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Title **Image File Format Conformance**
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1 Introduction

We have implemented some support for the Image File Format (IFF) in the GPAC Open Source Software (<http://gpac.io>) in particular the ability to package images in IFF files. This contribution proposes a set of files for conformance for IFF, in particular filling some of the gaps of the existing conformance suite.

2 Conformance suite analysis

2.1 ItemLocationBox

In the current conformance files, all bitstreams use version 0 of the box. This means that the following features are not tested:

- 32-bits item_counts, item_ids
- construction methods using the 'idat' box or items

Additionally, all files use the same value for offset_size, length_size, base_offset_size. This means that 64-bits extents are not tested.

Finally, all files have a single extent by item. Interleaving of items data is not tested, for example progressive loading of an image and its alpha mask.

This contribution proposes a bitstream with construction_method = 2 (see below) but does not cover the other missing cases.

2.2 Data Reference

All files use dref with flags set to 1. No bitstream uses data located outside of the IFF file.

2.3 Order and essentiality of properties

The order in which properties are given, in particular when essential properties are used is not tested. It could be interesting to have a bit stream with an (unknown) essential property first, followed by known non-essential properties. It would be expected that this file does not render.

2.4 4CC

We checked all 4CC used in the Image File Format specification and compared them to those present in the conformance bitstreams. Here is the result ("present" means already used in the conformance bitstreams):

Features present:

- 'mif1' (brand)
- 'msf1' (brand)
- 'hevc' (brand)
- 'elst' (edit list)
- 'vide' (track type)
- 'pict' (track type)
- 'thmb' (track & item reference)
- 'aux1' (item reference)
- 'base' (item reference)
- 'refs' (sample group)
- 'cdsc' (item reference)
- 'hvc1' (item type)
- 'Exif' (item type)
- 'ding' (item type)
- 'iovl' (item type)
- 'grid' (item type)
- 'iden' (item type)
- 'hvcC' (track & item configuration)
- 'auxC' (item configuration)
- 'ccst'
- 'iprp'
- 'ipco'
- 'ipma'
- 'ispe' (item property)
- 'clap' (item property)
- 'irot' (item property)
- 'grpl'
- 'altr'

Features not present:

- | | |
|---------------------------------|-------------------------------|
| - 'heix' (image brand) | provided in this contribution |
| - 'hevx' (image sequence brand) | |
| - 'pasp' (item property) | provided in this contribution |
| - 'rloc' (item property) | provided in this contribution |
| - 'tbas' (track reference) | provided in this contribution |
| - 'hvt1' (item type) | provided in this contribution |
| - 'pixi' (item property) | |
| - 'dpnd' (item reference) | |
| - 'colr' (item property) | |
| - 'auxv' (track type) | |
| - 'auxi' (track sample entry) | |
| - 'subs' (sample group) | |
| - 'mint' (item type) | |
| - 'md5i' | |

- 'stmi' (sample group)
- 'mime' (item type) with XMP metadata
- 'mime' (item type) with MPEG-7 metadata

3 New conformance bitstreams

3.1 HEVC Tile items

In the current conformance suite, there is no bitstream exercising HEVC tiles as tile items. We provide such bitstreams at the location <http://download.tsi.telecom-paristech.fr/gpac/MPEG/IFF/Conformance/> described in this contribution. Here are their descriptions.

- **T1 (iff_hevc_tile_single_item.heif)**: an item with one HEVC tile (with only its tile data, the data for the complete image is not present in the file). The item type is 'hvt1'. The item has 2 essential properties:
 - the 'ispe' property indicates tile width and height.
 - the 'hvcC' property contains the configuration for the complete image (i.e. not for decoding the tile as small image)
 The 'rloc' property is not used.
 The brands can only contain 'mif1'.
- **T2 (iff_hevc_tile_multiple_items.heif)**: 4 tile items (each with the item_type and properties as indicated in T1) coding entirely an image, with a 2x2 tiling. The 'hvcC' property is the same for all tile items and is shared with the same property index. There is no item describing the rendering of the entire image. Brand is unchanged. Rendering of the composition of the items is not explicitly described. The absence of 'rloc' does not allow the composition.
- **T3 (iff_hevc_tile_multiple_items_tbas.heic)**: same as T2 but with an additional 'hvc1' item corresponding to the complete image. The NAL units are shared between the 'hvc1' and 'hvt1' items by using construction_method = 2. The brands contain 'heic'. 'rloc' are used, and consequently 'tbas' track references.

3.2 Non-tiled Image items

A simple HEVC image item is provided in:

- **iff_hevc_single_item.heic**

An additional bitstream based on the Main 10 profile is provided:

- **iff_hevc_single_item_main10.heic**

4 Recommendation

We recommend adding the contributed bitstreams to the conformance suite of IFF. It is suggested that the missing features be considered "at-risk" for removal in a future corrigendum.