A Performance Study of QoS Architectures for MPLS Network

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Abstract

Supporting real-time applications e.g. voice and video, in IP networks has proven to be a challenging task. This is because of the strict communication requirements that are imposed by traffic generated by such applications in terms of, e.g., delay, jitter, packet loss and bandwidth. In an effort to meet these requirements, many research studies have suggested using Multiprotocol Label Switching (MPLS) to ensure Quality of Service (QoS) in IP networks. This project uses OPNET simulations to evaluate the performance of some well-known QoS architectures that have been suggested for achieving QoS in MPLS-enabled IP networks. Several link scheduling techniques have been considered in this research including FIFO, priority and weighted fair queuing. Three QoS levels have been set for the different types of traffic with the voice having the highest priority. Numerous simulation experiments have been conducted in order to evaluate the performance of the different QoS architectures for MPLS networks including DiffServ over MPLS-TE and MPLS DiffServ-aware TE under various network setups and operating traffic conditions. Our simulation results reveal that in the presence of heavy congestion DiffServ over MPLS-TE with WFQ is able to provide better QoS guarantees for real-time traffic than MPLS DiffServ-aware TE. Moreover, assigning higher priorities to voice and video traffic enables these to have an acceptable end-to-end delay and jitter in both DiffServ over MPLS-TE and MPLS DiffServ-aware TE.