HbbTV DRM Specification Explained

Background – Why?

- One (the?) main use-case for HbbTV is finding & consuming professional video content
  - As the quality improves from SD to HD to UHD, (US) content owners increasingly require stricter and stricter DRM
  - Access to content protected by DRM is more & more important for HbbTV content providers
  - Giving consumers access to content protected by DRM is more & more important for TV manufacturers
  - TV sets now (all?) include DRM to give access to Netflix, YouTube, etc
- HbbTV Association Board decided to bring DRM into the HbbTV ecosystem on the same basis as other technologies

History of HbbTV and DRM

- HbbTV historically ignored DRM
  - It was a proprietary technology with many vendors who were fiercely protective of their market position
- DRM tests for HbbTV TVs appeared as country and platform-specific proprietary add-ons outside the HbbTV test suite
  - Initially developed by Farncombe (now Cartesian) for the ancestor of today's FAVN
  - Now licensed by Resillion as part of their Ligada product family
  - Also independently developed for Italy by Kineton
- HbbTV started hearing that lack of working DRM was a reason not to develop HbbTV apps
  - In 2017, HbbTV released a DASH-DRM reference app and content.
    - HbbTV pays the developer to run this on their receiver zoo & provide HbbTV with anonymised stats
- Then along came hardware DRM, specifically PlayReady SL3000
  - At first there was no test content for HbbTV and SL3000
  - In 2022, SL3000 test content added to the DASH-DRM reference app

HbbTV and DRM in 2024/5

- 2024
  - Reviewed scope of UK and Italian country-specific test suite add-ons
  - Issued RfP to bring these into the HbbTV test suite
- 2025
  - Contract for tests awarded to Kineton with DRM license server provided by Nagra
  - First tests delivered April 2025
  - DRM specification stable draft in April 2025
  - Tests should be included in 2025-2 test suite release for 2026 products
    - Some in approved state, some may only be "additional" with approval to come in 2026 for 2027 products

DRM Specification Contents

- Educational & informative material
  - 5. Overview of DRM and DRM features for people who aren't that familiar with the technology. Introduction to concepts referred to later in the document.
  - 6. Overview of various features included in HbbTV like native DASH players, JavaScript DRM APIs
- Advice to stakeholders
  - 7. Choice of DRM systems
  - 8. Generic advice to stakeholders about inter-op and what they may need to do.
- Requirements on terminals
  - 9. Requirements that are independent of any one DRM system.
- Process
  - 10. Some objective criteria for future inclusion of additional DRM systems.
- Status of the ecosystem
  - A.1 Market data & how its gathered
  - A.2 Known issues
- DRM specific information and requirements
  - B. PlayReady
  - C. Widevine
  - D. Marlin (not relevant in HbbTV anymore).

JavaScript DRM APIs in HbbTV

- oipfDrmAgent
  - Historical API dating back > 10 years
  - Supported in the HbbTV installed base
  - Works with the native DASH player
    - With both HTML5 media element API and older object element API
- W3C EME
  - The standard web API
  - Works with JavaScript DASH players built on W3C MSE
  - Works with native DASH player only with ClearKey
    - May not work with native DASH player with Commercial DRM

Advanced Features

- Persistent licenses
  - i.e. not requesting a license when there already is one
    - Important to keep costs under control
- Key rotation
  - May be needed to some extent for live/linear
- Hardware DRM / trusted execution environment / security levels
  - PlayReady SL3000, Widevine level 1
- Transitioning between encrypted and unencrypted content
  - Needed for advert insertion or replacement as ads are not encrypted
- Key per track or key per resolution
  - Separate keys for video & for audio are common
  - Seamless switching between separate keys for SD video, for HD video and for UHD video is much less common

Choice of DRM Systems

- The HbbTV DRM specification does not require a specific DRM system
  - This is a commercial choice for stakeholders
- In the real world only 2 DRM systems are present in the installed base of HbbTV TVs
  - PlayReady and Widevine
  - Please see later for market data on how widely these are supported
- Choosing a DRM system with an open, tested definition of how to integrate with HbbTV will give better interop than one without that – which reduces costs
  - The HbbTV DRM spec is such an open & tested definition

Advice on Interop

- Interop of Apps and terminals is complex because HbbTV historically ignored DRM
- Identifying the content protection requirements
  - Over-engineering the DRM system will waste money
- Risk assessment
  - How 'bleeding edge' are the set of proposed features?
    - e.g. VOD is lower risk than live/linear
  - How much experience do the development team have with HbbTV and DRM?
  - Is there a certification program in operation in the market?
- Communication with implementers
  - Notice to implementers of new services & significant changes
  - Advance notice of high-risk changes
  - Someone to respond to questions & issues raised by implementers
- Test applications and test streams
  - Make representative streams / apps available (i.e. same workflow)
- Enhanced testing by the application / service developer
  - Have the apps tested in a receiver 'zoo'
- Certification of Terminals
  - Like LOVEStv, tivù

Market Data Summary – 2017 onwards

Test	MSE-EME		HTML5 Video object + OIPF DRMAgent	AVObject + OIPF DRMAgent
	2017-2023	2017-2024		
PlayReady™ CENC encryption	41%	64%	92%	92%
PlayReady™ Different KID for A/V	38%	52%	47%	45%
PlayReady™ Security Level 3000	34%	46%	40%	40%
Widevine™ SL1 and SL3	39 %	43%	4 % -> 9%	8%
PlayReady™ CBCS encryption	22%	28%	0%	0%
Widevine™ CBCS scheme	27%	45%	0%	0%
Multiperiod DRM	75%	78%	7%	--
Multi-DRM with PR and WV (*)	55%	55%	77%	78%
Persistent Licenses	--	5%	43%	44%

Key;
- PR = “PlayReady™”; WV = “Widevine™”
- Green is >= 67%
- Yellow is < 67% but > 33%
- Red is <= 33%
- Grey is no data available yet or feature not supported on enough devices to be statistically useful.

Numbers are not weighted by market significance.

Market Data Summary – 2022 - 2024

- PlayReady™ version 3.0 or better is supported in 95% of devices (PlayReady™ can be missing because of licensing or specific market issues)

  NOTE 1: When considering 2023 and 2024 devices, this increases to 97%.
- The oipfDRMAgent API is supported with the following specific features working:
  - CENC
  - Separate KID values for video and audio
  - Security Level 2000 for the above
  - Security Level 3000 is supported in 70% of devices

  NOTE 2: When considering 2023 and 2024 devices, this increases to 75%.
- The EME API is supported in 84 % of the devices, with the following specific features working:

  NOTE 3: When considering 2023 and 2024 devices, this increases to 87%.
  - PlayReady™ CENC, all devices, all devices supporting EME API
  - Separate KID values for video and audio, all devices supporting EME API
  - PlayReady™ Security Level 2000, all devices supporting EME API
  - When considering 2023 and 2024 devices, 85% support the PlayReady™ Security Level 3000 with the EME API.
- Widevine™ SL1 and SL3, supported in 65% of the devices supporting EME API

  NOTE 4: When considering 2023 and 2024 devices, this falls to 60%.

Summary - DRM is supported with HbbTV

- Since 2017, 92% support PlayReady with CENC and the old oipfDrmAgent API
  - 70% support SL3000 hardware DRM
- Since 2022, 97% support PlayReady >= v3.0
  - 84% with the EME API, 85% with SL3000
- 60%-65% support Widevine

(*) Percentages not weighted by market presence