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1 Introduction

The Media Source Extensions API [1] is developed by the W3C HTML Working Group. It defines JavaScript interfaces to enable the consumption of non-linear media in the browser and the adaptive streaming of media to a browser. It is currently only supported in Google Chrome Canary, when some flags are enabled. Several JavaScript libraries have been developed to implement DASH in Google Chrome Canary: [3], [4], [5].

As already presented in previous contributions, the GPAC Open Source project [2] already supports DASH playback (see m26906). This contribution reports on the implementation of the W3C MSE APIs in GPAC. We believe, given that both specifications MPEG-DASH and W3C MSE provide mechanisms for adaptive stream, that this report may be of interest to the group.

2 Implementation details

MSE relies on the support of the following technological aspects:

- Parsing of container formats such as MP4
- Media decoding and rendering
- Executing of JavaScript code
- Processing of HTML Media Elements

GPAC supports the first 3 aspects. The fourth aspect is more complex and was partly added. The HTML Media Elements are the following HTML 5 elements: <video>, <audio>, <source>, <track>. The processing of the HTML Media Elements can be decomposed in the parsing, rendering and execution of JS related interfaces.

GPAC does not support the parsing and rendering of HTML documents. But recently, the SVG Working Group decided to support the HTML Media Elements[1]. Since GPAC already supports parsing and rendering of SVG documents, the support for the HTML Media elements was added to that SVG support.

So far, a very basic support for the HTML5 audio and video elements was added. It is based on the MPEG LASeR/SVG Tiny 1.2 audio/video element code. The support for the src attribute

[1] http://www.w3.org/Graphics/SVG/WG/wiki/SVG2_Requirements_Input#Video.2Faudio_on_demand

(nor the source element, neither the track element), and for some parts of the JS APIs (HTMLMediaElement, HTMLVideoElement, HTMLAudioElement) was added.

It is still missing many aspects (readyState management, tracks, events, ...) but you can already experiment with videos in an SVG context (transforms, animations ...). Some basic tests are available in the GPAC repository.

Additionally, support for the MSE APIs was added. Again, the whole MSE spec is not (yet?) supported but it can already be tested. Namely, you can create a MediaSource object, attach it to a video (or audio) element, create MP4 source buffers, append MP4 segments (or entire files) in order, out-of-order (using the abort("continuation") method), change quality. Some elements which are not yet implemented are: some events, frame removal and dependent frame removal, audio splicing, MPEG-2 TS segments, text tracks ... The JavaScript code to use GPAC's MSE support is not yet fully compliant with the W3C specification. Some examples are available here[2]. In particular, it is not yet possible to reuse the DASH JS or DASH IF players but we expect to have full support soon.

Finally, as described in m29230, we have added support for SVC or WebVTT files in MP4Box and expect to be able to experiment with them using MSE.

3 Conclusion

This addition to GPAC provides an additional way to experiment with DASH, with SVC, with WebVTT or other media supported by GPAC. We would like to encourage people to use GPAC to test the DASH features, either through its native implementation or through JavaScript librairies and to report bugs if any.

References:

[1] Media Source Extensions, W3C Editor's Draft 08 April 2013, https://dvcs.w3.org/hg/html-media/raw-file/tip/media-source/media-source.html

[2] GPAC, http://gpac.wp.mines-telecom.fr/

[3] YouTube MPEG-DASH player, http://dash-mse-test.appspot.com/dash-player.html

[4] DASH JS, http://www-itec.uni-klu.ac.at/dash/?page_id=746

[5] DASH Industry Forum Reference Client, http://dashif.org/reference/players/javascript/0.2.2/index.html

[2] http://download.tsi.telecom-paristech.fr/gpac/MSE/