Implementation of New Congestion Control Mechanism in Manet Using Buffer Management

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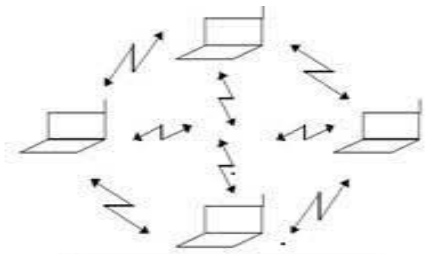
Abstract: ***A number of routing algorithms have been established to facilitate routing). However, most algorithms just implement the sh ortest path routing and do not follow well to MANET characteristics, such as the belief and battery levels of the mobile nodes, critically i nfluence the suitability of the routing decision. Network based congestion avoidance which involves handling the queues in the network devices is an integral part of any network. Maximum of the mobile networks use Drop tail queue management where packets are droppe d on queue overflow which is global synchronization problem. This Paper proposes a new scheme of buffer management to control cong estion in MANET. We set a buffer from sender to receiver with an X(X is not defined yet) buffer limit. There are several neighboring no des around that main buffer and every node have its own limit for placing no. of packets in it so that packets should not be dropped.***

Keywords: Mobile Ad hoc Network, Congestion Control, Buffer Management, Neighboring nodes, Packet drop

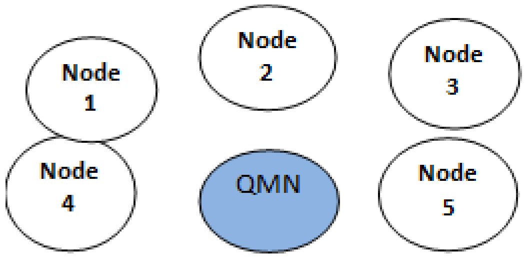
1. Introduction

A Mobile Ad hoc Network (MANET) is a category of ad ho c network. Ad hoc means arranged or happening whenever n ecessary and not planned in advance. Ad hoc is a Local Area Network which permits new network devices to be added sp eedily. Mobile ad hoc network is a group of independent nod es which forms impermanent network without any immobile infrastructure or central manager. For establishing network wireless connections (wi-fi) are used or any additional medi um such as satellite or cellular transmission. Each and every device in a MANET is permitted to move autonomously in a ny path. The movement of nodes is casual in MANET. So M ANETs have a dynamic topology.



Mobile Adhoc Network

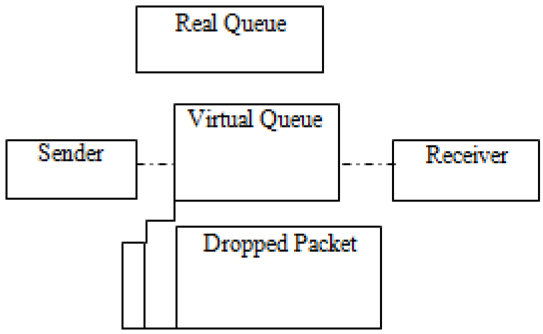
MANET is a communication medium in daily human life an d applications zones of MANET are growing rapidly Conges tion control and securities are major tasks in MANET. Cong estion control works very well in TCP over internet. But due to dynamic topology congestion control is a challenging tas k in mobile ad hoc network. Many approaches have been pla nned for congestion control in MANET. Congestion control technique is the procedure by which the network bandwidth is dispersed across multiple end to end connections. A conge stion control scheme on the other hand, MANET nodes are r esource controlled devices which have limited battery life an d memory/storage spaces. In such circumstances, data sent fr om sources which spread packets with a smaller amount of d ata rates does not get a fair part in queues. Though, such sou rces are not accomplished to convey packets with higher am ount of data rates due to contention of nodes and interfering areas on the path. Taking it as an benefit, some other nodes b ehave belligerently as they can send packets with higher data rates to the end node through intermediate nodes. Therefore, they can inhabit larger space in the queues in unfair manner.



Considered MANET Scenario

2. Existing Queue Management Schemes

Congestion control involves the design of mechanisms and a lgorithms to statistically bind the demand-capacity incongrui ty or dynamically control traffic sources when such incongru ity arises. It has been exposed that static results such as alloc ating more buffers, providing faster links or faster processor s are not in effect for congestion control purposes.



