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Spontaneous Interaction of Intermediate nodes for better Communication in Ad-hoc Networks

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Abstract:- Source and destination transmit data using the intermediate nodes after the connection has been established. The packets for which the acknowledgements are not received will be sent after round trip time (RTT) which violates the one important concept called timeliness in data communication. Our approach will decrease the time for communication. Intermediate nodes respond spontaneously in establish better communication between source and destination. This concept is not copied from any literature before.

Keywords:- Source, Destination, Intermediate nodes, Round trip Time, Ad-hoc Networks.

I. INTRODUCTION

Ad-hoc Networks are infrastructure less and dynamic networks [2, 4] where the communication between the source and destination will be done through the intermediate nodes. Communication must have four fundamental characteristics: delivery, accuracy, jitter, timeliness [1]. The data which delivered late or which is not delivered to the destination are waste [1].

In any wireless routing protocol the source will find the path to the destination by sending the route discovery packets [4] the intermediate nodes which receive these packets forward to the next intermediate until its finds its destination and the destination will send a route acknowledgement packet to the neighboring from which it is receiving the route discovery packet so that data flow path is created. Now the source is ready to send the data to the destination using the intermediate nodes [4].

Now one of the intermediate node or the destination node changes its position because of their mobility nature the source node will again need to send the route discovery packets in order to deliver packets to the destination. The data will be fragmented at the source node into packets and are sent to the destination [2,3] along the route established so in order to know which packet has reached each packet is maintains a sequence number and all the packets are to be assembled at the destination. At the end, the destination will check all the packets had been received or not by using the sequence number. The packets which are received by destination will send the acknowledgement for particular packet's and if the source will find any acknowledgement is not received or lost in the transmission within Round Trip Time (RTT) [5] it will resend the particular packet to the destination.

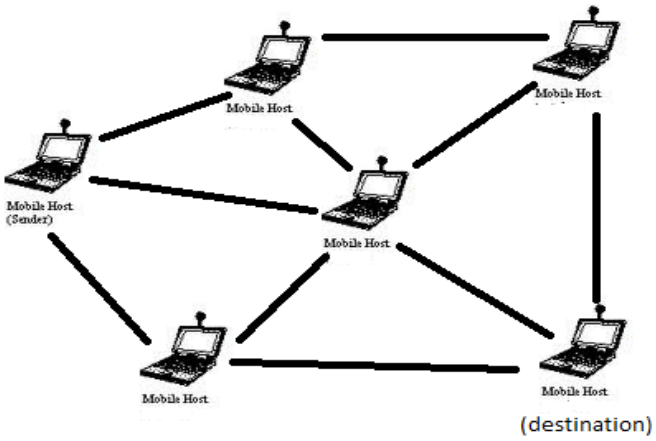

Fig. 1: Mobile Ad-hoc Networks

Proactive and reactive routing protocols work in the same manner to transmit data from source node to destination node.

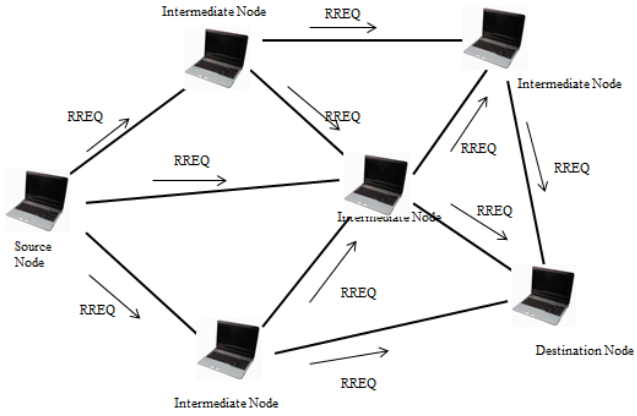

Fig. 2: Route Request Packets from Source to Destination

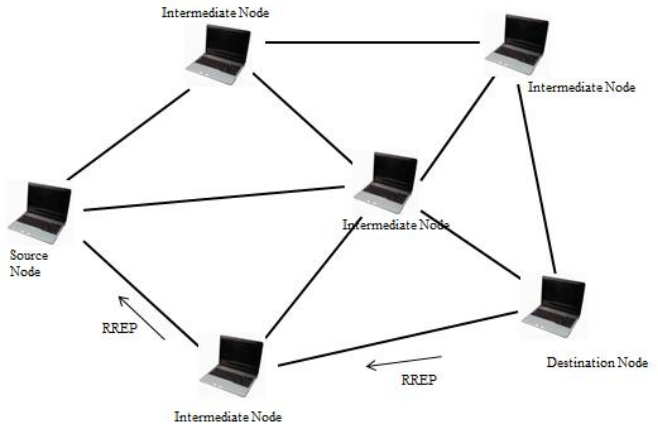

Fig. 3: Route Acknowledgement Packets from Source to Destination

II. UNACKNOWLEDGED PACKETS

A route has been established between the source and destination having intermediate nodes. Now the source sends its data packet to one of the intermediate node and again it send to next and finally reaches the destination and the destination will acknowledge the packet [5] it received the acknowledge must be received by the source before the RTT(round trip time) otherwise the source will duplicate the packet to the destination [4].

