Cover Letter

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We make two new contributions in this submission beyond the contributions in the conference version of the paper.

First, we design and evaluate a traffic engineering (TE) scheme that optimizes average latency for ISP traffic. All other schemes that we consider in the paper optimize link utilization based metrics. We find that this latency-optimizing TE scheme performs nearly the same as other link-utilization-optimizing TE schemes on two application performance metrics: TCP throughput, and VoIP call quality. This result strengthens our finding that all TE schemes (including a latency-optimizing TE scheme) result in almost identical user-perceived application performance.

Second, we empirically analyze the effect of *least latency adaptation*, in which each user downloads a content from the closest replica, on the network capacity to tolerate traffic demand surges. Least latency adaptation models the adaptation technique used by CDNs such as Akamai, while our earlier experiments, in which each user downloads a content from all content replicas in parallel, model the adaptation technique used by peer to peer applications such as BitTorrent. Our results from least latency adaptation further support our conclusion that application adaptation to location diversity blurs differences between TE schemes. However, least latency adaptation, which is unresponsive to network congestion, fails to improve network capacity when the number of content replicas is increased. This result suggests that an adaptation scheme must be responsive to network congestion to leverage location diversity and increase the network's tolerance to traffic demand surges.