MP-DSM: A Distributed Cross Layer Network Control Protocol

D. O'Neill, L. Yan, and S. Boyd

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We present a distributed cross layer approach to controlling the network performance under various QoS requirements in interference limited systems. The interaction between the different layers of the OSI protocol stack requires a cross layer approach in order to optimally allocate the resources of the network. The message passing direct step method presented here is an adaptive and distributed algorithm that achieves maximum network performance. Using the forward and backwards networks, this algorithm finds the left and right Perron Frobenius eigenvectors for the system and automatically adjusts the operating point of the system (data rates, link rates and transmitter powers) to their optimal values while satisfying QoS constraints. The approach is developed and simulated using the TCP Reno.