

## High Throughput in MANET Using relay algorithm and rebroadcast probability

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### Abstract –

A Mobile Ad Hoc Network is a self-configuring infrastructure less network of mobile devices which is connected by wireless. Each device in a MANET will move frequently in any direction, and change its links to other devices frequently. Relay algorithm is used to reduce packet redundancy and exact throughput is analyzed in Bonn Motion Chain Scenario model. In this model each mobile node observes movement patterns defined in all constituent models. Packet is transmitting from source to relay and then from relay to destination node. Packet redundancy is eliminated. Network Throughput refers to the volume of data that can flow through a network and it is constrained by factors such as the network protocols used, the capabilities of number of nodes, network type, speed etc. Network Throughput in wireless networks is constrained further by the capabilities of network adapters on client systems. This project uses rebroadcast protocol for reducing routing overhead in MANETs. By using coverage ratio and connectivity factor this project reasonable set rebroadcast probability. So it can significantly decrease the number of retransmissions and also reduce the routing overhead and improve the routing performance.

**Index Terms**—Capacity, mobile ad hoc networks, throughput capacity, packet redundancy, rebroadcast probability.

### I. INTRODUCTION

A mobile ad hoc network (MANET) is a peer-to-peer network with fully self-organized mobile nodes. In an autonomous network system, mobile users randomly move around and freely communicate to each other via wireless links without the aid of any pre-existing infrastructure. Therefore, any mobile objects including the humans, animals and vehicles, could easily form a MANET as long as each object carries a wireless communication device.

MANET has much lower establishment expenditure and maintenance cost than other wireless networks, no infrastructure support and base station is required. It is robust against the single point of failure, i.e. the death or diminishing of any particular network node will never affect the whole network performance. MANET holds great promise for a lot of future applications, such as the disaster relief, emergency operations, daily information exchange, military troop communication and vehicular ad-hoc network.

MANETs are a kind of wireless ad hoc networks that usually has a routable networking environment on top

of a Link Layer ad hoc network. Different protocols are then evaluated based on measure such as the packet drop, the overhead introduced by the, end-to-end packet delays, routing protocol network throughput etc. Significant examples include establishing efficient, dynamic communication for emergency operations, disaster relief efforts, and military applications. Network scenarios cannot rely on centralized and organized connectivity, and can be considered as applications of Mobile Ad Hoc Networks.



Fig 1: MANET structure

In fig: 1 node is moving from one place to another without any algorithms. A lot of mobility models have also been proposed to characterize

the mobility pattern, such as the i.i.d. (independently and identically distributed) model, random walk model, waypoint model, Brownian model, restricted mobility model, the Levy walk model and fly model. It is very difficult to predict the node movement behaviors. MANETs perform the required data delivery through node co-operations without an infrastructure, where mobile nodes transmit to each other spontaneously without any centralized scheduling. The wireless interference incurred by such spontaneous transmissions becomes much more challenging than that in cellular and Wi-Fi network, in which the data transmissions are scheduled by the base station.

## II. ISSUES AND OPEN PROBLEMS

The nodes in MANETs randomly move around in network region according to their own mobility patterns and it is very difficult to predict the node movement behaviors. The ongoing data reception at some node could easily get corrupted by the data transmission initiated by some neighboring node and out of the sensing range and thus has no idea of the channel occupation status.

### PACKET DELIVERY PROCESS

Packet delivery process is the main problem arises now a day. When a packet is transmitted from source to destination it may or may not reach destination. If it is reach destination packet redundancy is occurring. Exact throughput capacity is not able to achieve. In the early cases we use direct transmission from source to destination, in recent time we go for multicast systems, i.e. with the relay node source is reaching destination. Multiple copies are reaching destination so that infinite buffering time made the MANET a congested one.

## III. PROPOSED WORK

In the proposed work we develop a two hop relay algorithm for exact packet delivery process and for finding throughput capacity of MANET. In this two hop algorithm we are using a relay node to reach destination. For first phase packet is passing from source to destination and finally from source node to destination node delivery is done.