Existing System

In high-speed networks with connections with high delay-ba ndwidth products, gateways are possible to be aimed with co ngruently large maximum queues to accommodate transient congestion. In the present Internet, the TCP transport protoc ol senses congestion only after a packet has been dropped at the gateway. However, it would obviously be unwelcome to have large queues (possibly on the order of a delay-bandwidth product) that were filled much of the time; this would knowingly increase the average postponement in the network. Therefore, with progressively high-speed networks, it is progressively important to have mechanisms that have throughput high but average queue sizes small. RED measures congestion by queue length. Importantly, the choice of congestion measure finds how it is updated to replicate congestion. To evade congestion the router has to drop packets, before the situation has developed hopeless, the idea is that there is time for action to be taken before it is too late. To find when to start discarding, uphold a running average of their queue distance on some line surpasses threshold the line is said to be congested and starts discarding. Second, recognize a possibility purpose which is a piecewise linear and increasing purpose of the congestion measure. Finally, the congestion information is carried to the users by either dropping a packet or setting its ECN bit probabilistically.

REM is an active queue management scheme that aims to attain both high use and small loss and delay in a simple and scalable manner. The first idea of REM attempts to match user rates to network size while clearing buffers, regardless of number of users. The second idea implants the sum of link prices (congestion measures), summed over all the routers in the path of the user to the end-to-end marking (or dropping) possibility. Number of active flows shares a linear relationship with number of dissimilar flows in the buffer. Adaptive Virtual Queue (AVQ) is designed that results in low-loss, low-delay and high utilization operation at the link. AVQ algorithm upholds a virtual queue whose capacity is less than the actual capacity of the link. When a packet reaches in the real queue, the virtual queue is also updated to reflect the new packets in the real queue to replicate the new entrance. Packets in the real queue are marked/dropped using ECN mechanism when the virtual buffer overflows.

3. Literature Review

Muhammad Aamir et.al.[2013] make known to a new scheme of buffer management to handle packet queues in Mobile Ad hoc Networks (MANETs) for immobile and mobile nodes. In this scheme, try to achieve efficient queuing in the buffer of a centrally interactive MANET node through an active queue management strategy by assigning dynamic buffer space to all neighboring nodes in amount to the number of packets received from neighbors and hence controlling packet drop probabilities. the suggested algorithm is generated on the occurrence of a selected incident, the allocation is dynamically adjusted according to the rapid share of neighbors in the node's buffer and the gap between the occupied and allotted buffer space.

Iyyapillai Ambika et. al.[2014] his research proposes an effective queuing architecture, which supports both elastic and inelastic traffic. The packets of inflexible flows are always stored ahead of those of the elastic flows. If a link is critically loaded by the inflexible traffic, it results in large delays and elastic traffic may have some postponement restrictions that are no eligible. Based on PID mechanism, priority dropping active queue management algorithm (PID_PD) provides the illustrious service for the dissimilar layers or frames according to their priority. Simulation outcomes proved that the proposed design offers better fairness and delivery ratio with reduced postponement and drop.

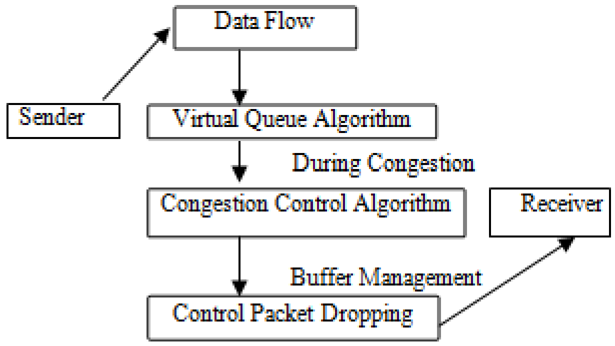
Mr. A. Chandra et. al. [2014] this paper completes an effort to present a queue management approach. However the method has outdone present queue management techniques RED and REM. Here choke packet mechanism is used to send the response to sender. It involves extra overhead to the traffic. Maintenance of virtual queue consumes additional buffer space. Reducing of the size of virtual queue can be carried in future.

