

Demonstration of the CompactPSH Incentive Scheme in a Peer-to-Peer Streaming Application

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Abstract—This demo shows the CompactPSH incentive scheme integrated in LiveShift. LiveShift is a peer-to-peer video streaming application, which supports both live streaming and video-on-demand. Peers participate in a distributed storage, which adds the ability to replay time-shifted streams from other peers in a distributed manner. The incentive scheme is in place to encourage peers to provide stored video data. CompactPSH allows peers to establish direct and indirect reciprocity to determine the contribution of peers. Thus, non-cooperative peers get a lower video quality than cooperative peers.

I. INTRODUCTION

Incentives are needed in P2P systems to encourage peers to share resources [1]. Current incentive mechanisms based on tit-for-tat (TFT) *e.g.*, BitTorrent [2], do not work with asymmetric interest. TFT-based incentive schemes require both peers to be interested in what one another offers to make the transaction possible. CompactPSH [3] ensures that peers that forward streams to other peers have a higher chance of receiving high-quality video streams from other peers if there is asymmetry of interest. CompactPSH finds transitive paths with at most one intermediate peer using Bloom filters [4]. CompactPSH has been shown to perform better than TFT in scenarios similar to peer-to-peer video streaming [3].

II. DEMO SETUP

In this demo, we setup four machines to run LiveShift. The source peer has a webcam showing the demo room and additional sources can be setup using local files or a video capture adapter. The remaining three machines watch the live stream or a time-shifted version. Since the source peer has limited bandwidth, the other peers need to exchange video streams among themselves.

Using the LiveShift application, users choose whether to enable the CompactPSH incentive scheme or not. With CompactPSH enabled, all transactions are accounted for in a history and are used to determine the video streaming quality. If no incentive scheme is used, then all peers including free-riders would receive the same video quality. Furthermore, a button to turn a peer into a free-rider is available as well. The basic idea is to present the following scenarios and expected results:

- In the first scenario, no incentives are used and at the beginning, there are no free-riders. Then, one peer will

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turn into a free-rider and the expected result is that all three peers will see the same quality of the video stream.

- In the second scenario, the CompactPSH incentive scheme is used and there are no free-riders at the beginning. Then, one peer will turn into a free-rider and the expected result is that the free-riding peer will see a lower quality. Changing channels or time-shifting should not affect the video quality received by that peer.

In order to visualize the quality of a video stream, a graph with received segments and the bandwidth is shown, as the difference between low and high quality is not always clearly noticeable. A screenshot of the current LiveShift application is shown in Figure 1. It shows the practicability of CompactPSH besides the file-sharing application presented in [3].

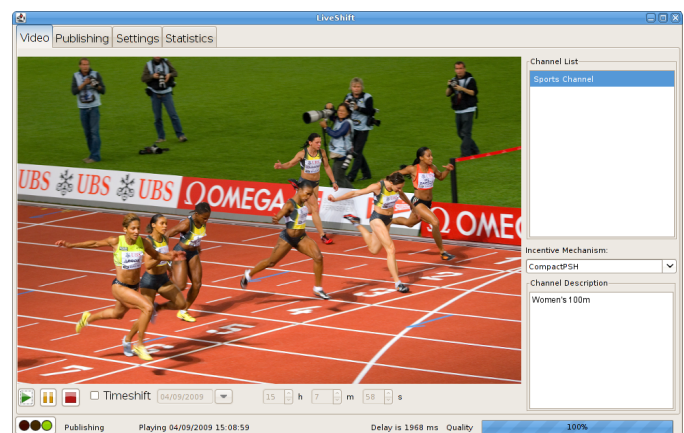


Fig. 1. LiveShift, a peer-to-peer streaming application [5]

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