



Smart TV[®]

Alliance

Technical Specification

Version 2.0

Status: Final
Version: 2.0.1
Date: 7 January 2013
Author: Smart TV Alliance, Inc.
Category: Confidential
Reference: SDKAPISPEC

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1. Change history

Version	Date	Changes
1.0	2012-06-14	Final
2.0 draft 5	2012-09-17	First draft version 2.0 for public release
2.0.1 Final	2012-12-13	Final version 2.0.1 for public release

2. Introduction

2.1. Overview

This document sets out version 2.0 of the Smart TV Alliance specification. It is intended primarily for manufacturers, and describes the technical features to be implemented by end user devices.

The Smart TV Alliance's motto is 'build once, run everywhere'. The members' ambition is to align on technology that will allow developers to create apps and successfully run them on all supported Smart TV Alliance platforms. These applications will typically be available to users from Smart TV portals.

As far as possible, the specification is built on existing “state of the art” solutions, and this document refers to those. The major building blocks are:

- HTML5;
- MPEG-DASH, Microsoft Smooth Streaming and HTTP Live Streaming;
- H.264 and HE-AAC;
- PlayReady and Widevine DRMs.

Where existing solutions are not available, this document specifies the technical solution developed by the Alliance.

The Alliance will also release a Software Development Kit and developer documentation. This will provide a user friendly environment for developers to create applications that run on the Alliance platform.

This document does not detail individual capabilities of the various members' platforms, such as all supported codecs or fonts. It specifies the capabilities common to all platforms.

While a lot of care has been taken to ensure the correctness of the information in this document, errors cannot be completely prevented. The latest version of this document, with possible corrections, is always available online. If you have questions and/or remarks regarding these guidelines, please post them through the designated support channels.

2.2. Definitions

AJAX	Asynchronous JavaScript and XML
API	Application Programming Interface
A/V	Audio / Video
AVC	Advanced Video Codec
CENC	Common Encryption
CFF	Common File Format
CSS3	Cascading Style Sheets
DOM	Document Object Model
DRM	Digital Rights Management
GIF	Graphics Interchange Format
HbbTV	Hybrid Broadcast Broadband Television
HE-AAC	High Efficiency – Advanced Audio Codec
HTML	Hypertext Markup Language
HTTP(S)	Hypertext Transport Protocol (Secure)
ISO	International Standards Organization
ISOBMFF	ISO Base Media File Format
JPEG	Joint Photographic Experts Group (compression format)
MPEG	Moving Picture Experts Group
MP3	MPEG 1 – Layer 3 audio
MP4	MPEG4
MPD	Media Presentation Description
MPEG2	MPEG2 video codec
MPEG-DASH	MPEG Dynamic Adaptive Streaming over HTTP

OIPF	Open IPTV Forum
PNG	Portable Network Graphics
SD	Standard Definition
SDK	Software Development Kit
SOAP	Simple Object Access Protocol
SSL	Secure Sockets Layer
TLS	Transport Layer Security
UI	User Interface
URL	Uniform Resource Locator
UX	User Experience
VoD	Video on Demand
XML	Extensible Markup Language

2.3. References

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<http://www.w3.org/TR/2012/WD-css3-transforms-20120403/>

[37] CSS3 Animations

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[39] CSS3 Fonts

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<http://www.w3.org/TR/2012/CR-css3-images-20120417/>

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<http://www.w3.org/TR/2011/CR-css3-multicol-20110412/>

[42] CSS3 Namespace

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<http://www.w3.org/TR/2012/WD-2dcontext-20120329/>

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<http://www.w3.org/TR/2012/CR-webmessaging-20120501/>

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<http://www.w3.org/TR/2012/WD-websockets-20120809/>

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<http://dvcs.w3.org/hg/editing/raw-file/tip/editing.html#selections>

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<http://www.oipf.tv/specifications/root/uncategorised/volume--5-declarative-application-environment51/download>

[53] Open IPTV Forum Release 2.1 Volume 2 – Media Formats

<http://www.oipf.tv/specifications/root/solution-specification-volume-2-media-formats/download>

