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A Mechanism for Booster Approach in Mobile Ad Hoc Network

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Abstract— In Mobile Adhoc network Nodes are highly mobile. They move around the Network. Due to this network topology and number of neighboring nodes in each node frequently change. Movement of nodes from one to another network also affect to the communication between them. As we know if nodes are within the range of each other they will work properly. But any of one node is not in the range of other node communication will Break. So we have to Design and develop that kind of system/approach which can handle such types of situation and prevent frequent link failure. To overcome this Link failure we introduced Booster Approach. In this Approach, we are dealing with the Power levels at both the ends (Tx as well as Rx) in order to make healthy communication between nodes in Adhoc Network. Suppose if our one node is moving away from the source node the moving node will measure its Rx power with respect to the distance and after a time duration when its current power level reaches the Threshold level (mini. Power level require for communication between nodes) it "ON its Booster" and at the same time it send one packet message MEP (Member Packet) to source node which contains (Received power level of moving node) due to this source node also "ON its Booster" enhance the Power level and trying to connect together to prevent the data lost during node mobility. In this paper we proposed a mechanism based on the Mathematical parameters . like Tx power, Rx power (Threshold level- minimum power require for communication between nodes), Distance between Tx and Rx, which are making an important role in Booster approach mechanism and Prevent link break during Nodes mobility at data transaction time.

Index Terms— MANET, Mechanism, Node, CHG,Booster, Tx/Rx Power.

1 INTRODUCTION

Adhoc Network is self organizing, Multi-Hop based future technology, But in MANET we have some various challenges like Battery Back up, Node Mobility, Bandwidth constraint, Routing Protocols & Security problems. As we know MANET is used where no infrastructure is available for communication, such like disastrous area, military application. A mobile Transaction is structured as a Distributed transaction [2, 3]. In which the transaction is completed by the help of mobile nodes, providing different services. The mobile environment produces the significant challenges to transaction processing. The wireless network provides limited bandwidth so network bandwidth is a scarce resource. Battery power drains with data transmission and transaction processing. Due to the Dynamic mobility of nodes it affect to the communication link which should be maintain properly during mobility. Here we are trying to prevent data loss during node mobility. For this we develop a Booster Technique. Booster is a kind of Device and Algo's combination attached within the equipment as laptop, mobile etc. and as per the requirement Booster operate automatically need not require manually. Before operate 1st it will check the device parameters which are require for operating this like (Tx power, Rx power-Threshold level, Distance between Tx and Rx). Once Booster activated the mobile node can cover to each other without any difficulty. Primary applications of MANET are military tactical application, oceanography and the situation where a human being is unable to go and we have the condition to access the information about the climate and environment of that location. Various approaches have been given to manage a MANET. The Booster Approach is Newest and Latest in this direction which can be helpful for Mobile Ad hoc Network.

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2 Related Work

In this model assuming that each node in MANET is booster enabled, a threshold value is used to activate and deactivate the booster. The threshold power level (T_{MIN}) value is related to strength of signal. All the nodes in the cluster send the performance table to the cluster head (CH). According to efficiency of the node CH maintains a Performance table. On the basis of efficiency the CH assign the task to the nodes in the cluster. If any node goes out from the cluster and receiving a low signal (equivalent to link failed), then outgoing node checks the value of signal strength, if signal strength is less than threshold power level (T_{MIN}) then booster becomes active, the booster amplifies the signal, the node which is somehow connected to outgoing node also activate its booster when it realize the equivalence of link failure.

Here, The provided approach showing that the cluster head always try to tie up with the efficient node with-

in its cluster, through the use of signal booster technology. . Using this technique we can increase strength to the various QoS models in MANET, & designing of low weighted and less battery consumption enabled boosters.

3 Proposed Model

In MANET we can not restrict over the speed of node i.e they are free to move any where. So provided approach showing that the cluster Head(CH) always to tie up with the efficient node within its cluster, through the use of signal booster Technology. So in the proposed model we developed a mechanism for booster RF approach..
In proposed mechanism we are taking three major points into consideration.. [7]

- Tx Power level.
- Rx Power level (Threshold level- minimum power level require for communication between nodes).
- Distance between Tx and Rx.

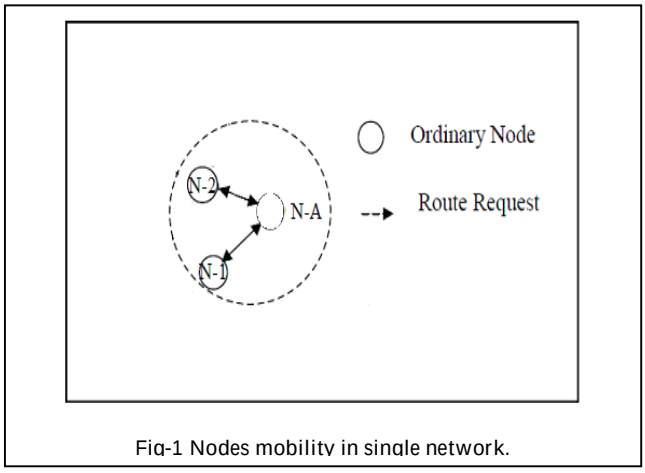

Fig-1 Nodes mobility in single network.

