

HbbTV DASH DRM Reference Application

OSMART 9th May 2022

Project Target and Timeline

- Development started around 2017 after it was recognized, that DASH DRM playback was a major interoperability issue
 - Commissioned by IITF (Improving interoperability Task Force)
- Goal of the project was to offer a toolbox of tested and proven components enabling implementation of a widely tested and working DASH DRM Player application
- Project also offers “industry best-practice” tools for content creation
- First commit was made in May 2017, and a version was released for testing for IRT IOP workshop in July the same year under the MIT licence
- Now the project is celebrating its 5th birthday, development is managed by IITF bi-weekly calls

General application characteristics

- All code released under MIT license in github, under HbbTV Association: <https://github.com/HbbTV-Association/ReferenceApplication>
- Three versions always available at <https://refapp.hbbtv.org>
 - Production
 - Updated three times per year, synced with HbbTV Test Suite Releases
 - Staging
 - Includes features stable enough for wide-spread early access testing
 - Testing
 - a “playground” for new features and ideas, development work
- Three “profiles”
 - “OIPF”
 - Uses AVObject and OIPF DRM object for video playback “HbbTV 1.5”
 - “HTML5”
 - Uses HTML5 video player and OIPF DRM object for video playback “HbbTV 2.0.x”
 - MSE-EME
 - Uses MSE-EME extensions and dash.js player for playback
 - Compatible with PC browsers, Xboxes, etc.
- Dasher tool and video library
 - For creating new test contents
 - Pre-created clear video content (AVC+HEVC)
 - Expressplay Marlin/Playready and Microsoft Playready test servers available for tests

Testing

- DASH DRM Reference App project produces a monthly “testing report” offering a quick overview of current status of device implementations to HbbTV members
- Anonymized list with 70+ devices in active testing cycle
- All test cycles include the complete set of test tasks, monitoring also the robustness of old features as well as takeup of new ones
- Results offer insights to operators about the feasibility of introducing new features to network