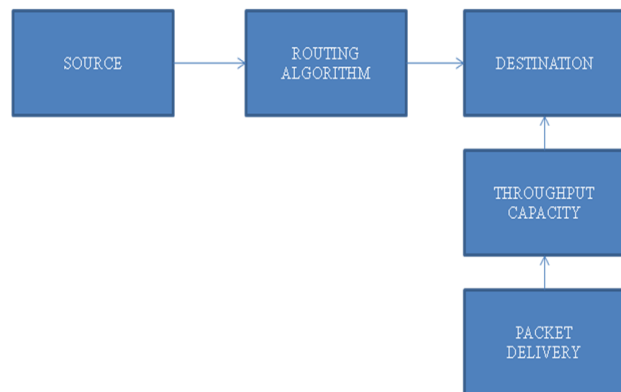


Fig: 2 Basic block diagram for source to destination transmission

Source will check whether destination is nearer to it. If it is nearer means source will directly transmit packets from source to destination. If not means source will select a relay node to reach destination. With probability 1/2, Source and Relay transmission done and then perform Relay-to-Destination transmission. Throughput capacity is the rate at which source is reaching destination. After the packet delivery process throughput capacity and delay analysis is measured.

When Source wins the transmission opportunity it overhears the channel for a specified interval of time to check whether D is inside the one-hop transmission range.

- If Source got replay from Destination within the specified time , it connects with Destination and then transmits packets directly to Destination (“Source-to-Destination” )
- If no reply during the specified time interval, a relay node (RN) is selected among the nodes within the one-hop transmission range of S. With probability 1/2, S and RN perform either the “Source-to-Relay” or “Relay-to-Destination” transmission:
- Source-to-Relay: packet P is generated for Source is currently delivering copies. Source first connects with Relay to check whether Relay has already received a copy of P. If not, Source delivers new copy of P to relay if less than m copies of P have been delivered now.
- Relay-to-Destination: Source connect with Relay to check if Source carries a packet P destined for R with SN = RN. If it is ok means Source delivers the packet P to Relay; otherwise, S remains idle for this time slot.

## IV. THROUGHPUT CAPACITY

To derive per node throughput capacity, we define two queues for Source and Destination. The local queue will stores the packets locally generated at Source, and virtual queue at Destination stores the

sequence numbers of the packets not received yet by Destination. The packets are locally generated at Source; it is put to end of the local queue. Whenever a packet P is moved to the head-of-line of the local queue, its sequence number is put to the end of the virtual queue. The head of line(HOL) entry of the local queue represents the packet that S is currently distributing copies, while the head-of-line (HOL) entry of the virtual queue represents the sequence number of the packet that Destination is currently requesting. When Source finishes copy distribution for the head of- line packet at the local queue, Source moves ahead the remaining packets waiting behind; when Destination receives the packet whose Sequence number equals the head-of-line entry at the virtual queue, Destination moves ahead the remaining entries.

The queue defined by Source characterizes the local packet generation and copy dispatching at the source node, which corresponds to the "Source-to-Relay" transmission of the 2HR-f scheme; while the virtual queue introduced to Destination depicts the packet delivery from the intermediate relay nodes to the destination, which corresponds to the "Relay-to- Destination" transmission

## V. SECURITY MEASURE AND ROUTING

MANET assumes that all nodes are co-operative in coordination process. But in some cases malicious attackers can easily disrupt network operations by violating specifications of protocol. Packets are forwarded by intermediate nodes through an established route to destination. The routing and packet forwarding operations are vulnerable to malicious attack. When distance vector routing protocols such as AODV are used, attackers may advertise a route with smaller distance than its actual distance to destination. Other attacks may be routing updates with a large sequence number and invalidate all routing updates from other nodes. Attackers can create routing loops in network and introduce severe network conjunction in MANET. Unlike wired network that have dedicated routers, each mobile node in ad-hoc network may function as a router and forward packets for other nodes. Another attack is denial of service (dos), in which attacker injects a large amount of junk packets in network

Two approaches for security in MANET are proactive and reactive. Proactive approach attempts to prevent attacks in first place through various cryptographic techniques. Reactive seeks to detect threats and react accordingly. Network layer securities for MANET are concerned with

protecting network function to deliver packets between mobile nodes through multi hop ad-hoc forwarding. Main challenge for source routing protocol is to ensure that each intermediate node cannot remove existing nodes or add extra nodes to route.

The problem mainly arise if source 1 is forwarding packets to destination 1 with the help of a relay node and source 2 also trying to use the same relay node to send packets to another destination means packet loss can happen, path failures, routing relay, network conjunction may happen. So we are using broadcast delay coverage Probability technique to reduce this overhead delay and conjunction.

Basic technique is to attach a per hop authenticator for source routing forwarder list to identify the alerting of list of nodes. For MANETs network connectivity and reduce the redundant retransmissions, connectivity factor is used to determine how many neighbors should receive the RREQ packet. Broadcasting is an effective mechanism for route discovery and the routing overhead associated with broadcasting can be quite large, By combining the additional coverage ratio and connectivity factor, rebroadcast probability can be used to reduce the number of rebroadcasts of RREQ packet and to improve the routing performance.