Pham and Perreau et. al. [2003] have proposed a load-balancing mechanism that impulses the traffic farther from the center of the network, using a routing metric that takes into account a node's degree of importance, for both proactive and reactive routing protocols. Their method progresses the load distribution and significantly enhances the network performances in terms of average delay and dependability. Though this method use only single path routing, which may cause extra overhead under high node mobility due to frequent route breaks.

4. Proposed System

We propose a scheme of buffer management for packet queues in MANETs for immobile and mobile nodes. For a MANET node, the packet queue is maintained in such a way that an equal buffer space is assigned to each neighboring source and an allowable extension is also available to each neighbor to avoid any underutilization of resources. The apportionment is made in the buffer of a centrally communicating MANET node and it is created on number of packets received in the queue at node's buffer to utilize the buffer space efficiently without any takeover of some surrounding source. We consider a MANET model working on Ad hoc On demand Distance Vector (AODV) routing protocol. It is a responsive protocol in which sources get routes to destinations when they demand for the same. Nodes only recognize their neighbors through routing table entries and keep track of neighbors by exchanging HELLO packets periodically.

This research paper proposes a new scheme of buffer management to control congestion in MANET. We set a buffer from sender to receiver with an X(X is not defined yet) buffer limit. There are several neighboring nodes around that main buffer and every node have its own limit for placing no. of packets in it. When the packets are send from sender then firstly it goes to neighboring nodes and then one by one send to main buffer and from main buffer packets are send to destination. In this whole process, packets are not dropped or discarded. Every node will have its own sequence number so to avoid congestion.

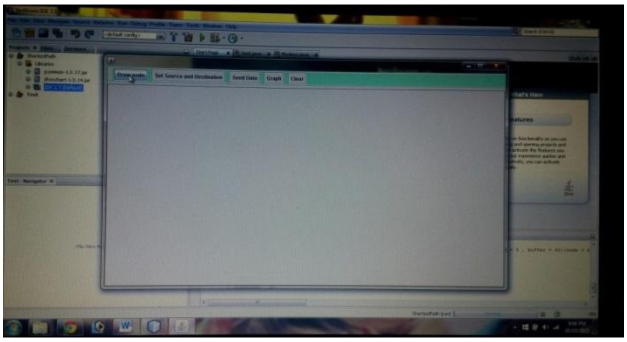


System Architecture

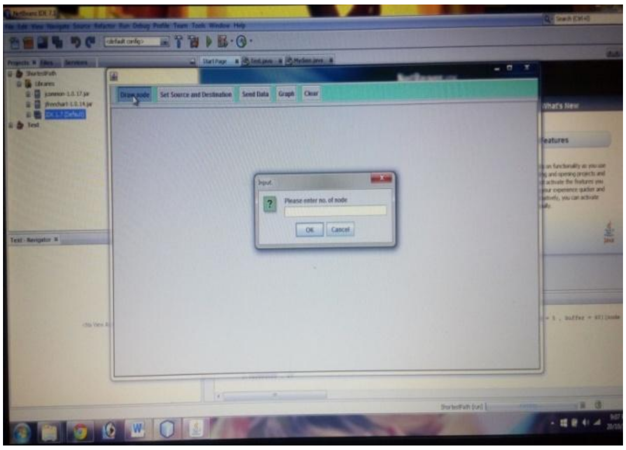
5. Result & Discussion

Screenshot 1 In the screenshot shown below, when we run the program then the first page open is shown below contains five points:

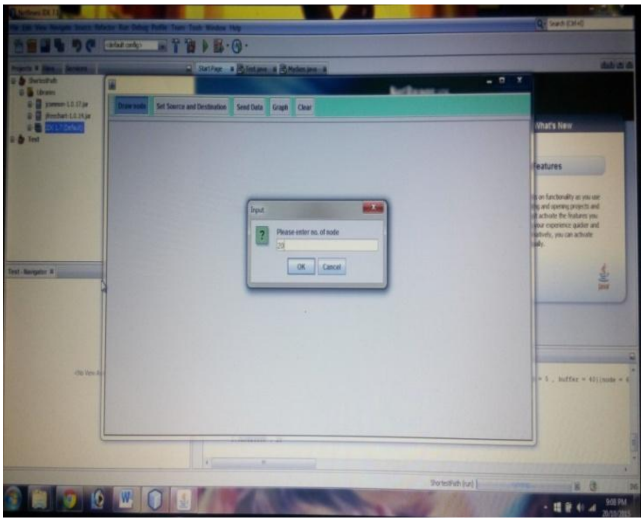
1. Draw Nodes
2. Set Source and Destination
3. Send Data
4. Graph
5. Clear


