

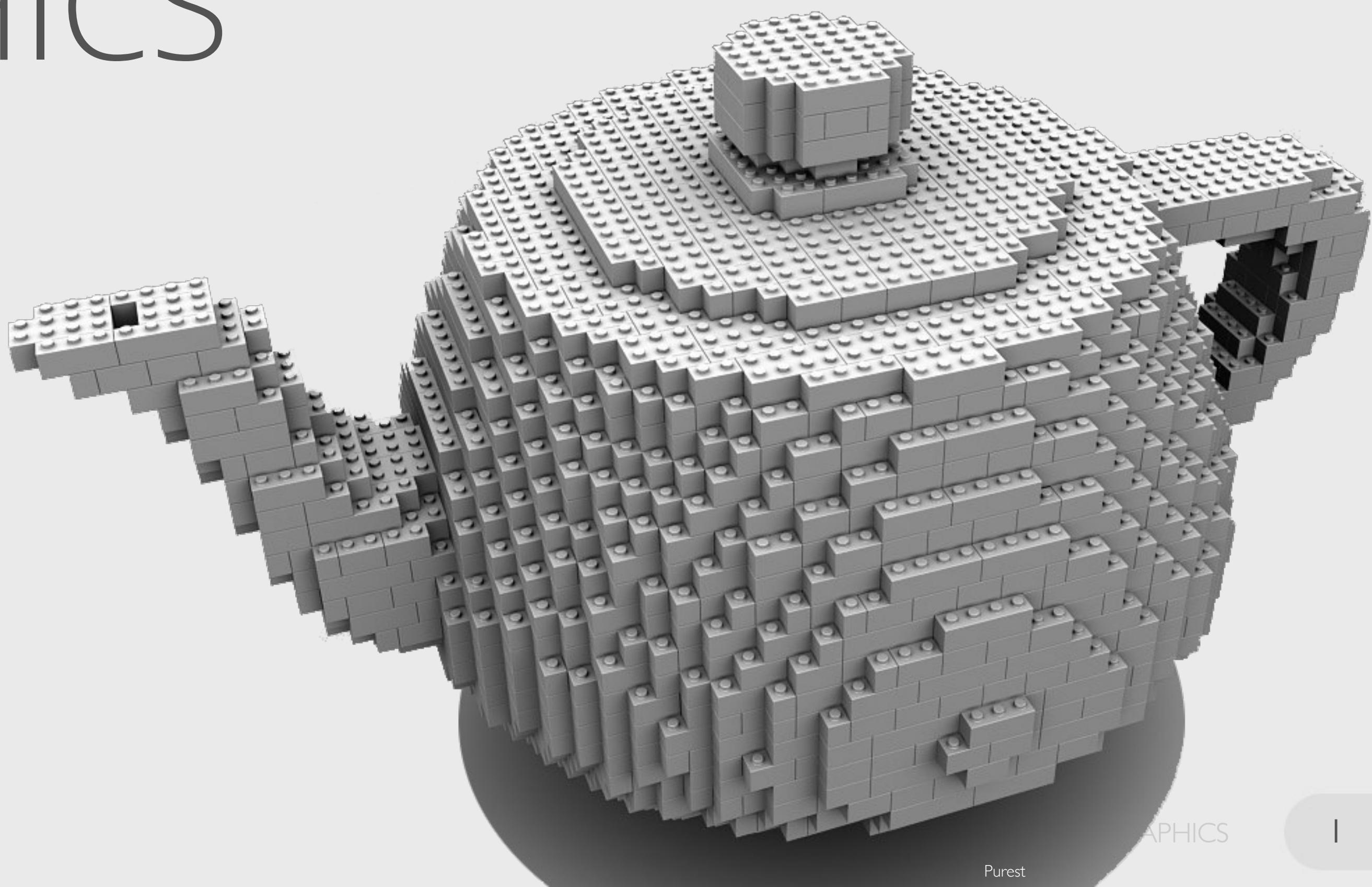


# MULTIMEDIA & COMPUTER GRAPHICS

Dr. Arturo Jafet Rodríguez Muñoz

Ing. Bernardo Moya de la Mora

## VIDEO MANIPULATION



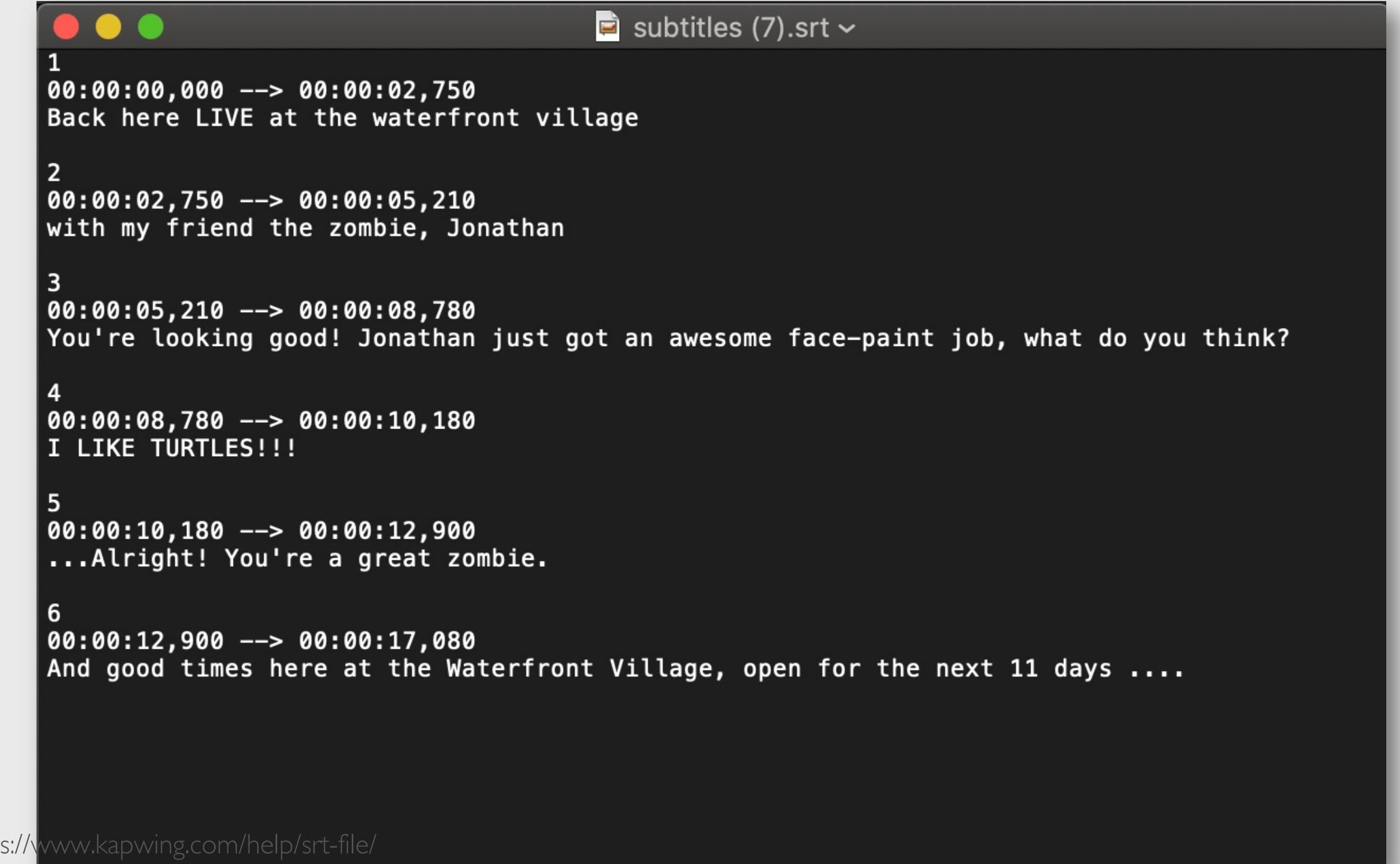
# SUBTITLES

SubRip

Can include rich text

Easy format to follow

Soft vs Hard



A screenshot of a text editor window showing an SRT subtitle file. The window title is "subtitles (7).srt". The file contains six subtitle entries, each with a number, timestamp range, and text. The text includes some rich text elements like bold and italic.

```
1
00:00:00,000 --> 00:00:02,750
Back here LIVE at the waterfront village

2
00:00:02,750 --> 00:00:05,210
with my friend the zombie, Jonathan

3
00:00:05,210 --> 00:00:08,780
You're looking good! Jonathan just got an awesome face-paint job, what do you think?

4
00:00:08,780 --> 00:00:10,180
I LIKE TURTLES!!!

5
00:00:10,180 --> 00:00:12,900
...Alright! You're a great zombie.

6
00:00:12,900 --> 00:00:17,080
And good times here at the Waterfront Village, open for the next 11 days ....
```

