



Smart TV[®] Alliance

Technical Specification

Version 3.0

| | |
|------------|------------------------|
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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 |
| 2.5 | 2013-04-01 | Final version 2.5 for public release |
| 3.0 | 2013-09-03 | Final version 3.0 for public release |

2. Introduction

2.1. Overview

This document sets out version 3.0 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 optionally Widevine DRMs;
- DIAL and optionally AllJoyn for multiscreen applications;
- A specification for ultra-high definition services using HEVC is also included;
- A separate Smart Home specification will be published in 2014.

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 (also known as H.264) |
| CENC | Common Encryption |
| CSS3 | Cascading Style Sheets |
| DIAL | Discovery And Launch |
| DOM | Document Object Model |
| DRM | Digital Rights Management |
| GIF | Graphics Interchange Format |
| HbbTV | Hybrid Broadcast Broadband Television |
| HE-AAC | High Efficiency – Advanced Audio Codec |
| HEVC | High Efficiency Video Coding |
| 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 Part 14 file format – equivalent to ISOBMFF (see above) |
| 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 |

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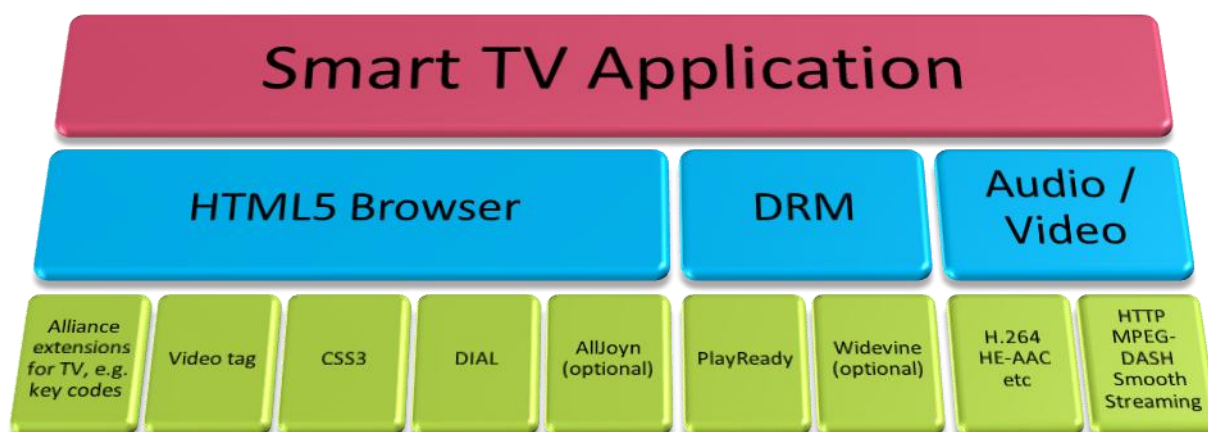
2.4. Trademarks and copyrights

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.
- Multiscreen allows web applications to run on the receiver and related applications on a second screen (such as a smart phone or tablet), and for these applications to discover, launch and communicate with each other.

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. | Such explicitly defined feature overrides any such feature included from older included specifications. |
| 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

The table below gives a high level view of the profile supported by the platform. Where partial is indicated, the detailed support is described.

| Standard | Reference | Status | Remark |
|--------------------------------|-----------|----------|---|
| HTML5 candidate recommendation | [16] | P | See section 3.3.1.18. |
| 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 | |
| DOM Level 3 Events | [60] | P | Support for Keyboard Events insofar required by this specification, other parts supported as common subset with DOM Level 2 |
| DOM Level 4 | [61] | P | Supported insofar required by supported HTML5 profile |
| DOM Parsing and Serialization | [67] | M | |
| ECMAScript-262 5.1 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 | Only mandatory items from that specification are supported. |

| | | | |
|--|----------------|---|----------------------|
| 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 | [40] | 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 |
| CSS3 Flexbox | [63] | P | |
| CSS3 Style Attributes | [64] | M | |
| CSS3 Text Decoration | [65] | P | |
| CSS3 Values and Units | [66] | P | |
| Web IDL | [68] | P | |
| Typed Arrays | [69] | P | |
| URIs, IRIs, IDNA | [70] [71] [72] | M | |
| Web Origin | [73] | M | |

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 |

| | | | |
|--------------------------------|----------------------|--|---|
| | [34] section 5.11.3 | :active | M |
| | [34] section 5.11.3 | :focus | M |
| | [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 |
| 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 |
| | [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, nav-index | 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] 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 |
| | [39] section 4.3 | src | M |
| Font rules | | | |
| | [39] section 4.1 | @font-face | M |

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 | P |

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 |

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

3.3.1.11. CSS3 Namespaces

| Section | Reference | Description | Support |
|---------|-----------|-------------|---------|
| | [42] | @namespace | P |

3.3.1.12. CSS3 Selectors

| Section | Reference | Description | Support |
|------------------|--------------------|--------------------------------------|---------|
| Simple selectors | | | |
| | [34] section 5.4 | Type selector (h1) | M |
| | [35] section 6.1.1 | Type selectors and namespaces (ns E) | M |
| | [34] | Universal selector (*) | M |

| | | | |
|---------------------|-----------------------|--|---|
| | [34] section 5.8 | Attribute presence and value selectors [att] [att=val] [att~=val] [att =val] | M |
| | [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 |
| | [34] section 5.9 | ID selectors (#) | M |
| Pseudo classes | | | |
| | [34] section 5.11.1 | :link | M |
| | [34] section 5.11.1 | :visited | M |
| | [34] section 5.11.3 | :hover | M |
| | [34] section 5.11.3 | :active | M |
| | [34] section 5.11.3 | :focus | M |
| | [35] section 6.6.2 | :target | M |
| | [34] section 5.11.4 | :lang | M |
| | [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 |
| | [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 |
| | [34] section 5.12.2 | ::first-letter | M |
| | [34] section 5.12.3 | ::before | M |
| | [34] section 5.12.3 | ::after | M |
| Combinators | | | |
| | [34] section 5.5 | Descendant selectors | M |
| | [34] section 5.6 | Child selectors | M |
| Sibling combinators | | | |
| | [34] section 5.7 | Adjacent sibling combinator (+) | M |

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 Text Decoration

| Section | Reference | Description | Support |
|---------|-----------|------------------|---------|
| | [74] | @text-decoration | P |

3.3.1.15. 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 | 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-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.

3.3.1.16. 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 | scrollY | 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 |
| | [45] section 4 | MediaQueryList | M |
| The MediaQueryList Interface | | | |
| | [45] section 4.1 | media | M |
| | [45] section 4.1 | matches | M |
| | [45] section 4.1 | addListener() | M |
| | [45] section 4.1 | removeListener() | M |
| | [45] section 4.1 | MediaQueryListListener | M |
| | [45] section 4.1 | handleChange() | 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 HTMLDivElement 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 |

3.3.1.17. HTML5 Detail

As HTML5 is still being defined, some of the supported API's are subject to change. 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.

3.3.1.18. HTML5 Common Infrastructure

| Section | Reference | Description | Support |
|----------------------------|----------------------|---|---------|
| HTMLAllCollection | [16] section 2.8.2.1 | As required by the referenced interfaces. | M |
| HTMLFormControlsCollection | [16] section 2.8.2.2 | As required by the referenced interfaces. | M |
| RadioNodeList | [16] section 2.8.2.2 | As required by the referenced interfaces. | M |
| HTMLOptionsCollection | [16] section 2.8.2.3 | As required by the referenced interfaces. | M |
| DOMStringMap | [16] section 2.8.3 | As required by the referenced interfaces. | M |
| Transferable objects | [16] section 2.8.4 | As required by the referenced interfaces. | M |