[54] Widevine API Mapping – Version 1.0

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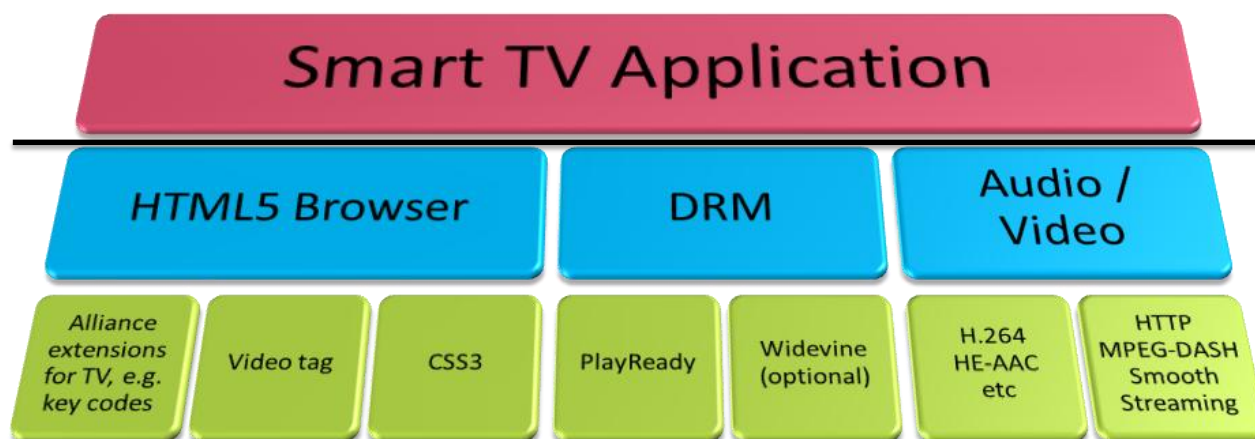
2.4. Trademarks and copyrights

All trademarks and copyrights are the property of their respective owners.

3. Technical Specification

3.1. Introduction

This chapter details the common Smart TV Alliance platform. It is divided into logical blocks. See the picture below for an overview of the most significant technologies:



Some important terms are explained as follows:

- Smart TV Applications are written in HTML5 and use the APIs specified in this document. Examples include VoD such as movie rental, catch-up TV and 3D services, social networking, games and news applications.
- The HTML5 Browser implements the HTML5 and APIs profiled for Smart TVs, allowing access to features of the platform such as input methods, video streaming and DRM.
- DRM is supported on the Smart TV Alliance platform, enabling a wide range of business models for content monetization.
- APIs allow the application to control audio and video streaming and presentation to the user.

3.2. Status Definition

This document specifies the technical features of the platform, using the terms defined in the table below. Items not listed are not supported by this version of the specification. Individual products may support extra features, but applications shall not use such features when targeting the Alliance platform.

Status	Definition	Remarks
M	Mandatory, Fully Supported. All devices SHALL support this feature in order to comply with this specification.	M(CSS2) indicates mandatory support at CSS2 level
C-M	Conditionally Mandatory. Implementation of this feature is optional, but devices that do implement this feature SHALL comply with this specification.	
P	Partially Supported. Details are defined in a separate table.	
O	Optional. Details are defined and devices MAY support this feature.	

3.3. Browser

This chapter describes the level of support from the referenced standards that the platform browser shall meet.

3.3.1. HTML5 profile

High Level View of Support Status

The platform has support for the profile as listed below. Where partial is indicated, the detailed support is described.

Standard	Reference	Status	Remark
HTML5 working draft	[16]	P	See section 3.3.1.16.
HTTP 1.1	[15]	M	
SSL / TLS		M	HbbTV server certificates shall be supported.
DOM Level 2 Core	[4]	M	
DOM Level 2 Style	[5]	M	
DOM Level 2 Events	[6]	M	including MouseEvent
DOM Level 2 HTML	[7]	M	
DOM Level 2 Views	[21]	M	
ECMAScript-262 5th ed.	[3]	M	
XMLHttpRequest Object (2)	[22]	P	See section 3.3.1.1
Cookies	[10], [9]	M	
CSS3 UI	[23]	P	See section 3.3.1.2
CSS3 BG	[24]	P	See section 3.3.1.3
CSS3 Media Queries	[2]	P	See section 3.3.1.4
CSS2.1	[11]	M	
CSS3 Transforms	[8]	P	See section 3.3.1.5
CSS3 Animations	[37]	P	See section 3.3.1.6
CSS3 Color Module	[38]	P	See section 3.3.1.7
CSS3 Fonts	[39]	P	See section 3.3.1.8
CSS3 Image Values and Replaced Content		P	See section 3.3.1.9
CSS3 Multi-column Layout	[41]	P	See section 3.3.1.10
CSS3 Namespaces	[42]	P	See section 3.3.1.11

CSS3 Selectors	[34]. [35]	P	See section 3.3.1.12
CSS3 Text	[43]	P	See section 3.3.1.13
CSS3 Transitions	[44]	P	See section 3.3.1.14
CSSOM View	[45]	P	See section 3.3.1.15

3.3.1.1. XMLHttpRequest

All section references are to [22] except where explicitly noted.

Section	Reference	Description	Support
CORS			
	[1]	CORS	M
Constructors			
	[22] section 4.3	XMLHttpRequest()	M
Event handlers			
	[22] section 4.5	onreadystatechange	M
States			
	[22] section 4.6	readyState	M
Request			
	[22] section 4.7.1	open()	M
	[22] section 4.7.2	setRequestHeader()	M
	[22] section 4.7.6	send()	M
	[22] section 4.7.8	abort()	M
Response			
	[22] section 4.8.1	status	M
	[22] section 4.8.2	statusText	M
	[22] section 4.8.3	getResponseHeader()	M
	[22] section 4.8.4	getAllResponseHeaders()	M
	[22] section 4.8.9	responseText	M
	[22] section 4.8.10	responseXML	M
Events			
	[22] section 4.9	readystatechange	M

