INTERNATIONAL ORGANISATION FOR STANDARDISATION
ORGANISATION INTERNATIONALE DE NORMALISATION
ISO/IEC JTC1/SC29/WG11
CODING OF MOVING PICTURES AND AUDIO

ISO/IEC JTC1/SC29/WG11 MPEG2015/M35849
February 2015, Geneva, Switzerland

Source **Telecom ParisTech**
Status **For consideration at the 111th MPEG Meeting**
Title **Storage of WebVTT Thumbnail tracks in ISOBMFF**
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1 Introduction

One of the usages seen on the Web of WebVTT is to provide preview thumbnails[1]. This contribution reviews how such content can be packaged in the ISOBMFF using 14496-30 or the Image File Format and identifies missing tools for such storage.

2 Preview Thumbnails Storage

2.1 Individual Thumbnail Files

In the following approach, WebVTT is used to provide the timing of the associated thumbnail images. The images can be stored separately as in the following example.

```
WEBVTT

00:00.000 --> 00:05.000
/assets/preview1.jpg

00:05.000 --> 00:10.000
/assets/preview2.jpg

00:10.000 --> 00:15.000
/assets/preview3.jpg

00:15.000 --> 00:20.000
/assets/preview4.jpg
```

There are several options to store these thumbnail images, along with their timing:

1) Create a JPEG track (most sensible option)
2) Store the WebVTT file using a 'wvtt' track (most straightforward option)

In both cases, there is currently no way to indicate that this track is a thumbnail track associated to a video. We suggest defining a 'thmb' track reference type (same code as the item reference type in the Image File Format 23008-12).

[1] http://support.jwplayer.com/customer/portal/articles/1407439-adding-preview-thumbnails

In this second case, there is a need to store the thumbnail images together with the WebVTT file. 14496-30 (section 4.4) allows using a 'meta' box in the track to store those images, whose URLs will be resolved by the WebVTT reader through ‘meta’ URL shadowing.

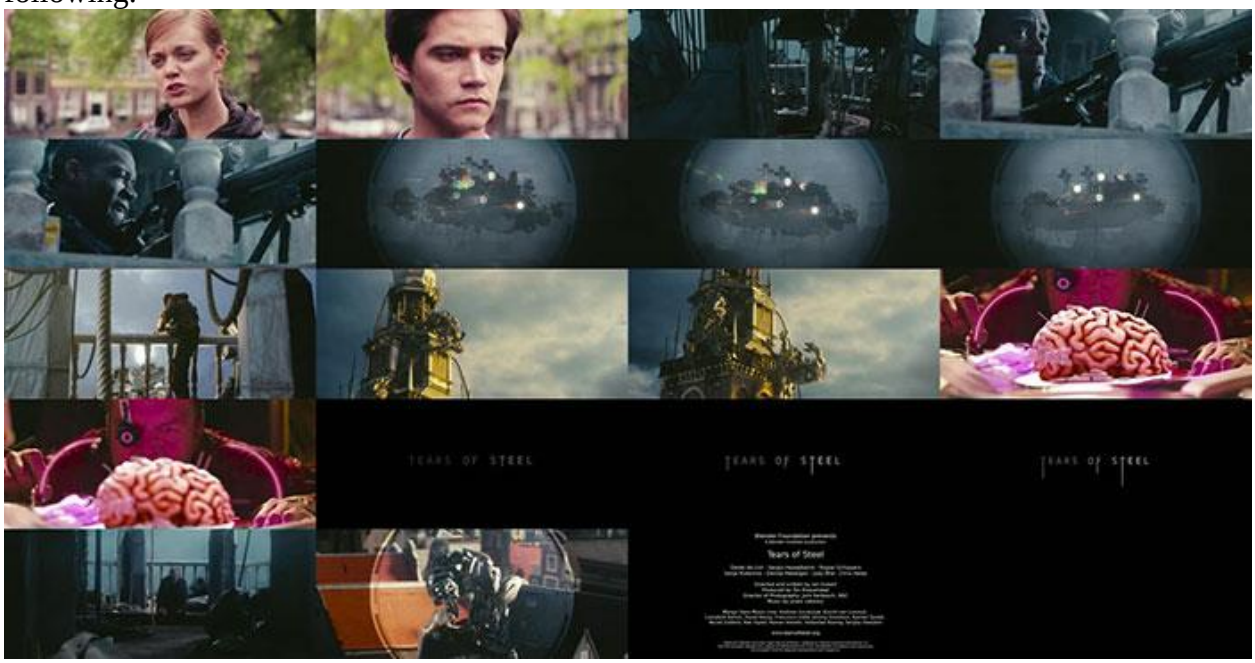
The 'meta' box would be as follows:
- have 4 items (the images), with the primary item set to any of the item.
- the handler type could be 'null' to "to indicate that it is merely being used to hold resources." as indicated in the ISOBMFF or 'pict' as in indicated in the IFF.
- The 'iinf' / ‘iloc’ boxes would be present and have 4 items with item_name = /assets/previewX.jpg.
However, in such case, it seems awkward that the media handler type for this subtitle track still be 'text', as recommended by 14496-30. The 'vide' handler should probably be better suited, as for the JPEG track.

The specification for handler says: “This box within a Media Box declares media type of the track, and thus the process by which the media-data in the track is presented ”

In this case, the “vide” seems appropriate, as the output of the VTT decoder is images.

2.2 Thumbnail Sprites

Another option used by content creators is to produce a thumbnail sprite image such as the following:



This can be done easily with tools such as ffmpeg and ImageMagick. The associated WebVTT file then becomes:

```
WEBVTT

00:00.000 --> 00:05.000
/assets/thumbnails.jpg#xywh=0,0,160,90
```

```
00:05.000 --> 00:10.000
/assets/thumbnails.jpg#xywh=160,0,320,90

00:10.000 --> 00:15.000
/assets/thumbnails.jpg#xywh=0,90,160,180

00:15.000 --> 00:20.000
/assets/thumbnails.jpg#xywh=160,90,320,180
```

In this case, the storage as a JPEG track is not possible. Only the storage of the WebVTT track is, in which case the use of the 'meta' box becomes mandatory.

The 'meta' box would therefore be as follows:
- have one item, with the primary item poiting to the image.
- the handler type could be 'null' to "to indicate that it is merely being used to hold resources." as indicated in the ISOBMFF or 'pict' as in indicated in the IFF.
- The 'iinf'/'iloc' box would be present and have 1 entry with item_name = /assets/thumbnails.jpg.

3 Conclusion

We recommend MPEG to define the 'thmb' track reference type. We also welcome further clarification on handler types for such tracks.

4 References

[1] Study of ISO/IEC DIS 23008-12 Carriage of Still Image and Image Sequences