<https://www.kapwing.com/help/srt-file/>



# FFMPEG

Created in 2000

Fabrice Bellard

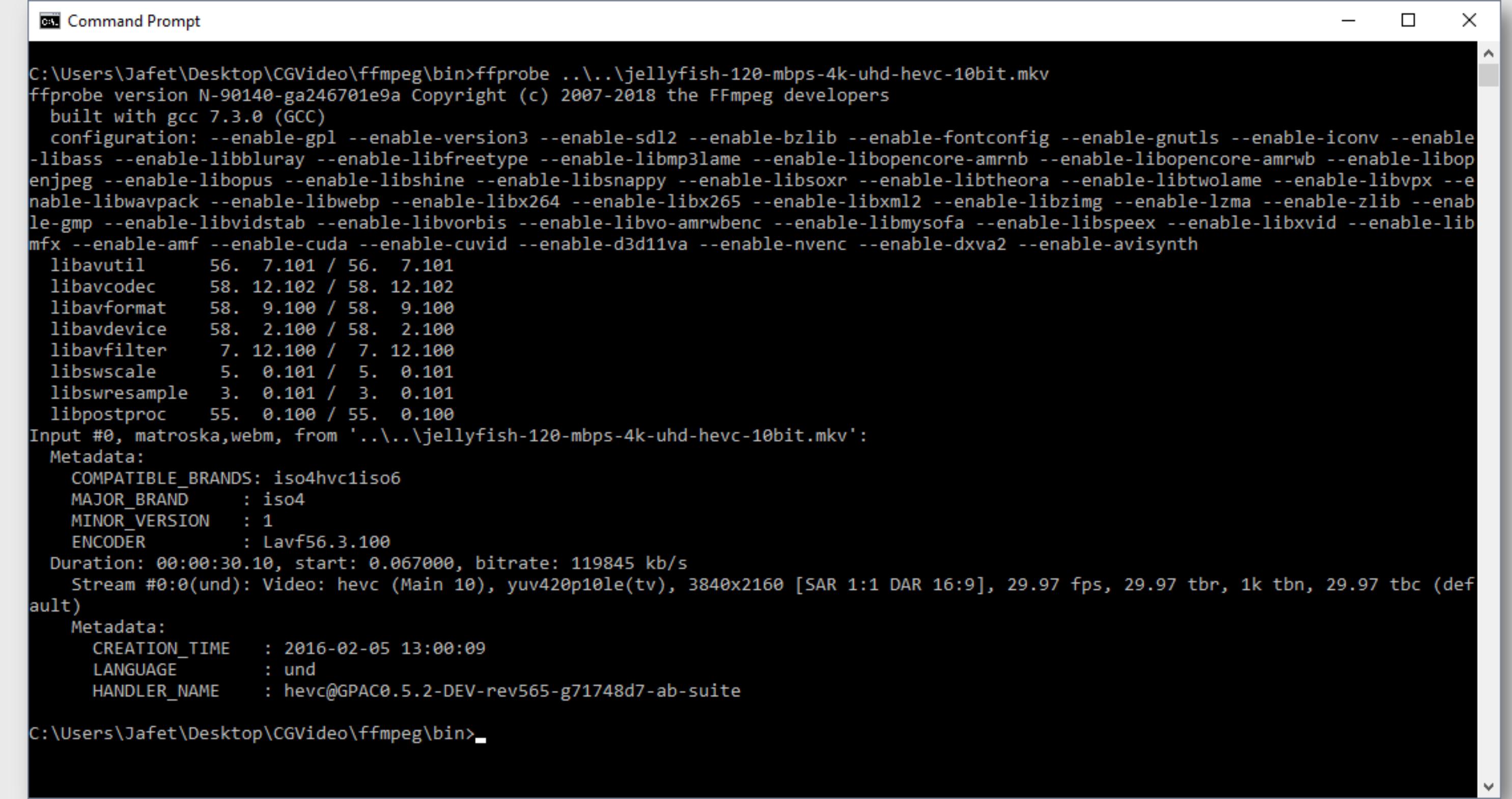
Widest range of codecs

VLC and other products based on it



# FFPROBE

Obtain info



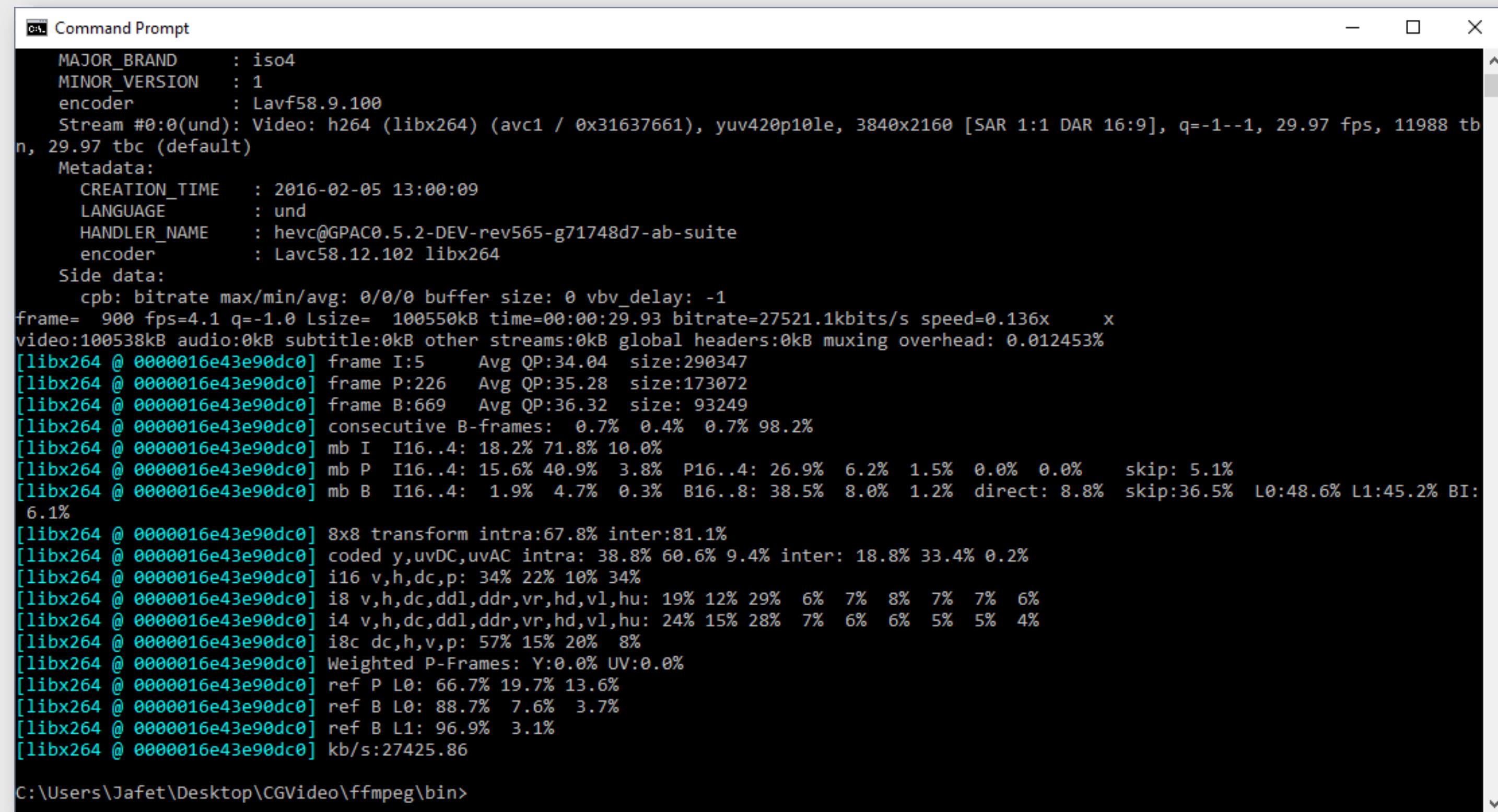
```
C:\Users\Jafet\Desktop\CGVideo\ffmpeg\bin>ffprobe ..\..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv
ffprobe version N-90140-ga246701e9a Copyright (c) 2007-2018 the FFmpeg developers
  built with gcc 7.3.0 (GCC)
    configuration: --enable-gpl --enable-version3 --enable-sdl2 --enable-bzlib --enable-fontconfig --enable-iconv --enable-libass --enable-libbluray --enable-libfreetype --enable-libmp3lame --enable-libopencore-amrnb --enable-libopencore-amrwb --enable-libopengl --enable-libopus --enable-libshine --enable-libsnappy --enable-libsoxr --enable-libtheora --enable-libtwolame --enable-libvpx --enable-libwavpack --enable-libwebp --enable-libx264 --enable-libx265 --enable-libxml2 --enable-libzimg --enable-lzma --enable-zlib --enable-gmp --enable-libvidstab --enable-libvorbis --enable-libvo-amrwbenc --enable-libmysofa --enable-libspeex --enable-libxvid --enable-libmfx --enable-amf --enable-cuda --enable-cuvid --enable-d3d11va --enable-nvenc --enable-dxva2 --enable-avisynth