3.3.1.2. CSS3 UI

Section	Reference	Description	Support
User interface selectors - pseudo classes			
	[34] section 5.11.3	:hover	M(CSS2)
	[34] section 5.11.3	:active	M(CSS2)
	[34] section 5.11.3	:focus	M(CSS2)
	[35] section 6.6.4.1	:enabled	M
	[35] section 6.6.4.1	:disabled	M
	[23] section 4.1.3	:default	M
	[23] section 4.1.4	:valid	M
	[23] section 4.1.4	:invalid	M
	[23] section 4.1.5	:in-range	M
	[23] section 4.1.5	:out-of-range	M
	[23] section 4.1.6	:required	M
	[23] section 4.1.6	:optional	M
	[23] section 4.1.7	:read-only	M
	[23] section 4.1.7	:read-write	M
	[35] section 5.11.2	:visited	M(CSS2)
Box Model addition			
	[23] section 6.1	box-sizing	M

Outline properties			
	[23] section 7.1	outline	M
	[23] section 7.2	outline-width	M
	[23] section 7.3	outline-style	M (CSS2)
	[23] section 7.4	outline-color	M
	[23] section 7.5	outline-offset	M
Resizing and overflow			
	[23] section 8.2	text-overflow	M
Pointing devices and keyboards			
	[23] section 9.2.2	nav-left, nav-right, nav-up, nav-down	M

3.3.1.3. CSS3 BG

Section	Reference	Description	Support
Backgrounds			
	[24] section 3.2	background-color	M
	[24] section 3.3	background-image	M
	[24] section 3.4	background-repeat	M
	[24] section 3.5	background-attachment	M
	[24] section 3.6	background-position	M
	[24] section 3.7	background-clip	M
	[24] section 3.8	background-origin	M
	[24] section 3.9	background-size	M
	[24] section 3.10	background	M
borders			
	[24][24] section 4.1	border-color	M
	[24] section 4.2	border-style	M
	[24] section 4.3	border-width	M
	[24] section 4.4	border	M
rounded corners			
	[24] section 5.1	border-radius	M
miscellaneous effects			
	[24] section 7.1	box-decoration-break	M
	[24] section 7.2	box-shadow	M

3.3.1.4 . CSS3 Media Queries

Section	Reference	Description	Support
media features			
	[2] section 4.1	width	P
	[2] section 4.2	height	P
	[2] section 4.3	device-width	P
	[2] section 4.4	device-height	P
	[2] section 4.5	orientation	P
	[2] section 4.6	aspect-ratio	P
	[2] section 4.7	device-aspect-ratio	P

Normal operation is fully supported, but behavior in certain erroneous conditions is not specified.

3.3.1.5. CSS3 Transforms

Section	Reference	Description	Support
	[36] section 6	Transform	M*
	[36] section 8	transform-origin	M*

2D Transform Functions			
	[36] section 13.1	matrix()	M
	[36] section 13.1	translate()	M
	[36] section 13.1	translateX()	M
	[36] section 13.1	translateY()	M
	[36] section 13.1	scale()	M
	[36] section 13.1	scaleX()	M
	[36] section 13.1	scaleY()	M
	[36] section 13.1	rotate()	M
	[36] section 13.1	skewX()	M
	[36] section 13.1	skewY()	M
Transform Function Lists			
	[36] section 14	transform function lists	M*

M*: Mandatory via browser extension, details to be included in developer guidelines.

3.3.1.6. CSS3 Animations

Section	Reference	Description	Support
Keyframes			
	[37] section 3.1	@keyframes	M
	[37] section 3.2	animation-name	M
	[37] section 3.3	animation-duration	M
	[37] section 3.4	animation-timing-function	M
	[37] section 3.5	animation-iteration-count	M
	[37] section 3.6	animation-direction	M
	[37] section 3.7	animation-play-state	M
	[37] section 3.8	animation-delay	M
	[37] section 3.9	animation-fill-mode	M
	[37] section 3.10	animation	M

3.3.1.7. CSS3 Color Module

Section	Reference	Description	Support
CSS3 Color Module			
	[38]	CSS3 Color Module Full Support	M

3.3.1.8. CSS3 Fonts

Section	Reference	Description	Support
Basic font properties			
	[39] section 3.1	font-family	M
	[39] section 3.4	font-style	M
	[39] section 3.5	font-size	M
	[39] section 3.7	font	M
Font Resources			
	[39] section 4.6	font-variant	M (CSS2)

3.3.1.9. CSS3 Image Values and Replaced Content

Section	Reference	Description	Support
CSS3 Image Values and Replaced Content			
	[40]	CSS3 Image Values and Replaced Content full support	M

