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AWT PJ
Video Streaming Mixer Library

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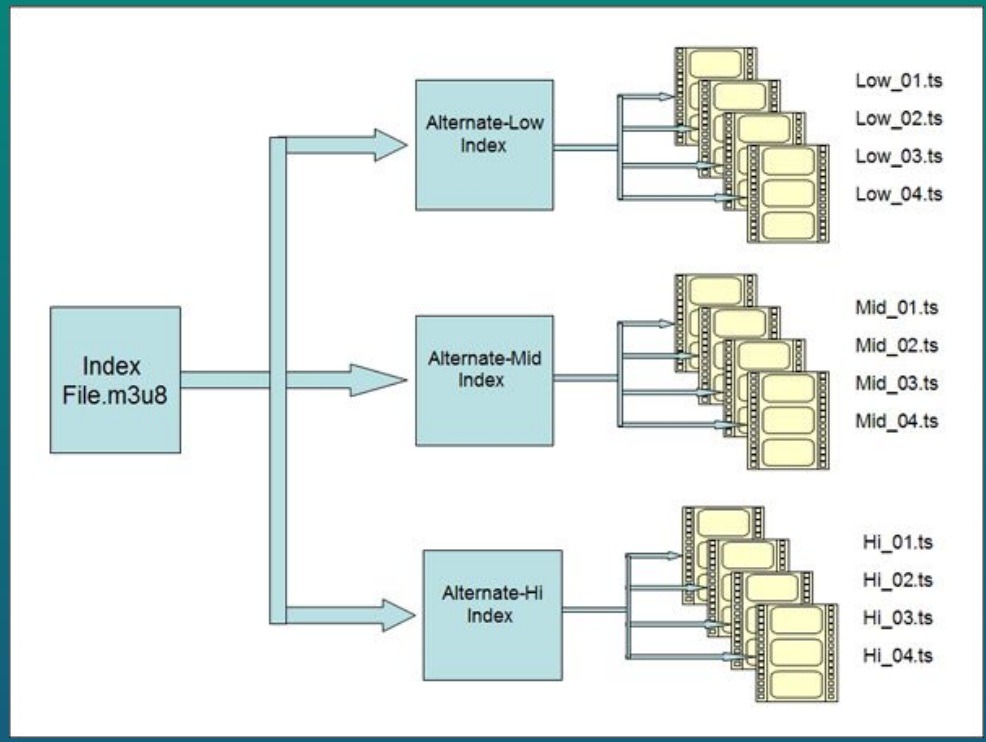
Agenda

1. Problem Statement
2. Paper and Technology Review
3. Possible Solutions
4. Schedule
5. Next Steps

Problem Statement

- We are in the Streaming Era
- Content is transmitted without downloading
- ABS dynamically changes the video source to avoid buffering
- HLS splits a video file into little segments
- Not all streams share the same representations
- We need an algorithm that identifies matching representation from variant video streams in order to output a single playlist



Paper and Technology review

- A progressive video stream is one single video file being streamed over the internet.

- Two major problems with progressive streaming are:

Quality

Buffering

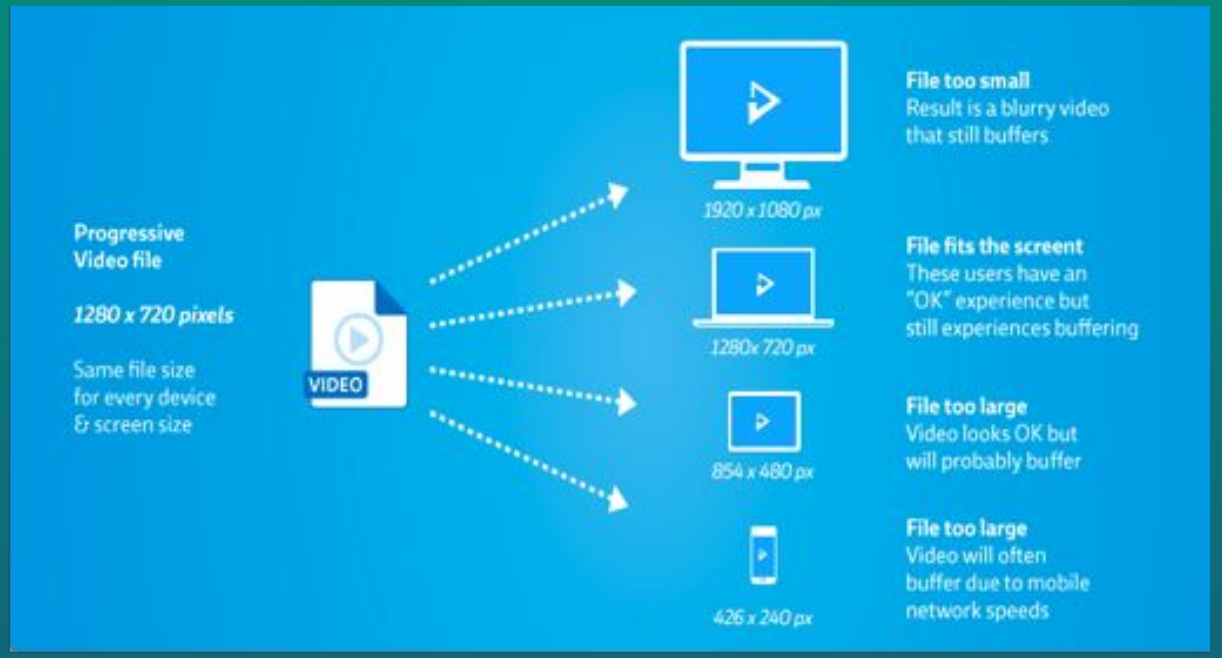


fig: https://bitmovin.com/adaptive-streaming/what-is-progressive-streaming

Paper and Technology review

Adaptive bitrate streaming

- Adapting : To speed of the user Internet connection.

- Adaptive streaming allows the video provider to create a different video for each of the screen sizes.

