

# YoMoApp - Documentation

Nikolas Wehner

April 3, 2018

This document offers a short introduction on the different log files generated by YoMoApp as well as the interpretation of the different events and statistics provided by YoMoApp.

YoMoApp generates three different types of log files for each video clip, namely, the data log file, the events log file, and the statistics log file.

The data log file contains information to the video playback, while the event log comprises all other information like video resolution, video player states, the amount of generated traffic, etc. At the end of a video session, a statistics log file is computed based on the data and the event log file. This log file provides some meta information about the video as well as several - and network-layer performance indicators.

Each log file is tagged with a unique session identifier, which is made up of an identifier for the used device, the date of the session, the starting time of the session, and an integer which represents the video number of the session (starting with 0). This identifier can be found in the first line of the log files as well as in the name of the log file.

Disclaimer: Note that video clips with less than 20 seconds video playback are discarded, i.e., no logs are generated and uploaded.

# 1 Data

An excerpt for an exemplary data log file can be seen in Listing 1. The first line corresponds to the unique identifier. Each other line in the log consists (from left to right) of the current Unix timestamp, the current playback time of the video, the current size of the video buffer, and the available playback time, corresponding to the sum of the current playback time and the current buffer size. These attributes are separated by a # and are sampled in an interval of less than one second.

Listing 1: An excerpt of a data log file

```
1234567890abcdef - 2018-03-06 - 15:14:11 - 0
1520345656706#0.0#0.0#0.0
1520345657427#0.374184#6.865816000000001#7.24
1520345657890#0.837793#18.203207#19.041
1520345658418#1.365312#17.675688#19.041
1520345658890#1.83654#17.20446#19.041
1520345659420#2.365736#17.920264000000003#20.286
1520345659890#2.835672#32.665327999999995#35.501
1520345660418#3.362654#32.138346#35.501
1520345660892#3.836361#31.664638999999998#35.501
1520345661418#4.36169#31.13931#35.501
1520345661890#4.832626#30.668373999999996#35.501
1520345662418#5.36013#30.14087#35.501
1520345662890#5.83142#29.669579999999996#35.501
...
```

## 2 Events

Listing 2 depicts an example for an event log file. Again, the first line corresponds to the unique identifier of the video. Each other line comprises the current Unix timestamp and the corresponding event, separated by a #. There are two types of event. The first type states a fact, where the timestamp is the main interest, e.g., "linkclick", while the second and more important type of event is made up of the name of the event and a value that was set, e.g., "network:HSPA", where "network" is the name of the event and "HSPA" is the type of network connection. Some events are fired regularly, e.g., the location determination or the detection of the signal strength, while others may be fired only once or never at all.

The available events and their description can be found in Table 1.

Listing 2: A modified excerpt of an event log file

```
1234567890abcdef - 2018-03-06 - 15:14:11 - 0
520345651847#linkclick
1520345655346#youtubeloadingtime:3.499
1520345656652#ytid:LsoLEjrDogU
1520345656706#cellid:3056925
1520345656706#network:HSPA+
1520345656706#screenorientation:portrait
1520345656706#volume:0
1520345656706#location:N/A
1520345656706#playermode:normal
1520345656706#state:playing
1520345656718#title:Bruno Mars - Finesse (Remix)
1520345656724#mse:true
1520345656724#supported-codec:1:video+audio codec: ...
1520345656724#supported-codec:2:video+audio codec: ...
1520345656777#duration:223
1520345656887#location:48.2659506,16.418319
1520345657060#canplay
1520345657075#playing
1520345657439#player:412x232
1520345657441#quality:360p (640x360, 16:9)
1520345657539#trbytes:42637959
...
```

Table 1: The attributes of the event log file

<b>Name</b>	<b>Description</b>
ytid	The ID of the video clip.
quality	The current video quality, represented by the resolution, the width and the height of the video in pixels, and the aspect ratio.
network	The kind of network the user is connected to.
trbytes	The total number of bytes received by the used device.
ttbytes	The total number of bytes transmitted by the used device.
mrbytes	The number of bytes received by the used device over the mobile network.
mtbytes	The number of bytes transmitted by the used device over the mobile network.
arbytes	The number of bytes received solely by YoMoApp.
atbytes	The number of bytes transmitted solely by YoMoApp.
cellid	The unique identifier for the used base transceiver station of the mobile network.
signal	The signal strength of the mobile network.
ssid	The service set identifier (ssid) of the utilized wireless connection.
bssid	The MAC address of the wireless access point.
rsssi	The received signal strength indication (rsssi) states the intensity of the received wifi signal.
location	The GPS coordinates of the user, where the first value resembles the latitude and the second value resembles the longitude.
title	The title of the video clip.
duration	The length of the video clip.
screenorientation	The layout of the used device, i.e., whether the device is in portrait or landscape mode.
player	The size of the video player.
playermode	The mode of the video player, which can be either normal (embedded into the webpage) or fullscreen mode.
volume	The volume of the used device represented by an integer.
mse	An indicator whether the used browser supports Media Source Extensions (MSE). Returns a boolean with true or false.