      libavutil      56. 7.101 / 56. 7.101
      libavcodec     58. 12.102 / 58. 12.102
      libavformat    58.  9.100 / 58.  9.100
      libavdevice    58.  2.100 / 58.  2.100
      libavfilter     7. 12.100 /  7. 12.100
      libswscale      5.  0.101 /  5.  0.101
      libswresample   3.  0.101 /  3.  0.101
      libpostproc    55.  0.100 / 55.  0.100
Input #0, matroska,webm, from '..\..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv':
  Metadata:
    COMPATIBLE_BRANDS: iso4hvc1iso6
    MAJOR_BRAND     : iso4
    MINOR_VERSION   : 1
    ENCODER         : Lavf56.3.100
  Duration: 00:00:30.10, start: 0.067000, bitrate: 119845 kb/s
  Stream #0:0(und): Video: hevc (Main 10), yuv420p10le(tv), 3840x2160 [SAR 1:1 DAR 16:9], 29.97 fps, 29.97 tbr, 1k tbn, 29.97 tbc (default)
    Metadata:
      CREATION_TIME   : 2016-02-05 13:00:09
      LANGUAGE        : und
      HANDLER_NAME    : hevc@GPAC0.5.2-DEV-rev565-g71748d7-ab-suite
C:\Users\Jafet\Desktop\CGVideo\ffmpeg\bin>
```

