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Novel Technique for Packet Marking For Multiple Services with Queue Management Technique



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Abstract:
With the fast growth of current internet and service demand for multiple access has also been increased significantly. Therefore, there is huge traffic in the network which results in congestion where buffer management acts an important role. Earlier, drop tail and random drop were used as buffer management techniques with the TCP. Drop tail suffers from huge queuing delay, lockout, global synchronization problem. To overcome all these problems with earlier techniques active queue management(AQM) technique has been introduced. In active queue discipline packets are dropped or marked before buffer becomes full while in earlier technique does the same when buffer becomes full. We have various algorithms under the AQM as Random early detection(RED), Random Exponential Marking (REM), Blue and Stochastic Fair Blue (SFB), ARED, Re RED, PI controller, Robust random early detection (RRED), RED with Preferential Dropping (RED-PD) etc. In this paper, we will perform the literature survey on the queue management and congestion control in the network

Keywords:
Queue Management (QM), Active Queue Management (AQM), RED, REM, Queue Length.

1.Introduction:
Transmission control protocol (TCP), is mostly used protocol in current communication network and also over the internet, also controls the rate of transmission from the sender node across the network with end to end feedback, through inferred packet. With the exponential growth of users and accessing of the network, the data traffic is more and more, which results in congestion, the existing congestion control mechanism based on Jacobson [1] and its variants like Tahoe, Reno, New Reno etc. have become ineffective. Congestion occurs in the network, When the link bandwidth becomes larger than the capacity of router, this causes delay and subsequently packet drop occurs. Drop Tel starts dropping of packet when the buffer is full, with the multiple TCP flow it causes global synchronization problem [2]. Newer technique for congestion control and avoidance required. So, in order to overcome this problem active queue management (AQM) [3] has been designed which notifies about the initiatory congestion proactively to the terminals. Active queue management (AQM) is mainly a technique based on router which is used to magnify the performance of TCP. Active queue management (AQM) is an effective congestion control mechanism that controls the queue size to ensure the high throughput, so that we can achieve effective congestion control and can get the quality of service(QoS).

Earlier AQM based technology for congestion control relies on classical control principle like Random Early Detection(RED) [4,5], proportional derivative (PD) control, proportional integral (PI), proportional integral derivative (PID) [6]. With the limitation of classical principles, the congestion control is not that much satisfied. To get better control, the modern control principles has been designed rapidly and many more methodology to control the congestion has been proposed like adaptive network congestion control [7,8], predictive congestion control [9], robust congestion control [10] etc. In these methods state feedback mechanism, has been introduced to improve the performance of the network. Random Exponential Marking is a newly designed active queue management scheme have two main feature; first, Match rate clear buffer; it matches the user rates with network capacity regardless of the users count, while clearing buffer.

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Another, in REM, the marking probability between end to end system observed depends on sum of link congestion measures i.e. prices, in a simple and precise manner, termed as sum prices. This feature is required in that network where multiple congested links are followed by the users.

2.Related Work:

Literature survey from various researcher related to queue management, AQM, congestion control and avoidance can be presented as:

• S. Floyd and V. Jacobson. [4] first proposed that Random Early Detection gateways, are an effective mechanism for congestion avoidance at the gateway, in cooperation with network transport protocols. The gateway detects incipient congestion by computing the average queue size.

• Jacobson [1] proposed gateways to monitor the average queue size to detect incipient congestion, and to randomly drop packets when congestion is detected. These proposed gateways are a precursor to the Early Random Drop gateways that have been studied by several authors. RED gateways differ from the earlier Early Random Drop gateways in several respects: the average queue size is measured; the gateway is not limited to dropping packets; and the packet-marking probability is a function of the average queue size.

• Hashem [15] discusses some of the shortcomings of Random Drop and Drop Tail gateways, and briefly investigates Early Random Drop gateways. In the implementation of Early Random Drop gateways in, if the queue length exceeds a certain drop level, then the gateway drops each packet arriving at the gateway with a fixed drop probability. Hashem stresses that in future implementations the drop level and the drop probability should be adjusted dynamically, depending on network traffic.

• Ramakrishnan, K.K., and Jain, Raj [16] proposed DECbit scheme, a binary feedback scheme, the gateway uses a congestion indication bit in packet headers to provide feedback about congestion in the network. When a packet arrives at the gateway, the gateway calculates the average queue length for the last (busy + idle) period plus the current busy period. (The gateway is busy when it is transmitting packets, and idle otherwise.)

• Sally Floyd, Ramakrishna Gummadi, and Scott Shenker [17] solved the problem with minimal changes to the overall RED algorithm. To do so, they revisit the Adaptive RED proposal of Feng et al. They made several algorithmic modifications to fleg proposal, while leaving the basic idea intact. They found that the revised version of Adaptive RED, which can be implemented as a simple extension within RED routers, removes the sensitivity to parameters that affect RED‟s performance and can reliably achieve a specified target average queue length in a wide variety of traffic scenarios.

• Santosh M Nejakar et al. [18] proposed a simple modification to the RED AQM algorithm in order to account for the presence of both input and output queues in the switch. The weighted sum of input and output queue lengths are specifically used as the congestion measure instead of just the output queue length. The average backlog in the switch is significantly reduced in the low speedup region by using our modified algorithm as compared to RED without this modification Mahmoud et al [19],

Proposed a controller technique for early stage congestion detection at the router buffer in the networks. The proposed technique extends the well-known Gentle Random Early Detection (GRED) algorithm. The proposed technique uses the average queue length and the delay rate as input linguistic variables for a fuzzy logic system. The utilized fuzzy logic system produces a single output that represents a packet dropping probability, which in turn control and prevent congestion in early stage.

• S. Athuraliya et al. [14] proposed REM for wired and wireless networks, and targets both a desired queue size and high link utilization. There are two extreme asymptotic regimes for sizing router buffers: the currently deployed bandwidth-delay rule, and a small buffer regime.

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Table 1: Literature Survey

Sr. No.	Title	Author and year	Technique used	Advantages	Disadvantages
1.	ActiveTrust: Secure and Trustable Routing in Wireless Sensor Networks [1]	Yuxin Liu, Mianxiong Dong, Anfeng Liu (2016)	Authors have proposed active detection-based security and trust routing technique for wireless sensor network called as ActiveTrust. In this, numbers of detection routes are actively created to immediately detect and calculate nodes trust values in order to enhance the data packet route security.	Allows energy efficient, reliable and Secure routing of data.	Trust evaluation and hence routing efficiency can be Improved.

3.Conclusion:

The study and research of queue management continues to be an active area for the researchers. The most asked question in queue management is about the buffer size and in particular likelihood of networks with small buffer length, now gives us a new stage among which queue management strategy could be assessed. In this survey paper, we have studied about the active queue management techniques and their many variants. First, I surveyed the earlier queue management techniques such as Drop Tel, Random Drop. Then, I came to the active queue management techniques such as RED, REM, ARED, Re-ARED, GRED, NLRED, PI mechanism. Many study and experimental results show that RED gives better performance in comparison with other techniques such as REM, PI, Drop Tel, Random Drop because it maintains stable queue size. Also, RED achieve higher throughput, low delay and have more stability than other techniques. RED is having many variants, out of which NLRED gives better performance with respect to queue size and average throughput.

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