Table 1: The attributes of the event log file

Name	Description
supported-codec	The supported codecs by the used browser. More details can be found on <a href="http://www.leanbackplayer.com/test/h5mt.html">http://www.leanbackplayer.com/test/h5mt.html</a> . For better differentiation, the codec entries are further numbered ranging from 1 to 31.
state	The state of the video player. Possible values are ended, seeking, paused, and playing.
HTML audio/video events	The available properties and events can be found on <a href="https://www.w3schools.com/tags/ref_av_dom.asp">https://www.w3schools.com/tags/ref_av_dom.asp</a> , e.g., <i>stalled</i> indicates whether the video is stalling, i.e., if a buffer underrun occurred. However, these events are unreliable and should not be considered for the evaluation.
ratinglike	The submitted rating submitted by the user for the liking of the content.
ratingquality	The submitted rating by the user for the picture quality of the video.
ratingstreaming	The submitted rating by the user for the quality of the video streaming.
ratingacceptability	An indicator whether a user perceived the quality of the streaming as acceptable. The rating is an integer, where a 1 corresponds to acceptable, a -1 corresponds to unacceptable, and 0 corresponds to not set.
youtubeloadingtime	The period of time until YouTube was fully loaded after opening it with the button on the main page.
advertisement:loading	The earliest point in time after a user clicked on a video and an advertisement appears.
advertisement:starting	The point in time where the playback of the advertisement clip starts.
advertisement:length	The overall length of the advertisement clip.
advertisement:logtime	The period of time between the loading of the advertisement and the ending of the advertisement.
dialog	The current state of the rating dialog. Possible values are show, i.e., the dialog is open, and finished, i.e., the rating process has been finished.

Table 1: The attributes of the event log file

<b>Name</b>	<b>Description</b>
videoend	The manner in which a video was ended. There are two flags. Once, the user can abort or finish the video. Second, the user can return to the YouTube main page or start another video.
app	The points of time when a user stops or reenters the application by starting another application or the home screen. The possible values are stop and start.
linkclick	The timestamp when the user started a video via an external link.

### 3 Statistics

An excerpt for a statistics log file is shown in Listing 3. The first line corresponds to the unique identifier of the video clip. Afterwards, the individual information and performance indicators are listed. The entries are again separated by a #, where the left side represents the label of the information and the right side represents the corresponding value to the label. All available statistics are listed in Table 2.

Listing 3: A modified excerpt of a statistics log file

```
1234567890abcdef - 2018-03-06 - 15:14:11 - 0
Date#2018-03-06
Time#15:14:16
Device-ID#48729fab045f8cd
Mobile operator#A1
Country# sterreich
Network switches#0
Network:HSPA+#25.16
Screen size#1080x1794
Screen density#420 dpi
Orientation changes#0
Orientation:portrait #25.16
Player resizes#0
Size:412x232 #25.16
Handovers#3
Cell-ID:2147483647 #5.64
...
Video-ID#LsoLEjrDogU
Video title#Bruno Mars - Finesse (Remix)
Log time#30.74
Length of video #223.00
User engagement #25.16 / 11%
Initial delay #5.58
Quality switches#0
360p (640x360, 16:9) #25.16
...
```

Table 2: The attributes of the statistics log file

<b>Name</b>	<b>Description</b>
Date	The date of the session.
Time	The starting time of the session.
Device-ID	A random 64-bit identifier for a device. Can change upon factory reset.
Mobile operator	The mobile network operator.
Country	The country in which the user watched the video clip.
Network switches	The number of times the device changed its type of network connection.
Networks	The overall connection time for the utilized network types.
Screen size	The screen size of the used device.
Screen density	The screen density of the used device.
Orientation changes	The number of times the user changed the layout of the device.
Orientations	The time upon each orientation (portrait and landscape).
Player resizes	The number of times the layout of the video player changed due to orientation changes and playermode change.
Sizes	The time upon each player size.
Handovers	The number of times the device changed the base transceiver station.
Cell-ID	The connection time with the base transceiver stations specified by the unique identifiers.
Video-ID	The YouTube ID of the video.
Video title	The title of the video.
Log time	The overall log time of a video starting with the selection of the video and ending with the selection of a new video or the return to the YouTube main page.
Length of video	The total duration of the video clip.
User engagement	The overall time and the percentage of the video clip the user watched.
Initial delay	The period of time between the video request to the actual start of the playback.
Quality switches	The number of quality adaptations.
Qualities	The time upon each quality layer.
Stalling events	The number of stalling events, i.e., how often a buffer underrun occurred.
Total stalling length	The cumulated sum of the lengths of all stalling events.



Table 2: The attributes of the statistics log file

<b>Name</b>	<b>Description</b>
Average stalling length	The average stalling length represented by the total stalling length divided by the number of stalling events.
Maximal stalling length	The longest observed stalling event throughout the video clip.
Average buffer level	The buffer level on average throughout the video clip.
Maximal buffer level	The highest observed buffer level throughout the video clip.
Pause events	The number of pause events, i.e., the user stopped the video manually.
Content rating	The submitted rating by the user for the video content.
Quality rating	The submitted rating byt the user for the video quality.
Streaming rating	The submitted rating by the user for the streaming quality.
Acceptability rating	The submitted rating for the acceptability of the streaming. A 1 states acceptability, a -1 indicates the opposite, a 0 corresponds to not set.