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CTA WAVE Conformance Instructions to add new Media Profile

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1 Introduction

This document discusses on the implementation of media profile validation as required for the CTA-WAVE content conformance according to the WAVE content specification [1]. The document can be referred to add the identification of any new media profile to the conformance software.

2 Identification of the Media Profile

The following steps gives the flow of the program from beginning of the conformance test until the media profile identification.

1. The Conformance testing is initiated by either providing the MPD URL or uploading the MPD file on the conformance page (conformance.dashif.org)
2. The provided MPD is processed which involves extracting the segment URLs of each Representation/Track and downloading them.
3. Each Representation/Track is validated using *ISOSegmentValidator* and an xml file is created which dumps all the boxes/atoms with their attributes present in the Track. A sample atom-xml file is shown in Figure 1.

```

<atomlist>
  <ftyp majorbrand="iso5" version="0x1" compatible_brands="[ "avc1" "iso5" "dash" ]"> </ftyp>
  ▼<moov>
    <mvhd version="0" flags="0" creationTime="0x0" modificationTime="0x0" timeScale="1000" duration="0x0"> </mvhd>
    ▼<trak>
      <tkhd version="0" flags="3" creationTime="0x0" modificationTime="0xce60c832" trackID="1" duration="0x0"> </tkhd>
      ▼<mdia>
        <mdhd version="0" flags="0" creationTime="0x0" modificationTime="0x0" timescale="12288" duration="0x0"> </mdhd>
        <hdlr version="0" flags="0" handler_type="vide"> </hdlr>
        ▼<minf>
          <vmhd version="0" flags="1"> </vmhd>
          ▼<dinf>
            ▼<dref version="0" flags="0" entryCount="1">
              <url version="0" flags="1"/>
            </dref>
          </dinf>
          ▼<stbl>
            ▼<stsd version="0" flags="0" entryCount="1">
              ▼<vide_sampledescription sdType="avc1" dataRefIndex="1" version="0" revisionLevel="0"
                vRes="72.000000" dataSize="0" frameCount="1" depth="24" clutID="-1">
                ▼<avcC config="1" profile="77">
                  ▼<Comment profile="main" constraint_set0_flag="0" constraint_set1_flag="1" constraint_set2_flag="0"
                    lengthsize_minusone="3" COMMENT="length fields are 4 bytes">
                    ▼<NALUnit length="25 (0x19)" zero_bit="0x0" nal_ref_idc="0x03" nal_type="0x07"
                      <comment profile="main" constraint_set0_flag="0" constraint_set1_flag="1" constraint_set2_flag="0"
                        3.1" seq_parameter_set_id="0x0000" log2_max_frame_num_minus4="0" pic_order_cnt_type="0"
                        gaps_in_frame_num_value_allowed_flag="0x0" pic_width_in_mbs_minus1="79" Comment3="1"
                        1)*16 = 720" frame_mbs_only_flag="1" direct_8x8_inference_flag="0x1" frame_cropping_flag="0x0"
                        aspect_ratio_idc="0x1" Comment3="aspect ratio is 1:1-square" overscan_info_present_flag="0">

```

Figure 1 A sample atom-xml file for a video track

The atom-xml files are located in `/DASH-IF-Conformance/Conformance-Frontend/temp/<session_folder>/Adaptx/`

