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Fair Bandwidth Allocation for Responsive and Unresponsive flows using Approximate Fairness Dropping Scheme*

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Abstract: In this paper, based on Equivalent Active Flow, we propose a novel technique called Approximate Fairness Dropping, which is able to achieve approximate fairness by containing misbehaved flows' access queue opportunity with low time/space complexity. Unlike most of the existing Active Queue Management schemes (e.g., RED, BLUE, CHOKE), Approximate Fairness Dropping does not drop the packets whose arriving rate is within the maximum admitted rate, so it protects the well-behaved flows against misbehaved ones, moreover, improves the throughput and decreases the queuing delay. Our simulation and analysis demonstrate that this new technique outperforms the existing schemes and closely approximates the "ideal" case, where full state information is needed.
Keywords: Approximate Fairness Dropping, Equivalent Active Flow, congestion control, Active Queue Management, fairness

1. INTRODUCTION

Traditional buffer management schemes such as [2-4] are mainly designed for the early TCP-dominated Internet. Simulations and Experiments [8] show that the performance of, in particular, fairness among TCP-UDP flows is degraded sharply with the proportion of UDP traffic increasing. Some scholars have been aware of this problem; thus other AQM schemes [5-7] have been brought forward since 2000. However, so far these proposed schemes have not been deployed in routers because of scalability, and/or complexity problems. In this paper, we propose a novel technique called Approximate Fairness Dropping (AFD) that can effectively protect the well-behaved flows against misbehaved ones, improve the throughput and decrease the queuing delay. Importantly, AFD possesses high scalability and low complexity.

The rest of paper is organized as follows. In Section II, we describe ideal dropping and introduce the conception of Equivalent Active Flow (*EAF*) that is a base of AFD, and Section III discusses AFD algorithm in detail. In Section IV, we compare the performance of AFD

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