ffprobe ..\..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv



# TRANSFER

```
ffmpeg -i ..\..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv ..\..\jellyfish.mp4 -hide_banner
```



```
MAJOR_BRAND : iso4
MINOR_VERSION : 1
encoder : Lavf58.9.100
Stream #0:0(und): Video: h264 (libx264) (avc1 / 0x31637661), yuv420p10le, 3840x2160 [SAR 1:1 DAR 16:9], q=-1--1, 29.97 fps, 11988 tb
n, 29.97 tbc (default)
Metadata:
CREATION_TIME : 2016-02-05 13:00:09
LANGUAGE : und
HANDLER_NAME : hevc@GPAC0.5.2-DEV-rev565-g71748d7-ab-suite
encoder : Lavc58.12.102 libx264
Side data:
cpb: bitrate max/min/avg: 0/0/0 buffer size: 0 vbv_delay: -1
frame= 900 fps=4.1 q=-1.0 Lsize= 100550kB time=00:00:29.93 bitrate=27521.1kbits/s speed=0.136x
video:10053kB audio:0kB subtitle:0kB other streams:0kB global headers:0kB muxing overhead: 0.012453%
[libx264 @ 0000016e43e90dc0] frame I:5 Avg QP:34.04 size:290347
[libx264 @ 0000016e43e90dc0] frame P:226 Avg QP:35.28 size:173072
[libx264 @ 0000016e43e90dc0] frame B:669 Avg QP:36.32 size: 93249
[libx264 @ 0000016e43e90dc0] consecutive B-frames: 0.7% 0.4% 0.7% 98.2%
[libx264 @ 0000016e43e90dc0] mb I I16..4: 18.2% 71.8% 10.0%
[libx264 @ 0000016e43e90dc0] mb P I16..4: 15.6% 40.9% 3.8% P16..4: 26.9% 6.2% 1.5% 0.0% 0.0% skip: 5.1%
[libx264 @ 0000016e43e90dc0] mb B I16..4: 1.9% 4.7% 0.3% B16..8: 38.5% 8.0% 1.2% direct: 8.8% skip:36.5% L0:48.6% L1:45.2% BI: 6.1%
[libx264 @ 0000016e43e90dc0] 8x8 transform intra:67.8% inter:81.1%
[libx264 @ 0000016e43e90dc0] coded y,uvDC,uvAC intra: 38.8% 60.6% 9.4% inter: 18.8% 33.4% 0.2%
[libx264 @ 0000016e43e90dc0] i16 v,h,dc,p: 34% 22% 10% 34%
[libx264 @ 0000016e43e90dc0] i8 v,h,dc,ddl,ddr,vr,hd,vl,hu: 19% 12% 29% 6% 7% 8% 7% 7% 6%
[libx264 @ 0000016e43e90dc0] i4 v,h,dc,ddl,ddr,vr,hd,vl,hu: 24% 15% 28% 7% 6% 6% 5% 5% 4%
[libx264 @ 0000016e43e90dc0] i8c dc,h,v,p: 57% 15% 20% 8%
[libx264 @ 0000016e43e90dc0] Weighted P-Frames: Y:0.0% UV:0.0%
[libx264 @ 0000016e43e90dc0] ref P L0: 66.7% 19.7% 13.6%
[libx264 @ 0000016e43e90dc0] ref B L0: 88.7% 7.6% 3.7%
[libx264 @ 0000016e43e90dc0] ref B L1: 96.9% 3.1%
[libx264 @ 0000016e43e90dc0] kb/s:27425.86

C:\Users\Jafet\Desktop\CGVideo\ffmpeg\bin>
```