3.3.1.19. HTML5 DOM

| Section | Reference | Description | Support |
|-----------------|----------------------|---------------------|---------|
| Document object | | | P |
| | [16] section 5.5.3 | location | M |
| | [16] section 5.3.1 | domain | M |
| | [16] section 3.1.3 | referrer | M |
| | [16] section 3.1.3 | cookie | M |
| | [16] section 3.1.3 | lastModified | M |
| | [16] section 3.1.3 | readyState | M |
| | [16] section 3.1.4 | Title | M |
| | [16] section 3.2.3.6 | Dir | M |
| | [16] section 3.1.4 | body | M |
| | [16] section 3.1.4 | head | M |
| | [16] section 3.1.4 | images | M |
| | [16] section 3.1.4 | embeds | M |
| | [16] section 3.1.4 | plugins | M |
| | [16] section 3.1.4 | links | M |
| | [16] section 3.1.4 | forms | M |
| | [16] section 3.1.4 | scripts | M |
| | [16] section 3.1.4 | getElementsByName() | M |
| | [16] section 3.4.1 | Document.open() | M |
| | [16] section 5.2.8 | WindowProxy open() | M |
| | [16] section 3.4.2 | close() | M |
| | [16] section 3.4.3 | write() | M |
| | [16] section 3.4.4 | writeln() | M |
| | [16] section 5.2 | defaultView | M |
| | [16] section 7.4.3 | activeElement | M |
| | [16] section 6.1.6.2 | onabort | M |
| | [16] section 6.1.6.2 | onblur | M |
| | [16] section 6.1.6.2 | oncanplay | M |
| | [16] section 6.1.6.2 | oncanplaythrough | M |
| | [16] section 6.1.6.2 | onchange | M |
| | [16] section 6.1.6.2 | onclick | M |
| | [16] section 6.1.6.2 | onclose | M |
| | [16] section 6.1.6.2 | ondurationchange | M |
| | [16] section 6.1.6.2 | onemptied | M |
| | [16] section 6.1.6.2 | onended | M |
| | [16] section 6.1.6.2 | onerror | M |
| | [16] section 6.1.6.2 | onfocus | M |
| | [16] section 6.1.6.2 | oninvalid | P |

| | | | |
|------|----------------------|--------------------|---------|
| | [16] section 6.1.6.2 | onkeydown | M |
| | [16] section 6.1.6.2 | onkeypress | M |
| | [16] section 6.1.6.2 | onkeyup | M |
| | [16] section 6.1.6.2 | onload | M |
| | [16] section 6.1.6.2 | onloadeddata | M |
| | [16] section 6.1.6.2 | onloadedmetadata | M |
| | [16] section 6.1.6.2 | onloadstart | M |
| | [16] section 6.1.6.2 | onmousedown | C-M (1) |
| | [16] section 6.1.6.2 | onmousemove | C-M (1) |
| | [16] section 6.1.6.2 | onmouseout | C-M (1) |
| | [16] section 6.1.6.2 | onmouseover | C-M (1) |
| | [16] section 6.1.6.2 | onmouseup | C-M (1) |
| | [16] section 6.1.6.2 | onpause | M |
| | [16] section 6.1.6.2 | onplay | M |
| | [16] section 6.1.6.2 | onplaying | M |
| | [16] section 6.1.6.2 | onprogress | M |
| | [16] section 6.1.6.2 | onratechange | M |
| | [16] section 6.1.6.2 | onseeked | M |
| | [16] section 6.1.6.2 | onseeking | M |
| | [16] section 6.1.6.2 | onsubmit | M |
| | [16] section 6.1.6.2 | onsuspend | M |
| | [16] section 6.1.6.2 | ontimeupdate | M |
| | [16] section 6.1.6.2 | onwaiting | M |
| | [16] section 6.1.6.2 | onreadystatechange | M |
| HTML | | | P |
| | [16] section 3.1.4 | title | M |
| | [16] section 3.2.3.3 | lang | M |
| | [16] section 3.2.3.6 | dir | M |
| | [16] section 3.2.3.9 | dataset | M |
| | [16] section 7.1 | hidden | M |
| | [16] section 7.3 | click() | M |
| | [16] section 7.4.3 | focus() | M |
| | [16] section 7.4.3 | blur() | M |
| | [16] section 7.6 | isContentEditable | M |
| | [16] section 4.2.6 | style | M |
| | [16] section 6.1.6.2 | onabort | M |
| | [16] section 6.1.6.2 | onblur | M |
| | [16] section 6.1.6.2 | oncanplay | M |
| | [16] section 6.1.6.2 | oncanplaythrough | M |
| | [16] section 6.1.6.2 | onchange | M |
| | [16] section 6.1.6.2 | onclick | M |
| | [16] section 6.1.6.2 | onclose | M |
| | [16] section 6.1.6.2 | ondurationchange | M |
| | [16] section 6.1.6.2 | onemptied | M |
| | [16] section 6.1.6.2 | onended | M |
| | [16] section 6.1.6.2 | onerror | M |
| | [16] section 6.1.6.2 | onfocus | M |
| | [16] section 6.1.6.2 | oninvalid | M |
| | [16] section 6.1.6.2 | onkeydown | M |
| | [16] section 6.1.6.2 | onkeypress | M |
| | [16] section 6.1.6.2 | onkeyup | M |
| | [16] section 6.1.6.2 | onload | M |
| | [16] section 6.1.6.2 | onloadeddata | M |
| | [16] section 6.1.6.2 | onloadedmetadata | M |
| | [16] section 6.1.6.2 | onloadstart | M |
| | [16] section 6.1.6.2 | onmousedown | C-M (1) |

| | | | |
|---|----------------------|--|---------|
| | [16] section 6.1.6.2 | onmousemove | C-M (1) |
| | [16] section 6.1.6.2 | onmouseout | C-M (1) |
| | [16] section 6.1.6.2 | onmouseover | C-M (1) |
| | [16] section 6.1.6.2 | onmouseup | C-M (1) |
| | [16] section 6.1.6.2 | onpause | M |
| | [16] section 6.1.6.2 | onplay | M |
| | [16] section 6.1.6.2 | onplaying | M |
| | [16] section 6.1.6.2 | onprogress | M |
| | [16] section 6.1.6.2 | onratechange | M |
| | [16] section 6.1.6.2 | onseeked | M |
| | [16] section 6.1.6.2 | onseeking | M |
| | [16] section 6.1.6.2 | onsubmit | M |
| | [16] section 6.1.6.2 | onsuspend | M |
| | [16] section 6.1.6.2 | ontimeupdate | M |
| | [16] section 6.1.6.2 | onwaiting | M |
| Global Attributes (for all HTML Elements) | | | P |
| | [16] section 3.2.3.1 | id | M |
| | [16] section 3.2.3.2 | title | M |
| | [16] section 3.2.3.3 | lang | M |
| | [16] section 3.2.3.6 | dir | M |
| | [16] section 3.2.3.7 | class | M |
| | [16] section 3.2.3.8 | style | M |
| | [16] section 3.2.3.9 | Embedding custom non-visible data (data-*) | M |

(1): Mandatory if pointer devices are supported for the Smart TV platform.

3.3.1.20. HTML5 Semantics

| Section | Reference | Description | Support |
|--|---------------------|-------------|---------|
| The root element | [16] section 4.1 | | M |
| Document Metadata | [16] section 4.2 | | P |
| The title element | [16] section 4.2.2 | | M |
| The base element | [16] section 4.2.3 | | M |
| The link element | [16] section 4.2.4 | | P |
| The meta element | [16] section 4.2.5 | | M |
| The style element | [16] section 4.2.6 | | M |
| The script element | [16] section 4.3.1 | | P |
| The body element | [16] section 4.4.1 | | P |
| The article element | [16] section 4.4.2 | | M |
| The section element | [16] section 4.4.3 | | M |
| The nav element | [16] section 4.4.4 | | M |
| The aside element | [16] section 4.4.5 | | M |
| The h1, h2, h3, h4, h5 and h6 elements | [16] section 4.4.6 | | M |
| The hgroup element | [16] section 4.4.7 | | M |
| The header element | [16] section 4.4.8 | | M |
| The footer element | [16] section 4.4.9 | | M |
| The address element | [16] section 4.4.10 | | M |
| The p element | [16] section 4.5.1 | | M |
| The hr element | [16] section 4.5.2 | | M |
| The pre element | [16] section 4.5.3 | | M |
| The blockquote element | [16] section 4.5.4 | | M |
| The ol element | [16] section 4.5.5 | | M |
| The ul element | [16] section 4.5.6 | | M |

