

Enabling Bandwidth Adaptation in Streaming Overlays

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Abstract:

A major challenge for real-time streaming overlays is to distribute high bit-rate streams with uninterrupted playback. Hosts usually have sufficient inbound bandwidth to support streaming, but due to asymmetric links the performance bottleneck is the aggregate, overlay-wide outbound bandwidth; if this is less than that required to forward the stream to the overlay members then a large number of users potentially experience poor playback. In addition, aggregate outbound bandwidth varies over time due to node churn and competing traffic flows on links. Successfully deployed overlays usually rely on either dedicated infrastructure or the goodwill of universities to provide extra outbound bandwidth to compensate. However, infrastructure is expensive and universities are increasingly blocking this traffic.

In this talk, I will describe GateKeeper, a decentralized generic infrastructure, which monitors and profiles per-host bandwidth information, and aggregates and distributes histograms containing this information to the members of the overlay. Overlay maintenance algorithms can be extended to implement policies that allow the overlay to adapt using the bandwidth information. I will describe four such policies: local child management, admission control, stream bit-rate selection, and dynamic contribution control. Experimental results using a large-scale emulation testbed with realistic broadband link characteristics demonstrate that GateKeeper performs well.

Short Bio:

Dejan Kostic obtained his Ph.D. in Computer Science at the Duke University, under Amin Vahdat. He spent the last two years of his studies and a brief stay as a postdoctoral scholar at the University of California, San Diego. He received his Master of Science degree in Computer Science from the University of Texas at Dallas, and his Bachelor of Science degree in Computer Engineering and Information Technology from the University of Belgrade (ETF), Serbia. In January 2006, he started as a tenure-track assistant professor at the School of Computer and Communications Sciences at EPFL (Ecole Polytechnique Fédérale de Lausanne), Switzerland. His interests include Distributed Systems (Peer to Peer Computing, Overlay Networks), Computer Networks, Operating Systems, and Mobile Computing.