs connectivity aspect for node density version. By combining the ratio and connectivity aspect, we finalized a rational re-broadcast probability. With the help of this method the neighbor knowledge and the probabilistic mechanism, which decreases the number of re-transmissions so as to reduce the path congestion, and can increase the routing performance which gives the high packet delivery ratio as compared to other routing protocol.

Keywords: broadcasting, MANET, neighbor coverage, probabilistic rebroadcast.

I. INTRODUCTION

The wireless network having many forms in which mobile ad-hoc network is one. In this network mobile hosts can interconnect without any stable established infrastructure. This can be deployed for many applications. In a MANET, due to host mobility, broadcastings can be applied to many areas, such as contacting exact host, sending signal, and identifying a route to exact host, etc. Due to some reason such as congestion the connection failure then device re-broadcast request to all other node to find the end point. Various routing protocols, e.g. DSR and AODV have been used for MANET. The above protocols are of type on-demand routing protocols, and they can even expand the scalability of MANET by when a new route is requested.

Due to node mobility in MANET, repeated connection breakages might direct to regular path failures and route search, which could advance the congestion of routing protocols and fall down the packet deliverance ratio and increase the end delay. Thus, decreasing the routing overhead in route search is an important issue. In the network the traffic is directed and transported by the routing technique from a source to a destination. The basic functionalities of routing are as,1) Route set up (creation, select the route, send the data) and 2) Route preservation. Routing has two features such as Unicasting and Broadcasting and to solve the routing issue.

In network the process by which one node can send the packet to all other node is called broadcasting. Popular research topic and have been proposed for use in many areas such as rescue operations, tactical operations, environmental monitoring, conferences and the like.

There are mainly two types of attacks in MANET, namely active attack and passive attack. For passive attacks, packets containing secret information might be eavesdropped, which violates confidentiality. Examples include eavesdropping, traffic analysis and monitoring, active attack, including injecting packets to invalid destinations.

II. Literature Survey

Recently use of MANET is increase that means there is increase in the node and that will effect in the path detection. For finding the path in changing topology many scheme use the request queue packet which causes the overflowing in path discovery and that will create the congestion in the network which lead to link failure. Recently many techniques have proposed for decreasing overhead.

The Huang suggested scheme for path discovery which is based on probability that are Adjusted Probabilistic route discovery and Enhance Adjusted Probabilistic route discovery. The two method focuses on broadcast storm problem in the existing on-demand routing protocols. The F Huang suggested a methodology which depend on condition of network which animatedly altering the Hey timer and the Timeout timer. For example, in huge changeable network in which topology recurrently changes for this network it uses small timer. Whereas instable topology large value timer is set. This technique improves the overhead reduction at 40%.

Next Ould-Khaoua [5] having the work on EAP-AODV and AP-AODV which decide forwarding probability from local compactness of the source node. For decreasing the routing congestion without degrading the network output in compressed networks, the nodes forwarding probability in spare zones is fixed high while at dense nodes it is set low .APAODV improve performance by 55% and EAP-AODV at about 71%

Disadvantage of this method considers only previous node coverage factor. Therefore this can be additional recover and spread.

Next Aminu projected new scheme which consider value of packet counter topology size, no. of node and transmission range for calculating re-broadcast probability for sending node. This scheme gives 20% improved result than other method.

III. Implementation Details

In network for getting exact coverage factor the propose system i.e. ENCPR use neighbor coverage information and the re-broadcast interval in re-broadcast order. The benefits of the neighbor coverage information delay-probabilistic method, is expressively reduce the number of re-transmissions and increase routing performance by decreasing routing overhead.

A. This system recommends an innovative scheme to compute the rebroadcast interval. The rebroadcast interval is to fix the sending order. The node having collective neighbors with the earlier node has the lesser delay. If that lesser delay node re-broadcasts a packet, then most of shared neighbors will recognize this information. This rebroadcast delay facilitates the facts that the nodes have pass on the packet reached to most of the neighbors, that is the important part of the achievement of recommended system.

B. Now this system presents new method for find the re-broadcast probability. The method ruminates the information about the unvisited sibling node (USN), connectivity metric and local node density. The rebroadcast probability is made up of two parts

    i. The supplementary coverage factor can be calculated from the fraction of the number of nodes which is visited in one broadcast to the total number of sibling node.

    ii. Connectivity ratio, which reflects the association of network connectivity and the number of sibling node of a source node.

C. Rebroadcast Delay; The Rebroadcast delay can be calculated from uncovered neighbors set node $V(n_i)$.And that can be calculated from neighbor list in RREQ packet of node ni which received packet from previous nodes Initially broadcaster receives all the packets from source and divides it into number of packet and sends it to neighbor node for calculating Rebroadcast interval and probability of neighbor node.

