HbbTV 2.0.2 Explained

HbbTV Specification Versions

- HbbTV specs have a formal name and an informal name

Informal Name	Formal Name
HbbTV 2.0.2	TS 102 796 V1.5.1
HbbTV 2.0.1	TS 102 796 V1.4.1
HbbTV 2.0	TS 102 796 V1.3.1
HbbTV 1.5	TS 102 796 V1.2.1
HbbTV 1.0	TS 102 796 V1.1.1

What's New in 2.0.2?

1. Integration of HbbTV with
   - High Dynamic Range (HDR) video
     - both PQ10 and HLG
   - High Frame Rate (HFR) video
     - e.g. 100Hz or 120Hz
   - Next Generation Audio (NGA)
     - Both AC-4 and MPEG-H audio
   - HbbTV doesn't require any of these
     - Up to national, broadcaster or operator specs to require them
2. Fixes for bugs in HbbTV 2.0.1 found in development of apps, TVs, STBs and test cases
   - TVs and STBs not supporting any of HDR, HFR, NGA still get the fixes
   - Some previously published in errata #1 and errata #2 to HbbTV 2.0.1

DVB-DASH

- Most of the work for HDR, HFR & NGA in DASH was done in DVB
- Updated DVB-DASH (formal name will be TS 103 285 V1.2.1)
  - Describes how to include HDR, HFR and NGA in manifest
  - Fixes issues found by users of previous versions
  - Currently available from DVB as BlueBook A168 https://www.dvb.org/resources/public/standards/a168_dvb_mpeg-dash_nov_2017.pdf
- Updated DVB audio & video codec spec (formal name TS 101 154 V2.4.1)
  - Annex L defines profiles of AVC and HEVC video codecs for broadband
    - Based on a detailed comparison of CMAF codec profiles with existing DVB broadcast profiles
    - HbbTV TVs and STBs will use the same video decoder for broadcast and broadband
  - http://www.etsi.org/deliver/etsi_ts/101100_101199/101154/02.04.01_60/ts_101154v020401p.pdf

HDR

- Builds on DVB selection of technologies; HLG and PQ10
    - Both of these are just extra data carried in an HEVC BT.2020 bitstream
    - No additional work needed on the bitstream by HbbTV or DVB
- For broadband
    - Builds on 2 MPEG-DASH mechanisms
        - Essential Property descriptors define extra information essential to decoding the content – i.e. players need to ignore content if there's one of these that they don't understand
        - Supplemental Property descriptors define extra information useful to decoding the content – i.e. players can still present the content if there's one of these they don't understand
    - Common to both HLG and PQ10 are Essential Property descriptors to identify BT.2020 video
        - PQ10 also identified by an extra Essential Property descriptor
        - HLG is backwards compatible so also identified by a Supplemental Property descriptor
    - DVB-DASH defines a new 2017 profile and PQ10 must be in this profile & not the old 2014 profile
        - Existing 2014 profile DASH players cannot be relied on to respect Essential Property descriptors so without this might attempt to present PQ10 video as SDR
            - Will not give a good result
- For broadcast
    - Apps can test if a device can decode a HDR/HFR/NGA broadcast and show that instead of a regular one

HFR

- Broadcast and broadband HFR have different optimisations
  - Both enable delivery of a single elementary stream of 100Hz / 120Hz video
- Broadcast optimisation
  - Content coded at 100Hz/120Hz can be delivered as
    - one stream for 50Hz/60Hz devices &
    - a second enhancement stream for 100Hz/120Hz devices to combine with the 1st stream
- Broadband optimisation
  - Enable producing in 100Hz/120Hz & extracting a 50Hz/60Hz subset without re-encoding
    - Relies on a feature of HEVC that has not been widely used so far

NGA

- A lot in common between AC-4 and MPEG-H audio around integration with HbbTV and DASH
  - Audio for a content is built up of multiple components
    - E.g. background music, effects & several language tracks
  - Content provider can define a number of preselections – combinations of components
    - E.g. 1) background music + effects + language A, 2) background music + effects+ language B, 3) effects + language A without background music
- Can be used in 3 possible modes
  - Single Representation Single Preselection (SRSP)
    - A DASH Representation contains a single preselection & all necessary audio components
    - Changing language or accessibility choice means changing Adaptation Set
  - Single Representation Multiple Preselection (SRMP)
    - A DASH Representation contains >=1 preselection and the union of all necessary audio components across all of them
    - Audio components not used by the currently presented preselection are downloaded & then discarded
    - Changing language or accessibility choice means staying within the same Adaptation Set
  - Multiple Representation Multiple Preselection (MRMP)
    - Content contains multiple preselections
    - Audio components can be distributed across multiple DASH Adaptation Sets
    - e.g. each component in its own Adaptation Set or some combinations
    - Potential to avoid downloading and discarding unused audio components
    - Optional in DVB-DASH and HbbTV

