

A Review Paper On - Analysis And Performance Evaluation For Congestion Control Routing Protocols In Manet

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Abstract- MANET is aggregation of wireless mobile nodes that can transmit in absence of main controller and do not have fixed configuration. MANET has dynamic nature due to which every node travel effortlessly in network. The multipaths has to be constructed in order to avoid and control congestion. In MANET, link collapse or node failure could be a reason for packet loss. There are many problems and outcomes in mobile ad-hoc network. Presence of many nodes transmitting packets simultaneously over network, the probability of mislaying packet over the network advances to a larger scope. Various congestion control techniques and algorithms has been discussed in this paper. The motive of the paper is to examine and contrast among many proposed techniques of congestion control in MANETs.

Keywords- MANET, CONGESTION, AODV ROUTING PROTOCOLS

I. INTRODUCTION

MANET is a branch of networking that deals with communication between two or more nodes without use of any external devices. MANET is a continuously self-configuring, infrastructure-less network of mobile devices connected wirelessly [1]. It is one of the types of ad-hoc network. Here ad-hoc means whenever there is need, devices establish the connection. MANET is collection of nodes, which are free to move in the wireless network. The nodes are responsible for forwarding the data or packets from source to destination. Each node performs the role of both host and router [2]. And thereby the topologies of network shift quickly and unpredictably which make it burdensome to map routes among various nodes. As mobile node has restricted capacity of transmission, these mostly interact using multi-hop delay. The multi-hop routing being challenged at parameters like finite wireless bandwidth, dynamic changes topology of network, high exposure to collapse, less device power [3].figure 1 shows the basic architecture of MANETs.

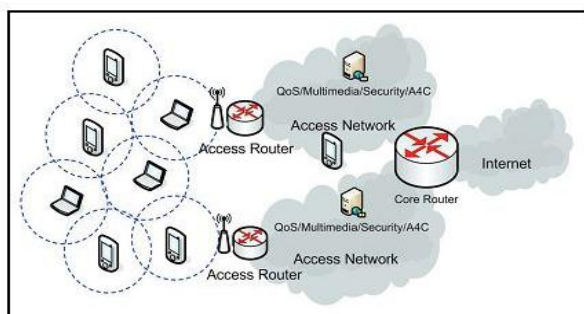


Fig 1: MANET Architecture

A. Routing Protocols

In response to these challenges, various routing algorithms of MANETs are proposed. The distinct dimensions for them to be categorized are: Pro-active against On-demand of routing or One path against multipath in routing[4].

In the **Pro-active**, routes linking each two nodes is established priory even when there is no transmission in demand. However this type of approach is not good for larger network. **On demand** routing protocols are much effective in a manner that path is found only when there is transmission and becomes free, when no transmission takes place.

There are wide variety of application of MANETs that includes military area, in short range communication, in emergency. Among various challenges in MANET namely dynamic topologies, limited power, multi caste routing, error in transmission, packet losses and congestion, our focus is on congestion.

1. Ad-Hoc On demand Distance Vector routing(AODV)
In this routes are requested only if source need to transfer data to desirable receiving node source them sends RREQ to its neighbor nodes. When intermediary node receive RREQ, routing table attach information of routing. If table has entry before, router will compare sequence number hop count with surviving information in table. Once destined receives RREQ its sends routing reply packet (RREP) only to source node, also update routing table of intermediary node. Thereby, AODV make the routing path.

2. Dynamic Source Routing(DSR)

Here source node send routing information and then store it in cache route of each node. Whenever any data is to be send on destination node, source node examine the cache route for destination route. And if no valid route is there, source node initiate route discovery procedure by relaying route request packets. If source node which has valid route to destined node will be receiving these RREQ then the node from source to destination is accepted.

3. CA-AODV(congestion adaptive AODV)

It is intended to make sure that the primary and alternatives routes are accessible and the routing overhead can be controlled. If on the primary route congestion occurs between source and destination's node, previous node will be alerted by concerned node. Previous node make use of non-congested alternative path to reach destination node.

4. CARP(Congestion Adaptive Routing Protocol)

It is unicast on demand routing protocol for MANETs. It attempts to avoid occurring routing congestion at first place. Every appearing node on route notify its previous node when it is likely to congest. So it uses additional paths namely bypass paths which bypasses the congested node. This decreases packet delay. Also it attempts to lessen the protocol overhead by splitting the traffic over bypass. Hence it adaptively reacts to congestion in network.