As we can see in the fig.1 we are focusing on Node N-A and node N-1. Here node N-A wants to communicate to node N-1 But both nodes are far from each other due to this communication link can be Break and the data can be lost. To prevent this we have to increase the Power (Strength) level of our signal. To increase the Power level we are introducing "Booster Mechanism".

In this Mechanism, we are dealing with the Power levels at both the ends (Tx as well as Rx) in order to make healthy communication between nodes in Adhoc N / w.

Before Booster activated. 1st Both of the node (N-A & N-1) should know the Rx power level of each other. Here we introduce MEP packets (Message packet). MEP packets are responsible for Exchanging of data including Rx power level between nodes in Adhoc network.

Once both the nodes know the Rx power level of each other they compare it with Threshold power level (mini. Power level require for communication between nodes) and if current Rx power level reaches the Threshold level they will activate their Booster respectively. Suppose in the given fig.1 node N-1 is moving far from node N-A so as per the formula if distance increases Rx power level will decreases. After a certain time of period if node N-1 has Rx power level will reach the Threshold power level its Booster will activated automatically and at the same time node N-1 send MEP packets to node N-A. Informing its Rx power level to node N-A.

As node N-A get this MEP packet its Booster will be automatically activated and both the nodes try to reconnect in order to enhance the power level and make proper Communication.

Before doing all these things we have to consider some points-

1. Tx power of mobile.
2. Rx power of mobile. (i.e. Threshold Power level)
3. Distance between Tx and Rx.
4. Formula

$$Pr=Pt*Gt*Gr/(4r\pi/\lambda)^2$$

1 Step – Tx Power level—
In this step we are dealing with the Tx power of nodes in Adhoc network. As we know more Tx power covers more area and increase vicinity and the data loss chances become less.

TABLE 1

Transmission power level and its corresponding transmission range of a node

Level	Transmission Power (db)	Distance (m)
4	26.82	250
3	24.01	200
2	21.51	150
1	17.99	100

After analyzing these results we can say our network support up to 250 m. single hop communication (Maxi. Communication distance between one node to another node directly) without facing any difficulty and for 1 m distance we require approximate 0.1 db Tx power in Ad hoc network.

As per given formula we can say as distance increase Tx power level increase while Rx power level decrease.

2 & 3 Step- Rx Power level with respect to distance—

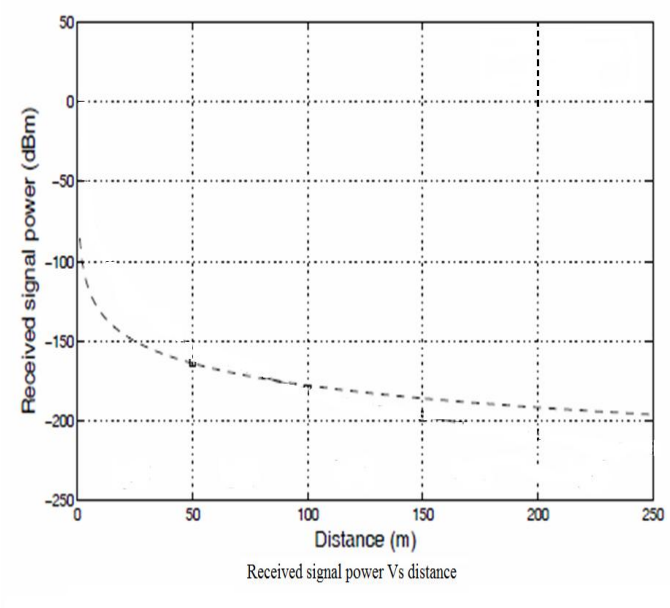

Figure-Received power Vs Distance

TABLE 2

Receive power level and its corresponding Receive range of a node

Level	Receive Power (Threshold Level) (dbm)	Distance (m)
4	-199	250
3	-192	200
2	-185	150
1	-178	100

So, here as distance increases Rx power level decreases. With the help of given curve Rx power level vs. distance we can say our Threshold Rx power level is = -199 dbm. At 250 m. (for ad-hoc wireless network).
Where Tx power = 26.82 db.
Rx power level (Maxi. Threshold level) approximate = -199 dbm.
Distance between Tx and Rx = 250m.

4 CONCLUSION

Mobile Adhoc Network is the future technology; we have provided the mechanism for Booster approach .By the proposed mechanism we can save the efficient node in the cluster which may be responsible to maintain communication in our cluster.By measuring Tx power level, Rx power level (Threshold level) and Maximum. Dis tances between nodes. This paper has proposed the approach in which cluster head always try to tie up with the efficient node within its cluster through the use of Booster Technology. Using this this approach we can increase network efficiency and also increase the QOS of network.

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