| | | | |
|------------------------|------------------------|------------|---|
| The li element | [16] section 4.5.7 | | M |
| The dl element | [16] section 4.5.8 | | M |
| The dt element | [16] section 4.5.9 | | M |
| The dd element | [16] section 4.5.10 | | M |
| The figure element | [16] section 4.5.11 | | M |
| The figcaption element | [16] section 4.5.12 | | M |
| The div element | [16] section 4.5.13 | | M |
| The a element | [16] section 4.6.1 | | P |
| The em element | [16] section 4.6.2 | | M |
| The strong element | [16] section 4.6.3 | | M |
| The small element | [16] section 4.6.4 | | M |
| The s element | [16] section 4.6.5 | | M |
| The cite element | [16] section 4.6.6 | | M |
| The q element | [16] section 4.6.7 | | M |
| The dfn element | [16] section 4.6.8 | | M |
| The abbr element | [16] section 4.6.9 | | M |
| The code element | [16] section 4.6.11 | | M |
| The var element | [16] section 4.6.12 | | M |
| The i element | [16] section 4.6.16 | | M |
| The b element | [16] section 4.6.17 | | M |
| The u element | [16] section 4.6.18 | | M |
| The mark element | [16] section 4.6.19 | | M |
| The span element | [16] section 4.6.25 | | M |
| The br element | [16] section 4.6.26 | | M |
| The wbr element | [16] section 4.6.27 | | M |
| The img element | [16] section 4.8.1 | | P |
| The iframe element | [16] section 4.8.2 | | P |
| The embed element | [16] section 4.8.3 | | P |
| The object element | [16] section 4.8.4 | | P |
| The param element | [16] section 4.8.5 | | M |
| The canvas element | [16] section 4.8.11 | | P |
| The map element | [16] section 4.8.12 | | P |
| The area element | [16] section 4.8.13 | | P |
| The table element | [16] section 4.9.1 | | M |
| The caption element | [16] section 4.9.2 | | M |
| The colgroup element | [16] section 4.9.3 | | M |
| The col element | [16] section 4.9.4 | | M |
| The tbody element | [16] section 4.9.5 | | M |
| The thead element | [16] section 4.9.6 | | M |
| The tfoot element | [16] section 4.9.7 | | M |
| The tr element | [16] section 4.9.8 | | M |
| The td element | [16] section 4.9.9 | | M |
| The th element | [16] section 4.9.10 | | M |
| TableCellElement | [16] section 4.9.11 | | M |
| The summary element | [16] section 4.11.2 | | M |
| Links | [16] section 4.12 | | M |
| Link types | [16] section 4.12.5 | | P |
| | [16] section 4.12.5.1 | alternate | M |
| | [16] section 4.12.5.11 | stylesheet | M |

3.3.1.21. HTML5 Media elements

| Section | Reference | Description | Support |
|-------------------|--------------------|-------------|---------|
| The video element | [16] section 4.8.6 | | P |
| | [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 |
| The audio element | [16] section 4.8.7 | | P |
| The source element | [16] section 4.8.8 | | P |
| | [16] section 4.8.8 | src | M |
| | [16] section 4.8.8 | type | M |
| | [16] section 4.8.8 | media | M |
| The track element | [16] section 4.8.9 | | P |
| | [16] section 4.8.9 | kind | C-M (1) |
| | [16] section 4.8.9 | src | C-M (1) |
| | [16] section 4.8.9 | srclang | C-M (1) |
| | [16] section 4.8.9 | label | C-M (1) |
| | [16] section 4.8.9 | default | C-M (1) |
| | [16] section 4.8.9 | Track | C-M (1) |
| Media elements | [16] section 4.8.10 | | P |
| | [16] section 4.8.10.1 | error | M |
| | [16] section 4.8.10.2 | src | M |
| | [16] section 4.8.10.3 | currentSrc | M |
| | [16] section 4.8.10.4 | networkState | M |
| | [16] section 4.8.10.5 | preload | M |
| | [16] section 4.8.10.5 | load() | M |
| | [16] section 4.8.10.3 | canPlayType() | M |
| | [16] section 4.8.10.7 | readyState | M |
| | [16] section 4.8.10.9 | seeking | M |
| | [16] section 4.8.10.6 | currentTime | M |
| | [16] section 4.8.10.6 | duration | M |
| | [16] section 4.8.10.6 | startDate | M |
| | [16] section 4.8.10.8 | paused | M |
| | [16] section 4.8.10.8 | defaultPlaybackRate | M |
| | [16] section 4.8.10.8 | playbackRate | M |
| | [16] section 4.8.10.8 | played | M |
| | [16] section 4.8.10.9 | seekable | M |
| | [16] section 4.8.10.8 | ended | M |
| | [16] section 4.8.10.7 | autoplay | M |
| | [16] section 4.8.10.6 | Loop | M |
| | [16] section 4.8.10.8 | play() | M |
| | [16] section 4.8.10.8 | pause() | M |
| | [16] section 4.8.6 | Poster | M |
| | [16] section 4.8.10 | audioTracks | C-M (2) |
| | [16] section 4.8.10 | textTracks | C-M (1) |
| MediaError | [16] section 4.8.10.1 | | M |
| AudioTrackList | [16] section 4.8.10.10.1 | | P |
| | [16] section 4.8.10.10.1 | Length | C-M (2) |
| | [16] section 4.8.10.10.1 | AudioTrack() | C-M (2) |
| | [16] section 4.8.10.10.1 | getTrackById() | C-M (2) |
| AudioTrack | [16] section 4.8.10.10.1 | | C-M (2) |
| | [16] section 4.8.10.10.1 | Id | C-M (2) |
| | [16] section 4.8.10.10.1 | Kind | C-M (2) |
| | [16] section 4.8.10.10.1 | Label | C-M (2) |
| | [16] section 4.8.10.10.1 | Language | C-M (2) |
| | [16] section 4.8.10.10.1 | Enabled | C-M (2) |
| TextTrackList | [16] section 4.8.10.12.5 | | C-M (1) |
| | [16] section 4.8.10.12.5 | Length | C-M (1) |
| | [16] section 4.8.10.12.5 | TextTrack() | C-M (1) |

| | | | |
|------------|--------------------------|----------|----------------|
| TextTrack | [16] section 4.8.10.12.5 | | P |
| | [16] section 4.8.10.12.5 | Kind | C-M (1) |
| | [16] section 4.8.10.12.5 | Label | C-M (1) |
| | [16] section 4.8.10.12.5 | Language | C-M (1) |
| | [16] section 4.8.10.12.5 | Mode | C-M (1) |
| TimeRanges | [16] section 4.8.10.14 | | M |

(1): Mandatory if TTML subtitles are supported according to this specification. See section 3.3.5.2.1 and section 3.4.6.

(2): Mandatory if Multi Audio is supported. See section 3.4.7.

3.3.1.22. 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 |

3.3.1.23. HTML5 Forms

| Section | Reference | Description | Support |
|---------------------------------|--------------------------|---------------|----------|
| The form element | [16] section 4.10.3 | | P |
| The fieldset element | [16] section 4.10.4 | | P |
| The legend element | [16] section 4.10.5 | | M |
| The label element | [16] section 4.10.6 | | M |
| The input element | [16] section 4.10.7 | | P |
| | [16] section 4.10.7.1.1 | type=hidden | M |
| | [16] section 4.10.7.1.2 | type=text | M |
| | [16] section 4.10.7.1.6 | type=password | M |
| | [16] section 4.10.7.1.17 | type=radio | M |
| | [16] section 4.10.7.1.19 | type=submit | M |
| | [16] section 4.10.7.1.21 | type=reset | M |
| | [16] section 4.10.7.1.22 | type=button | M |
| Common input element attributes | [16] section 4.10.7.3 | | P |
| | [16] section 4.10.7.3.4 | readonly | M |
| | [16] section 4.10.7.3.5 | size | M |
| | [16] section 4.10.7.3.6 | required | M |
| | [16] section 4.10.7.3.10 | min/max | M |

| Section | Reference | Description | Support |
|-----------------------------------|--------------------------|-------------|---------|
| | [16] section 4.10.7.3.11 | step | M |
| The button element | [16] section 4.10.8 | | P |
| The select element | [16] section 4.10.9 | | P |
| The optgroup element | [16] section 4.10.10 | | M |
| The option element | [16] section 4.10.12 | | M |
| The textarea element | [16] section 4.10.13 | | M |
| The progress element | [16] section 4.10.16 | | M |
| The meter element | [16] section 4.10.17 | | M |
| Association of controls and forms | [16] section 4.10.18 | | M |
| Form validation | [16] section 4.10.1.4 | | M |
| The constraint validation API | [16] section 4.10.21.3 | | M |
| ValidityState | [16] section 4.10.21.3 | | M |

