# HbbTV TA Phase 2 Explained

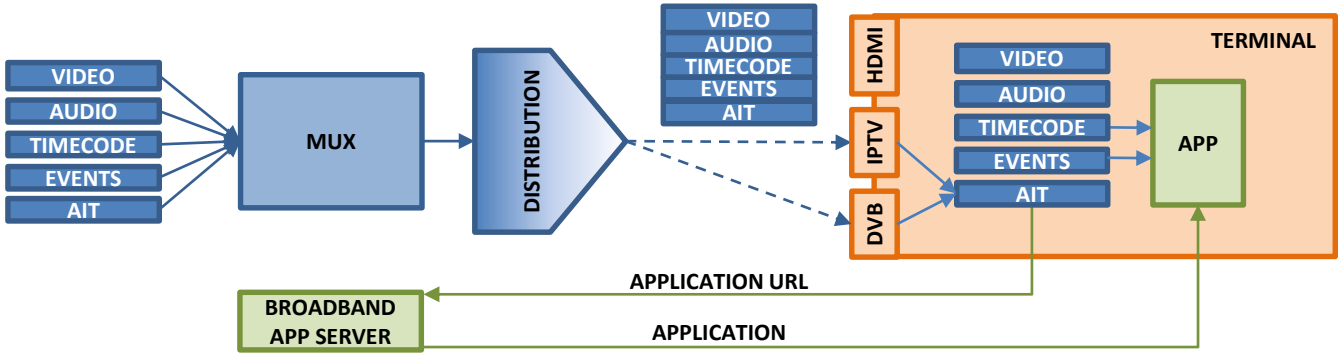
## Where "Broadcast" Reaches the TV over HDMI from a Set-top Box

# Combining HbbTV ADB2 and TA

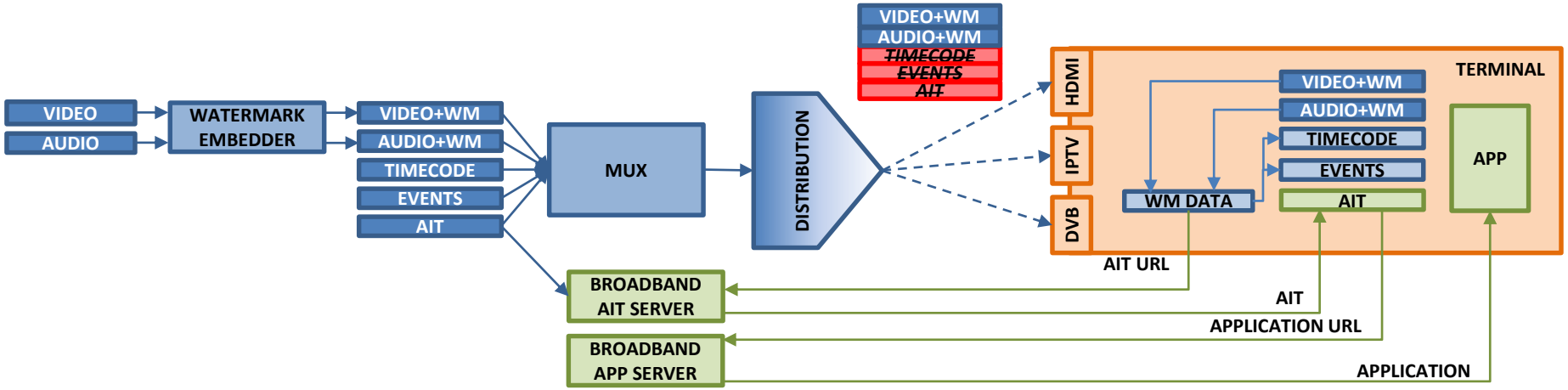
- HbbTV-TA phase 2 is built out of 2 parts
  1. Application Discovery over Broadband phase 2 (ADB2)
     - Enables basic core HbbTV functionality where linear broadcast TV reaches the TV set over HDMI from a STB
     - Uses ATSC 3.0 watermarks in video & audio to launch HbbTV apps, provide stream events and so on
  2. HbbTV-TA phase 1 enables faster & more precise control of switching broadcast -> ad & back than basic core HbbTV
- Together ADB2+TA enable
  - Launching HbbTV apps in linear broadcast TV reaching the TV via HDMI
  - Apps that have faster & more precise control of switching HDMI -> ad & back than basic core HbbTV