3.3.1.10. CSS3 Multi-column Layout

Section	Reference	Description	Support
The number and width of columns			
	[41] section 3.1	column-width	M
	[41] section 3.2	column-count	M
	[41] section 3.3	columns	M
Column gaps and rules			
	[41] section 4.1	column-gap	M
	[41] section 4.2	column-rule-color	M
	[41] section 4.3	column-rule-style	M
	[41] section 4.4	column-rule-width	M
	[41] section 4.5	column-rule	M
Column breaks			
	[41] section 5.1	break-before	M
	[41] section 5.1	break-after	M
	[41] section 5.1	break-inside	M
Spanning columns			
	[41] section 6.1	column-span	M
Filling columns			
	[41] section 7.1	column-fill	M

3.3.1.11. CSS3 Namespaces

Section	Reference	Description	Support
	[42]	@namespace	M

3.3.1.12. CSS3 Selectors

Section	Reference	Description	Support
Simple selectors			
	[34] section 5.4	Type selector (h1)	M (CSS2)
	[35] section 6.1.1	Type selectors and namespaces (ns E)	M
	[34]	Universal selector (*)	M (CSS2)
	[34] section 5.8	Attribute presence and value selectors [att] [att=val] [att~=val] [att =val]	M (CSS2)
	[35] section 6.3.2	Substring matching attribute selectors [att^=val] [att\$=val] [att*=val]	M
	[35] section 6.3.3	Attribute selectors and namespaces (attr)	M
	[34] section 5.8.3	Class selectors (.)	M (CSS2)
	[34] section 5.9	ID selectors (#)	M (CSS2)
Pseudo classes			
	[34] section 5.11.1	:link	M (CSS2)
	[34] section 5.11.1	:visited	M (CSS2)
	[34] section 5.11.3	:hover	M (CSS2)
	[34] section 5.11.3	:active	M (CSS2)
	[34] section 5.11.3	:focus	M (CSS2)
	[35] section 6.6.2	:target	M
	[34] section 5.11.4	:lang	M (CSS2)
	[35] section 6.6.4.1	:enabled	M
	[35] section 6.6.4.1	:disabled	M
	[35] section 6.6.4.2	:checked	M
	[35] section 6.6.5.1	:root	M
	[35] section 6.6.5.2	:nth-child()	M
	[35] section 6.6.5.3	:nth-last-child()	M
	[35] section 6.6.5.4	:nth-of-type()	M

	[35] section 6.6.5.5	:nth-last-of-type()	M
	[34] section 5.11.1	:first-child	M (CSS2)
	[35] section 6.6.5.7	:last-child	M
	[35] section 6.6.5.8	:first-of-type	M
	[35] section 6.6.5.9	:last-of-type	M
	[35] section 6.6.5.10	:only-child	M
	[35] section 6.6.5.11	:only-of-type	M
	[35] section 6.6.5.12	:empty	M
	[35] section 6.6.7	negation pseudo class :not(X)	M
Pseudo Elements			
	[34] section 5.12.1	::first-line	M (CSS2)
	[34] section 5.12.2	::first-letter	M (CSS2)
	[34] section 5.12.3	::before	M (CSS2)
	[34] section 5.12.3	::after	M (CSS2)
Combinators			
	[34] section 5.5	Descendant selectors	M (CSS2)
	[34] section 5.6	Child selectors	M (CSS2)
Sibling combinators			
	[34] section 5.7	Adjacent sibling combinator (+)	M (CSS2)

3.3.1.13. CSS3 Text

Section	Reference	Description	Support
Alignment and Justification			
	[43] section 7.1	text-align	M
Spacing			
	[43] section 8	word-spacing	M
	[43] section 8.2	letter-spacing	M
Edge Effects			
	[43] section 9.1	text-indent	M
	[43] section 10.3	text-shadow	M

3.3.1.14. CSS3 Transitions

Section	Reference	Description	Support
Transitions			
	[44] section 2.1	transition-property	M*
	[44] section 2.2	transition-duration	M*
	[44] section 2.3	transition-timing-function	M*
	[44] section 2.4	transition-delay	M*
	[44] section 2.5	Transition	M*
Transition Events			
	[44] section 5	TransitionEvent	M*
	[44] section 5	propertyName	M
	[44] section 5	elapsedTime	M
Animation of Property Types Support			
	[44] section 6	Color	M
	[44] section 6	Length	M
	[44] section 6	Percentage	M
	[44] section 6	integer	M
	[44] section 6	font weight	M
	[44] section 6	number	M