3.3.1.24. HTML5 Loading web pages

| Section | Reference | Description | Support |
|---------------|----------------------|------------------|---------|
| Window object | [16] section 5.2 | | P |
| | [16] section 6.1.6.2 | onabort | M |
| | [16] section 6.1.6.2 | onblur | M |
| | [16] section 6.1.6.2 | oncanplay | M |
| | [16] section 6.1.6.2 | oncanplaythrough | M |
| | [16] section 6.1.6.2 | onchange | M |
| | [16] section 6.1.6.2 | onclick | M |
| | [16] section 6.1.6.2 | ondurationchange | M |
| | [16] section 6.1.6.2 | onemptied | M |
| | [16] section 6.1.6.2 | onerror | M |
| | [16] section 6.1.6.2 | onfocus | M |
| | [16] section 6.1.6.2 | oninput | M |
| | [16] section 6.1.6.2 | oninvalid | M |
| | [16] section 6.1.6.2 | onkeydown | M |
| | [16] section 6.1.6.2 | onkeypress | M |
| | [16] section 6.1.6.2 | onkeyup | M |
| | [16] section 6.1.6.2 | onload | M |
| | [16] section 6.1.6.2 | onloadeddata | M |
| | [16] section 6.1.6.2 | onloadedmetadata | M |
| | [16] section 6.1.6.2 | onloadstart | M |
| | [16] section 6.1.6.2 | onmessage | M |
| | [16] section 6.1.6.2 | onmousedown | C-M (1) |
| | [16] section 6.1.6.2 | onmousemove | C-M (1) |
| | [16] section 6.1.6.2 | onmouseout | C-M (1) |
| | [16] section 6.1.6.2 | onmouseover | C-M (1) |
| | [16] section 6.1.6.2 | onmouseup | C-M (1) |
| | [16] section 6.1.6.2 | onmousewheel | C-M (1) |
| | [16] section 6.1.6.2 | onpause | M |
| | [16] section 6.1.6.2 | onplay | M |
| | [16] section 6.1.6.2 | onplaying | M |
| | [16] section 6.1.6.2 | onpopstate | M |
| | [16] section 6.1.6.2 | onprogress | M |
| | [16] section 6.1.6.2 | onratechange | M |
| | [16] section 6.1.6.2 | onresize | M |
| | [16] section 6.1.6.2 | onscroll | M |
| | [16] section 6.1.6.2 | onseeked | M |
| | [16] section 6.1.6.2 | onseeking | M |

| | | | |
|------------------------|----------------------|--------------|---|
| | [16] section 6.1.6.2 | onstorage | M |
| | [16] section 6.1.6.2 | onsubmit | M |
| | [16] section 6.1.6.2 | onsuspend | M |
| | [16] section 6.1.6.2 | ontimeupdate | M |
| | [16] section 6.1.6.2 | onunload | M |
| | [16] section 6.1.6.2 | onwaiting | M |
| The WindowProxy object | [16] section 5.2.8 | | M |
| The History interface | [16] section 5.2.2 | | P |
| The Location interface | [16] section 5.2.3 | | P |
| PopState event | [16] section 6.1.6.2 | | M |

(1): Mandatory if pointer devices are supported for the Smart TV platform.

3.3.1.25. HTML5 Web application APIs

| Section | Reference | Description | Support |
|----------------------|----------------------|-------------|---------|
| Events | [16] section 6.1.6 | | |
| | [16] section 6.1.6.2 | oninput | M |
| WindowBase64 | [16] section 6.4 | | M |
| The navigator object | [16] section 6.5.1 | | P |
| NavigatorID | [16] section 6.5.1 | | M |

3.3.1.26. HTML5 User interaction

| Section | Reference | Description | Support |
|----------------------|------------------|-------------|---------|
| The hidden attribute | | | |
| | [16] section 7.1 | hidden | M |
| | | | |
| | | | |

3.3.1.27. 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 |

3.3.1.28. 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 |
|---------------------------------|---|---|
| Browser resolution | Single window with 1280x720 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 3.4.4 | |

3.3.3. Input/key support

The platform supports DOM Level 3 Keyboard Events ([60]) insofar as required by this specification. This includes the keyCode attribute and support for the following global VK_-key constants:

| 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: some manufacturers may implement these key constants in a Javascript library.

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.

3.3.4. User Agent String

The Smart TV Alliance platform compliant to all mandatory items of this specification shall include the following user agent strings, separated by white space.

SmartTvA/3.0.0

3.3.5. Extended API for Smart TV Alliance

The Smart TV Alliance API provides an interface to the information associated with the Smart TV Alliance platform. The API is accessible by a JavaScript application running on the receiver.

3.3.5.1. SmartTvA_API Object

SmartTvA_API object provides Smart TV Alliance specific methods and properties. The TV device shall create this object and then create properties and methods for this object defined in this specification. The Smart TV Alliance platform shall allow JavaScript software running on the TV to extend this object with other properties and methods.

3.3.5.2. Methods for SmartTvA_API object

3.3.5.2.1. hasCapability

| hasCapability | | | |
|---------------|--|--|---|
| Description | Query an optional or conditionally mandatory function on the Smart TV Alliance platform. | | |
| Arguments | Name | Type | Description |
| | Query | String | This string is the optional or conditionally mandatory function name to query support for. Note: this string is case sensitive. |
| | Params | String | This string contains additional query information as a variable number of param arguments (param1, ..., paramN). The number of arguments depends on the query string (refer to hasCapability method arguments table). Note: this string is case sensitive. |
| Return value | Boolean | It is set to true if the given function is supported, otherwise false. | |

hasCapability method arguments table

| Query | Param1 | Param2 | Description | Remark |
|-------------|-------------|--------|---|---------------------|
| 3DSupport | | | Return value is set to true if receiver can display 3D video in side-by-side and top-bottom formats, otherwise false. | See section 3.4.4.1 |
| Key | numerickeys | | Return value is set to true if global VK_ key constants corresponding to all defined numeric keys (VK_0, VK_1, ..., VK_9) are supported, otherwise false. | See section 3.3.3 |
| | colorkeys | | Return value is set to true if global VK_ key corresponding to all color keys (VK_RED, VK_GREEN, VK_YELLOW, and VK_BLUE) are supported, otherwise false. | See section 3.3.3 |
| Multiscreen | AllJoyn | | Return value is set to true if AllJoyn is supported, otherwise false. | See section 3.6.2 |
| DRM | PlayReady | DASH | Return value is set to true if PlayReady in combination | See section 3.5 |

| | | | | |
|------------|-----------|-------------------|---|-----------------------|
| | | | with MPEG-DASH are supported according to this specification, otherwise false. | |
| | Widevine | AdaptiveStreaming | Return value is set to true if Widevine in combination with Widevine Adaptive Streaming and Widevine API are supported according to this specification, otherwise false. Note: No space is included in "AdaptiveStreaming". | See section 3.5 |
| Multiaudio | | | Return value is set to true if Multi Audio is supported, otherwise false. | See section 3.4.7 |
| TTML | inband | | Return value is set to true if TTML in band subtitles are supported according to this specification, otherwise false. | See section 3.4.6.1.3 |
| | outofband | | Return value is set to true if TTML out of band subtitles are supported according to this specification, otherwise false. | See section 3.4.6.1.4 |
| UHD | | | UHD is set to true if supported according to this specification, otherwise false. | See section 3.4.8 |

Usage: SmartTvA_API.hasCapability(query[,param1,....,paramN]);

3.3.5.2.2. *exit*

| | |
|--------------|--|
| Exit | |
| Description | Notify the Smart TV Alliance platform that an application is ready to exit and returns control back to the platform. Note: The end user's expectation is to navigate back to the source application that called the application. The platform is expected to meet this user experience, but there could be exceptions and the behavior following this call is device dependent. |
| Arguments | <i>None</i> |
| Return value | <i>None</i> |

Usage: SmartTvA_API.exit();

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 | M | 3.4.2.2 |
| | Microsoft Smooth Streaming | M | [13] |
| | MPEG-DASH (ISOBMFF & 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 6, equivalent to protocol version 3, as specified in [12], is mandatorily supported with the following tag exceptions:

| Tags NOT Supported | Reference |
|-------------------------|--------------------|
| EXT-X-PROGRAM-DATE-TIME | [12] Section 3.3.4 |
| EXT-X-ALLOW-CACHE | [12] Section 3.3.5 |
| EXT-X-DISCONTINUITY | [12] Section 3.3.9 |

3.4.2.3 MPEG-DASH

Receivers shall implement the MPEG-DASH [25] ISOBMFF Live profile, as further defined by HbbTV version 1.2.1 [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 formats are supported:

| Format | Detail | Status | Reference |
|-----------------|--|--------|-----------|
| MP4 File Format | Used in combination with HTTP, MPEG-DASH and Smooth Streaming. | M | [27] |

| | | | |
|------------------------|--|---|------|
| MPEG2 Transport Stream | Used in combination with HTTP streaming and HLS. | M | [28] |
|------------------------|--|---|------|

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 (H.264) | Supported profiles: BP@L3, MP@L3, HP@L4. | M | [29] |

Receivers advertising 3D capability according to section 3.3.5.2.1 shall support fullscreen 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:

| Format | MIME Type | Reference | Comment |
|------------------|-------------------------------|------------|---|
| MPEG-DASH | application/dash+xml | [25], [26] | Used for all DASH content. |
| Smooth Streaming | application/vnd.ms-sstr+xml | [13] | Used for all Smooth Streaming content. |
| HLS | application/vnd.apple.mpegurl | [12] | Used for all HLS content. |
| MP4 file format | video/mp4 | [53] | Used for non-adaptive streaming only. |
| MPEG2-TS | video/mpeg | [53] | Used for non-adaptive streaming only. |
| HE-AAC | audio/mp4 | [53] | Used for non-adaptive audio-only streaming. |
| MP3 | audio/mpeg | [53] | Used for non-adaptive audio-only streaming. |

These MIME types are used in the HTML5 video object.

