

Usages of DASH for Rich Media Services

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Rich Media Services

Services featuring

- Multiple media elements
 - audio, video, text, 2D/3D graphics
- Dynamicity
 - Changing text, animated graphics, ...
 - Possibly triggered on server-side (streaming)
- Synchronization with media elements
- Interactivity

Example of Rich Media Technologies

• HTML 5, MPEG-4 BIFS, Flash...



Context

Rapid development of HTTP Streaming technologies

• MPEG, 3GPP, OIPF, W3C, ...

Increased usages of Rich Media Technologies

- Presentation glue for A/V content (HTML+video)
- Streamed services including live meta-data (SVG/DIMS, MPEG-4 BIFS)





- How can Rich Media languages use DASH-delivered audio/video content?
 - Study A

How can Rich Media content be delivered over DASH?

• Study B



Study A: Description

Goal

- Provide a generic API for MPD manipulations within a rich media document
- Compatibility with existing Rich Media languages

Hypothesis

- Bandwidth related manipulations are handled at the DASH level
- Trick Mode related manipulations may be handled at both DASH and browser levels

Requirements

The API shall provide access to:

- The desired video resolution & frame rate
- The desired language
- The desired quality
- The desired view



Study A: Architecture



Study A: Solutions

Use of fragment identifiers

<video src="dash.mpd#viewpoint=1&width=176&height=144">

Use of attributes in DASH namespace

Use of ECMAScript

```
var track = createTrackFromDASH(`subtitles',`lang','en');
```



Study B: Description

Goal

- Deliver Rich Media Streams synchronously with related audio/video data
- Automatic repackaging of existing broadcast interactive services over DASH

Requirements

- Enable transposition of the traditional carrousel approach
 - Minimize bandwidth, leverage HTTP
 - Preserve interactivity

Use case

- Digital Radio Service [demonstration: <u>http://www.youtube.com/watch?v=Bmer91TZhCo</u>]
 - T-DMB (MPEG-2 TS + MPEG-4 A/V + MPEG-4 BIFS)



Study B: Architecture



Digital Radio Service & Broadcast environment

Digital radio stream







Approach 1: Basic Segmentation

Digital radio stream segments



Media Segment

Media Segment

Segment the MPEG-2 TS

- Possibly with « carousel » alignment
- Bandwidth inefficient because of carousel
- ⇒Need to extract « carousel » data out of media segments





Approach 2: Initialization Segment

Digital radio stream segments

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Initialization Segment Media Segment

Media Segment

Data into IS not yet allowed by the DASH standard

- Problem: how to signal version number increment
 - Without requiring the use of new periods



Approach 3: External data references

Digital radio stream segments



Approach 3: External data references (cont'd)

External Data References and Segment formats

- Not possible with MPEG-2 TS syntax
 - Potentially possible with FLUTE or others but high overhead
- Possible with DataReferenceBox in MP4
 - Not yet authorized by the DASH standard

Additional problem

 Avoid carousel refresh for DASH clients already « tuned-in »

⇒Use of « redundant » signaling in MP4

Additional Consideration:Redundant Signaling



Study B: Summary of solutions

Use of data in Initialization Segment (IS)

Under evaluation for DASH

Use of external data references (EDR)

- Requires MP4
- Under evaluation for DASH

Use of redundant signaling (RS) in MP4 for RM data

- Accepted as an MP4 amendment
- Possible joint usages:
 - IS+EDR or EDR + RS or IS+EDR+RS



Implementation

GPAC Open Source Projet

- DASH Player
 - Supports MPD and M3U8 playlists
- MP4Box
 - Segmentation tool for MP4 files
- MP42TS
 - DVB & DMB Mux
 - Segmentation





Thank you

Questions?

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