	[44] section 6	transform list	M
	[44] section 6	rectangle	M
	[44] section 6	visibility	M
	[44] section 6	shadow	M
	[44] section 6	gradient	M
	[44] section 6	list of above types	M
Properties from CSS			
	[44] section 7.1	background-color	M
	[44] section 7.1	border-bottom-width	M
	[44] section 7.1	border-left-width	M
	[44] section 7.1	border-right-width	M
	[44] section 7.1	border-spacing	M
	[44] section 7.1	border-top-width	M
	[44] section 7.1	bottom	M
	[44] section 7.1	color	M
	[44] section 7.1	font-size	M
	[44] section 7.1	height	M
	[44] section 7.1	left	M
	[44] section 7.1	letter-spacing	M
	[44] section 7.1	line-height	M
	[44] section 7.1	margin-bottom	M
	[44] section 7.1	margin-left	M
	[44] section 7.1	margin-right	M
	[44] section 7.1	margin-top	M
	[44] section 7.1	max-height	M
	[44] section 7.1	max-width	M
	[44] section 7.1	min-height	M
	[44] section 7.1	min-width	M
	[44] section 7.1	opacity	M
	[44] section 7.1	outline-color	M
	[44] section 7.1	outline-offset	M
	[44] section 7.1	outline-width	M
	[44] section 7.1	padding-bottom	M
	[44] section 7.1	padding-left	M
	[44] section 7.1	padding-right	M
	[44] section 7.1	padding-top	M
	[44] section 7.1	right	M
	[44] section 7.1	text-indent	M
	[44] section 7.1	top	M
	[44] section 7.1	vertical-align	M
	[44] section 7.1	visibility	M
	[44] section 7.1	width	M
	[44] section 7.1	word-spacing	M
	[44] section 7.1	z-index	M

M*: Mandatory via browser extension, details to be included in developer guidelines.

3.3.1.15. CSSOM View

Section	Reference	Description	Support
Extensions to the Window interface			
	[45] section 4	matchMedia()	M
	[45] section 4	screen	M
	[45] section 4	innerWidth	M
	[45] section 4	innerHeight	M
	[45] section 4	scrollX	M

	[45] section 4	pageXOffset	M
	[45] section 4	scrollTop	M
	[45] section 4	pageYOffset	M
	[45] section 4	scroll()	M
	[45] section 4	scrollTo()	M
	[45] section 4	scrollBy()	M
	[45] section 4	screenX	M
	[45] section 4	screenY	M
	[45] section 4	outerWidth	M
	[45] section 4	outerHeight	M
The Screen Interface			
	[45] section 4.2	Screen	M
	[45] section 4.2	availWidth	M
	[45] section 4.2	availHeight	M
	[45] section 4.2	width	M
	[45] section 4.2	height	M
	[45] section 4.2	colorDepth	M
	[45] section 4.2	pixelDepth	M
Extensions to the Document Interface			
	[45] section 5	elementFromPoint()	M
Extensions to the Element Interface			
	[45] section 6.1	getClientRects()	M
	[45] section 6.1	getBoundingClientRect()	M
	[45] section 6	scrollIntoView()	M
	[45] section 6	scrollTop	M
	[45] section 6	scrollLeft	M
	[45] section 6	scrollWidth	M
	[45] section 6	scrollHeight	M
	[45] section 6	clientTop	M
	[45] section 6	clientLeft	M
	[45] section 6	clientWidth	M
	[45] section 6	clientHeight	M
Extensions to the HTMLElement Interface			
	[45] section 7	offsetParent	M
	[45] section 7	offsetTop	M
	[45] section 7	offsetLeft	M
	[45] section 7	offsetWidth	M
	[45] section 7	offsetHeight	M
Extensions to the Range Interface			
	[45] section 8	getClientRects()	M
	[45] section 8	getBoundingClientRect()	M
Extensions to the MouseEvent Interface			
	[45] section 9	screenX	M
	[45] section 9	screenY	M
	[45] section 9	pageX	M
	[45] section 9	pageY	M
	[45] section 9	clientX	M
	[45] section 9	clientY	M
	[45] section 9	x	M
	[45] section 9	y	M
	[45] section 9	offsetX	M

	[45] section 9	offsetY	M
The ClientRectList Interface			
	[45] section 10.1	ClientRectList	M
	[45] section 10.1	length	M
	[45] section 10.1	item()	M
The ClientRect Interface			
	[45] section 10.2	ClientRect	M
	[45] section 10.2	top	M
	[45] section 10.2	right	M
	[45] section 10.2	bottom	M
	[45] section 10.2	left	M
	[45] section 10.2	width	M
	[45] section 10.2	height	M

3.3.1.16. HTML5 detail

As HTML5 is still being defined, some of the supported API's are subject to change. This specification assumes that the platform browser has basic HTML4 support and thus is not exhaustive where it pertains to this minimum level of standard support. Also refer to [33]. Where needed, partial support for certain parts is indicated and details are described below - section references are included for each item where possible.

3.3.1.17. HTML5 Elements

Section	Reference	Description	Support
Elements in the DOM			
	[16] Section 3.2.2	HTMLElement	P
Global Attributes			
	[16] Section 3.2.3	Global Attributes	P
	[16] Section 3.2.3.9	Embedding custom non-visible data (data-*)	M
Dynamic markup insertion			
	[16] Section 3.4	Dynamic markup insertion	M
	[16] Section 3.5.6	outerhtml	M
Sections			
	[16] Section 4.4.2	Section elements	M
Grouping content			
	[16] Section 4.5.11	figure	M
	[16] Section 4.5.12	figcaption	M
Text-level semantics			
	[16] Section 4.6.19	mark	M
	[16] Section 4.6.27	wbr	M
Embedded content			
	[16] Section 4.8.7	Audio element	P
	[16] Section 4.8.6	Video element	P
	[16] Section 4.8.11	Canvas element	M
Interactive elements			
	[16] Section 4.11.2	summary	M
	[16] Section 4.11.4	menu element of type list	M

