POLITECNICO DI TORINO
Repository ISTITUZIONALE

Demonstrating the Impact of P2P Streaming on Video Quality

Publisher:

Published
DOI:

(Article begins on next page)

03 August 2020

Demonstrating the Impact of P2P Streaming on Video Quality

L. Abeni[1], C. Kiraly[1], R. Birke[2], M. Mellia[2] , E. Leonardi[2], S. Traverso[2], R. Lo Cigno[1]

[1]University of Trento, Italy; [2]Politecnico di Torino, Italy

I. DESCRIPTION OF THE DEMO

This demonstration will present a tool that allows the evaluation of the impact of P2P distribution on video quality, as a function of various parameters and design choices of the streaming system, such as:

- media-aware chunkisation with and without substreaming vs. non-media-aware chunkisation;
- different chunk trading protocols [2];
- different chunk/peer schedulers;
- etc...

Respect to the traditional evaluation methodologies, which are based on simulations and on the evaluation of some chunk loss and delay characteristics, the presented tool will show the impact on real videos, by dividing the video stream in chunks (according to different strategies, for example the one presented in [1]) and removing/corrupting the chunks lost during the P2P streaming process. The resulting (corrupted video) will be played simultaneously with the original one to show the artefacts introduced by the P2P streaming system.

A graphical interface will allow to:

- play the original video
- configure and start the P2P diffusion process
- play the received video stream (synchronised with the original video)
- modify some of the streaming parameters, to evaluate their effects on the received video stream
- compute and plot performance graphs on the fly, showing the impact of the changed parameters on various performance metrics

The presented tool is highly modular, and can use different software components for computing the chunks lost during the P2P diffusion process. To keep the demo predictable (and to limit the requirements in terms of Internet connectivity and number of machines needed for the demo), a simulator will be used for computing the list of chunks lost by each peer. However, a real P2P streamer can also be used for this purpose, and will be demonstrated if possible.

II. WHY THIS DEMO IS ATTRACTIVE TO GC10 ATTENDEES?

In the authors' opinion, this demo is interesting for GC10 attendees because it can show in real-time the impact of different P2P streaming strategies on the video. Instead of simply presenting some QoS metrics (that are sometimes difficult to interpret), the video as received by a selected peer is shown to the attendees.

This can be interesting for two main reasons:

- It immediately shows how some techniques (presented in other GC papers) can help in improving the user experience
- It gives an idea of how some QoS metrics relate to the quality perceived by the user (for example, sometimes maximising the PSNR does not really improve the video quality)

III. EQUIPMENT AND SPACE REQUIREMENT FOR THIS DEMO

We will bring with us the computers needed for the demo, but having a large monitor would be useful for better showing the videos and graphs to the attendees. We will also need two tables and some space for 1 poster or 2.

If more computers and/or good Internet access are provided, we will try to use a real P2P streamer application and a live distributed swarm to derive the list of lost chunks and show video quality.

REFERENCES

[1] KIRALY, C., AND LO CIGNO, R., AND ABENI, L. Deadline-based Differentiation in P2P Streaming In *Proceedings of IEEE Globecom '10* Miami, FL, USA, Dec. 2010.
[2] CARTA, A., MELLIA, M., MEO, M., AND TRAVERSO, S. Efficient Uplink Bandwidth Utilization in P2P-TV Streaming Systems In *Proceedings of IEEE Globecom '10* Miami, FL, USA, Dec. 2010.