# Application Discovery over Broadcast

- Traditionally, HbbTV Terminals “discover” applications using an Application URL carried in an Application Information Table (**AIT**) received via broadcast
- Timecode and stream events are found multiplexed into the broadcast stream
- This is supported in the **HbbTV Core Specification** (and referenced DVB specs)



- Watermarking extends use cases for Application Discovery over Broadband to include:
  - Service delivery to the HbbTV Terminal via **HDMI and other non-broadcast interfaces**
  - **Timecode**
  - **Stream Events**



# Step by Step Walkthrough ADB2+TA

1. Broadcaster application launched according to "Application Discovery over Broadband"
2. Broadcaster sends message to app announcing that 'placement opportunity' is near
   - Message payload could be included in video watermark
   - Message payload could be fetched via broadband based on signalling in audio watermark
   - Message payload could be the same as HbbTV TA phase 1
3. App confirms that the terminal can safely replace ad
   - App confirms that terminal capabilities are sufficient
   - App confirms that user environment is configured appropriately (e.g. audio routing)
4. App asks ad decision server for an ad that could be played
   - Response could use existing web advertising standards ("VAST")
5. App preloads ad
   - Preload may be 100% if there's enough RAM / depending on broadcaster / advertiser requirements
     - 100% preload uses Web "Media Source Extensions" API – new to HbbTV in TA phase 1 or HbbTV 2.0.3
6. App tells TV when to switch from HDMI to ad
   - Time based on media timeline reconstructed from audio & video watermarks
   - New "fast media switch API"
7. App manages presentation of ad
   - App monitors watermark presence to detect activity on the STB (e.g. showing EPG) & respond accordingly
8. App reports back on playback of ad
   - Critical otherwise nobody gets paid
9. App switches back from ad to HDMI
   - Also using new "fast media switch API"

Black is TA phase 1, Green is the existing ADB2, Blue is completely new (ADB2+TA)

# Some Care Required by Broadcasters

- ADB2+TA is not a perfect solution
  - User experience not as good as TA on the STB would be
  - Broadcasters (or suppliers) will need understanding of the behaviour of the STBs in the markets they address
  - Consumer messaging & communication is important
- Many audio configurations are possible between STB and TV
  - Some will work fine
  - Some won't work with ADB2 at all
  - Broadcasters need to be careful only to substitute ads when it's safe to do so
    - ADB2+TA spec enables apps to query this
- Video watermark may be visible in the top line of broadcast video
  - Important for when user asks for EPG on STB while an ad is being replaced on TV
  - Care required depending on content
  - Could upset viewers & result in complaints

# Looking Forwards

- Remember ADB and TA are separate specs
  - Not part of the natural evolution of the core HbbTV spec
  - Dialog required between broadcasters & manufacturers about their implementation
    - Care needed to avoid a "Catch 22"
- Assuming TA phase 1 is a success …..
  - Builds momentum, goodwill & mutual credibility for introducing ADB2+TA
  - Many commercial relationships for TA phase 1 seamlessly move forwards to ADB2+TA
  - Apps & technical infrastructure from TA phase 1 are *largely* re-usable for ADB2+TA
- Unit tests needed for implementations in TVs
  - 57 unit test descriptions for ADB2+TA
  - 123 unit test descriptions for the ADB2
  - Unit tests now need creating from these descriptions & reviewing
- ADB2+TA is submitted to ETSI for consideration as TS 103 464 V1.3.1

# Background Information

- Specifications
  - TA
    - ETSI TS 103 736-1 and ETSI TS 103 736-2
  - ADB+TA
    - Update to ETSI TS 103 464 integrating ETSI TS 103 736
- HbbTV "explainer"
  - These slides mostly from "ADB2+TA Explained"
  - ADB2 has its own explainer here