Earl Davis, "Analyzing Selfish Congestion Control in a Greedy Network"

Abstract

Consider a scenario in which network end-points behave in a selfish manner, trying to maximize their own throughput. The project relies on ns2 network simulations to show the stability or instability of greedy end-point behaviors through the analysis of TCP flows via a simple bottleneck network. Each flow modifies its actions to maximize their own throughput by modifying the congestion control behavior. This study examines the effects of network stability during the process of greedy end-points and attempts to answer two questions. First, what happens when only a small fraction of TCP flows behave in a greedy manner and the rest behave in the socially optimal manner? Does this improve the efficiency of the network at the Nash Equilibrium? Second, what happens when selfish flows employ different variants of TCP when trying to behave in a greedy manner? Results of the TCP Reno model show that greediness manifests with dropped packets. In fact, the actions of one node becoming greedy does not have a severe penalty cost in terms of dropped packets. However, if more nodes become greedy, there is a severe cost in the number of dropped packets.