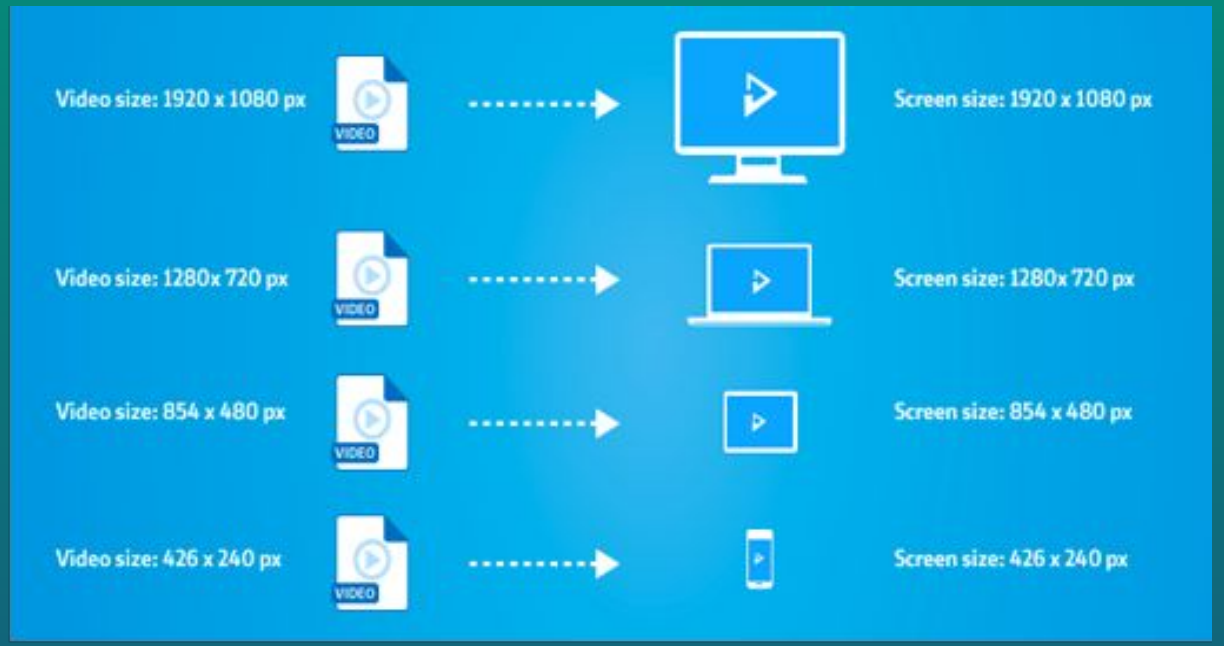


fig: https://bitmovin.com/adaptive-streaming/what-is-adaptive-streaming-quality

Paper and Technology review

HTTP Live streaming (HLS)

- Most widely used video streaming protocols.

- All Internet connected device support HTTP

- It can increase or decrease video quality depending on network condition without interrupting playback.

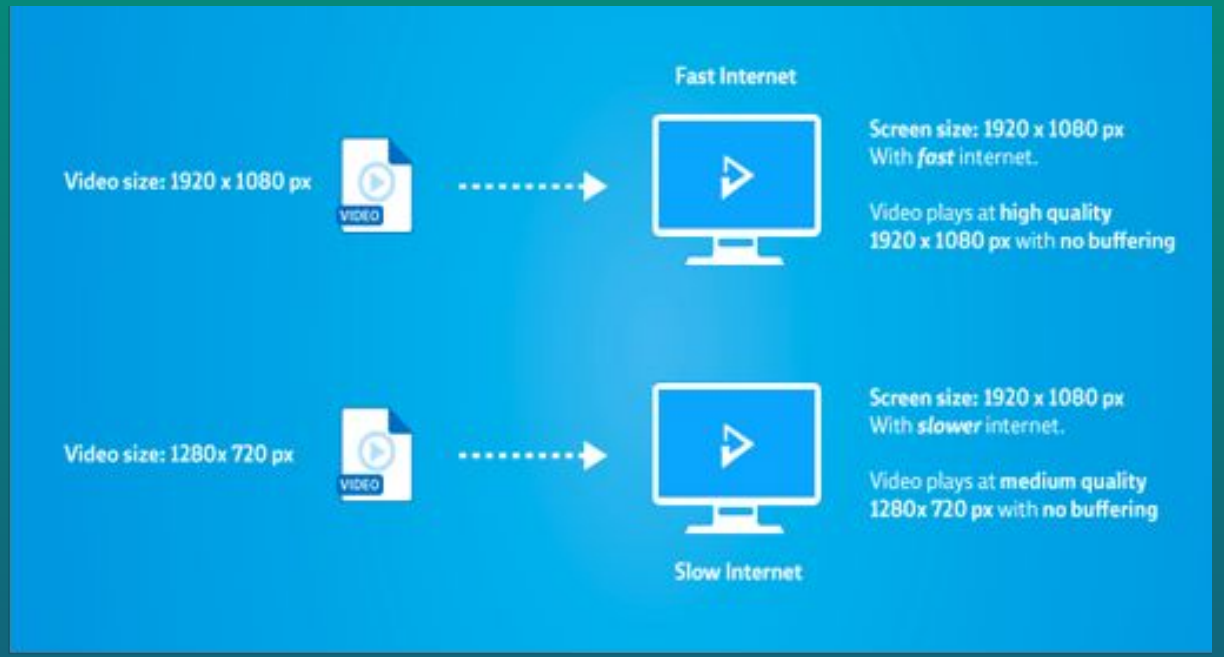


fig: https://bitmovin.com/adaptive-streaming/Adaptive-streaming-without-buffering

Paper and Technology review

HLS Parser JS Library

Node Js

- HLS allows User's video/song loads quickly.