B. CONGESTION CONTROL

Congestion comes in network when link or node carry data in huge amount which deteriorate the service quality of network [5]. Congestion can come into play because of many causes such as when traffic rate input overshoot capacity of output line, because of slow processors, limited space in buffer of router and sometimes because of slow links. In MANETs one cannot deduce that how many no. of node will lead to congestion [6, 7]. If the routing protocol of MANET is not aware of congestion then following issues may happen:

1. **Long Delay:** It complicate the procedure in detecting congestion. Whenever there is severe congestion, it is proposed to choose an alternate different path. However the succeeding routing protocol-on demand detains routs search procedure.
2. **High overhead:** Much communication attempts and processing is needed to find new route. It requires extra effort to sustain multi path despite of presence of different route if use of multi path routing is employed.
3. **Numerous packet losses:** It occurs when sender's sending rate overwhelms the receiver's receiving rate. Also when intermediate nodes are congested, then chances of packet losses increases manifold.

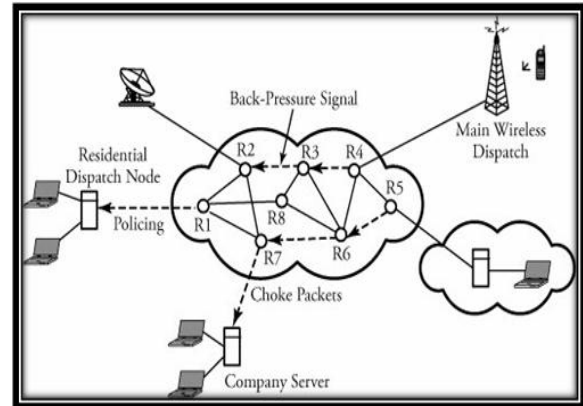


Fig 2: Congestion in Network

Because of dynamic nature [4] of topology, congestion control is difficult work in MANET. Congestion control technique can be stated as the means through which bandwidth of network is disseminated among many end to end links. Congestion control mechanism makes sure that only those no of packets are sent on wireless channel which can be carried to final receiving node by the sending node. The foremost aim of congestion controlling algorithm is to balance traffic so that network's throughput can be increased. It is also feasible to increase node transfer, ratio of packet delivery and decrease traffic congestion so that performance of network could be improved.

II. RELATED WORK

In [8], the authors have proposed a new routing protocol namely Congestion Routing Protocol (CRP) is presented which is congestion adaptive and unicast protocol of routing in MANETs. The CRP uses a bypass routing concept in which every coming node in the path notify its foregoing node, when path is getting to congest. It thus splits the traffic into two routs namely the bypass path and primary path. The various technical issues as discovery of primary route, discovery of bypass minimization to multi path, recovery from failure etc has been enumerated. Queuing delay time has lessened as the CRP has made the less congestion in network. Also the NS-2 simulator has verified the superiority of CRP and indicated a remarkable routing and energy effective refinement higher than AODV and DSR. In [9], the authors presents a fair amount of technique for controlling congestion and measures are presented to get control of it prior to its development or following its existence. With the help of this survey, paper recommended a measure of congestion control namely RFR (Resource Free Ratio) that has examined some principal specifications to impart congestion free path recovery. It has been proposed in the paper that accessible congestion control means and metrics is not abundant and does not minimize packet loss to a considerable level. Further the outcome of selection of

node has been presented on the basis calculation of fuzzy logic using the suggested metric.

In [10], authors have propose a cross layered form clog controlling method to dispose of issue of blockage which occur in MAC, transport of layer of MANET. Introduced system connected on Ad-Hoc On Demand Muti Path Reliable Aware QoS ROUTING PROTCOL (AOMP-REQR). The methodology of Additive Increase, Multiplicative Decrease(AIMD) are apply in rate dependent on clog controlling in transport layer convention. Results of simulation have proved that the presented approach has achieved reduced delay and lesser no of packet drops.

In [11] authors proposed a Modified Ad-hoc Transmission Protocol(M-ADTCP) mechanism in which receiver perceives the predictable status of the current network and sends this knowledge to the sender as a response. The behavior of sender changes accordingly. This paper have shown that presented metrics namely IDD(Inter Delay Differences) short term throughput have allowed to suppress the noise in studied data enhance decreasing occurrence of false congestion recognition. Simulation are also done using NS-2 version and the inferences to consistency in throughput.

In[12] authors relates differing congestion control in MANET which works to contribute free congestion in addition to congestion prevention technique. In this paper, multi path routing, load aware mechanism are discussed to reduce data drop. This paper proposes control on congestion utilizing dynamic queue management mechanism. It uses route finding procedure and recognizes every accessible node-disjoint path by making use of single flooding RREQ (Route Request) information. This lowers routing overhead generated by path discovery thereby enhancing the capacity of the network.