Device Capabilities

- Existing HbbTV device capabilities mechanism extended to allow apps to test which HDR, HFR, NGA technologies are supported
- For broadband, list of combinations of supported codecs extended to include HDR, HFR, NGA, e.g.

```
<video_profile name="MP4_HEVC_UHD_25_HEAAC_EBUTTD" type="video/mp4" transport="dash"
sync_tl="dash_pr" hdr="urn:dvb:dash:bitstream:video:hdr_hlg10"/>

<video_profile name="MP4_HEVC_UHD_25_HEAAC_EBUTTD" type="video/mp4" transport="dash"
sync_tl="dash_pr" hdr="urn:dvb:dash:bitstream:video:hdr_pq10"/>

<video_profile name="MP4_HEVC_UHD_HFR_25_HEAAC_EBUTTD" type="video/mp4" transport="dash"
sync_tl="dash_pr" hdr="urn:dvb:dash:bitstream:video:hdr_hlg10"/>

<video_profile name="MP4_HEVC_HD_25_10_AC4-C_EBUTTD" type="video/mp4" transport="dash"
sync_tl="dash_pr"/>

<video_profile name="MP4_HEVC_HD_25_10_MPEGH_EBUTTD" type="video/mp4" transport="dash"
sync_tl="dash_pr"/>
```

- New `<broadcast>` element added to list supported broadcast technologies, e.g.

```
<broadcast>urn:dvb:broadcast:ird:video:50_Hz_HEVC_HDTV_10-bit_IRD</broadcast>
```

- HDR capabilities based on URNs so no barrier to including non-DVB HDR technologies
- New `<video_display_format>` element added to give applications visibility of the UHD capabilities of the display (whether built-in or connected).

Selected Significant Bug Fixes – Errata #3

- deviceID (#7598)
  - Renamed to distinctive identifier and clarified circumstances and options for when it may not be accessible to apps for privacy reasons
- Approval and pre-approval of companion screen app launching HbbTV app (#7970)
  - Clarified that TV / STB must support some mechanism to approve / pre-approve apps to be launched & that this must allow future apps to be launched
    - Either by asking the user or by the manufacturer updating a some sort of white-list
- Relative file names accessing a carousel after channel changing (#7697)
  - Added explanation of issue around using relative file names to access files in a carousel after channel changing & use of the HTML `<base>` element to solve this
- W3C Encrypted Media Extensions (#7607)
  - Updated to refer to W3C Recommendation and not a Working Draft
- MPEG common encryption with conventional DRM and W3C clear key (#6215)
  - Clarified choice between EME and oipfDrmAgent APIs if content would use common encryption with both conventional DRM and clear key

Selected Significant Bug Fixes – Errata #2

- Sharing cookies between apps from the same broadcaster on different services (#7323)
  - User preferences set on one broadcast service were not available on another service from the same broadcaster due to the DVB-SI service_id being included in the origin of an HTML page loaded from the broadcast. The origin used for such HTML pages has been changed to permit this.
- SHA-1 sunset date has passed (#7162)
  - The SHA-1 signature algorithm is now forbidden in HbbTV as it is in the web
- Enable apps to prioritise which DRM is used (#7088)
  - Extra method added to allow apps to prioritise which DRM is used when a TV/STB supports >1
- DASH players for HTML5 video element and A/V control object (#7046)
  - TVs and STBs are required to use the same DASH player regardless of the API used hence avoiding duplication of tests and testing between the two APIs
- Including or not including data services in the service list (#7045)
  - Explain that there are reasons why data services with non-supported apps may still be relevant to include in the channel list
- Spec version of an app in the AIT signalling and in the DOCTYPE (#6915)
  - Reinforced existing requirements that HbbTV 2.0.1 TVs and STBs run apps for earlier versions of the spec according to HbbTV 2.0.1 regardless of the (minimum) spec version signalled in the AIT or the DOCTYPE
- Clarify video/broadcast object behaviour when a/v object is playing and channel is changed (#6211)
  - Clarified behaviour around channel changing while a broadcast-related app is presenting broadband delivered video
- Ignoring unsupported AIT descriptors (#5583)
  - TVs and STBs are required to ignore unsupported AIT descriptors in order to avoid problems in the future should HbbTV need to use additional ones
- CSS3 nav-* properties (#5385)
  - Support for these has been dropped from web browsers. They are deprecated in HbbTV and will be removed in a future HbbTV specification

Selected Significant Bug Fixes – Errata #1

- Permit use of DVB security solution for "man in the middle" attacks on broadcast
  - Updated version of TS 102 809 to the one including this solution
  - Up to broadcasters, operators and national specifications to require this be supported
- Avoid leaking "secret" stream URLs via Media Synchroniser (#6049)
  - For some broadcasters' VoD services, the URL of the broadband media stream or manifest includes sensitive information, such as authentication tokens
  - Additional contentIdOverride property added to the mediaSynchroniser object to allow apps to override the contentID used for inter-device sync
- UPnP version to be used with DIAL (#5910)
  - UPnP v1.1 was required but 1.0 is more common and there is no benefit from requiring 1.1 so 1.0 is now also allowed

Testing

- HbbTV process requires unit test definitions before a new spec is published
  - 177 unit tests identified, reviewed & approved
- HbbTV expects to order test cases before Easter for delivery before the summer
- HDR, HFR, NGA test cases will be included in July 2018 release of HbbTV test suite
  - Some may be approved for device certification, others may still be "candidate" status