

Multicast Instant Channel Change (ICC) in IPTV Systems

by

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ABSTRACT

IPTV delivers television content over an IP infrastructure with the potential to enrich the viewing experience of users. From an engineering perspective, IPTV places both significant steady state and transient demands on bandwidth while delivering superior user experience. Normal internet streaming techniques incur delays for play-out buffering; but when viewers switch or surf channels, it is important to minimize the user-perceived latency. Traditional Instant Channel Change (ICC) techniques reduce this latency by having a separate unicast assist channel for every user changing channels. We propose a multicast-based approach using a secondary base-quality "channel change stream" corresponding to each channel. During channel change events, the user does a quick multicast join to this new stream and has very low display latency. In the background, once the play-out buffer of the new full-quality multicast stream is filled, the transition to the new channel will be complete. We show that this approach has several performance benefits including lower bandwidth consumption even during flash crowds of channel changes, lower display latency (50% lower), and lower variability of network & server load. The tradeoff is a base-quality picture during the play-out buffering period. Our results are based upon both synthetic channel change arrival patterns as well as traces collected from an operational IPTV environment.