- The majority of unwatched or un-listened to portions of the song won't be downloaded.

- We can use the familiar HTTP protocol, which means less server and client configuration.

Paper and Technology review

"Dynamic ad-insertion and content orchestration workflows through manifest manipulation in HLS and MPEG-DASH" is an example of how the hls manifest can be manipulated to output a different video stream

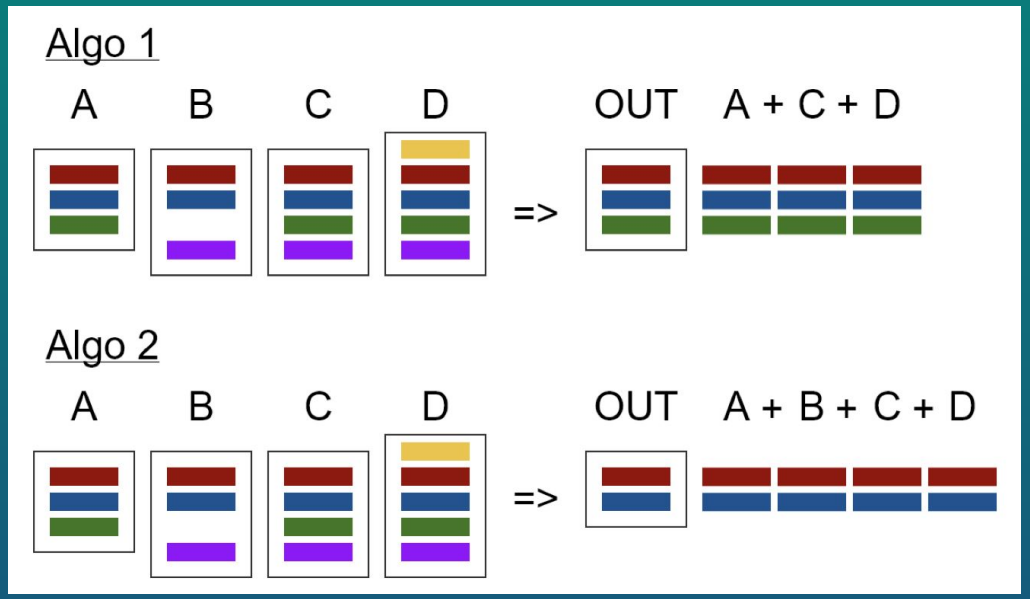
- Content manipulation and dynamic ad insertion is realized through non-video-intrusive technologies operating on manifest level

