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RTS/CTS Exchange Scheme for Nodes with Diverse Power Level in MANETs

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***Abstract*- Power heterogeneity is common in mobile ad hoc networks (MANETs). With high-power nodes MANETs can improve network scalability, connectivity, and broadcasting robustness. In Existing System, to reduce the interference raised by high power nodes during data transmission, packet forwarding via high power nodes is eliminated. In this work, the interference raised by high power nodes is minimised by using RTS/CTS exchange scheme. A successful RTS/CTS exchange will not guarantee successful transmission of data in a heterogeneous network. As the network density goes down, there are fewer neighbours that can interfere with the DATA transmission. Hence the success rate of DATA transmissions from low power nodes improves, but it is still far below the success rate for high power nodes. A possible solution to prevent this degradation is to extend the reach of the RTS/CTS reservation so that all high power nodes that could potentially interfere with the DATA transmission are made aware of the reservation. One way to extend the reach of 0the RTS/CTS reservation mechanism without boosting, transmits power is for nodes that hear the CTS message to propagate it again. Thus, the success rate of data transmission via high power nodes is relatively high compared to any other nodes in the networks.**

***Index Terms*— Mobile ad hoc Networks (MANET), Power heterogeneous, Routing, Clustering, Wireless.**

I. Introduction

The A mobile ad hoc network (MANET) is a self-configuring infrastructure less network of mobile devices connected by wireless. Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Such mobile network consist of devices with heterogeneous characteristics in terms of transmission power. Power heterogeneity is common in MANETs. In 802.11-based power heterogeneous MANETs, mobile nodes have different transmission power, and power heterogeneity becomes a double-edged sword. On one hand, the benefits of high-power nodes are the expansion of network coverage area and the reduction in the transmission delay. High-power nodes also generally have advantages in power, storage, computation capability, and data transmission rate. Generally, low power nodes have a disadvantage in accessing the medium due to higher levels of interference from the high power nodes.

II. RTS/CTS Reservation Scheme

Generally, low power nodes have a disadvantage in accessing the medium due to higher levels of interference from the high power nodes. We consider propagating the control messages generated by a node wishing to initiate communication to distant nodes so that they may for bear transmissions for some time, thereby allowing clear access to the initiating node. We find that the overhead incurred due to the additional message transmissions outweighs the potential gain achieved by propagating these messages. The term power capability will refer to the power level that a node is capable of using for transmissions.

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The terms homogeneous network and heterogeneous network will refer to networks in which all nodes have, respectively, identical or non-identical power capabilities. A successful RTS/CTS exchange will not guarantee successful transmission of data in a heterogeneous network. As the network density goes down, there are fewer neighbors' that can interfere with the DATA transmission. Hence the success rate of DATA transmissions from low power nodes improves, but it is still far below the success rate for high power nodes. A possible solution to prevent this degradation is to extend the reach of the RTS/CTS reservation so that all high power nodes that could potentially interfere with the DATA transmission are made aware of the reservation. One way to extend the reach of the RTS/CTS reservation mechanism without boosting transmits power is for nodes that hear the CTS message to propagate it again.

III.RTS/CTS DESCRIPTION

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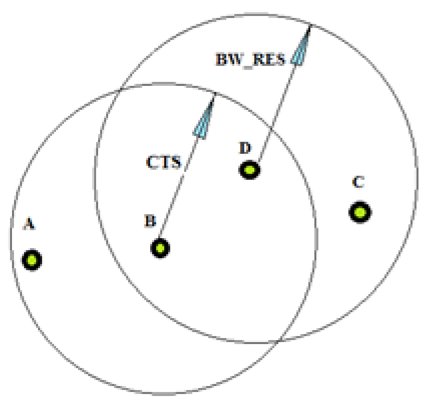

Fig 1. RTS/CTS Exchange Scheme

In the above figure, Say node D broadcasts the CTS it hears from node B. The CTS from node B could not reach node C, but the broadcast message from node D will reach node C and node C will then defer its own transmissions during the ensuing DATA/ACK sequence between nodes A and B.