3.4.6. Subtitles

This section specifies subtitle support for the Smart TV Alliance platform.

3.4.6.1. Subtitles using native renderer

This specification supports the use of TTML [75] for subtitles, and a minimum profile is defined.

Implementation of this profile is optional for receivers. Receivers supporting subtitles are only required to support subtitles for full screen video.

3.4.6.1.1. Profile

Each timed text entry shall be contained as a `<p>` item. Timing information is specified as follows:
`tt:begin="hh:mm:ss:ff" tt:end="hh:mm:ss:ff"`.

Support of all other tags is optional. Receivers may interpret other tags and attributes if they are present. If present, tags and attributes not supported by the receiver shall be ignored. `<p>` items with valid timing information shall be displayed even if they contain attributes not supported by the receiver.

The following is an example TTML file:

```
<?xml version="1.0" encoding="utf-8"?>
<tt xml:lang="en"
    xmlns="http://www.w3.org/ns/ttml"
    xmlns:tts="http://www.w3.org/ns/ttml#styling"
    xmlns:ttm="http://www.w3.org/ns/ttml#metadata">
  <head>
  </head>
  <body>
    <div>
      <p begin="00:00:01:00" end="00:00:04:00">First text.</p>
      <p begin="00:00:05:00" end="00:00:09:00">Second text.</p>
    </div>
  </body>
</tt>
```

3.4.6.1.2. Delivery

TTML subtitles may be delivered either in band or out of band. Receivers supporting this profile shall support in band method.

For in band delivery, Smooth Streaming is used, according to [13].

For out of band delivery, the TTML file is delivered using HTTP, independent of the streaming protocol.

3.4.6.1.3. In band method

Applications control subtitles using HTML5 TextTrack element. The following table shows the Microsoft Smooth Streaming mapping to HTML5 TextTrack element.

| HTML5 | | Microsoft Smooth Streaming |
|---------------|-----------|---|
| Interface | Attribute | Mapping Info |
| TextTrackList | length | Number of StreamIndex tags of Text |
| TextTrack | label | Name attribute of StreamIndex tag of Text |
| TextTrack | language | Language attribute of StreamIndex tag of Text |

TextTrack.mode (disabled / hidden / showing) is used for selecting the subtitle language.

The TextTrack object list order shall be the same as the order of StreamingIndex.

3.4.6.1.4. Out of band method

Applications control subtitles using HTML5 TextTrack element. The native client in the receiver acquires the TTML file by making an HTTP request to the URL given in the `src` attribute.

| HTML5 | | |
|------------------|-----------|----------------------------|
| Interface | Attribute | Mapping Info |
| TextTrackList | length | Number of text tracks |
| TextTrack | language | Language of the text track |
| HTMLTrackElement | src | Address of the TTML file |

See [76] for an informative explanation of the use of out of band subtitle delivery.

3.4.7. Multi Audio

The Smart TV Alliance platform provides an interface for the content to provide multiple track audio streams.

3.4.7.1. HTML5 Media Element

| Reference | Attribute | Support |
|---------------------|-------------|---------|
| [16] section 4.8.10 | audioTracks | C-M |

3.4.7.2. AudioTrackList Interface

| Reference | Attribute | Support |
|--------------------------|--------------|---------|
| [16] section 4.8.10.10.1 | length | C-M |
| [16] section 4.8.10.10.1 | [index] | C-M |
| [16] section 4.8.10.10.1 | getTrackById | C-M |

The length attribute must return the number of tracks represented by their objects at the time of request. The Smart TV Alliance platform aligns the [index] list and the track list. e.g.)

| |
|------------------------|
| [Media Container File] |
| <Track#1> |
| <Track#2> |
| <Track#3> |
| : |
| : |

```

audioTracks [0] = Track#1
audioTracks [1] = Track#2
audioTracks [2] = Track#2
:
:

```

3.4.7.3. AudioTrack Interface

| Reference | Attribute | Support |
|--------------------------|-----------|---------|
| [16] section 4.8.10.10.1 | id | C-M |
| [16] section 4.8.10.10.1 | kind | C-M |
| [16] section 4.8.10.10.1 | label | C-M |
| [16] section 4.8.10.10.1 | language | C-M |
| [16] section 4.8.10.10.1 | enabled | C-M |

The *id* attribute shall return the identifier of the track, if it has one, or an empty string otherwise. The *kind* attribute shall return the category of the track, if it has one, or an empty string otherwise. The *label* attribute shall return the label of the given track. The *language* attribute shall return the RFC5646/BCP 47 language tag of the track, if it has one, or an empty string otherwise. The *enabled* attribute shall be set to true to select a track. The enabled attribute must return true if the track is currently selected, and false otherwise.

Limitation:

The Smart TV Alliance platform does not support that multiple audio tracks are mixed. Multiple audio tracks cannot be enabled (= true) simultaneously.

3.4.7.4. Mapping to Streaming Protocols

The multiaudio profile supports the following streaming protocols.

| Streaming Protocol | Support |
|----------------------------|---------|
| Microsoft Smooth Streaming | C-M |
| MPEG-DASH (ISO BMFF) | C-M |

3.4.7.5. Smooth Streaming

| Interface | Attribute | Mapping |
|----------------|-----------|---|
| AudioTrackList | length | Number of StreamIndex[13] tags of Audio |
| AudioTrack | Label | Name attribute of StreamIndex tag (1) |
| AudioTrack | language | Language attribute of StreamIndex tag (2) |

(1): The *Name* attribute specifies the name of the track. This attribute is usually used to discriminate between multiple tracks of the same type, e.g. AAC, MP3.

(2): The *Language* attribute specifies the ISO639-2/T code of the used language, which consists of a three-letter code, e.g. eng, jpn.

3.4.7.6. MPEG-DASH

| Interface | Attribute | Mapping |
|----------------|-----------|--|
| AudioTrackList | length | Number of Adaptation[25] tags of Audio |
| AudioTrack | language | The lang attribute of Adaptation tag (3) |

(3): The *lang* attribute specifies the RFC5646/BCP 47 code of the used language, which consists of a two-letter code, e.g. en, jp.

3.4.8. Ultra High Definition Services

This section specifies features that are mandatory for platforms which are capable of handling Smart TV Alliance Ultra High Definition video services. Video shall be presented in Ultra High Definition resolution only when the video is shown in full screen. When the video is not in full screen, the application resolution is unchanged as section 3.3.2 specifies.

| Function | Details |
|------------------------------------|--|
| Video format | 3840 × 2160p at 24 (Mandatory), 25/30 fps (Mandatory – see note (2)), 48, 50, 60 fps (Optional) |
| Video codecs | HEVC [57] Profile: Main 10 Level: Main Tier 5.1 Support for Tiles and WPP (wavefront parallel processing) are optional. (1) |
| Audio codecs | As in section 3.4.4.2 |
| Systems layer | As in section 3.4.3 [58] specifies the carriage of HEVC in MP4 file format [59] specifies the carriage of HEVC in MPEG2 Transport Stream |
| Content Protection | As in section 3.5 Combination of PlayReady + MPEG-DASH is mandatory for the platform supporting UHD. |
| Progressive and Adaptive Streaming | As in section 3.4. Only MPEG-DASH and HLS need to be supported for HEVC content. This includes the above video format. |

Note:

1) The platform does not need to support streams where either `tiles_enable_flag` or `entropy_conding_sync_enabled_flag` (both in `picture_parameter_set`) is set to 1.

2) It is mandatory for receivers to support at least one of 25 and 30 fps.

3.5. Digital Rights Management

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

The following table shows the supported combinations of DRM and streaming format.

| 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] [51] |
| 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.

3.6. Multiscreen

3.6.1. DIAL

This chapter describes the use of the DIAL protocol (see [55]) for Smart TV Alliance applications. Two components are mandatory – DIAL Service Discovery and DIAL REST Service.

DIAL Service discovery enables a client to discover DIAL servers on its local network segment and obtain access to the DIAL REST Service on those devices.