3.3.1.18. HTML5 Video element

Reference	Description	Support
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[16] section 4.8.6	error	M
[16] section 4.8.6	src	M
[16] section 4.8.6	currentSrc	M
[16] section 4.8.10	networkState	M
[16] section 4.8.10	preload	M
[16] section 4.8.10	buffered (TimeRanges)	M
[16] section 4.8.6	canPlayType()	M
[16] section 4.8.10	readyState	M
[16] section 4.8.10	seeking	M
[16] section 4.8.6	currentTime	M
[16] section 4.8.6	duration	M
[16] section 4.8.10	paused	M
[16] section 4.8.10	defaultPlaybackRate	M
[16] section 4.8.10	playbackRate	M
[16] section 4.8.10	seekable (TimeRanges)	M
[16] section 4.8.10	ended	M
[16] section 4.8.10	autoplay	M
[16] section 4.8.10	loop	M
[16] section 4.8.6	play()	M
[16] section 4.8.6	pause()	M
[16] section 4.8.6	width	M
[16] section 4.8.6	height	M
[16] section 4.8.6	videoWidth	M
[16] section 4.8.6	videoHeight	M
[16] section 4.8.6	poster	M
[16] section 4.8.6	MediaError	M
[16] section 4.8.6	Media Element Events	P

3.3.1.19. HTML5 Media Element Events

Reference	Description	Support
[16] section 4.8.10.15	loadstart	M
[16] section 4.8.10.15	progress	M
[16] section 4.8.10.15	suspend	M
[16] section 4.8.10.15	abort	M
[16] section 4.8.10.15	error	M
[16] section 4.8.10.15	emptied	M
[16] section 4.8.10.15	loadedmetadata	M
[16] section 4.8.10.15	loadeddata	M
[16] section 4.8.10.15	canplay	M
[16] section 4.8.10.15	canplaythrough	M
[16] section 4.8.10.15	playing	M
[16] section 4.8.10.15	waiting	M
[16] section 4.8.10.15	seeking	M
[16] section 4.8.10.15	seeked	M
[16] section 4.8.10.15	ended	M
[16] section 4.8.10.15	durationchange	M
[16] section 4.8.10.15	timeupdate	M
[16] section 4.8.10.15	Play	M
[16] section 4.8.10.15	Pause	M
[16] section 4.8.10.15	ratechange	M

3.3.1.20. HTML5 Loading web pages

Section	Reference	Description	Support
Window object			

	[16] section 5.2	Window object	M
Session history and navigation			
	[16] section 5.2	history	M
Offline web applications			
		Offline web applications	M

3.3.1.21. HTML5 Web application APIs

Section	Reference	Description	Support
Events			
	[16] section 6.1.6.2	oninput	M
	[16] section 6.1.6.2	onchange	M
System state and capabilities			
		The navigator object	M

3.3.1.22. HTML5 User interaction

Section	Reference	Description	Support
The hidden attribute			
	[16] section 7.1	hidden	M
Editing			
	[16] section 7.5	contenteditable	M

3.3.1.23. HTML5 Forms

Section	Reference	Description	Support
The fieldset element			
	[16] Section 4.10.4	name	M
	[16] Section 4.10.4	type	M
	[16] Section 4.10.4	elements	M
The label element			
	[16] Section 4.10.6	form	M
	[16] Section 4.10.6	htmlFor	M
The input element			
	[16] Section 4.10.7	autofocus	M
	[16] Section 4.10.7	form	M
	[16] Section 4.10.7	formAction	M
	[16] Section 4.10.7	formEnctype	M
	[16] Section 4.10.7	formMethod	M
	[16] Section 4.10.7	formNoValidate	M
	[16] Section 4.10.7	formTarget	M
	[16] Section 4.10.7	type=search	M
	[16] Section 4.10.7	type=tel	M
	[16] Section 4.10.7	type=url	M
	[16] Section 4.10.7.1	type=email	M
	[16] Section 4.10.7.1	type=number	M
	[16] Section 4.10.7.1	type=range	M
	[16] Section 4.10.7.1	type=checkbox	M
Common input element attributes			
	[16] Section 4.10.7.3.1	autocomplete	M
	[16] Section 4.10.7.3.2	dirname	M
	[16] Section 4.10.7.3.7	multiple	M
	[16] Section 4.10.7.3.9	pattern	M

Section	Reference	Description	Support
	[16] Section 4.10.7.3.12	placeholder	M
The select element			
	[16] Section 4.10.9	select	M
The datalist element			
	[16] Section 4.10.10	datalist	M
The output element			
	[16] Section 4.10.15	output	M
The progress element			
	[16] Section 4.10.16	progress	M
The meter element			
	[16] Section 4.10.17	meter	M
Association of controls and forms			
	[16] Section 4.10.18	Association of controls and forms	M
Form validation			
	[16] Section 4.10.21.3	willValidate	M
	[16] Section 4.10.21.3	validity	M
	[16] Section 4.10.21.3	validationMessage	M
	[16] Section 4.10.21.3	checkValidity()	M
	[16] Section 4.10.21.3	setCustomValidity()	M