Steps in RTS/CTS

- First RTS frame is sent from the source
- After receiving RTS frame, the destination replies with CTS frame to the source
- The source then sends the data frame to the destination
- The destination then acknowledges the data frame sent by the source

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IV.SYSTEM ARCHITECTURE

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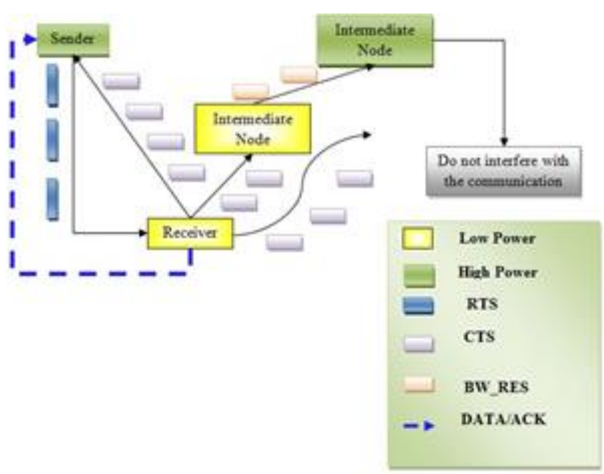

Fig 2. System Architecture

V.MODULE DESCRIPTION

The proposed work is formulated as following modules:

A)Network Configuration

The nodes are created and located in the simulation environment. The nodes are moved from one location to another location based on the movement trace file. The setdest command is used to give the movement to a vehicle. The Random way point mobility model is used in our simulation. The nodes are using Omni-antenna to send and receive the data. The signals are propagated from one location to another location by using Two Ray Ground propagation model. The Priority Queue is maintained between any of the two nodes as the interface Queue.

B)*RTS/CTS Handshaking*

RTS/CTS are a hand shaking: before sending a packet, the transmitter sends a RTS and wait for CTS from the receiver (see figure below). The reception of a CTS indicates that the receiver is able to receive the RTS, so the packet (the channel is clear in its area).

At the same time, every node in the range of the receiver hears the CTS (even if it doesn't hear the RTS), so understands that a transmission is going on. The nodes hearing the CTS are the nodes that could potentially create collisions in the receiver (assuming a symmetric channel). Because these nodes may not hear the data transmission, the RTS and CTS messages contain the size of the expected transmission (to know how long the transmission will last). This is the collision avoidance feature of the RTS/CTS mechanism (also called virtual carrier sense): all nodes avoid accessing the channel after hearing the CTS even if their carrier sense indicates that the medium is free.

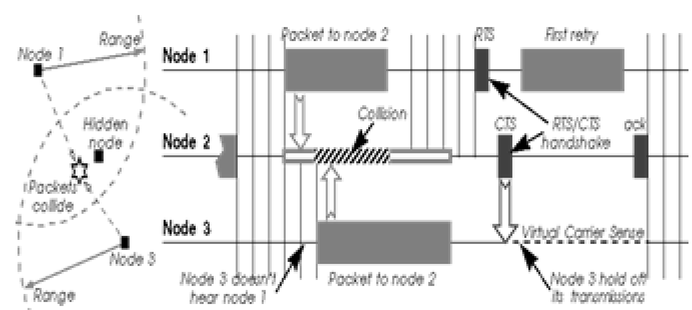

Fig 3. RTS/CTS Handshaking

C)DATA/ACK Transmission

First, our technique takes the large coverage space for B-nodes to the broadcast RREQ packet. Hence, the delay from the route discovery can be improved. Second, forwarding rules for the RREQ packet is based on the state of a node and local topology information; therefore, redundant transmissions of RREQ packets can be avoided, and the overhead of the route discovery procedure can be significantly reduced.

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Third, our scheme intends to avoid forwarding data packets through B-nodes; therefore, the impact of B nodes on network throughput can be largely reduced. Finally, LRPH is adaptive to the density of B-nodes for LVC.

In an extreme case where no B-node exists in the network, i.e., the state of all nodes belongs to GIsolated; LRPH becomes a routing protocol similar to classical source routing. The difference is that LRPH forwards data packets through bidirectional links and improves transmission efficiency.