In [13] authors have proposed a recent mechanism called load balancing in MANETs. The noval technique is fundamental yet very productive to attain load balanced, congestion reduction. This allows every node to progress RREQ in selective manner acc to status of load in node. Burdened nodes could be eliminated from demanding path from particular time period. Every node provide extra traffic flow until not overloaded. Noval scheme employs interface queue occupancy, workload to have control on RREQ adjustably. Every node keep threshold value, i.e., decision criteria how to respond of RREQ message. Threshold value in node is modified firmly depending on status in load of node depending on queue occupant and work load in particular period. Simulation have proved that packet latency has declined notably. Also the throughput of network has boosted than those of base protocols.

In [14] authors have shown concerned with congestion control and MANET using AODV routing protocol. This

principal idea is to make sure that system executes rated capacity even in situation of overload. Traffic overcrowding has been described an important matter. Data rate of arriving traffic should be critically lowered so as to avoid origination of queue. Also the traffic between mobile node needs to be disseminated so as to enhance the throughput of network and its performance simulation of various parameter has been done using MATLAB tool box.

In [15] a new and unique controlling mechanism, namely Congestion Control AODV (CC-AODV) has been presented by the authors. In this protocol path for data is found by maintaining a table of congestion counter. Also the comparison among AODV and CC-AODV has been done, simulated using NS-3 simulator. Later it has been shown that by the help of congestion counter, the throughput of network has been strengthened by helping in reducing the number of busy nodes in the network. However this has increased the overhead.

[In [16] authors have presented the critical issue in MANETs that is controlling congestion by keeping the traffic under the network's capacity. Numerous approaches has been studied in brief. By keeping different parameters of the network in MANET, performance of every approach differs correspondingly.

In [17] authors have reviewed many problems and various mechanism for video streaming on MANET. For this multi path routing protocol has been accessed so as to upgrade quality of service(QOS) in multimedia application of real time. Inferences show that M-AODV achieve finer in regard with network and throughput with high mobility MDSDV. But for larger network MDSDV is effective in regard with network load, loss rate. Finely it is concluded that multi path routing in combination with techniques of coding present effective way to bear video trafficking over MANET with suitable QOS.

In [18] author explains architecture of MANET its attributes, benefits, difficulties, threats, security attacks for systematic and successful communication among nodes taking part in dynamically established network in nodes. Also this paper presents a short interpretation on unicast routing protocols and how each of them is superior over other routing protocols.

In [19] the author described that wireless nodes intercommunicate with one another in MANET. However there are restricted resources in network with regard to bandwidth which lead to high probability of blockage. To prevent this, many techniques has discussed here along with their advantages and disadvantages. So every technique is associated with different overheads like extra load and less throughput.

Table: Comparison among various Congestion Control Techniques

Author	Paper name	Technique used
[8] D. A. Tran	Congestion Adaptive Routing in Mobile Ad Hoc Networks	Congestion Routing Protocol (CRP)
[10]V. Thilgavathe	Cross Layer based Congestion Control Technique for Reliable and Energy Aware Routing in MANET	Cross-Layer based Congestion control
[11]Sreenivas B.C.	M-ADTCP: An Approach for Congestion Control in MANET	M-ADTCP
[12]Hitesh Gupta	Survey of Routing Base Congestion Control Techniques under MANET	Congestion control by Queue Based Approach[6] and Mulipath routing Under MANET
[13]Young J Lee	A Workload-Based Adaptive Load-Balancing Technique for Mobile Ad Hoc Networks	Load Balancing Technique
[15]Yefa Mai	CC-ADOV: An Effective Multiple Paths Congestion Control AODV	CC-AODV

[17]M. Sedrati	Multipath Routing to Improve Quality of Service for Video Streaming Over Mobile Ad Hoc Networks	Multipath Routing in combination with coding technique
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III. Performance of AODV protocol

MANET being of dynamic in nature having no centralized controller and hence each node operates on an interim basis. Therefore we cannot presume about the real destination node and the path which the node follows. Intermittently it could occur that the full data or some part of it do not reach destination at proper time. Due to blockage or some other problems over the network, it has left somewhere in the network. So we desire such a technique which could transmit the packets over different paths through which if any of packet has dropped at some hop, it would nowise make penalty at destination whenever assembled because it would have then followed other hops in the network to yield a congestion free communication.

IV. Conclusion

In this paper we presented a brief overview on various congestion controlling techniques and algorithms in MANETs. Also we have discussed various problems that occur mostly in ad-hoc networks like MANETs. Study of TCP Congestion control protocols AODV and DSR has been studied. In future we will try to establish a network based on MANET and simulations will be done using NetSim simulator. Comparison and performance evaluation on various parameters will be studied using new congestion control techniques.

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