International J. of Engg. Research & Indu. Appls. (IJERIA).
ISSN 0974-1518, Vol.2, No.I (2009), pp 199-210

ENHANCED CORE STATELESS FAIR QUEUING ALGORITHM FOR PACKET-SWITCHING NETWORKS

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Abstract

Router mechanisms designed to achieve fair bandwidth allocations, like Fair Queuing, have many desirable properties for congestion control in the Internet. However, such mechanisms usually need to maintain state, manage buffers, and/or perform packet scheduling on a per flow basis, and this complexity may prevent them from being cost-effectively implemented and widely deployed. In this paper, we propose an architecture that significantly reduces this implementation complexity yet still achieves approximately fair bandwidth allocations. We apply this approach to an island of routers - that is, a contiguous region of the network and we distinguish between edge routers and core routers. Edge routers maintain per flow state; they estimate the incoming rate of each flow and insert a label into each packet header based on this estimate. Core routers maintain no per flow state; they use FIFO packet scheduling augmented by a probabilistic dropping algorithm that uses the packet labels and an estimate of the aggregate traffic at the router. We call the scheme Enhanced Core-Stateless Fair Queuing (ECSFQ). We present simulations and analysis on the performance of this approach, and discuss an alternate approach.

Keywords: Transmission latency, Core-Stateless Fair Queuing (CSFQ), ECSFQ, Data traffic control.