

Anatomy of a Video

When you look behind the scenes of a video on YouTube you will notice that each video has more than one video (in the example below, YouTube has 24 videos). Streaming video companies like YouTube, Netflix, Apple, Pluto and others need to support different devices with different bandwidths and screen resolutions. If the internet gets too bogged down, video providers will step down to the next video at a lower bandwidth until a higher bandwidth is available.

```
Loading video...
<Stream: itag="18" mime_type="video/mp4" res="360p" fps="30fps" vcodec="avc1.42001E" acodec="mp4a.40.2" progressive="True" type="video">
<Stream: itag="337" mime_type="video/webm" res="2160p" fps="60fps" vcodec="vp9.2" progressive="False" type="video">
<Stream: itag="336" mime_type="video/webm" res="1440p" fps="60fps" vcodec="vp9.2" progressive="False" type="video">
<Stream: itag="335" mime_type="video/webm" res="1080p" fps="60fps" vcodec="vp9.2" progressive="False" type="video">
<Stream: itag="136" mime_type="video/mp4" res="720p" fps="30fps" vcodec="avc1.4d401f" progressive="False" type="video">
<Stream: itag="247" mime_type="video/webm" res="720p" fps="30fps" vcodec="vp9" progressive="False" type="video">
<Stream: itag="334" mime_type="video/webm" res="720p" fps="60fps" vcodec="vp9.2" progressive="False" type="video">
<Stream: itag="135" mime_type="video/mp4" res="480p" fps="30fps" vcodec="avc1.4d401f" progressive="False" type="video">
<Stream: itag="244" mime_type="video/webm" res="480p" fps="30fps" vcodec="vp9" progressive="False" type="video">
<Stream: itag="333" mime_type="video/webm" res="480p" fps="60fps" vcodec="vp9.2" progressive="False" type="video">
<Stream: itag="134" mime_type="video/mp4" res="360p" fps="30fps" vcodec="avc1.4d401e" progressive="False" type="video">
<Stream: itag="243" mime_type="video/webm" res="360p" fps="30fps" vcodec="vp9" progressive="False" type="video">
<Stream: itag="332" mime_type="video/webm" res="360p" fps="60fps" vcodec="vp9.2" progressive="False" type="video">
<Stream: itag="133" mime_type="video/mp4" res="240p" fps="30fps" vcodec="avc1.4d4015" progressive="False" type="video">
<Stream: itag="242" mime_type="video/webm" res="240p" fps="30fps" vcodec="vp9" progressive="False" type="video">
<Stream: itag="331" mime_type="video/webm" res="240p" fps="60fps" vcodec="vp9.2" progressive="False" type="video">
<Stream: itag="160" mime_type="video/mp4" res="144p" fps="30fps" vcodec="avc1.4d400c" progressive="False" type="video">
<Stream: itag="278" mime_type="video/webm" res="144p" fps="30fps" vcodec="vp9" progressive="False" type="video">
<Stream: itag="330" mime_type="video/webm" res="144p" fps="60fps" vcodec="vp9.2" progressive="False" type="video">
<Stream: itag="139" mime_type="audio/mp4" abr="48kbps" acodec="mp4a.40.5" progressive="False" type="audio">
<Stream: itag="140" mime_type="audio/mp4" abr="128kbps" acodec="mp4a.40.2" progressive="False" type="audio">
<Stream: itag="249" mime_type="audio/webm" abr="50kbps" acodec="opus" progressive="False" type="audio">
<Stream: itag="250" mime_type="audio/webm" abr="70kbps" acodec="opus" progressive="False" type="audio">
<Stream: itag="251" mime_type="audio/webm" abr="160kbps" acodec="opus" progressive="False" type="audio">
```

Most video files are actually containers. mp4, avi, mov, mkv and flv are containers. Containers can hold a lot of information, audio tracks in different languages, video, closed caption text files etc.

Codecs are different from containers as they compress and decompress different file. The word codec was even taken from **compress** and **decompress**. Most popular codecs are h.264, h.265 or hevc, aac, mp3 and others vp9 is a youtube codec.

Tools like ffprobe and mediainfo allow you to see inside of a video container. Most containers contain a compressed video and at least 1 audio track.

StreamEngine allows you to convert up to 8 audio tracks inside of a container.

Below is a video from the united nations with many different language tracks.