The DIAL REST Service enables the client to query, launch and optionally stop applications on a Host Device and to retrieve the Application Instance URL.

3.6.1.1. Definitions for section 3.6.1

| Definitions | Description |
|--------------------------|---|
| Companion Device | Mobile device (e.g. smart phone or a tablet) This is equivalent to the 2 nd screen in DIAL. |
| Client | Companion Device |
| Host | Smart TV Alliance device |
| Host application | A Smart TV Alliance application or native application running on the Host |
| Client application | Application running on the Client |
| Look-up table | A table matching application name to web application URL (e.g. mySTAAApp -> www.mySTAAApp.com) |
| App-to-app communication | Communication between an application running on the companion device and a Smart TV Alliance Application running on the TV. |

3.6.1.2. DIAL Service Discovery

Service discovery is defined in [55]. Refer to chapter 5 “Dial Service Discovery”

3.6.1.3. DIAL REST Service

3.6.1.3.1. Application Resource

The Application Resource URL is defined in [55]. Refer to section 6.1 “Application Resource”.

3.6.1.3.2. Launching an Application

Launching an application is defined in the DIAL specification[55]. Refer to section 6.1.1 “Launching an Application”

The launch parameters shall be added to the application URL as a query string.

E.g. if the launch parameters are param1=value1¶m2=value2 and the url that has to be launched is "www.mystaapp.com". The following URL shall be opened
"www.mystaapp.com?param1=value1¶m2=value2" (See also annex A2.1)

The host has access to a look-up table of the combination of the Application Name and the URL of the web application. The implementation of this look-up table is not specified in this document. The host browser accesses the URL in the look-up table. If the Application Name is not in the look-up table, then the host returns an HTTP response with response code 404 Not Found. Otherwise, refer to section 6.1.1.2 “Server Response” in [55].

Optionally the user may be notified the first time an application is launched through DIAL.

3.6.1.3.3. **Stopping an Application**

Stopping an application is defined in the DIAL specification [55]. Refer to section 6.1.2 “Stopping an Application”.

Support for stopping an application is optional.

3.6.1.3.4. **Querying for Application Information**

Querying for application information is defined in the DIAL specification [55]. Refer to section 6.1.3.1 “Client request”.

3.6.1.4. **Multiscreen Application Naming Conventions**

The application name of a multiscreen application shall be prefixed by the multiscreen Smart TV Alliance prefix.

The multiscreen Smart TV Alliance prefix shall be “*org.smarttv-alliance*”.

The maximum total size of the Smart TV Alliance Multiscreen Application Name shall be 277 bytes. The first 21 bytes are reserved for Smart TV Alliance prefix as above (“*org.smarttv-alliance*” + “. ”). The rest of 256 bytes are used for the application name.

3.6.2. **AllJoyn**

This chapter describes the use of AllJoyn.

The implementation of AllJoyn is optional.

The AllJoyn framework provides a mechanism that enables both members and application developers to create peer-to-peer applications to interact between one or more mobile devices, and the television. These applications include DIAL like functionality, as well as other more interactive multi-screen experiences.

AllJoyn enables applications to publish their functionality on the network using object oriented APIs. These APIs are discovered using either explicit advertising/discovery or finer grain announcements. These announcements enable services to advertise their capabilities as they are defined in the interfaces they expose. Applications and services are defined by these interfaces as they provide the mechanism for interaction over the network, they are the API definitions services expose. These APIs can also be marked as secured which will enable authentication and encryption between the applications.

AllJoyn is provided via an Open Source Project which is available on GitHub at the following URL: <http://alljoyn.github.com/download-source.html>, the implementation serves as the specification. There is also tutorial and general documentation available (see [56]).

3.6.2.1. **Definitions for section 3.6.2**

| Definitions | Description |
|--------------|--|
| Peer to peer | The ability to communicate directly without having to mediate that communication via a server. Applications are said to be peer applications when they implement both service and client side functionality; that is, neither is the server or the client, but each is both. |
| Service | An application exposing APIs on the network |
| Client | An application using APIs published by a service |
| Interface | An API definition that is used by services to expose their functionality on the network. It can be thought of as a contract stating that the service will honor the functionality defined in the interface definition. |
| Method | A member of an interface. Allows a client to interact via the service and receive a reply |
| Signal | A member of an interface. Allows the asynchronous delivery of information from a service to a client. |

| | |
|----------|---|
| Property | A member of an interface. A way of publishing some data on the network. |
|----------|---|

3.6.2.2. Application Launch Specification

The following is the specification for an application launch service similar to DIAL. It defines the *org.alljoyn.launch* standard AllJoyn interface.

3.6.2.2.1. Overview

The *org.alljoyn.launch* interface is implemented by an AllJoyn service on a target device such as a smart TV. The target device advertises the existence of its launch service by publishing a sessionless signal that declares the capabilities of the service. Client devices such as smart phones and tablets discover the existence of the service by receiving this sessionless signal. Once a client device has received the signal, it can present the information to the user who may then choose to connect in order access the service offered by the *org.alljoyn.launch* interface.

3.6.2.2.2. Security

The *org.alljoyn.launch* interface exposes methods that greatly affect the usability and user experience of the device. Therefore, it is assumed that some device manufacturers will want to control access to the *org.alljoyn.launch* interface to a restricted set of client devices. To provide this control, the *org.alljoyn.launch* interface is defined to be secure. Any of the standard AllJoyn authentication mechanisms (Pin Code, username/password or certificate based) can be used to authenticate the identity of connecting clients. Certain implementations may choose to loosen this requirement and provide non-secure access to the *org.alljoyn.launch* interface. However, client implementations that want to be interoperable with all implementations of *org.alljoyn.launch* should assume that authentication will be required.

3.6.2.2.3. Advertised Capabilities

AllJoyn nodes that wish to implement the *org.alljoyn.launch* interface should advertise their existence over AllJoyn by sending an “*org.alljoyn.capabilities.Capabilities*” sessionless signal that declares at least one BusObject (of any path name) that implements the *org.alljoyn.launch* interface.

AllJoyn nodes may also include vendor specific metadata in the *org.alljoyn.capabilities.Capabilities* sessionless signal that they emit. This metadata may be used to identify the brand and model of the device in addition to any other data that the vendor wishes to include. Although implementors are free to put any information they want in the metadata, there are some conventions for “typical” metadata entries. These “typical” metadata entries are:

Vendor: A String representation of the vendor name

Product: A String representation of the product name

FriendlyName: A String representation of a potentially user configurable name (e.g. “Living Room TV”)

3.6.2.2.4. Methods

The following methods are exposed by a BusObject that implements the *org.alljoyn.launch* interface:

GetAppInfo(in STRING appName, out AppInfo appInfo)

Inputs:

appName: Reverse domain name style application name (e.g. “com.company.appname”)

Output:

appInfo: Describes given appName (See AppInfo definition below)

Description:

Receive information about an application with a given application name

StartApp(in STRING appName, in BYTE[] appArgs, in StartAppOptions options, out StartAppResponse response)

Inputs:

appName: Reverse domain name style application name (e.g. “com.company.appname”)

appArgs: Application specific arguments passed to running app instance

options: See definition of StartAppOptions below

Outputs:

response: See StartAppResponse definition below.

Description:

Start the named application with given appArgs and options.

When StartApp is called, the current state of the requested application is obtained by the service in an implementation specific way. Then, based on the StartAppOptions that were specified when the application was originally started, one of the following actions are taken. (Please refer to section entitled “**Related AllJoyn Data Types**” for details.)

| Current App State | startOptions.allowControl | Action |
|----------------------------------|---------------------------|---|
| Installed but not running | N/A | App is started with given args and options |
| Running | true | appArgs are passed to running app instance |
| Running | false | No action. StartAppResponse indicates failure reason. |
| Not Installed | N/A | No action. StartAppResponse indicates failure reason. |
| AppName is unknown | N/A | No action. StartAppResponse indicates failure reason. |

StopApp(in STRING appName, out StopAppResponse response)

Inputs:

appName: Reverse domain name style application name (e.g. “com.company.appname”)

Output:

response: See StopAppResponse definition below.

Description:

Stop the named application.

InstallApp(in STRING appName, out InstallAppResponse response)

Inputs:

appName: Reverse domain name style application name (e.g. “com.company.appname”)

Output:

response: See InstallAppResponse definition below.

Description:

Install the named application.

3.6.2.2.5. Signals

None

3.6.2.2.6. Properties

None

3.6.2.2.7. Related AllJoyn Data Types

The following struct data types are used in the Methods, Signals and Properties of the org.alljoyn.launch interface.