The parameters required for the media profile identification are present in the sample entry in *stsd* box as shown for video example track in Figure 2.

```

<vmhd version="0" flags="1"> </vmhd>
<indf>
  <dref version="0" flags="0" entryCount="1">
    <url version="0" flags="1"/>
  </dref>
</indf>
<stbl>
  <stsd version="0" flags="0" entryCount="1">
    <vide_sampledescription sdType="avc1" dataRefIndex="1" version="0" revisionLevel="0" vendor="" temporalQuality="0"
    vRes="72.000000" dataSize="0" frameCount="1" depth="24" clutID="-1">
      <avcC config="1" profile="77">
        <Comment profile="main" constraint_set0_flag="0" constraint_set1_flag="1" constraint_set2_flag="0" constraint_
        lengthsizeinuse="3" COMMENT="length fields are 4 bytes">
          <NALUnit length="25 (0x19)" zero_bit="0x0" nal_ref_idc="0x03" nal_type="0x07" comment0="Sequence parameter s
          <comment profile="main" constraint_set0_flag="0" constraint_set1_flag="1" constraint_set2_flag="0" constrai
          3.1" seq_parameter_set_id="0x0000" log2_max_frame_num_minus4="0" pic_order_cnt_type="0" log2_max_pic_order
          gaps_in_frame_num_value_allowed_flag="0x0" pic_width_in_mbs_minus1="79" Comment1="width (PW + 1)*16 = 1280
          1)*16 = 720" frame_mbs_only_flag="1" direct_8x8_inference_flag="0x1" frame_cropping_flag="0x0" vui_paramet
          aspect_ratio_idc="0x1" Comment3="aspect ratio is 1:1-square" overscan_info_present_flag="0x0" video_signal
          timing_info_present_flag="0x1" num_units_in_tick="1" time_scale="48" fixed_frame_rate_flag="0x0" nal_hrd_p
          vcl_hrd_parameters_present_flag="0x0" pic_struct_present_flag="0x0" bitstream_restriction_flag="0x1" motio
          max_bytes_per_pic_denom="0" max_bits_per_mb_denom="0" log2_max_mv_length_horizontal="11" log2_max_mv_lengt
          max_dec_frame_buffering="4" one_bit="0x1"/>
        </NALUnit>
        <NALUnit length="4 (0x4)" zero_bit="0x0" nal_ref_idc="0x03" nal_type="0x08" comment0="Picture parameter set"
        entropy_coding_mode_flag="0x1" pic_order_present_flag="0x0" num_slice_groups_minus1="0x0000" num_ref_idx_l0
        weighted_pred_flag="0x1" weighted_bipred_idc="0x2" pic_init_qp_minus26="0" pic_init_qs_minus26="0" chroma_qp
        constrained_intra_pred_flag="0x0" redundant_pic_cnt_present_flag="0x0" one_bit="0x1"> </NALUnit>
      </Comment>
    </avcC>
  </vide_sampledescription>
</stsd>
<stts version="0" flags="0" entryCount="0"> </stts>
<stsc version="0" flags="0" entryCount="0"> </stsc>
<stsz version="0" flags="0" sampleSize="0" entryCount="0"> </stsz>
<stco version="0" flags="0" entryCount="0"> </stco>
</stbl>

```

Figure 2 Atom list showing video media profile parameters

4. CTAWAVE sub-module contains the file CTAWAVE_SelectionSet.php which contains function *getMediaProfile()*.

The structure of the source files-

DASH-IF-Conformance

- CTAWAVE

- o CTAWAVE_Handle.php
- o CTAWAVE_Initialization.php
- o CTAWAVE_PresentationProfile.php
- o CTAWAVE_SelectionSet.php

The function *getMediaProfile()* has three parts , each for video, audio and subtitle tracks. This function extracts the parameters from the atom-xml file and identifies the media profile of the track.

```

getMediaProfile()
{
    if (track type is video)
        //collect the video parameters- codec, profile, level, resolution, color,
        //transfer and matrix coefficients, framerate.
        //then call function
        checkAndGetConformingVideoProfile(parameters)

    If(track type is audio)
        //collect the audio parameters- codec, profile, channels, sampleRate.
        //then call function
        checkAndGetConformingAudioProfile(parameters)

    if(track type is subtitle)
        //collect the subtitle parameters- codec, content_type, mimetype,
        //mimeSubtype
        //then call function
        checkAndGetConformingSubtitleProfile(parameters)
}

```

The function *checkAndGetConformingVideoProfile()* compares the extracted parameters of the input track with the parameters from the Table 1 to check which media profile the track conforms to. Similarly audio and subtitle media profile check happens.

3 Addition of new media profile

The new media profile can be added in the respective functions for example- for video – *checkAndGetConformingVideoProfile()* or a new function similar to this can be written and called from *getMediaProfile()*.

4 Unit testing

Unit tests for the media profile checks are under */CTAWAVE/UnitTests/MediaProfilesTest.php* After implementing new media profile, unit test can be added to the test file *MediaProfileTest.php*.

Instructions to create and run unit tests can be found in
/CTAWAVE/UnitTests/Doc/UnitTesting_Doc.pdf

5 Reference

[1] - WAVE Content Specification, April 2018