3.3.1.24. HTML5 Syntax

Section	Reference	Description	Support
Writing HTML Documents			
	[16] Section 8.1.1	DOCTYPE	M
Parsing HTML Documents			
	[16] Section 8.2	HTML5 tokenizer	M
	[16] Section 8.2	HTML5 tree building	M

3.3.1.25. HTML5 Related standards

Below standards are not directly part of HTML5:

Reference	Description	Support
[46]	2D Context	M
[46] Section 1	Text	M
[47]	Cross-document messaging	M
[17]	Server-sent events	M
[48]	WebSocket	M
[18] Section 4.2	Session Storage	M
[18] Section 4.3	Local Storage	M
[20]	Workers	M
[49]	Text selection	M

3.3.2. Capabilities

The Smart TV platform adheres to these minimum capabilities:

Capability	Details	Remark
Screen resolution	1280 times 720 pixels (within safe area)	Static resolution - refer to the development guidelines for safe screen area information.
Color format	32 bits	

Supported fonts (or equivalent)	"Tiresias" (Screenfont) minimum size 18pts	font-family: sans-serif. (True Type font, Basic Euro Latin Character Set)
Text entry method	Supported	Refer to guidelines for more information; for some platforms an on screen keyboard needs to be implemented.
Image format	GIF, JPEG and PNG	
Media format	Refer to 3.3.4	

3.3.3. Input/key support

The platform supports DOM level 2 KeyEvents ([6]), including the following VK_-key constants (for some manufacturers, key constants are implemented in a Javascript library):

Key constant	Description	Support
VK_UP		M
VK_DOWN		M
VK_LEFT		M
VK_RIGHT		M
VK_ENTER	Typically mapped to the OK key	M
VK_PLAY		M
VK_PAUSE		M
VK_STOP		M
VK_FAST_FWD		M
VK_REWIND		M
VK_BACK		M
VK_0		C-M
VK_1		C-M
VK_2		C-M
VK_3		C-M
VK_4		C-M
VK_5		C-M
VK_6		C-M
VK_7		C-M
VK_8		C-M
VK_9		C-M
VK_RED		C-M
VK_GREEN		C-M
VK_YELLOW		C-M
VK_BLUE		C-M

Note: Digit and color keys are available for developers, but these may not be readily available to users on certain platforms. Please see the developer guidelines for additional details.

3.4. Video/audio streaming

3.4.1. HTML5 video/audio

See HTML Video Element and Media Element Events table in section 3.3

Note: The `src` element shall be set to the URL of the Smooth Streaming manifest or the MPEG DASH MPD, or playlist file of HLS.

3.4.2. Streaming protocols

The following streaming protocols shall be implemented by receivers:

Function	Detail	Status	Reference
General	HTTP 1.1 with Range request	M	-
	HTTP streaming over SSL	M	3.4.2.1
Adaptive	HTTP Live Streaming version 4	M	3.4.2.2
	Microsoft Smooth Streaming	M	[13]
	MPEG DASH (CFF & CENC) per HbbTV1.5 profile	M	3.4.2.3

3.4.2.1. HTTP streaming over SSL

Receivers shall support reception of streams via HTTPS, with HbbTV root certificates for server authentication [19].

3.4.2.2. HLS

HTTP Live Streaming specification version 4, equivalent to protocol version 2, is mandatorily supported with the following tag exceptions:

Tags NOT Supported	Reference
EXT-X-PROGRAM-DATE-TIME	[12] Section 3.2.4
EXT-X-ALLOW-CACHE	[12] Section 3.2.5
EXT-X-DISCONTINUITY	[12] Section 3.2.8

Furthermore, it is recommended that service providers make content available at a minimum of SD resolution

3.4.2.3 MPEG-DASH

Receivers shall implement the MPEG-DASH [25] ISO/BMFF Live profile, as further defined by HbbTV version 1.5 [26].

Receivers shall support MPEG-DASH for unencrypted content. Details of MPEG-DASH support for encrypted content are specified in the DRM chapter of this document.

3.4.3. Streaming containers

The following container types are supported:

Function	Detail	Status	Reference
MP4 File Format	Used in combination with HTTP and MPEG-DASH	M	[27]

MPEG2 Transport Stream	Used in combination with HTTP streaming only	M	[28]
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3.4.4. Streaming codecs

The supported media formats/codecs are described in this section.

3.4.4.1. Video Codecs

Codec	Detail	Status	Reference
AVC	Supported profiles: BP@L3, MP@L3, HP@L4.	M	[29]

3D displays shall support 3D video in side-by-side and top-bottom formats.

