FI2020: Video Streaming

A small DEMO on adaptive bitrate video streaming

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Reference architecture

What does it mean to maximize user experience?

How do different adaptation algorithms work?
Current standard: **MPEG-DASH** (Dynamic Adaptive Streaming over HTTP).

**ABR** (Adaptive Bitrate Algorithm): implemented at player side, tries to maximize the QoE by selecting which chunks to fetch as network bandwidth fluctuates.
In general, we want to maximize the delivered video resolution.
Optimization goals [2]
Video streaming in a nutshell

▶ .. avoiding rebuffering ..
Optimization goals [3]
Video streaming in a nutshell

.. and high instability.
How do different adaptation algorithms work?

Three main classes of algorithms:

- **Buffer Based**: the quality decision is taken only taking into account the buffer health of the player.
- **Rate Based**: the quality decision is taken only taking into account the current throughput estimation.
- **Mixed approaches**: the quality decision is taken taking into account *both* buffer health and throughput estimate (and eventually more..)

Wanna play with ABRs? → https://dashif.org/
Network trace under test

Let's have a look to:

- Reactivity to bandwidth drop.
- Convergence time once the bandwidth stabilize.

Now, let's watch some videos!
But..

.. what about existing providers?
Solution: Measurements

▶ PAM2020: Understanding video streaming algorithms in the wild
  ▶ Main objective: understanding what deployed ABR algorithms are trying to optimize for.

▶ A snapshot on some interesting results:

Most of the quality switches happen in the startup phase.

YouTube builds much higher buffer with respect to Fandom.