- If node receives a new RREQs from source, find the neighbor's Nodes of source and relay node and set P
- Compute the Rebroadcast delay D from P.
- Set a Timer according to rebroadcast delay D.
- If node receives a duplicate RREQ from another source before Timer, adjusts the uncovered neighbors and discard RREQ and make that requested node dead for that interval
- If the Timer expires compute the rebroadcast probability.
- If the Rebroadcast Probability  $\geq$  Random (0, 1), then RREQ.
- If the Rebroadcast Probability  $\leq$  Random(0,1) Discard RREQ..

## VI. SIMULATION RESULT

Steps

- Place some nodes in the network scenario.
- Assign source and destination node.
- Relay node is used to send packets from source to destination.
- Source will check whether destination is in nearby or not.
- If yes means packets are transmitted directly to destination.
- If destination is not nearby means packets are transmitted to destination with the help of a relay node.
- If another source will also use the same relay node to send packets to another destination, packet drop can happen or network conjunction will take place.
- To overcome this problem we are using rebroadcast algorithm
- In this algorithm if the relay node receives a new request means, we have to find the common neighbors of requested source and relay node.
- Delay time is calculated and set that delay as timer.
- Whenever the request came in this interval to relay node is discarded and make that node as dead node.
- After the timer expiration source can use that relay node for sending packets to particular destination.
- This delay time is calculated to make the node request dead for an interval and make the communication perfect between source to relay and relay to destination.

The channel model follows lucent wave LAN with bit rate of 2 Mbps and transmission range is 250 meters. Each packet size is 500 bytes per second. The mobility model is based on the random waypoint model in a field of 1000m \* 1000m.in this mobility model each nodes moves with a constant speed with a uniform distribution speed. Whenever a nodes receives destination it stops its pause time interval and choose new destination and speed..The first step is to create a certain amount nodes in network scenario. Nodes are placed in different places.

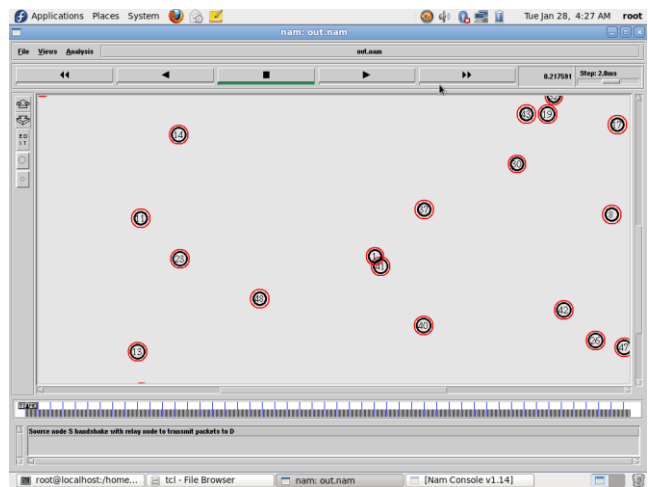


Fig: 3 Node Formations

Here in fig: 3, 50 nodes are created for analyzing the node movement and packet transmission between source and destination.ie 0 to 49 nodes are created

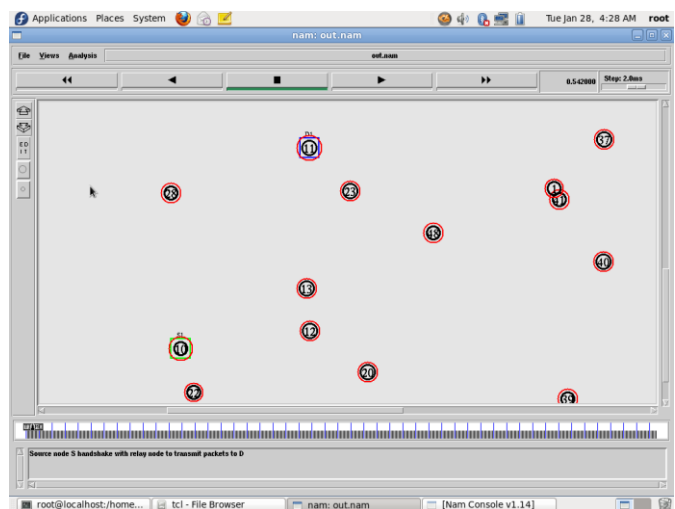


Fig: 4 Assigning Source node and destination node

Here in fig: 4, Node 10 is assigned as source Node and Node 11 is assigned as destination Node. The nodes are placed in different places. Each node has information about its neighbor nodes and each node is free to move in any direction without any specific algorithms.