3.6.2.2.8. AppInfo

| Member Name | Type | Description |
|----------------------------|--------------------|--|
| Name | STRING (s) | Reverse domain name style name of application (e.g. “com.company.appname”) |
| runState | UINT8 (y) | 0 = Unknown Application 1 = Application is known but is not installed 2 = Application is installed but not running 3 = Application is running |
| applicationSpecific | DICTIONARY (a{sv}) | Application specific data. Valid keys and value types are specified by the application. None are required. |

3.6.2.2.9. StartAppOptions

| Member Name | Type | Description |
|---------------------|-------------|--|
| allowControl | BOOLEAN (b) | Set to true if other clients are allowed to “restart” or “stop” the application. |
| autoClose | BOOLEAN (b) | Set to true if the service should automatically close the application when the client/service session is closed. |

3.6.2.2.10. StartAppResponse

| MemberName | Type | Description |
|----------------------------|------------|---|
| Status | UINT8 (y) | 0 = Success (other fields of this struct contain valid info) 1 = Unknown App name 2 = App not installed 3 = App already started (restart not allowed) 4 = App failed to start (platform specific) |
| applicationResponse | STRING (s) | Application specific response to start request |

3.6.2.2.11. StopAppResponse

| Member Name | Type | Description |
|---------------|-----------|--|
| Status | UINT8 (y) | 0 = Success 1 = Unknown App name 2 = App not running |

3.6.2.2.12. InstallAppResponse

| Member name | Type | Description |
|---------------|-----------|--|
| Status | UINT8 (y) | 0 = Success 1 = Unknown App name 2 = App failed to install |

3.6.2.2.13. AllJoyn Introspection XML

The following XML defines the org.alljoyn.launch interface.

```

<node name="/anyobject"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="http://www.alljoyn.org/schemas/introspect.xsd">
  <interface name="org.alljoyn.launch">
    <method name="GetAppInfo">
      <arg name="appName" type="s" direction="in"/>
      <arg name="appInfo" type="(sqa{sv})" direction="out"/>
    </method>
    <method name="StartApp">
      <arg name="appName" type="s" direction="in"/>
      <arg name="appArgs" type="sy" direction="in"/>
      <arg name="options" type="(bb)" direction="in"/>
      <arg name="response" type="(ys)" direction="out"/>
    </method>
    <method name="StopApp">
      <arg name="appName" type="s" direction="in"/>
      <arg name="response" type="(y)" direction="out"/>
    </method>
    <method name="InstallApp">
      <arg name="appName" type="s" direction="in"/>
      <arg name="response" type="(y)" direction="out"/>
    </method>
  </interface>
</node>

```

3.7. Smart Home

A separate Smart Home specification will be published, based on this version of the Smart TV Alliance technical specifications. This specification will include the methods to monitor and control various kinds of smart home appliances.

Smart Home functions will be optional for compliance with this version of the Smart TV Alliance specification.

4. History

4.1. Changes from version 2.5 to version 3.0

| | v2.5 | v3.0 |
|---------------------|---|---|
| HTML5 | Only DOM level 2 referenced. | DOM Level 3 Events and 4 referenced, as required by the supported HTML5 profile. Major enhancements to HTML5 profile. |
| CSS3 | | Major enhancements to CSS3 profile. |
| JavaScript | | New APIs for device capability and application exit. |
| AV Streaming | Support for services up to HD resolution. HLS v2 | Support for Ultra High Definition services. HLS v3 Support for audio track selection by application. |
| Subtitles | | Support for subtitles using TTML. |
| Smart Home | | Specification to be published in 2014. |

4.2. Changes from version 2.0 to version 2.5

| | v2.0 | v2.5 |
|--------------------|---|--|
| CSS2 | Obsolete CSS2.1 DRAFT specification referenced. | Latest CSS2.1 RECOMMENDATION referenced. |
| Multiscreen | No specific support. | Support added for: <ul style="list-style-type: none"> - DIAL - AllJoyn (optional) - Annex on the use of Websockets for app to app communication |
| HTTP | | Added Smart TV Alliance identifier with version information in user agent string. |
| Misc | | Editorial corrections and clarifications. |

4.3. Changes from version 1.0 to version 2.0

| | 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 | Extended/Additional Support for: <ul style="list-style-type: none"> - CSS3 UI |

| | | |
|------------------------|--|--|
| | <ul style="list-style-type: none"> - CSS3 BG - CSS3 Media Queries | <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> 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 |

Annex A. Multiscreen (Informative)

Annex A.1 Resolving URL from Application Name

Annex A describes examples of use cases for a server run by the manufacturer being used to resolve an Application URL using a look-up table, and application to application communication using W3C WebSocket API.

A.1.1 Resolving Application URL via Internet Server

DIAL Client in the companion device would request to launch an application in the host. The DIAL server in the host needs to resolve the valid Application URL according to the requested Application Name. The Manufacturer's server provides the look-up table.

The form of look-up table and connections between look-up module and Manufacturer's Server(s) are dependent on the receiver manufacturer.

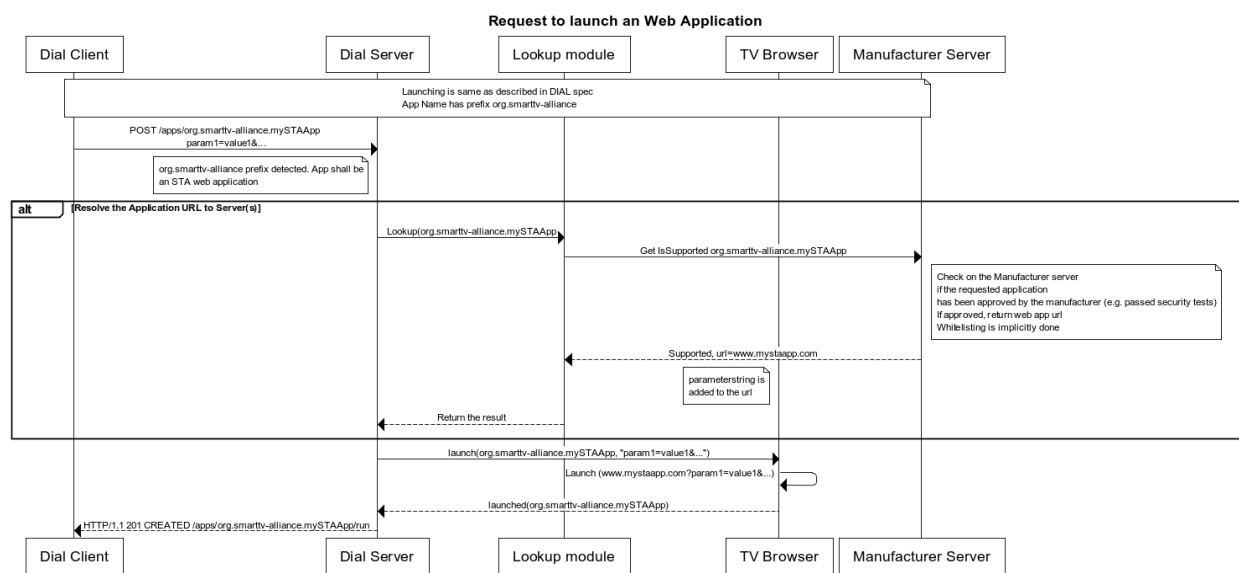


Figure A. 1 An example sequential diagram to retrieve an Application URL from Manufacturer's server

In figure A.1, DIAL Client requests to launch "org.smarttv-alliance.mySTAAApp" application in the host. DIAL Server in the host receives a HTTP POST message. This calls a function of Lookup module which sends a request with Application Name to Manufacturer's Server(s), Manufacturer's Server(s) will response this message with one or more valid Application URL(s) to Lookup module. The Lookup module returns the results to DIAL Server. DIAL Server will launch the Application with the Application URL when the Application Name is a valid to this receiver

A.1.2 Look-up Table of Web Applications

The Lookup module in the Smart TV Alliance Receiver can download one or more look-up tables from the Manufacturer's Server(s). This means the receiver can maintain both the valid Application Name and Application URLs in local storage.

There are two ways to download look-up tables from the Manufacturer's Server(s).

- 1) Pull table
- 2) Notify the version change of table

The first approach is the easier way to update the local look-up table in the Smart TV Alliance Receiver. The lookup module downloads the whole table or parts of the table in the Manufacturer's Server(s). Notification of look-up table version changes is recommended. As soon as the Manufacturer's Server notifies the update of look-up table to Smart TV Alliance Receiver(s), the lookup module shall download changes to the table.

