DASH Deployment by YouTube

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1 Data Generation Method

We used the python library `youtube-dl` to build a crawler (`youtube-csv.py`). The crawler gets a youtube playlist as input and downloads the MPD's for all videos contained in this playlist. For our evaluation we used a playlist which contains the 500 most played videos of all time. This results in a database of 500 MPD files for evaluation.

The output of the crawling process are two CSV files. In the first file (`representation_stats.csv`) each line represents a single representation of a MPD. In the second file (`video_stats.csv`) each line represents a single MPD along with the number of representations contained in it. Among others we included following data fields into these files:

- **Youtube ID**: The video this representation belongs to. Each video has a unique ID.
- **Video Codec**: The video codec used in this representation.
- **Width**: The width of the video.
- **Height**: The height of the video.
- **FPS**: Frames per Second of this representation.
- **Bitrate**: The bitrate of this representation.

2 Data Analysis Method

For data analysis and visualization we build an EXCEL sheet (`Evaluation.xlsx`)to which we imported the CSV files generated by the crawler. Using EXCEL's visualization tools, it was easy to generate some diagrams for the imported data.

3 Results

From the expected 500 MPD's only 497 could be loaded cause three of the videos where not available in Austria.

3.1 Analysis of spatial resolutions

Our dataset contained 88 differenct spatial resoutions which where used by YouTube. In figure 3.1 only the 20 most used resoutions are shown. There are a lot of resolutions which where only used two or three times in our dataset.

The most used resolution is **640x360** followed by **1280x720**. As figure 3.1 reveals, the MPD's mostly contain one adaptation set for mp4/avc and one adaptation set for webm/vp9.

There is an significant decrease in the frequency after the first 6 most frequent resolutions. These six resolutions seem to be the standard resolutions used in most of the MPD's.

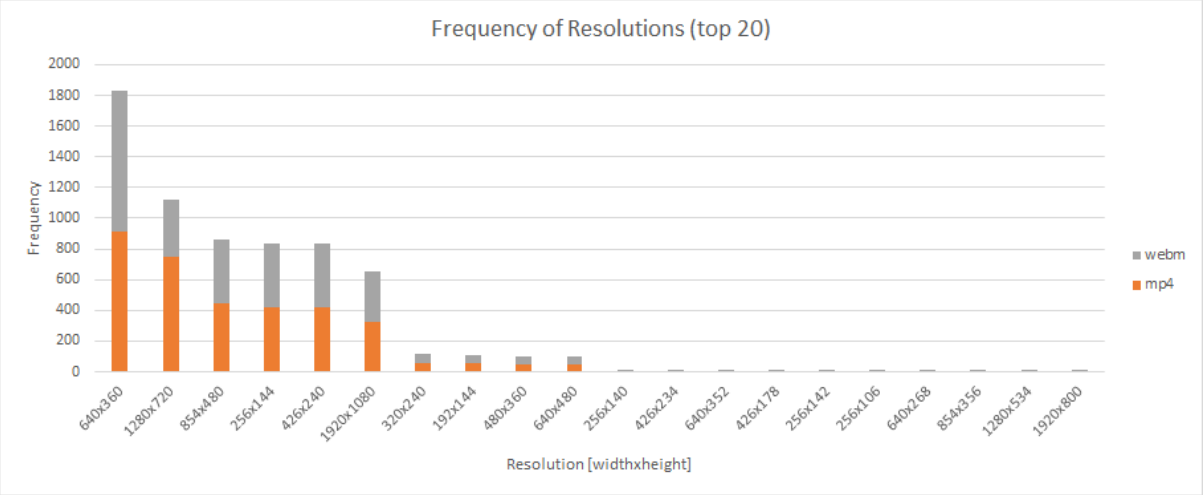

Figure 3.1: Frequency of Resolutions (top 20)

3.2 Analysis of video bitrates

Since the bitrate values where very different (3358 different values) we assigned the to several bins:

- <= 64 kbit/s
- 65 - 128 kbit/s
- 129 - 256 kbit/s
- 257 - 512 kbit/s
- 513 - 1024 kbit/s
- 1025 - 2048 kbit/s
- 2049 - 4096 kbit/s
- > 4096 kbit/s

For the higher bitrates larger than 4096 kbit/s mainly mp4/avc was used for videos. For all other lower bitrates mp4/avc and webm/vp9 are nearly evenly used.

3.3 Number of Representations

As you can see in figure 3.3 most of the MPD's contain 12 video representations. They are separated into two adaptation sets, one for mp4/avc and one for webm/vp9, each containing 6 representations. These six representations are also the most frequent as shown in figure 3.1.