Screenshot 1

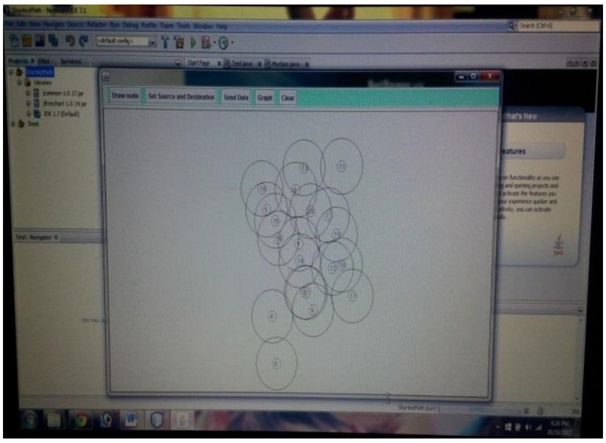
Screenshot 2 In the screenshot shown below, when we click on draw nodes option then a dialogue box get open which will ask for no. of nodes.


Screenshot 2

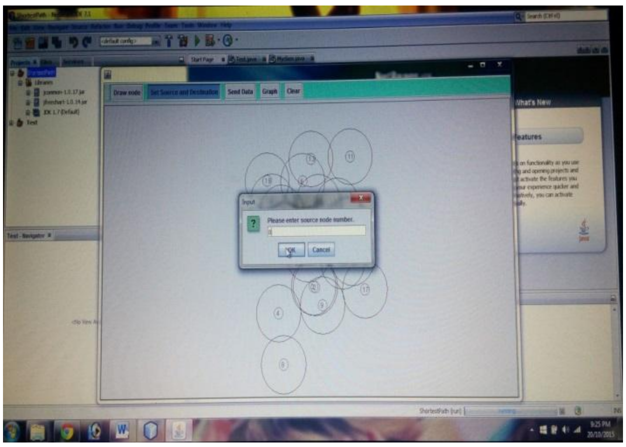
Screenshot 3 In the screenshot shown below, we enter no of nodes according to us. As here in this screenshot no of nodes entered are 20.


Screenshot 3

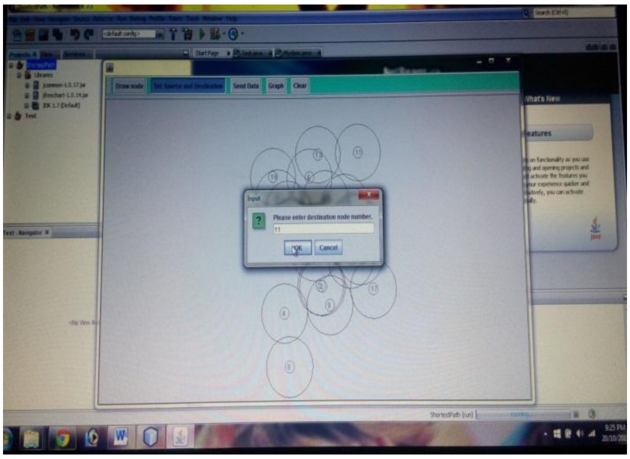
Screenshot 4 In the screenshot shown below, no of nodes entered is drawn.


Screenshot 4

Screenshot 5 In the screenshot shown below, source nodes are entered. Here in this screenshot source node entered is 8.

