

# GPAC support for High Efficiency Image Format (HEIF)

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@WeAreGPAC



TELECOM  
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## ■ Multimedia OSS since 2003:

- MP4Box (packager) + MP4Client (player)
- MPEG #HEVC #DASH #SHVC #CENC + IETF + W3C
- IBC 2014: [Story of GPAC](#) 
- IBC 2015: [MP4Box.js - MP4 in the browser](#)
- IBC 2016: [Delivery of VR/360 videos using tiles w/ MPEG-DASH](#)



# What is HEIF?

## ■ New image container format

- Derive from ISOBMFF
- With some image-specific constructs (boxes)

## ■ Containing

- For individual images
- Image sequences (bursts)
- Image metadata

## ■ Codec agnostic

- Originally designed for HEVC still picture
- Officially supports AVC still and JPEG

## ■ Nice features

- Image transformations (rotation ,mirror, grid overlays...)
- Additionnal image planes (alpha masks, ...)
- Thumbnails , cover images, hidden images
- Codec optimizations (parameter sets sharing, tiling, multi-layer...)
- Progressive refinement



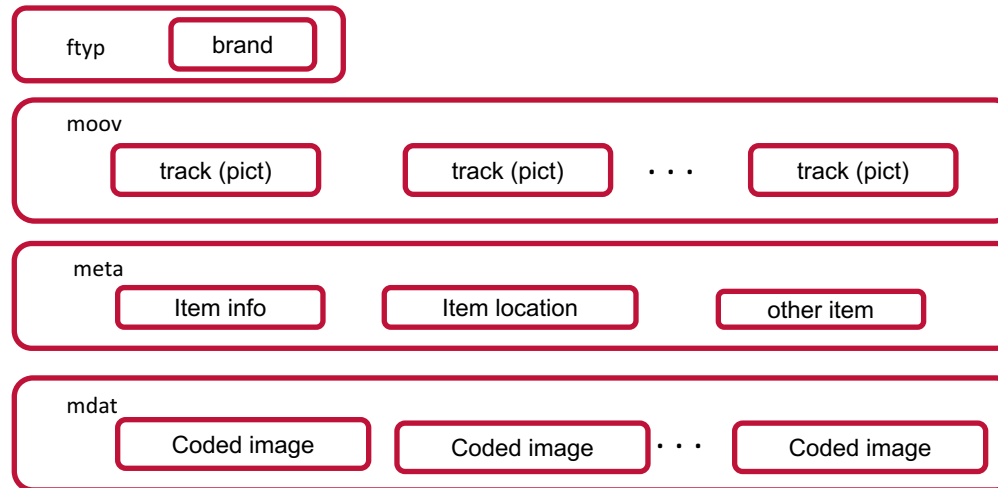
# HEIF container design

## ■ Single images

- stored as items in the “meta” box
- May share properties (transformation rules) and data (param sets, tile data) with other images

## ■ Image sequences

- stored as ISOBMF tracks
- With a new handled type “pict”



# HEIF brands and file extension

brand	coding format	extension	mime
mif1	any	.heif	image/heif
msf1	any	.heif	image/heif-sequence
heic	HEVC (Main or Main Still Picture profile)	.heic	image/heic
heix	HEVC (Main 10 or format range extensions profile)	.heic	image/heic
hevc	HEVC (Main or Main Still Picture profile)	.heic	image/heic-sequence
hevx	HEVC (Main 10 or format range extensions profile)	.heic	image/heic-sequence
avci	AVC (no profile restrictions), only still image	.avci	Image/avci
avcs	AVC (no profile restrictions)	.avcs	Image/avcs
jpeg	JPEG	Not defined	Not defined
jpgs	JPEG in 'mjpg' pict track	Not defined	Not defined



# Why would you use HEIF?

## ■ Codec efficient

- Up 2x better compression than JPEG when it uses HEVC
- Allows partitioning of a picture into tiles (HEVC)

## ■ Image collection

- Multiple images in the same file
- Efficient storage of image bursts and HDR images
- Keeps links between a master image and its derived versions (visual effects)

## ■ Extensible format

- You can add your own codec if needed!
- Not restricted to images
  - possibility to include other media types (text, audio,..)



# GPAC and HEIF

## ■ Generation and Extraction using MP4Box

```
MP4Box -add-image file.hvc:primary -ab heic -new image.heic
```

This will take the first image of the HEVC file, create a “meta” box, add one image item, make it a primary item and add the “heic” brand to the output file

```
MP4Box -add-image file.hvc:time=1.2:primary -ab heix -new  
image.heic
```

This command line will do the same but for the next IDR frame after the given time and the “heix” brand.

```
MP4Box -add-image tiled.hvc:split_tiles:primary -ab heic -new  
tiled.heic
```

This command line will take a tiled HEVC stream and generate one item per tile and one item for the entire image.

## ■ Initial support of heif playback in MP4Client



# For more information

HEIF Post :

<http://gpac.io/2017/06/09/gpac-support-for-heif/>

Tile Based HEVC Post :

<http://gpac.io/2017/02/01/hevc-tile-based-adaptation-guide/>

GPAC source code :

<https://github.com/gpac/gpac/>