# COMMANDS

```
ffmpeg -i ..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv -t 00:00:05 -map 0 -c copy ..\jellyfish.mkv -hide_banner
```

```
ffmpeg -i ..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv -qscale 0 -r 12 -y ..\jellyfish.mp4 -hide_banner
```

```
ffmpeg -i ..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv -vf scale=1920:-1 ..\jellyfish.mkv -hide_banner
```

```
ffmpeg -i ..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv -f mp4 -vcodec libx264 -preset slow -acodec acc -vf scale=1920:-1 ..\jellyfish.mp4 -hide_banner
```

```
ffmpeg -i ..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv -f mp4 -vcodec libx264 -preset slow -acodec acc -b:v 2M -maxrate 2M -bufsize 1M ..\jellyfish.mp4 -hide_banner
```

```
ffmpeg -i ..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv -i ..\subs.srt -map 0 -map 1 -c copy ..\jellyfish.mkv
```

```
ffmpeg -i ..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv -i ..\water.flac -map 0 -map 1 -c copy ..\jellyfish.mkv
```

```
ffmpeg -i ..\jellyfish-120-mbps-4k-uhd-hevc-10bit.mkv -i ..\Sony_Swordsmith.mp4 -map 0 -map 1 -c copy ..\monster.mkv
```

# YOUTUBE VIDEOS

Created in 2005

3 former PayPal Devs

Google bought it in 2006

15 billion USD in revenue\*

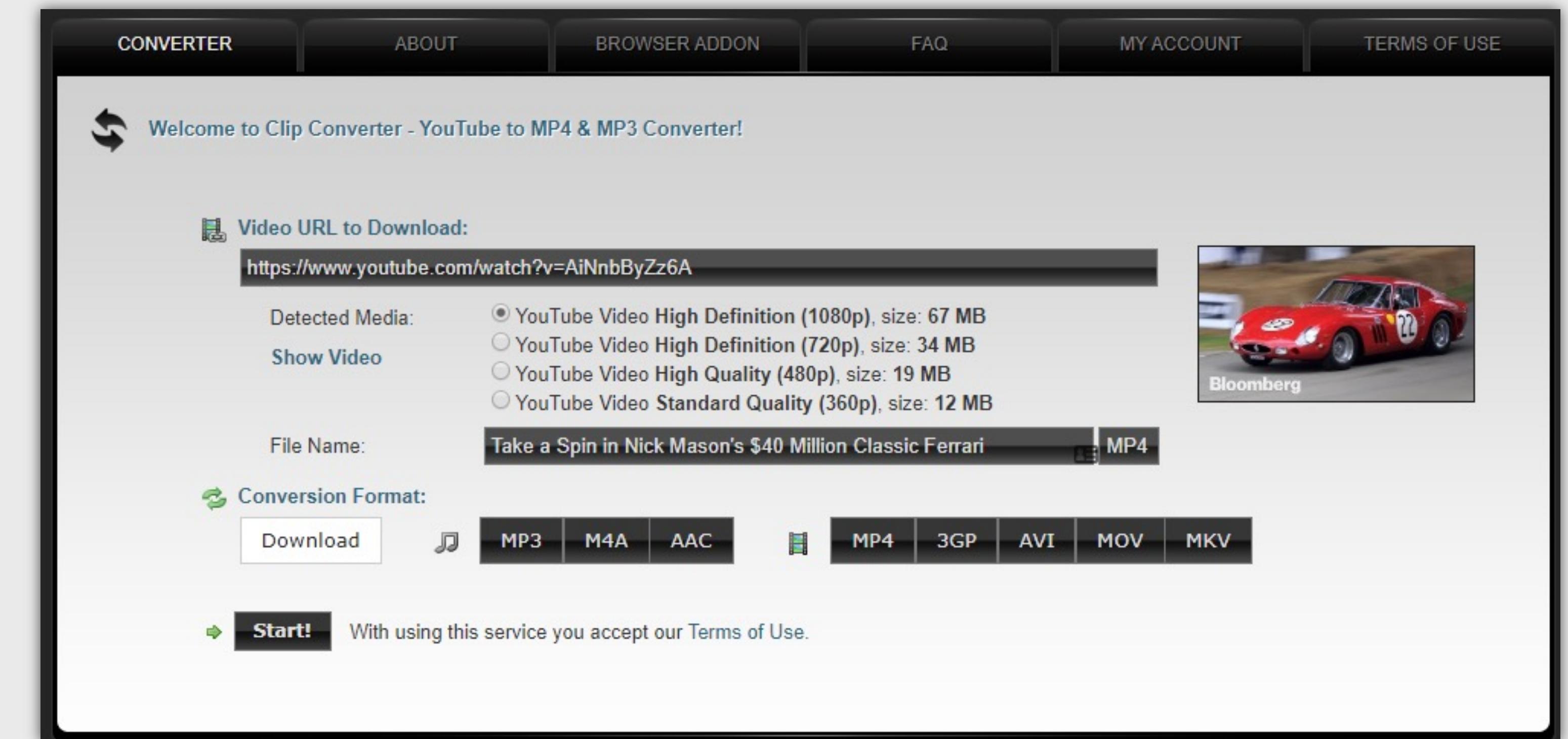
Most famous streaming service



<https://www.youtube.com/watch?v=AiNnbByZz6A>