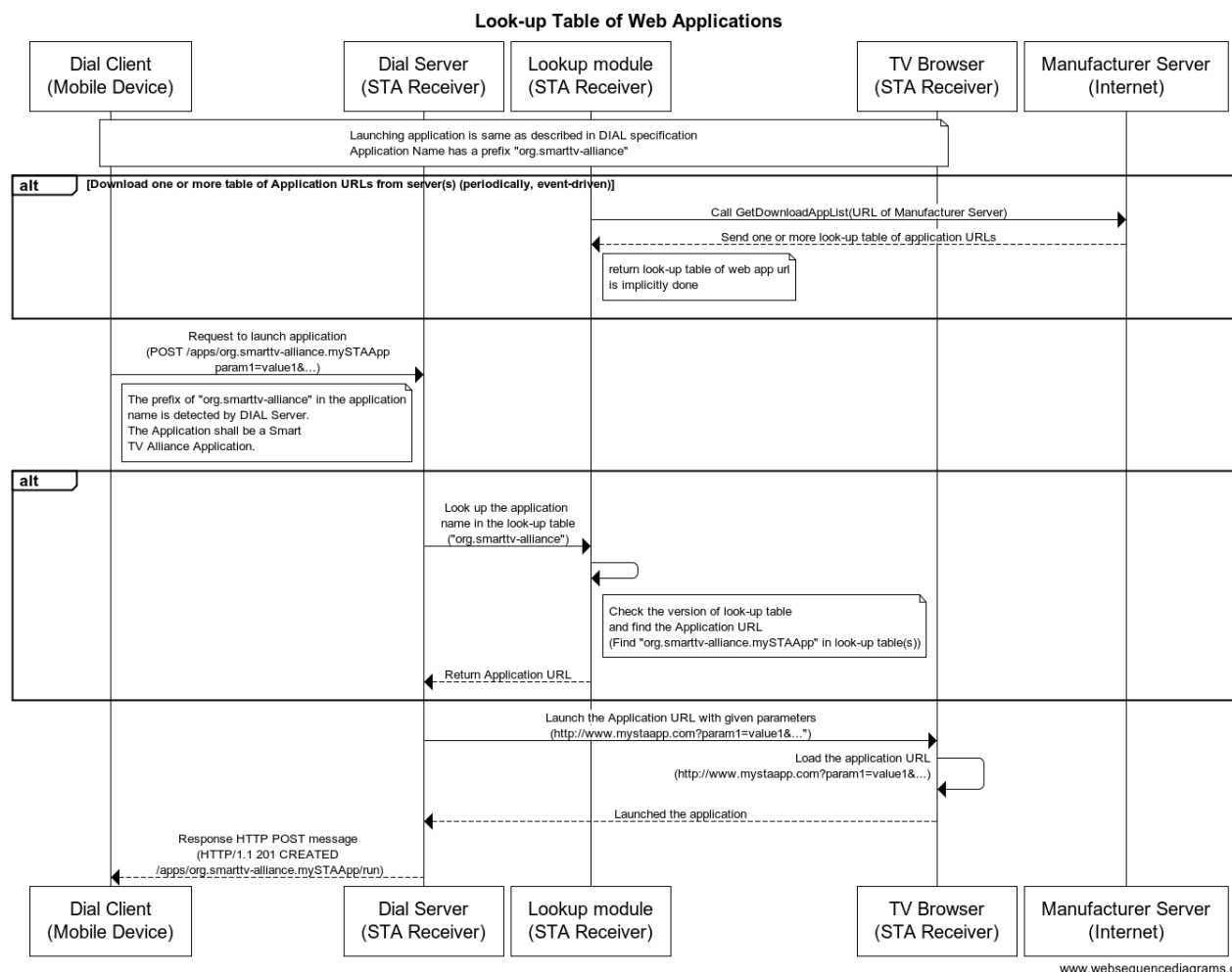


Figure A. 2 Update local look-up table(s) of Application URL(s) from Manufacturer's Server(s)

Figure A.2 shows the mechanisms of the look-up table update. The lookup module makes a connection to the Manufacturer Server to check the version of table in the Manufacture Server periodically. The Manufacturer Server gives the latest version of the table that is available to the lookup Module when the Smart TV Alliance Receiver has an old version.

Annex A.2 W3C WebSocket API for Application to Application Communication

This section describes the Application to Application Communication for Multiscreen Applications using DIAL and W3C WebSocket API.

A.2.1 Cloud based app to app communication (informative)

App to app communication is possible via a server in the cloud. A Service Provider can run its own WebSocket Server on the Internet. Both mobile and TV applications are provided with the address of this server by the Service Provider, and can make a WebSocket connection to this server. They then communicate with each other via this server. The server is responsible routing messages between the applications, using for example an ID communicated between the applications via the DIAL protocol.

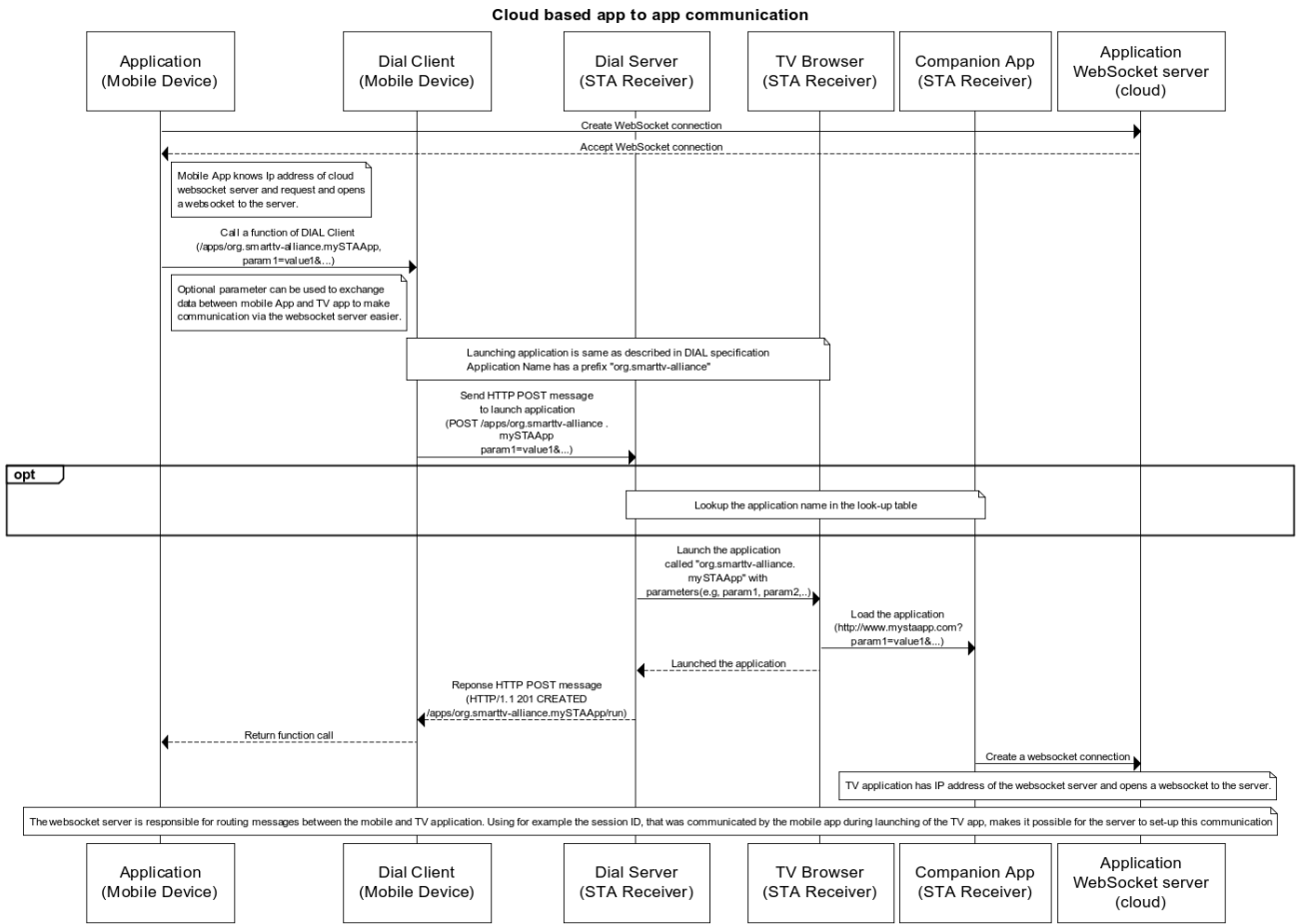


Figure A. 3 Cloud based app to app communication

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