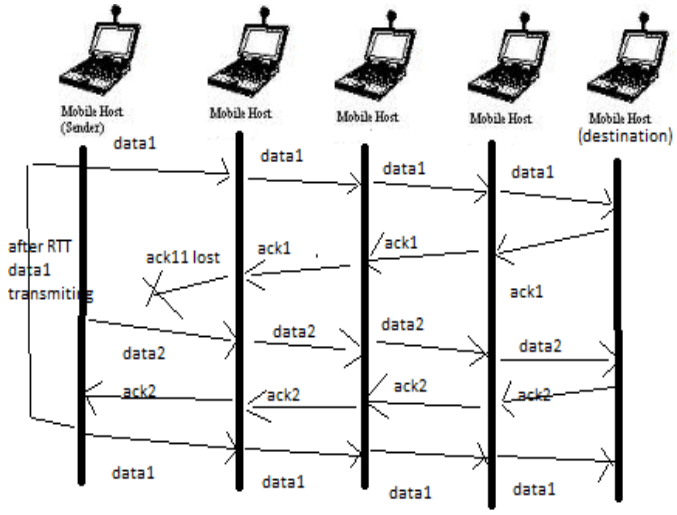

Fig. 4: Unacknowledged Packets

III. LOSS OF PACKETS

Source is transmitting the packet to the destination using the intermediate nodes to transmit. Suppose the packet is lost at any intermediate node either by congestion or by decrease in the window size the source will wait for the acknowledgement of the packet and the destination will wait for the packet to receive [3].

Until the completion of RTT source node don't react. After RTT the sender will again send the packet to the destination if it again fails source wait for RTT [5] and sends it again until the acknowledgement of the packet is received.

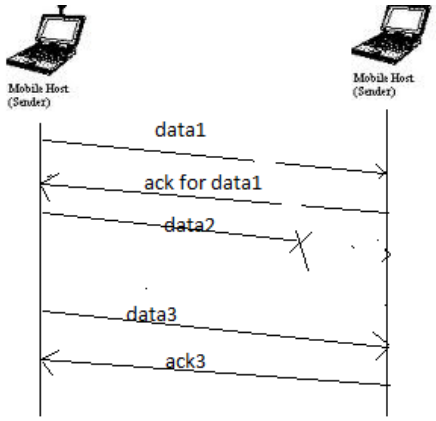

Fig. 5: Packet Loss in Transmission

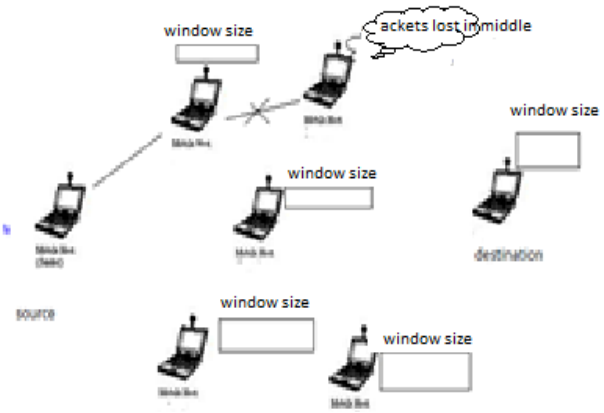

Fig. 6: Nodes in Data Transmission

IV. INSUFFICIENT WINDOW SIZE

While the data is transmitting from a source to the destination it follows the path obtained by the intermediate nodes. Each intermediate node is having the window in order to store the packets which are transmission through it. Suppose the packets are transmitted from many sources the window size is insufficient to store the packets then it will lose some of the packets [4] and the source sending those packets not know about the packets loss and wait for acknowledge up to completion of round Trip Time (RTT) and retransmit the packet [5].

V. PROPOSED CONCEPT

When the source is sending packets to the destination through the intermediate nodes if any loss of packet occur near the intermediate nodes these nodes spontaneously react for the loss packets and send the lost packet information to the sender so the sender reacts for the intermediate node information and retransmits the packet to the destination.

VI. IDENTIFICATION OF SOURCE

Every intermediate node has window in order to store the packets, which are transmitting to it. The intermediate node will store the information of every source and destination along with the packet sequence number every time it will record these details in the table when any packet is passing through it.

Suppose the source discovers a route to the destination by using the intermediate nodes. At particular node, there is no vacancy for a packet to store then the packets trying to move in the direction will be lost. Upto now it stores the packet sequence numbers in the table so it checks for the next sequence number any sequence number of the packet is missed in the transmission. The particular packet will be identified and intimate the particular source which it is sending.

The source will respond to the intermediate node intimation and send the packet again. This benefits good communication with the destination.

Table I: Maintaining packets information

Source Address	Destination Address	Sequence Number
192.168.1.0	192.168.23.1	1,2
192.168.3.0	192.168.93.9	3,4
192.168.5.0	192.168.33.5	5

VII. COMPLEXITY IN FINDING LOST PACKETS

A. ***AT SOURCE NODE:***

When a packet is lost at the Source node the complexity will be less because the next intermediate node identifies the lost packet and intimate the source so that source will retransmit the packet with no loss time.

B. **AT DESTINATION NODE:**

When a packet is lost at Destination node the complexity will be more because the destination node even find the loss of packet it only sends acknowledgement to the received packets so loss of packets ignores so Source node has to wait for completion of Round Trip Time to send this packet.

C. **AT INTERMEDIATE NODE:**

When a packet is lost at any intermediate node the complexity will be less when compared to the packet loss at destination node, the intermediate nodes spontaneously react the lost packet and intimate the source to retransmit.

VIII. ESTIMATION TIME OF PACKET

The intermediate node have to calculate the estimation time that it will stay near that node based on the estimation time it will compare with the round Trip Time (RTT) of the source so that it can estimate the packet reaching if it will reach the destination with in the time if it fails it can be estimated by the intermediate node. The source node will be intimated that there will be some congestion point that the packet will lost. The source will respond to the intimation and again transmit the packet by other path.

IX. CONCLUSION

Communication will be optimized by the spontaneous intermediate nodes in cases of congestion and packet losses. The source will respond immediately to the lost packets and transmit the packet to the destination. This reduces the source waiting and communication between the source and the destination will be worked out. I have some idea on this paper and I will go for further research at the later stage.

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