Possible Solutions - Video Streaming Mixer Library

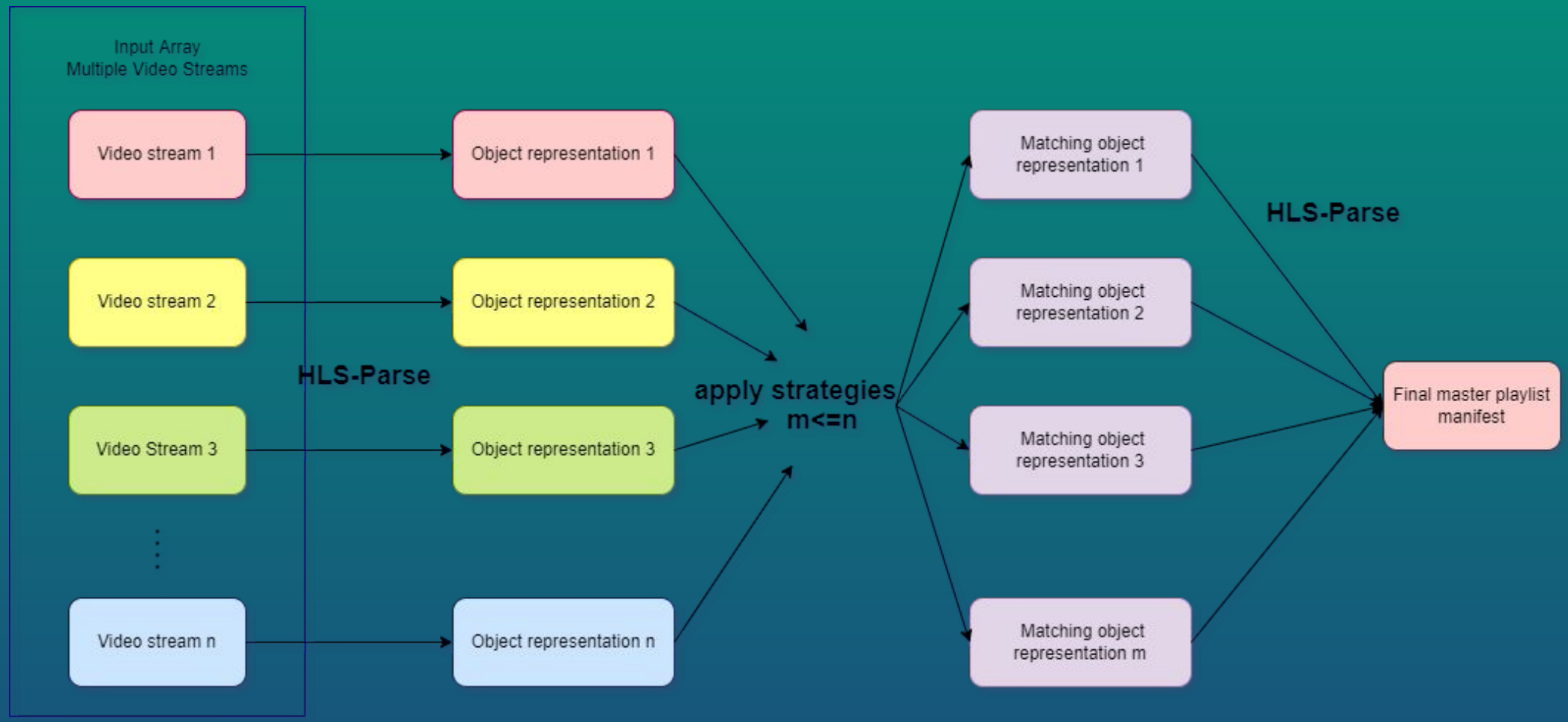
- Parse HLS manifest into object representations
- Implement algorithm to identify matching video streams

  Strategy 1: set Filter against first element's attributes
  Strategy 2: set intersection for matching attributes

- The output should be a master HLS manifest of a playlist including all matching video streams



Possible Solutions - Video Streaming Mixer Library



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Roadmap


Implement the first Strategy
Study of HLS Apple and HLS Parser Documentation
Setup
- The development environment
-The repository & the Deployment
Identify problem statement
June 14th
Workshop 2:
Output final master HLS manifest with the matching steams
Submitting Final Code
May 17th (Today)
Workshop 1:
July 19th
Workshop 3:
July 31th
Deadline:
Paper and Technology review
Identify Possible Solutions
Parse
the HLS manifest into Object representation using the HLS JS Library
setup as
a Dependency Library
Implement the second Strategy
Submitting
the Scientific paper

Next Steps

1. Implement the first strategy (First Demo.)
2. Setup the development environment
3. Setup the repository & the deployment
4. Study of HLS Apple and HLS Parser Documentation
5. Review of Use cases and graphical representation.

Resources

- https://bitmovin.com/adaptive-streaming/
- https://www.wowza.com/blog/adaptive-bitrate-streaming
- HLS documentation https://datatracker.ietf.org/doc/html/rfc8216
- hls-parse js library https://www.npmjs.com/package/hls-playlist-parser
- R. Seeliger, D. Silhavy, Dr. S. Arbanowski “Dynamic ad-insertion and content orchestration workflows through manifest manipulation in HLS and MPEG-DASH” https://ieeexplore.ieee.org/document/8228708
- https://developer.apple.com/documentation/http_live_streaming/about_apple_s_http_live_streaming_tools