	A	B	C	D	E	F	G	H	I	J	K
	Model year	Index	HbbTV	DRM ID	DRM	Subtitles	Audio Switch	Ad insertion	Live	Multiperiod (MSE-EME)	SL3000 (OIPF)
30	2019	72	1.4.1	Playready	NOT OK	NOT OK	OK	OK	NOT OK	NOT OK	NOT OK
31	2020	74	1.5.1	Playready	OK	OK	OK	OK	OK	OK	NOT OK
32	2020	75	1.2.1	Playready	N/A	N/A	N/A	N/A	N/A	N/A	N/A
33	2020	76	1.5.1	Playready	N/A	NOT OK	NOT OK	NOT OK	OK	OK	OK
34	2020	77	1.5.1	Playready	OK	OK	OK	OK	OK	OK	OK
35	2020	78	1.5.1	Playready	OK	NOT OK	NOT OK	OK	NOT OK	NOT OK	NOT OK
36	2020	81	1.5.1	Playready	OK	OK	OK	OK	OK	OK	NOT OK
37	2018	82	1.4.1	Playready							
38	2021	83 / 84	1.5.1	Playready	OK	N/A	N/A	N/A	OK	OK	OK
39	2021	86	1.5.1	Playready	OK	NOT OK	OK	NOT OK	OK	OK	NOT OK
40	2020	89	1.5.1	Playready	OK	OK	OK	NOT OK	OK	OK	NOT OK
41	2021	90	1.5.1	Playready	OK	OK	OK	OK	OK	OK	NOT OK
42	2020	91	1.2.1	Playready	OK	NOT OK	NOT OK	OK	OK	N/A	NOT OK
43	2021	95	1.5.1	Playready	OK	OK	OK	OK	OK	OK	NOT OK
44	2021	97	1.5.1	Playready	OK	NOT OK	NOT OK	NOT OK	NOT OK	NOT OK	OK
45	2020	98	1.5.1	Playready	OK	OK	OK	NOT OK	OK	OK	OK
46	2019	99	1.5.1	Playready	OK	NOT OK	OK	NOT OK	NOT OK	OK	NOT OK
47	2021	101	1.5.1	Playready	OK	OK	OK	OK	OK	OK	OK
48	2021	105	1.5.1	Playready							
49	2021	106	1.5.1	Playready	N/A	NOT OK	NOT OK	NOT OK	OK	OK	NOT OK
50	2021	107	1.5.1	Playready	OK	OK	NOT OK	OK	OK	OK	NOT OK
51	2021	109	1.5.1	Playready	OK	NOT OK	OK	OK	OK	OK	OK
52	2021	110	1.5.1	Playready	OK	NOT OK	NOT OK	OK	OK	OK	NOT OK
53	2022	111	1.6.1	Playready	OK	OK	NOT OK	NOT OK	OK	OK	NOT OK
54	2021	112	1.5.1	Playready	OK	NOT OK	NOT OK	NOT OK	OK	OK	OK
55	2022	113	1.5.1	Playready	OK	OK	OK	OK	OK	OK	OK
56	2022	114	1.5.1	Playready	OK	OK	OK	OK	OK	NOT OK	OK
57	2021	116	1.5.1	Playready	OK	NOT OK	OK	NOT OK	NOT OK	OK	NOT OK
58	2021	117	1.5.1	Playready	OK	NOT OK	OK	NOT OK	OK	OK	OK
59	2021	118	1.5.1	Playready	OK	OK	OK	NOT OK	OK	OK	NOT OK
60	2021	120	1.5.1	Playready	OK	OK	OK	OK	OK	OK	OK
61	2017	122	1.2.1	Playready	N/A	N/A	N/A	N/A	N/A	N/A	N/A
62	2022	123	1.5.1	Playready	NOT OK	NOT OK	NOT OK	NOT OK	OK	OK	NOT OK
63	2022	124	1.5.1	Playready	OK	NOT OK	NOT OK	NOT OK	NOT OK	OK	NOT OK
64	2022	125	1.5.1	Playready	OK	OK	OK	OK	OK	NOT OK	OK
65	2022	126	1.5.1	Playready	OK	OK	OK	OK	OK	OK	OK

User interface example

HbbTV
DASH-DRM
REFERENCE APPLICATION
MSE-EME

PlayReady1 **PlayReady2** Marlin ClearKey Live

1080p 2.9 AVC 1080p SL2000	2160p 2.12 AVC 2160p SL3000	2160p 2.15 HEVC SL3000 (PR.rec)
2160p 2.10 HEVC 2160p SL2000	2160p 2.13 HEVC 2160p SL3000	1080p 2.16 AVC 1080p SL2000 UTF-8
1080p 2.11 AVC 1080p SL3000	2160p 2.14 HEVC SL2000 (PR.rec)	

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Features:

- Easy-to-use UI
- Test tasks arranged in groups
- Clear feedback and result interpretation
- On-screen and server debug logging

Test categories (DRM):

- Playready
- Marlin
- Clearkey (not really DRM)

Available tests

- Full HD playback, 4k playback
- Playready (cenc) Security Levels 2000 and 3000 (single KID and multiple KIDs, for different levels for video and audio)
- Static and live Multiperiod DASH for server-side ad insertion testing
- Multi-Audio testing
- In-band and out-of-band subtitles
- In-band events
- Live DASH (livesim)
- Multiple moof/mdat tests
- Almost all content available protected by Marlin as well
- Some clearkey tests also included

Lifecycle of the project and future developments

- Application is under active maintenance and some new features are under consideration
- Development of the application is guided by the industry needs (questionnaires and direct feedback received via github)
- Virtually all new devices coming to market are using the tool to verify correct operation
- Monthly statistics are collected about the usage (on average 50-100 Gib/month, 4000 monthly visitors)
 - Total for 2021: 61 944 visitors / 1.1 TiB transferred