



DASH-DRM Reference Application OSMART Workshop December 2023



What is the Reference Application („RefApp“)?



- HbbTV application and sample content to showcase the HbbTV technology together with MPEG-DASH and DRM
- Includes a complete workflow with free & open source MPEG-DASH content creation tools (with and without DRM)
- Also includes an HbbTV client application with video catalogue of sample content, including the video player made compatible with receivers having support for HbbTV 1.5 and HbbTV 2.0.1 specifications

mpeg-DASH
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Management

What is the RefApp for?

- The goal was to create a recipe for successfully and rapidly deploying HbbTV services using MPEG-DASH and DRM
- Also to improve HbbTV services interoperability outside the scope of HbbTV's official Test Suite. With the openly available deliverables the TV industry can test and validate their receivers and implementations.
- With the Reference App HbbTV product vendors have an easy way to test their DRM implementation and video playback compatibility with the MPEG-DASH content with and without DRM that is not part of the HbbTV Test Suite



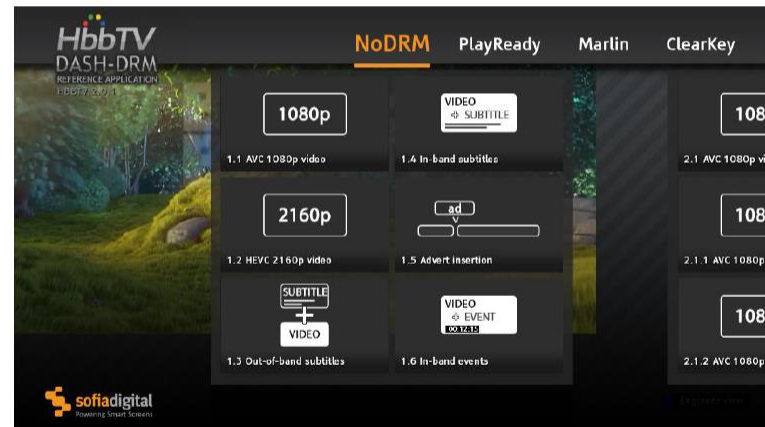
How to use the RefApp?

- The reference application is freely distributed to any party interested in testing the technology by HbbTV association.
- Project deliverables includes documentation covering the creation of valid MPEG-DASH files from users own video content.
Furthermore, the reference application is implemented in a way which makes the code easily reusable for anybody to implement their own DASH video streaming application.



How to use the RefApp? (cont'd)

- The reference application presents a catalogue of content items for the TV viewer, which can then be played in clear unencrypted format or with each supported DRM system.
- Application and the content catalogue is designed in a way that it is easily extended with additional content and DRM systems.



How to use the RefApp? (cont'd)

- Further the application is written in such a way it allows an application author to determine the structure and purpose of each functional area allowing them to easily understand the code and to “pick & choose” which parts of the application to copy.
- As well as running on HbbTV 1.5 and 2.0.1 terminals, the reference application can be run on web browsers supporting W3C MSE and EME, and in the future HbbTV versions.



Testing



Tested against devices in the market:
(details anonymized, available to HbbTV members)

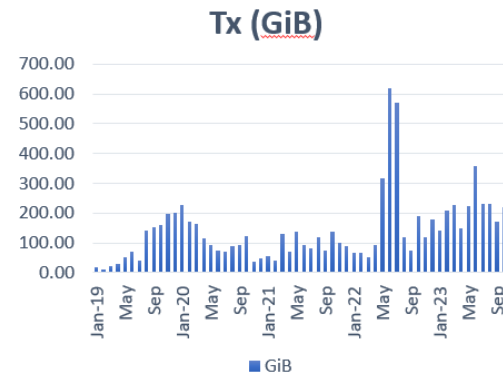
Year	Model Count
2017	10
2018	8
2019	11
2020	14
2021	14
2022	13
2023	14
2024	4*

*2024 models “under development”

