

## **Size-based and direction-based TCP fairness issues in IEEE 802.11 WLANs.**

### **ABSTRACT**

Cross-layer interaction of Distributed Coordination Function (DCF) of 802.11 MAC protocol and TCP transport protocol leads to two types of unfairness. In a mixed traffic scenario, short-lived TCP flows suffer from poor performance compare to the aggressive long-lived flows. Since the main source of Internet traffic is small file web transfers, this issue forms a major challenge in current WLANs which is called size-based unfairness. In addition, when sharing an access point bottleneck queue, upstream flows impede the performance of downstream flows resulting in direction-based unfairness. Proposed solutions in literature mostly rely on size-based scheduling policies. However each proposed method is able to solve any of these two mentioned aspects, none of them can provide both size-based and direction-based fairness in a unique solution. In this paper, we propose a novel queue management policy called Threshold-based Least Attained Service-Selective Acknowledgment Filtering (TLAS-SAF). We show analytically and by simulation that TLAS-SAF is capable of providing both direction-based and size-based fairness and can be taken into account as a unique solution to be applied at access point buffers.

**Keyword:** TCP protocol; QoS; Fairness; IEEE 802.11; WLAN.