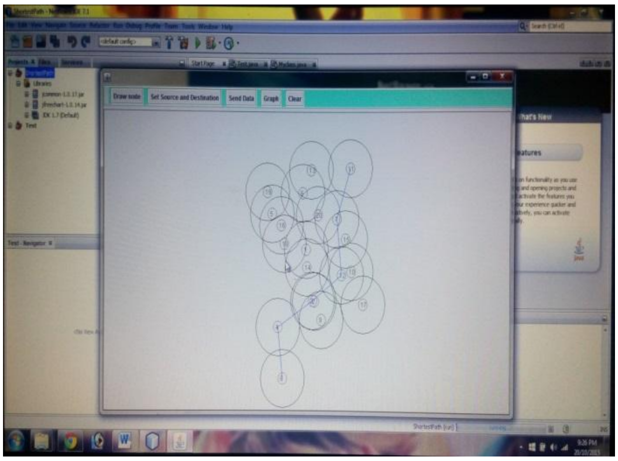

Screenshot 5

Screenshot 6 In the screenshot shown below, a destination node is entered. Here in this screenshot destination node entered is 11.



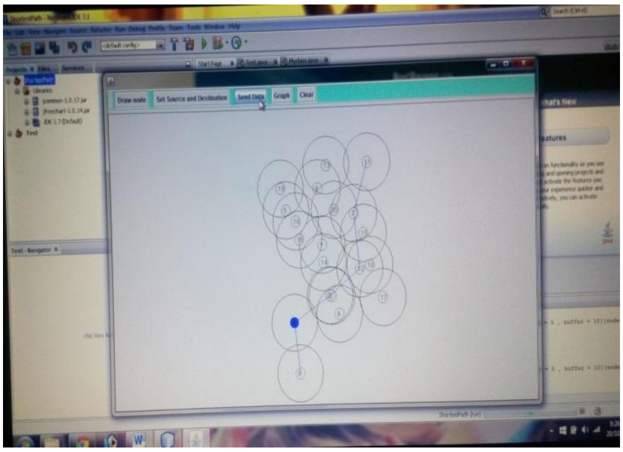
Screenshot 6

Screenshot 7 In the screenshot shown below, shortest path from source to destination is determined. Here in this screenshot the shortest path is 8, 4, 3, 2, 12, 7, 11.

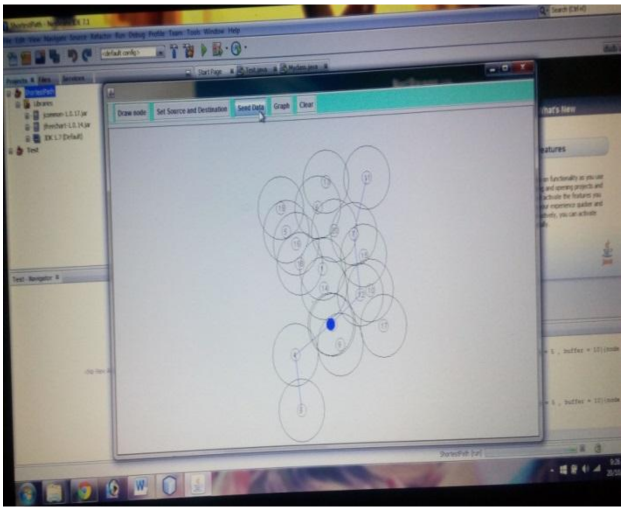


Screenshot 7

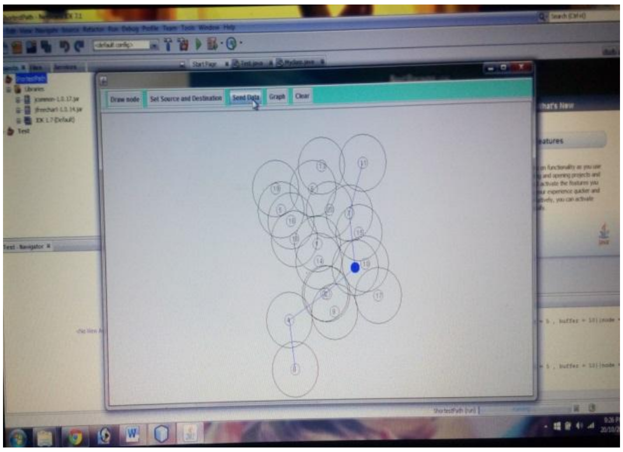
Screenshot 8, 9, 10, 11, 12 In the screenshot shown below, transfer of data node by node is shown. Firstly data transferred from source node 8 to node 4 then from node 4 to node 3 then from node 3 to node 2 then from node 2 to node 12 then from node 12 to node 7 then finally from node 7 to destination node 11.