# DOWNLOAD VIDEOS



The screenshot shows the homepage of Clip Converter. At the top, there are tabs for CONVERTER, ABOUT, BROWSER ADDON, FAQ, MY ACCOUNT, and TERMS OF USE. Below the tabs, a logo and the text "Welcome to Clip Converter - YouTube to MP4 & MP3 Converter!" are displayed. A video thumbnail of a red Ferrari with the number 22 is shown on the right. The main form area has a "Video URL to Download:" input field containing "https://www.youtube.com/watch?v=AiNnbByZz6A". To the left of the URL is a "Show Video" link. To the right are four radio button options for detected media: "YouTube Video High Definition (1080p), size: 67 MB" (selected), "YouTube Video High Definition (720p), size: 34 MB", "YouTube Video High Quality (480p), size: 19 MB", and "YouTube Video Standard Quality (360p), size: 12 MB". Below the media options is a "File Name:" input field with the value "Take a Spin in Nick Mason's \$40 Million Classic Ferrari". To the right of the file name is a "MP4" button. Under "Conversion Format:", there are two rows of buttons. The first row contains "Download", "MP3", "M4A", and "AAC". The second row contains "MP4", "3GP", "AVI", "MOV", and "MKV". At the bottom is a "Start!" button with a green arrow icon and the text "With using this service you accept our Terms of Use."

Obtain a video from YT

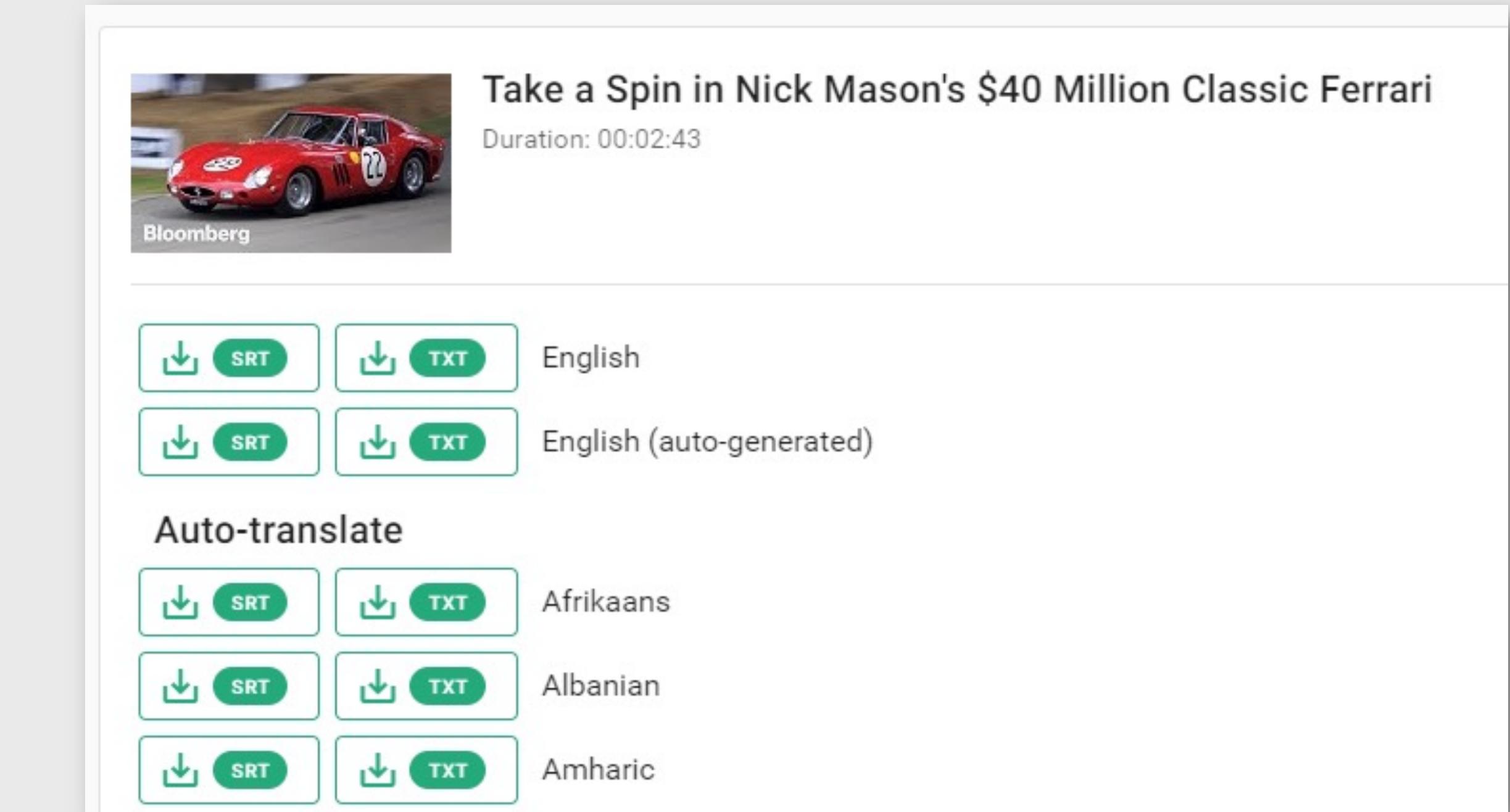
There are many sites, you just have to be careful

