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Efficient Bandwidth Estimation and Minimize the Packet Loss in TCP/IP MANET

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ABSTRACT: In wired network transmission control protocol(TCP) is designed as a transport protocol. In MANET each node act as a router which leads to packet loss and delay which reduces the transmission rate and throughput. In performance evaluation of various TCP, snoop protocol is integrated in every node which improves the performance and throughput efficiency.some modifications have been proposed to estimate the efficiency of bandwidth and to minimize the packet loss.In receiver side, the sender helps toincrease the congestion window with the help of AIMD mechanism to measure the bandwidth and to avoid the slow start stage bandwidth and to avoid the slow start stage increase the congestion window with the help of AIMD mechanism to measure the bandwidth and to avoid the slow Start stage .

I.INTRODUCTION

In recent years, MANET areregarded as mobile nodes which are consideredas infrastructureless network.In specific area, mobile users can roam and still communicatedirectly with other node. So every node act as a router to other nodes Most of the researcher are interested in wireless network.Here we focusan efficient bandwidth estimation and to reduce packet loss in tcp along with internet protocolwhere IP handles data delivery and TCP deliversan individual packet for efficient routing .Byusing flow control, sequence number, acknowledgementand timer ,the TCP can send a packet in error free mannerfrom sender to receiver.In MANET environment, the nodes can change frequently which leads packet loss and occurs as congestion. So the TCP will reduces the transmission rate and performance to degrade the throughput.

II.CONGESTION

In data networking and queuing theory, network congestion occurs when a link The node is carrying so much data that its quality of service deteriorates. Typical effects include queuing delay, packet loss or the blocking of new connections. A consequence of the latter two effects is that incremental increases in offered load leads either only to small increase in network throughput, or to an actual reduction in network throughput.

III.CONGESTION CONTROL

Congestion control concerns controlling traffic entry into a telecommunications network, so as to avoid congestive collapse by attempting to avoid oversubscription of any of the processing or link capabilities of the intermediate nodes and networks and taking resource reducing steps, such as reducing the rate of sending packets. There are mainly two approaches to congestion control. They are

- End-end congestion control
- Network assisted congestion control

IV.TCP CONGESTION CONTROL

The main task of TCP congestion control is to adjust the sending rate of the source in accordance with the state of the network. For this purpose, TCP limits the amount of outstanding data. The congestion window (cwnd) represents the maximum amount of data a sender can have sent and for which no acknowledgment was yet received. In particular, when the source starts sending data, TCP conservatively initializes cwnd to one packet and then doubles cwnd for every window worth of ACKs received until congestion is detected. This behaviour is referred to as slow start(SS). Network congestion is identified by packet losses. When loss is detected, cwnd is reduced to react to congestion and to reduce the risk of losing more packets. The congestion avoidancealgorithm is then used to slowly increase cwnd in a linear manner by one packet for every window worth of packets that are acknowledged. This is called the congestion avoidance (CA) phase.

V.RACC ALGORITHM

In RACC mechanism, the receiver not only performs the function of flow control, but also participates in the congestion control. It first measures the bandwidth, and then computes an appropriate congestion window size based on the measured bandwidth and the RTT. To perform these functions, the receiver has to maintain two timers: one timer for recording the packet inter-arrival interval and the other for measuring the RTT. The sender makes use of this information from its receiver to adjust the congestion window.

VI.RECEIVER'S FUNCTION

The receiver measures the bandwidth according to the packet inter-arrival interval. This method can remedy the oscillation in the estimation of bandwidth of TCP Westwood.

Let B_w be the measured bandwidth, L be the data packet size, and t_{int} be the packet inter-arrival interval. Then, one can estimate the available bandwidth by $B_w=L/t_{int}$ for each packet arrival. Moving average method is used within each congestion window. Let B_w be the i-th measured bandwidth. Then, the bandwidth can be continuously updated by

$$B_w = \propto B_w + (1-\propto) B_{w_i}$$

Where α is an exponential filter co-efficient, α =0.9 is a good value because the former averaged values should have a higher weight (0.9 in this mechanism) to lower the measure variations. To reduce the influence of cross traffic, a low pass filter can also be adopted.