Maintenance of international peace and security - Security Council, 9657th meeting



14 June 2024

Briefer: Ms. Alice Wairimu Nderitu, Under-Secretary-General, Special Adviser to the Secretary-General on the Prevention of Genocide

Here is what a .mov video container looks like with mediainfo, the following example has 4 - two channel audio tracks as well as 1 video track and 1 other track.

```
$ mediainfo 1080i60_SMPTE_8CH_audible.mov
```

General

Complete name : 1080i60_SMPTE_8CH_audible.mov
Format : MPEG-4
Format profile : QuickTime
Codec ID : qt 2005.03 (qt)
File size : 63.8 MiB
Duration : 14 s 181 ms
Overall bit rate mode : Variable
Overall bit rate : 37.7 Mb/s
Encoded date : UTC 2021-03-04 16:00:20
Tagged date : UTC 2021-03-04 16:00:22
Writing library : Apple QuickTime
TIM : 00;00;00;00
TSC : 60000
TSZ : 1001

Video

ID : 1
Format : ProRes
Format version : Version 0

Format profile	: 422 LT
Codec ID	: apcs
Duration	: 14 s 181 ms
Bit rate mode	: Variable
Bit rate	: 31.0 Mb/s
Width	: 1 920 pixels
Height	: 1 080 pixels
Display aspect ratio	: 16:9
Frame rate mode	: Constant
Frame rate	: 59.940 (60000/1001) FPS
Color space	: YUV
Chroma subsampling	: 4:2:2
Scan type	: Interlaced
Scan type, store method	: Interleaved fields
Scan order	: Top Field First
Bits/(Pixel*Frame)	: 0.249
Stream size	: 52.4 MiB (82%)
Writing library	: adb0
Language	: English
Encoded date	: UTC 2021-03-04 16:00:20
Tagged date	: UTC 2021-03-04 16:00:20
Color primaries	: BT.709
Transfer characteristics	: BT.709
Matrix coefficients	: BT.709

Audio #1

ID	: 2
Format	: PCM
Format settings	: Little / Signed
Codec ID	: sowt
Duration	: 14 s 181 ms
Bit rate mode	: Constant
Bit rate	: 1 536 kb/s
Channel(s)	: 2 channels
Channel layout	: M M
Sampling rate	: 48.0 kHz
Bit depth	: 16 bits
Stream size	: 2.60 MiB (4%)
Language	: English
Encoded date	: UTC 2021-03-04 16:00:20

Tagged date : UTC 2021-03-04 16:00:20

Audio #2

ID : 3
Format : PCM
Format settings : Little / Signed
Codec ID : sowt
Duration : 14 s 181 ms
Bit rate mode : Constant
Bit rate : 1 536 kb/s
Channel(s) : 2 channels
Channel layout : M M
Sampling rate : 48.0 kHz
Bit depth : 16 bits
Stream size : 2.60 MiB (4%)
Language : English
Encoded date : UTC 2021-03-04 16:00:20
Tagged date : UTC 2021-03-04 16:00:20

Audio #3

ID : 4
Format : PCM
Format settings : Little / Signed
Codec ID : sowt
Duration : 14 s 181 ms
Bit rate mode : Constant
Bit rate : 1 536 kb/s
Channel(s) : 2 channels
Channel layout : M M
Sampling rate : 48.0 kHz
Bit depth : 16 bits
Stream size : 2.60 MiB (4%)
Language : English
Encoded date : UTC 2021-03-04 16:00:20
Tagged date : UTC 2021-03-04 16:00:20

Audio #4

ID : 5
Format : PCM
Format settings : Little / Signed

Codec ID	: sowt
Duration	: 14 s 181 ms
Bit rate mode	: Constant
Bit rate	: 1 536 kb/s
Channel(s)	: 2 channels
Channel layout	: M M
Sampling rate	: 48.0 kHz
Bit depth	: 16 bits
Stream size	: 2.60 MiB (4%)
Language	: English
Encoded date	: UTC 2021-03-04 16:00:20
Tagged date	: UTC 2021-03-04 16:00:20

Other

ID	: 6
Type	: Time code
Format	: QuickTime TC
Duration	: 14 s 181 ms
Frame rate	: 59.940 (60000/1001) FPS
Time code of first frame	: 00:00:00;00
Time code, striped	: Yes
Language	: English
Encoded date	: UTC 2021-03-04 16:00:20
Tagged date	: UTC 2021-03-04 16:00:20

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Revision #3

Created 3 July 2024 15:29:31 by Admin

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