<https://www.y2mate.com/>

<https://yt1s.com/en1>

# DOWNLOAD SUBS

Obtain subs from YT



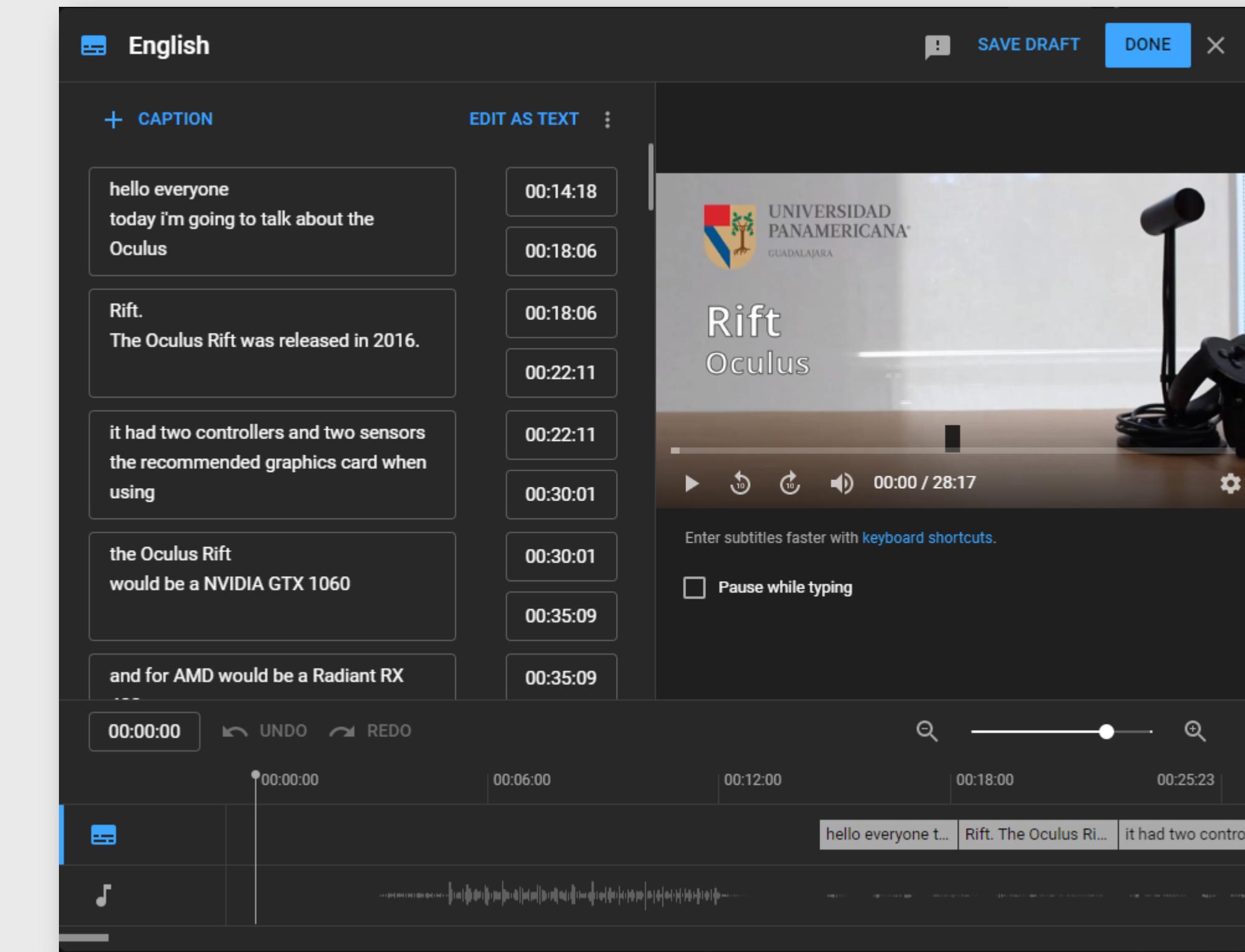
There are many sites, you just have to be careful