IV. SYSTEM DESIGN

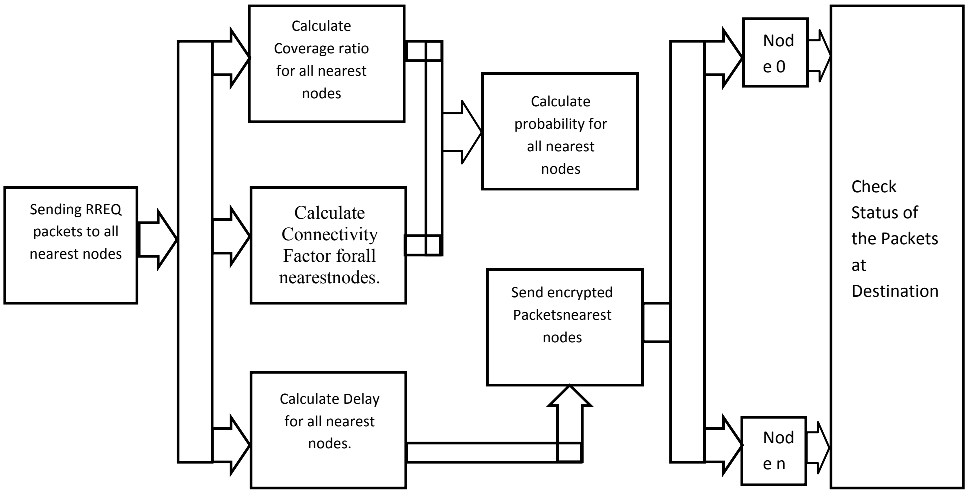

Fig1 .Block diagram of probability calculation for each node

Description:

N_i-set of node i=1, 2, 3……….

$V(n_i)$-unveiled neighbor set

The $V(n_i)$ can be premeditated as $V(n_i) = N(n_i) - [N(n_i) \cap N(s)] - \{s\}$ ……………..1

Where N(s) and $N(n_i)$ are the neighbor set of node s &n_i resp. And i = 1, 2, 3….

S - Initial node which send RREQ packet to node n_i.

Neighbor receiving an RREQ packet and calculate Rebroadcast time interval from neighbor list in RREQ packet and its own neighbor list. The Rebroadcast time interval can be calculated from

Xp– Rebroadcast time interval ratio of n_i , $Xp(n_i) = 1 - |N(s) \cap N(n_i)|$ ……………..2

Where $Xp(n_i)$- Time interval ratio of n_i.

Xt-Rebroadcas time interval, can be calculated as: $Xt(n_i) = MaxDelay * Xp(n_i)$ ……………..3

The calculated time interval is defined for following reason:

a. The node transmission order is determine by the interval time.

b. To discover neighbor coverage information.

Rebroadcast Probability

The lower rebroadcast time interval node can send RREQ packet to the node having higher time interval. Then the new $V(n_i)$ can be calculated as:

$V(n_i) = V(n_i) - [V(n_i) - \cap N(n_j)]$ ……………..4

After adjusting V(ni) the RREQ packet receive from nj is discarded. The supplementary exposure ratio can be calculated as:

$E_a(n_i)=|V(n_i)|/|N(n_i)|$ ……………..5

Connectivity factor is $Fc(n_i)=N_c/|N(n_i)|$ ……………..6

By combining supplementary exposure ratio & Connectivity Factor we get the

Rebroadcast Probability $Pr(N_i)$ of n as $Pr(N_i)=Fc(N_i) . Ea(N_i)$ ……………..7

We set the $Pr(N_i)$ to 1, if $Pr(N_i)$ is greater than 1

V. ALGORITHMS

1. RREQu: Packet received from node u.
2. Ru.id: identifier (id) for RREQu
3. N(v): neighbor set of node v
4. V(v ,y): uncovered neighbors set of node v for RREQ whose id is y
5. Timer (v,y):Timer of node v for RREQ packet whose id is x
6. If Nodes receives new RREQs from initial sender node then
7. {then calculate the initial uncovered neighbors set U(ni) with id for RREQs:}
8. Calculate the Rebroadcast delay Td(ni) from the delay ratio of nii.e.Tp(ni) and max delay.
9. Set the Timer (ni, Rs.id) with respect to Td(ni).
10. End if
11. While ni receives a duplicate RREQj from nj before Timer (ni,Rs.id) Expires do
12. Adjust the new U(ni)
13. Discard (RREQj)
14. End while
15. If the Timer (ni,Rs.id) Expire then
16. Calculate the rebroadcast probability Pr(ni) from additional coverage ratio Ra and connectivity factore Fc
17. If random (0,1)<=Pr(ni) then
18. Broadcast (RREQs)
19. else
20. Discard (RREQs)
21. end if
22. end if

From this the probability is calculated and based on that the shortest path will get calculated. In order to add more security the massage will get encrypted using DES encryption algorithm and send to the destination.