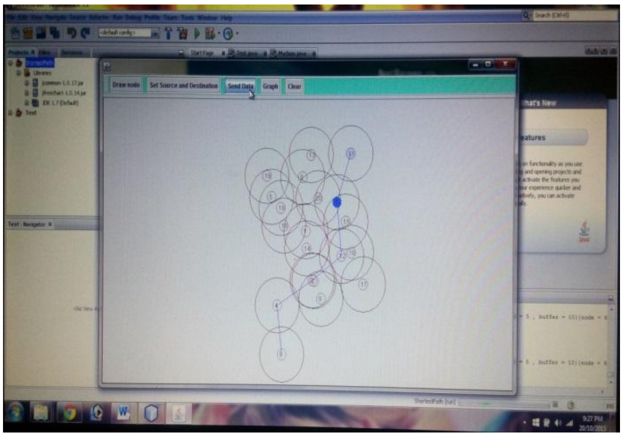
Screenshot 8



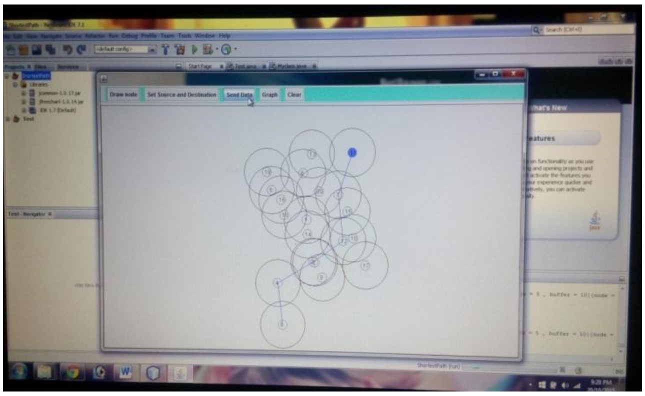
Screenshot 9



Screenshot 10

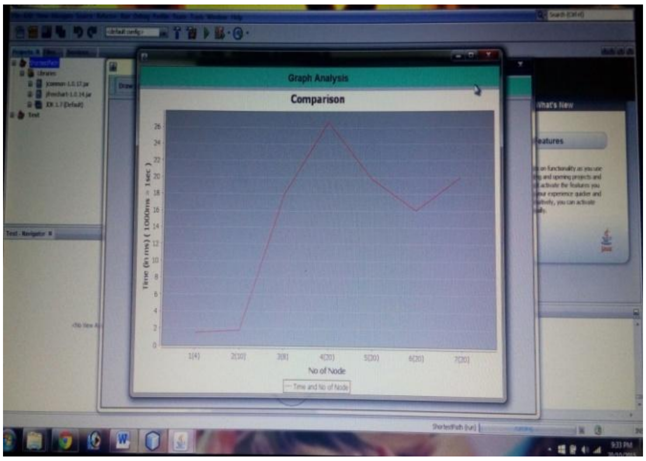


Screenshot 11



Screenshot 12

Screenshot 13 In the screenshot below, a comparison of time vs no of nodes graph is shown.



Screenshot 13

6. Conclusion

As well as also we presents an overview on congestion control algorithms. We can conclude that there is no single algorithm for congestion control in mobile ad hoc network. Nodes in MANET have limited bandwidth, buffer space, queue etc. So it is essential to distribute the traffic among the mobile nodes. In MANET, to improve the performance, it is very essential to balance the traffic congestion. Main objective of any congestion control algorithm is to balance the traffic to increase throughput of the network. Also it is possible to maximize nodes transfer, packet delivery ratio, and minimizes traffic congestion, end-to-end packet delay and network performance can be improved. In our future work we will propose multipath load balancing with queue scheme as well as acknowledgment delay difference base estimation technique, also find out number of data drop from the network with reason that work help to rectification of our work and minimize the congestion from the network.

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