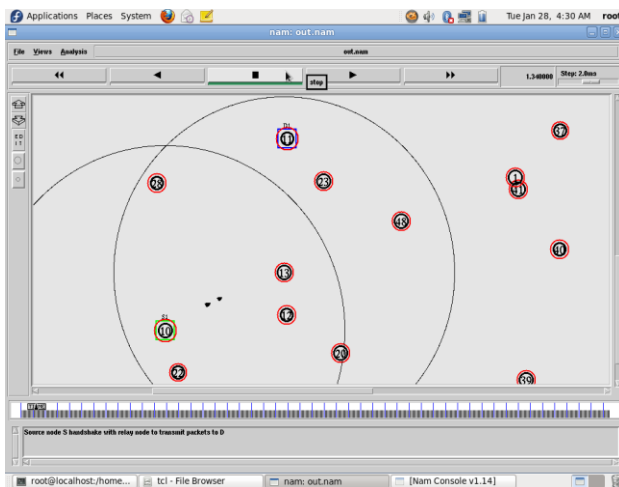


Fig: 5 packet transmission from source node to relay node

At each time the signal transmission varies. The signals are transmitted via relays. In fig: 5 assign node 13 as relay node. Packet is transmitted from source to relay node. First step is to check whether this relay node receive any new request from another source or not. If another request came means we have set a delay time for the new request and make requested node death for that time interval.

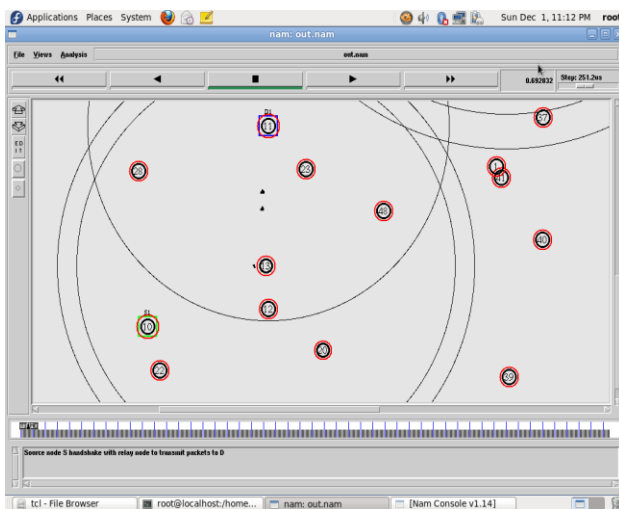


Fig: 6 packet transmission from relay node to destination node

In fig: 6, packet is transmitted from relay node to destination node. Packet loss is avoided and throughput is achieved. Relay algorithm is used to send packets from source to destination. Throughput is the rate at which source is reaching destination.

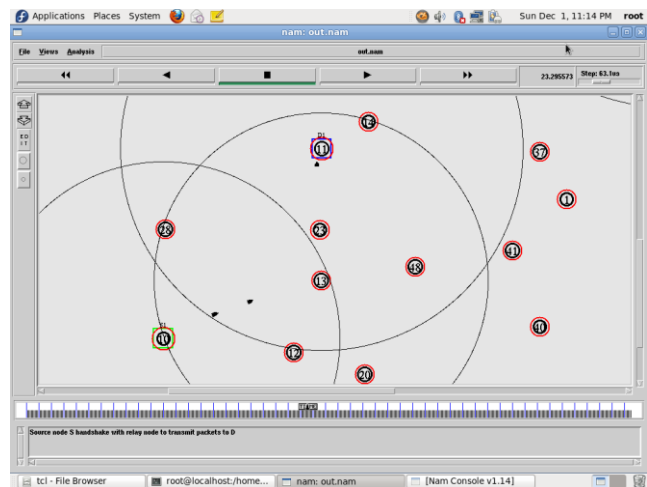


Fig: 7 packet transmission from source to destination by relay algorithm

Fig: 7 show the transmission of packet from source to destination without any loss.

## VII. CONCLUSION

In this work High throughput and packet redundancy is achieved. It is based on heterogeneous pattern. Network Throughput refers to the volume of data that can flow through a network and it is constrained by factors such as the network protocols used, the capabilities of number of nodes, network type, speed etc. Network Throughput in wireless networks is constrained further by the capabilities of network adapters on client systems. In this model each mobile node observes movement patterns defined in all constituent models, Packet redundancy is avoided. High level security is added to reduce network conjunction and packet loss. The results show that the proposed protocol generates less rebroadcast traffic than the flooding. The proposed protocol mitigates the network collision and to increase the packet delivery ratio and decrease the average end-to-end delay. The proposed works have good performance when the network is heavy loaded.

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