3.4.4.2 Audio Codecs

Codec	Detail	Status	Reference
HE-AAC	For A/V and audio only services.	M	[30]
AC-3	For A/V services only. Not supported for audio only services.	M	[31]
MP3	For audio only services. Not supported for A/V services.	M	[32]

3.4.5. MIME types for A/V media formats

MIME types shall apply as follows:

- For MPEG DASH content, as defined in [25] and [26]
- For Microsoft Smooth Streaming, as defined in [13]
- For HLS, as defined in [12]
- For non-adaptive HTTP streaming,
 - For MP4 file format: “video/mp4” [53]
 - For MPEG2-TS: “video/mpeg” or “video/mp2t” [53]
- For non-adaptive HTTP streaming audio only,
 - For HE-AAC: “audio/mp4” [53]
 - For MP3: “audio/mpeg” [53]

3.4.6. Subtitles

Subtitling of video content is supported through the use of a Javascript library in the application. The Popcorn library [50] is recommended, and receivers shall support the use of this library.

3.5. Digital Rights Management

This chapter describes the Digital Rights Management methods supported on the platform.

DRM	Detail	Status	Reference
PlayReady	According to Microsoft requirements. In combination with Microsoft Smooth Streaming.	M	[14]

PlayReady	According to Microsoft requirements. In combination with MPEG-DASH.	O	[14]
Widevine	In combination with Widevine Adaptive Streaming.	O	[54]

3.5.1. PlayReady

This chapter describes the mandatory features of PlayReady, and the API provided to use PlayReady from an application.

3.5.1.1. PlayReady Features

The following table shows which features of PlayReady [14] are mandatory for devices.

PlayReady feature	Status	Reference
Reactive license acquisition / License post-delivery	M	[14]
Proactive license acquisition / License pre-delivery	M	[14]
Domains	O	[14]
Metering	O	[14]
License query	O	[14]
License server URL override	M	[14]
Set Challenge CustomData	M	[14]
Set Challenge SOAP Header	O	[14]
Set Challenge HTTP Header	O	[14]

3.5.1.2. PlayReady API

Applications interface with PlayReady via the following interfaces:

- HTML5 video object
 - The `src` element shall be set to the URL of the Smooth Streaming manifest or the MPEG DASH MPD.
 - The Smooth Streaming manifest shall include PlayReady signalling as specified in [14].
 - The MPEG DASH MPD shall include PlayReady signalling as specified in [51].
 - In case of an error, the error attribute of the HTML5 video object shall be set to `MEDIA_ERR_DECODE`.
- OIPF DRM Agent
 - Applications shall use the OIPF DRM Agent API [52], as applied to PlayReady in [51]. The `oipfDrmAgent.sendDRMMessage` method is used to pass requests to PlayReady, and results are returned via `onDRMMessageResult`.

3.5.2. Widevine

The API provided to use Widevine from an application is described in [54]. Widevine DRM is optional for devices.

4. Changes from v1.0

	v1.0	v2.0
HTML5	Partial Support for: <ul style="list-style-type: none"> - HTML5 working draft: - audio tag - video tag 	Extended/Additional Support for: <ul style="list-style-type: none"> - HTML5 Elements - HTML5 Video Element - HTML5 Media Element Events - HTML5 Loading web pages - HTML5 Web application APIs - HTML5 User interaction - HTML5 Forms - HTML5 Syntax - HTML5 Related standards
CSS3	Partial Support for <ul style="list-style-type: none"> - CSS3 UI - CSS3 BG - CSS3 Media Queries 	Extended/Additional Support for: <ul style="list-style-type: none"> - CSS3 UI - CSS3 BG - CSS3 Media Queries - CSS3 Transforms - CSS3 Animations - CSS3 Color Module - CSS3 Fonts - CSS3 Image Values and Replaced Content - CSS3 Multi-column Layout - CSS3 Namespaces - CSS3 Selectors - CSS3 Text - CSS3 Transitions - CSSOM View
JavaScript	Partial Support for: <ul style="list-style-type: none"> - ECMAscript-262 5th edition 	Full and Mandatory Support for: <ul style="list-style-type: none"> - ECMAscript-262 5th edition
AJAX	Support for: XMLHttpRequest	Extended/Additional Support for: <ul style="list-style-type: none"> - XMLHttpRequest CORS - XMLHttpRequest Constructors - XMLHttpRequest Event Handlers - XMLHttpRequest States - XMLHttpRequest Request - XMLHttpRequest Response - XMLHttpRequest Events
AV Streaming	Support for: <ul style="list-style-type: none"> - WMV, VC-1, WMA 	<ul style="list-style-type: none"> - Support for: MPEG_DASH Removed Support for: <ul style="list-style-type: none"> - WMV, VC-1, WMA
DRM	Support for: <ul style="list-style-type: none"> - PlayReady but with no streaming protocols 	Support for: <ul style="list-style-type: none"> - PlayReady with OIPF DRM Agent Optional Support for: <ul style="list-style-type: none"> - PlayReady with MPEG_DASH

		- Widevine with Widevine Adaptive Streaming
UI/UX Guideline	Combined device and app support list	Separated device and app support list