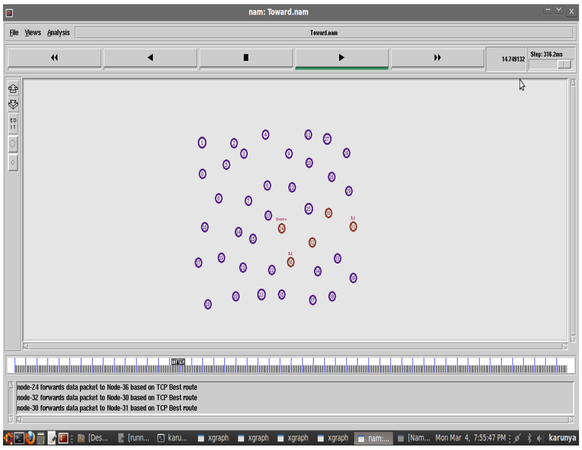
MANAGING THE RTO TIMER:

An implementation must manage the retransmission timer(s) in such a way that a segment is never retransmitted too early, i.e. less than one RTO after the previous transmission of that segment.

VII.SENDER'S REACTION

As the receiver can timely help the sender to increase the congestion window according to the instantaneous available bandwidth, the sender only needs to maintain the AIMD mechanism in the congestion avoidance stage, and the slow start stage can be eliminated. Upon a timeout event (whether it is detected by the sender's timer or informed by the receiver's ACK), the sender will decrease the congestion window to one in consideration that the network is in congestion, and it will have some time to recover.

VIII.SIMULATION



```
node-24 forwards data packet to Node-36 based on TCP Best route
node-32 forwards data packet to Node-30 based on TCP Best route
node-30 forwards data packet to Node-31 based on TCP Best route
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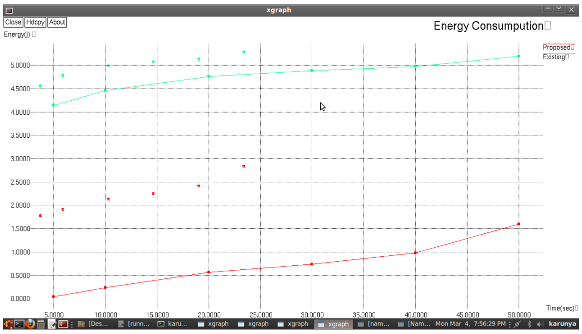
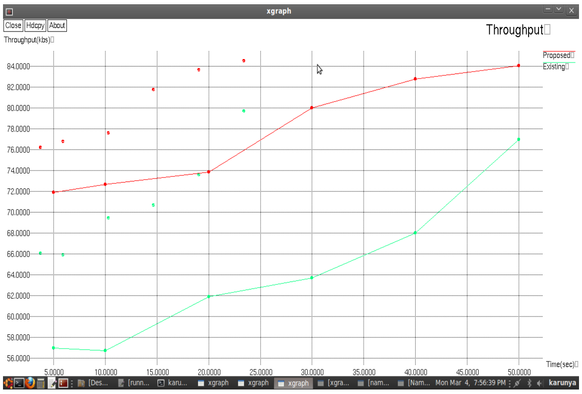
SIMULATION



ENERGY CONSUMPTION



THROUHPUT

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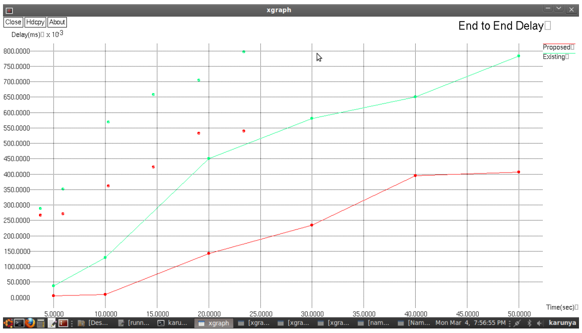
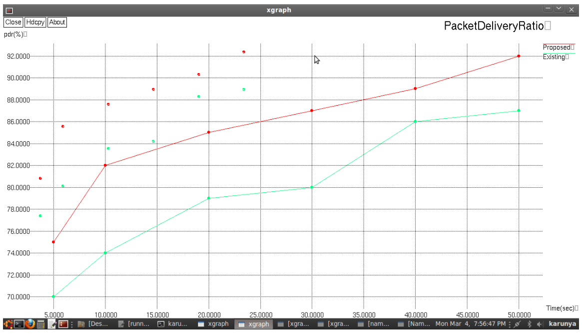


END TO END DELAY



POWER CONSUMPTION

IX.RESULT

THROUGHPUT COMPARISON	
TCP without congestion control	90%
TCP using RACC algorithm	95%

X.CONCLUSION

In this project, the various methods used for congestion control in TCP and the limitations of those technologies are analysed. The end-end congestion function of the RACC algorithm is simulated. The throughput of the network is calculated. It is observed that the throughput of the proposed algorithm is higher than that of the traditional TCP. In future work, the algorithm will be simulated with snoop TCP and will be tested with video transmission.

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