Model year	Index	HbbTV	DRM ID	DRM	Subtitles	Audio Switch	Ad insertion	Live	Multiperiod (MSE-EME)	SL3000 (OIPF)
2018	62	1.2.1	Flagready	OK	OK	OK	OK	OK	N/A	OK
2017	08	1.2.1	Flagready	OK	N/A	N/A	N/A	N/A	N/A	OK
2018	09	1.2.1	Flagready	OK	OK	OK	NOT OK	NOT OK	NOT OK	NOT OK
2017	11	1.2.1	Flagready	OK	OK	OK	NOT OK	OK	OK	NOT OK
2018	12	1.4.1	Flagready	OK	OK	NOT OK	NOT OK	N/A	OK	NOT OK
2017	14	1.4.1	Flagready	OK	N/A	N/A	N/A	OK	N/A	N/A
2017	16	1.2.1	Flagready	OK	OK	OK	NOT OK	NOT OK	NOT OK	NOT OK
2018	18	1.5.1	Flagready	OK	OK	OK	OK	OK	NOT OK	NOT OK
2018	20	1.4.1	Flagready	OK	OK	OK	OK	NOT OK	NOT OK	NOT OK
2018	21	1.2.1	Flagready	OK	NOT OK	NOT OK	OK	N/A	OK	NOT OK
2017	23	1.4.1	Flagready	OK	NOT OK	NOT OK	NOT OK	N/A	NOT OK	NOT OK
2017	32	1.2.1	Flagready	OK	N/A	N/A	N/A	OK	NOT OK	N/A
2017	34	1.2.1	Flagready	OK	OK	OK	OK	OK	NOT OK	NOT OK
2019	38	1.5.1	Flagready	OK	OK	OK	OK	OK	NOT OK	NOT OK
2018	47	1.4.1	Flagready	OK	NOT OK	NOT OK	OK	OK	OK	NOT OK
2019	48	1.4.1	Flagready	OK	OK	OK	OK	OK	NOT OK	NOT OK
2019	50	1.2.1	Flagready	OK	OK	OK	OK	OK	NOT OK	NOT OK
2019	51	1.2.1	Flagready	OK	OK	OK	OK	OK	NOT OK	N/A
2019	52 / 121	1.5.1	Flagready	OK	OK	OK	OK	N/A	OK	NOT OK
2019	53	1.2.1	Flagready	OK	NOT OK	NOT OK	OK	OK	N/A	NOT OK
2017	58	1.2.1	Flagready	OK	N/A	N/A	N/A	N/A	N/A	N/A
2018	59	1.2.1	Flagready	N/A	N/A	N/A	N/A	N/A	N/A	NOT OK
2019	60	1.5.1	Flagready	OK	OK	NOT OK	NOT OK	OK	NOT OK	NOT OK
2019	61	1.1.1	Flagready	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2020	66	1.5.1	Flagready	OK	OK	OK	OK	NOT OK	OK	NOT OK
2020	68	1.5.1	Flagready	OK	OK	OK	OK	NOT OK	OK	OK
2020	70	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	OK
2020	71	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	NOT OK
2019	72	1.4.1	Flagready	NOT OK	NOT OK	OK	OK	NOT OK	NOT OK	NOT OK
2020	74	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	NOT OK
2020	75	1.2.1	Flagready	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2020	76	1.5.1	Flagready	N/A	NOT OK	NOT OK	NOT OK	OK	OK	OK
2020	77	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	OK
2020	78	1.5.1	Flagready	OK	NOT OK	NOT OK	OK	NOT OK	NOT OK	NOT OK
2020	81	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	NOT OK
2021	83 / 84	1.5.1	Flagready	OK	N/A	N/A	N/A	OK	OK	OK
2021	86	1.5.1	Flagready	OK	NOT OK	OK	NOT OK	OK	OK	NOT OK
2020	89	1.5.1	Flagready	OK	OK	OK	NOT OK	OK	OK	NOT OK
2021	90	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	NOT OK
2020	91	1.2.1	Flagready	OK	NOT OK	NOT OK	OK	OK	N/A	NOT OK
2021	96	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	NOT OK
2021	97	1.5.1	Flagready	OK	NOT OK	NOT OK	NOT OK	NOT OK	NOT OK	OK
2020	98	1.5.1	Flagready	OK	OK	OK	NOT OK	OK	OK	OK
2019	99	1.5.1	Flagready	OK	NOT OK	OK	NOT OK	NOT OK	OK	NOT OK
2021	101	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	OK
2021	105	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	OK
2021	106	1.5.1	Flagready	N/A	NOT OK	NOT OK	NOT OK	OK	OK	NOT OK
2021	107	1.5.1	Flagready	OK	OK	NOT OK	OK	OK	OK	NOT OK
2021	109	1.5.1	Flagready	OK	NOT OK	OK	OK	OK	OK	OK
2021	110	1.5.1	Flagready	OK	NOT OK	NOT OK	OK	OK	OK	NOT OK
2022	111	1.6.1	Flagready	OK	OK	NOT OK	NOT OK	OK	OK	NOT OK
2021	112	1.5.1	Flagready	OK	NOT OK	NOT OK	NOT OK	OK	OK	OK
2022	113	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	OK
2022	114	1.5.1	Flagready	OK	OK	OK	OK	OK	NOT OK	OK
2021	116	1.5.1	Flagready	OK	NOT OK	OK	NOT OK	NOT OK	OK	NOT OK
2021	117	1.5.1	Flagready	OK	NOT OK	OK	NOT OK	OK	OK	OK
2021	118	1.5.1	Flagready	OK	OK	OK	NOT OK	OK	OK	NOT OK
2021	120	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	OK
2017	122	1.2.1	Flagready	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2022	123	1.5.1	Flagready	NOT OK	NOT OK	NOT OK	NOT OK	OK	OK	NOT OK
2022	124	1.5.1	Flagready	OK	NOT OK	NOT OK	NOT OK	NOT OK	OK	NOT OK
2022	125	1.5.1	Flagready	OK	OK	OK	OK	OK	NOT OK	OK
2022	126	1.5.1	Flagready	OK	OK	OK	OK	OK	OK	OK

Features

- [Production](#) version:
 - PlayReady, Marlin, Widevine
 - Non-DRM Streams for reference
 - Subtitles, Audio stream selection via colour buttons
 - Live and VOD HbbTV and DVB DASH profiles
 - CBCS
 - Multiperiod
- [Staging](#) version (all the production material plus work awaiting further stakeholder feedback):
 - Persistent Licences
 - MultiDRM example
- Testing version: Ongoing work:
 - Key rotation
 - Persistent licenses for MSE-EME
 - 4K HEVC DRM Live content



- <https://github.com/HbbTV-Association/ReferenceApplication>
- Complete tool chain for re-creating all test assets locally available at github project page