Media synchronisation in DVB and HbbTV
New sync standards for TVs and tablets
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Contents

- DVB specification on inter-device media synchronisation
  - Architecture
  - Protocols
- HbbTV profile on multi-stream and inter-device media synchronisation
  - Profile of DVB sync spec
  - API
  - Application-controlled life cycle
  - Buffer model
- Open issues
DVB spec on inter-device media sync

- **DVB CSS**: Companion Screens and Streams
- **Spec**: DVB A167-2, a.k.a. ETSI TS 103 286-2
- **Use case**: companion-screen content synchronised to TV programme
DVB spec on inter-device media sync

Architecture and protocols

- Material Resolution Service (MRS)
- Broadcast or Internet
- Companion Screen Application (CSA)
- TV Device

Identifiers, Timelines and MRS location

Content Identifier (CSS-MRS)

Material Information on structure of broadcast and relationship to Timelines

Timing information

Content Identification and other Information (CSS-CII)
Wall Clock Synchronisation (CSS-WC)
Timeline Synchronisation (CSS-TS)
Trigger Events Notification (CSS-TE)

Internet

Home Network

© DVB
DVB spec on inter-device media sync

- Content identification
- Intrinsic and extrinsic timelines
  - MPEG-TS PTS: Presentation Time Stamp
  - ISOBMFF: Composition Time
  - TS Adaptation (TSAP or MPEG TEMI)
  - MPEG DASH: Period Relative Timeline
  - ... extensible
- Correlation timestamps in CSS-MRS protocol to translate between timelines
HbbTV profile for media synchronisation

- HbbTV 2.0, to become ETSI TS 102 796 v1.3.1
- Both multi-stream and inter-device
  - Use cases: alternative audio, sign language, subtitle, ...

Note: support of multiple video decoders is optional in HbbTV 2.0
HbbTV profile for media synchronisation

- Timelines and protocols from DVB spec
- Common API for multi-stream and inter-device
- Terminal can be both “master” and “slave”

Slide 7
Open issues

- Accurately control play-out for synchronization
  - HDMI 2.0 offers limited control
  - Use cases: multiple screens, 3D audio, ...

- Control timing across various domains
  - DVB and HbbTV assume single network segment
  - Use cases: tablet connected via 3G/4G, social TV, large scale synchronisation

- Synchronising and orchestrating multiple sources
  - DVB and HbbTV assume single broadcaster domain
  - DVB already has some "hooks" in Material Information
  - Use cases: user-generated A/V streams at live events
Conclusions

- DVB and HbbTV standards for media sync
  - DVB: protocols between TV and tablet
  - HbbTV: API for TV, also multi-stream
- Lots of open issues

THANK YOU!
HbbTV profile for media synchronisation

- **Buffer model**
  - Optional buffer of minimally 30 MB in TV for all types media sync
  - Ancillary content to be pre-loaded on CDN
    - (or editorial delay of broadcast TV)
  - MPEG DASH shall be buffered on CDN
HbbTV profile for media synchronisation

API and life cycle of MediaSynchroniser object

- void initMediaSynchroniser (Object mediaObject, String timelineSpecification)
- void initSlaveMediaSynchroniser (String css_ci_service_url)
- void addMediaObject (Object mediaObject, String timelineSelector, CorrelationTimestamp correlationTimestamp, Number tolerance)
- void removeMediaObject (Object mediaObject)
- void updateCorrelationTimestamp (Object mediaObject, CorrelationTimestamp correlationTimestamp)
- void enableInterDeviceSync (function callback)
- void disableInterDeviceSync (function callback)