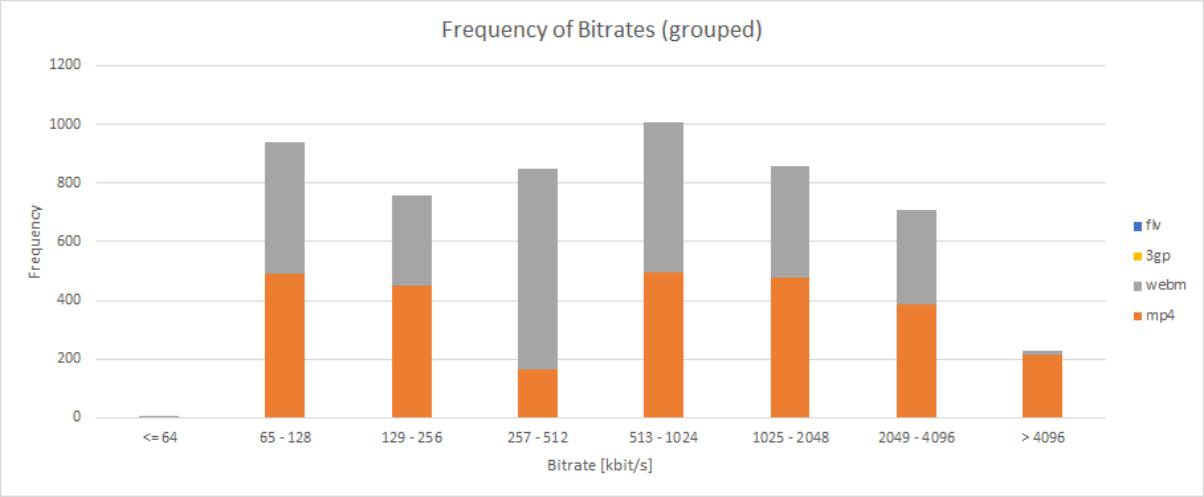

Figure 3.2: Frequency of Bitrates (grouped)

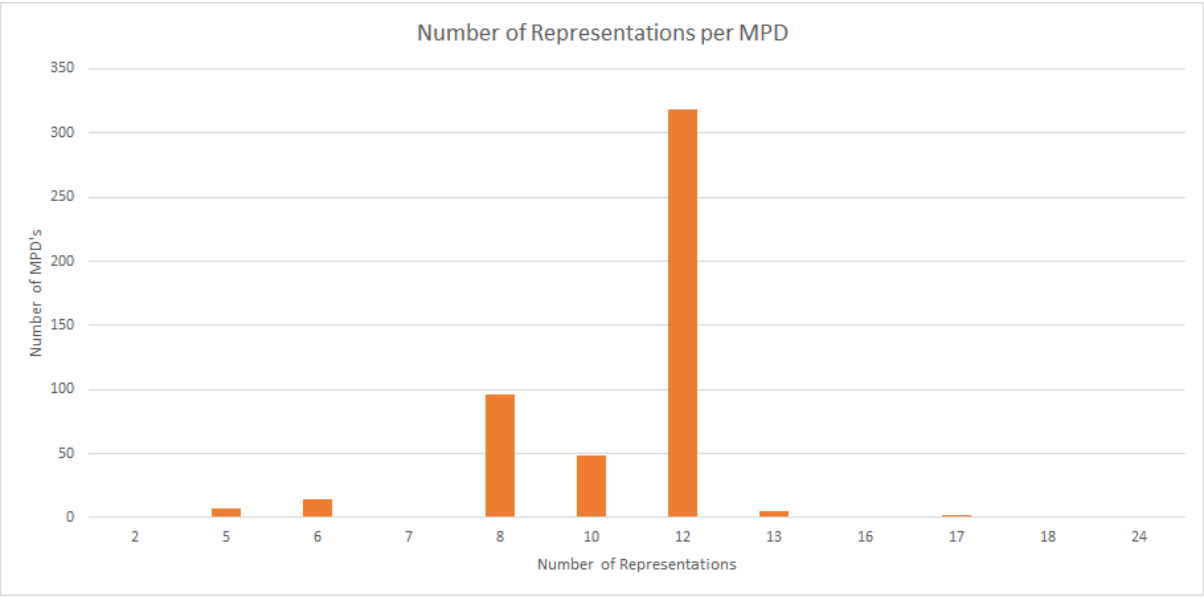

Figure 3.3: Number of Representations per MPD