When a middle node on the route detects the link failure through the BN table, the route maintenance is activated. First, a route error (RERR) packet is created and sent to the source node along the reverse route. When any middle node (including the source node) along the route receives the RERR packet, the route with the broken link will be removed from the routing cache. When the source node receives the RERR packet, a new round of route discovery procedure will be activated. The sender node sends the DATA to the receiver node through the route that we have constructed. The sender receives the ACK packets through the same route.

D)Performance evaluation

The performance of the proposed scheme is evaluated by plotting the graph. The parameter used to evaluate the performance is as follows: Packet delivery ratio, Packet loss ratio, End to end delay. These parameters are recorded during the simulation by using record procedure. The

VI. Evaluation By Simulation

The performance of the proposed scheme is evaluated by plotting the graph. The parameter used to evaluate the performance is as follows: Packet delivery ratio, Packet loss ratio, End to end delay. These parameters are recorded during the simulation by using record procedure. The recorded details are stored in the trace file. The trace file is executed by using the Xgraph.

a)Throughput : Amount of data received in a given amount of time.

b)Packet loss ratio : It occurs when one or more packets of data travelling across a computer network fail to reach their destination.

c)End to end delay : It refers to the time taken for a packet to be transmitted across a network from source to destination.

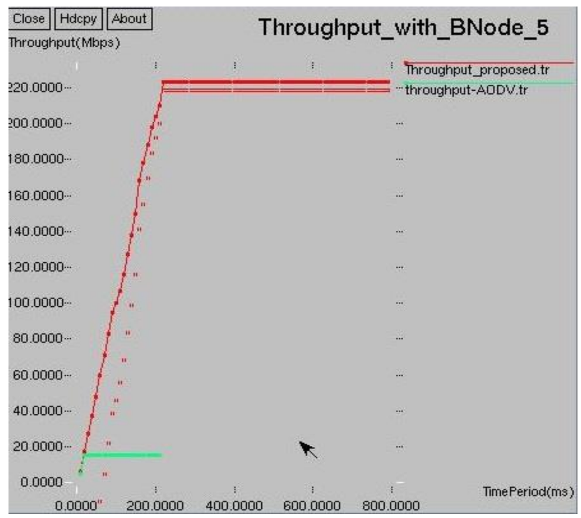

Fig (a) Throughput

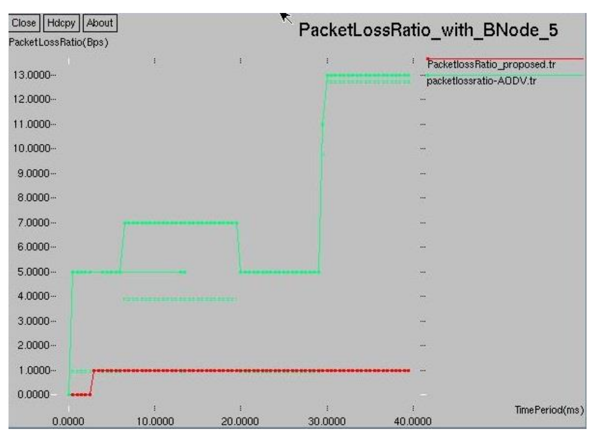

Fig (b).Packet Loss Ratio

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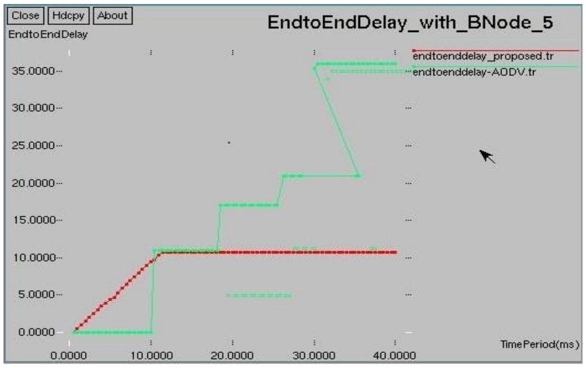

Fig (c). End to End Delay

VII.Conclusion

A technique named RTS/CTS Exchange scheme has been used to reduce interference raised by high power nodes. A Packet transfer through high power nodes need not be avoided using the above mentioned. Such transfer would increase network throughput and decrease the delay that occurs during packet.

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