<https://savesubs.com/es>

<https://www.dvdvideosoft.com/online-youtube-subtitles-download>

# CREATE SUBS

Upload a video to YT



Setup the information correctly and it will automatically generate them

# HANDBRAKE

Created in 2003

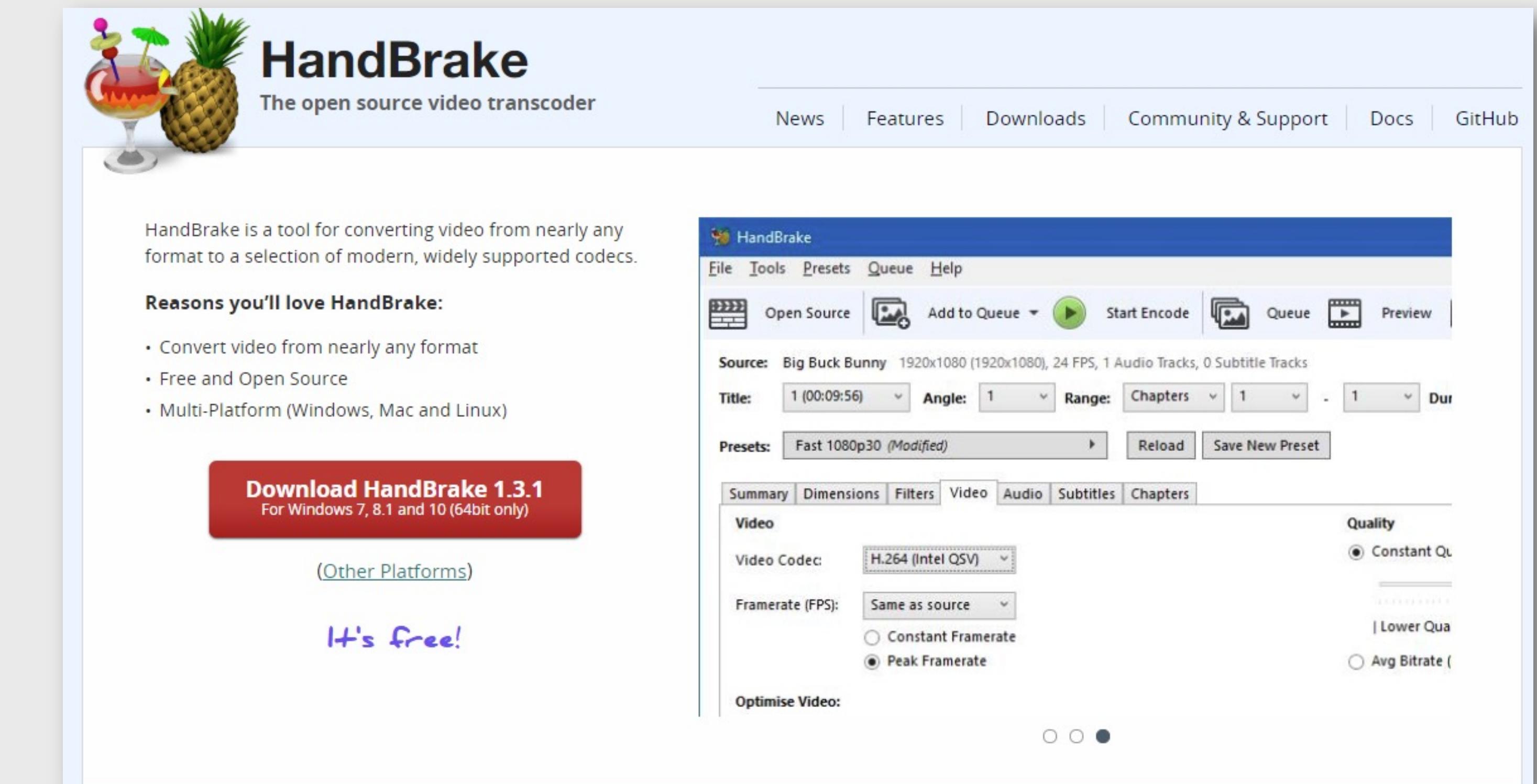
Eric Petit

GNU GPLv2

Hardware accelerated

Written in Objective-C, C, C#

Uses FFmpeg, libvpx and x265



# CLASSWORK

Remove audio

Add subtitles (burn-in/hard)

Trim the video to the first 66 seconds

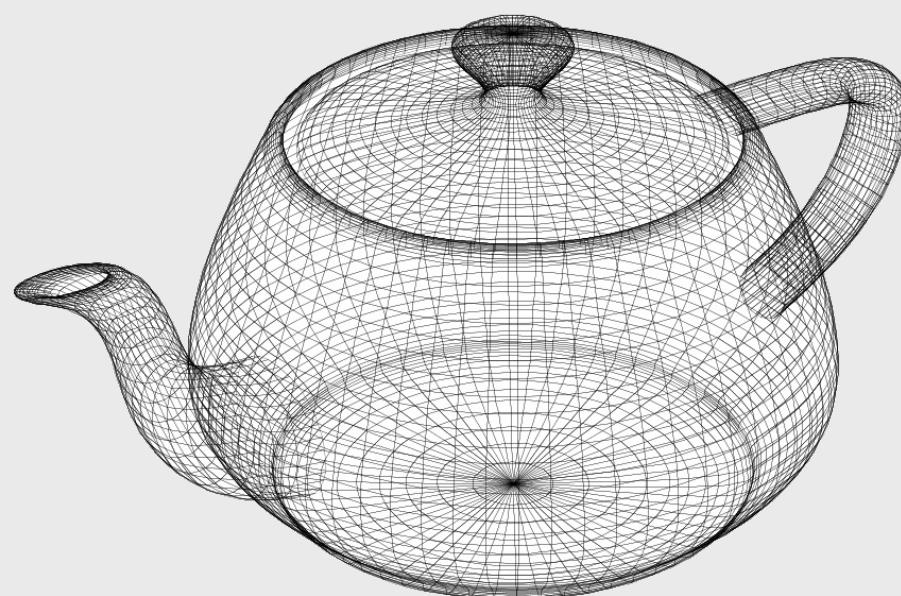
Upload as a comment the commands you used and the video

Challenge Mode (0.3x)



Highly entertaining

# REFLECTION



Pato

Charly

Carlos S

Dubin

Emiliano

Jaime

Valeria

Kenzo

Rodrigo

Cracklitos

Omar

Soto

Samuel

Fátima

