

## Constructing a locality-aware ISP-friendly peer-to-peer live streaming architecture

Mohammad Zakaria Masoud, Xiaojun Hei, Wenqing Cheng

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**Abstract-** Recently peer-to-peer (P2P) live streaming has become a promising approach for delivering videos on massive scale on the Internet. The popularity of various P2P streaming systems have now driven Internet Service Providers (ISPs) to carry huge intra/inter-domain video traffic. To reduce costs, ISPs have attempted to deploy traffic shaping measures while P2P streaming systems have attempted to apply escape strategies to avoid the rate-throttling punishment. Nevertheless, the emerging cooperation between ISPs and P2P systems may bring forth benefits for both parties by constructing a locality-aware ISP-friendly P2P live streaming architecture. Lacking of incentive, however, makes collaboration difficult if not impossible. Therefore, we propose a new collaboration-enhanced live streaming architecture (CELS) to encourage cooperation between ISPs and P2P streaming systems. Within this architecture, ISPs contribute amplifiers to reinforce the bandwidth provisioning for streaming channels. Reciprocally, peers cooperatively provide their locality information to ISPs. ISPs then use this information to assist peers to select appropriate neighbors which can reduce intra/inter-domain traffic load. This architecture utilizes the locality information in a three-tier hierarchy: AS, PoP and IP blocks, to reduce inter/intra-domain traffic. We conducted a simulation study to evaluate the performance of the proposed CELS architecture. We implemented a push-pull live streaming protocol, CoolStreaming+ and the CELS architecture in ns2. Our simulation experiments demonstrate that CELS reduces inter-domain traffic but maintains satisfied streaming performance of the CoolStreaming+ system. Our study may provide some insights into the design trade-off for exploring the full potentials of the ISP-P2P cooperation.