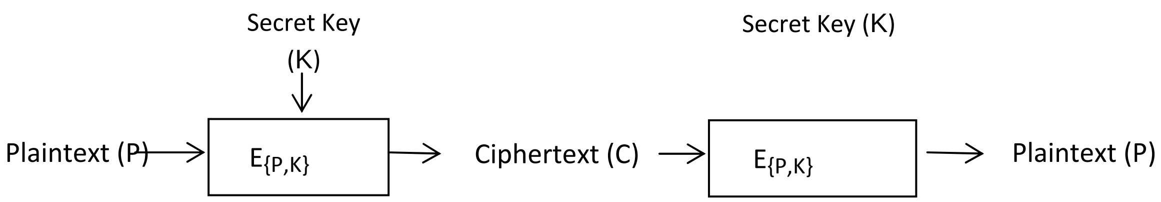

Fig.2DES implementation

VI. RESULT

The graphical representation of the system shows the performance of the ENCPR protocol with various paths and comparison chart of Average end to end delay(s) with varied number of nodes.The graphical representation of the system shows the comparison of proposed scheme ENCPR with existence AODV which shows ENCPR works much better than other protocols.

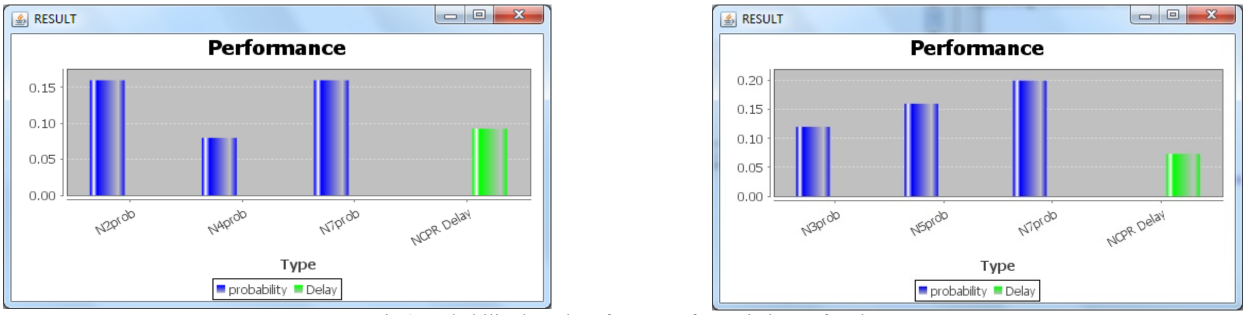

Fig.3 Probability based performance for varied no. of nodes

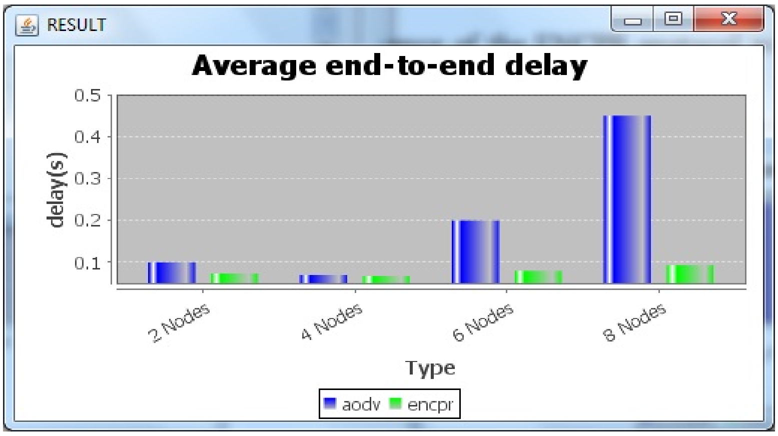

Fig4. Average end to end delay(s) with varied number of nodes

.CONCLUSION AND FUTURE WORK

In this propose method an Innovative Rebroadcast Method is introduced for fall down Routing congestion in Mobile Ad Hoc Networks. This method considers the nearest coverage information. It includes supplementary exposure ratio and connectivity factor. And apathetically determine the rebroadcasting Probability which is used to determine the sending order of packets. On the basis of priority of the packet the respective probability node is choose and create the path to the destination. This scheme produces fewer rebroadcast congestion as compared to flooding and other optimize scheme. This method alleviates the network collision and conflict this will result in high packet delivery ratio. For the future concern different methods can be used for calculating delay & probability.

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