International Telecommunication Union

ITU-R

Radiocommunication Sector of ITU

# Recommendation ITU-R BT.1699-1
(09/2009)

# Harmonization of declarative application formats for interactive TV

**BT SERIES**

**Broadcasting service (television)**

## Foreword

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### Series of ITU-R Recommendations

(Also available online at http://www.itu.int/publ/R-REC/en)

| Series | Title |
|---|---|
| **BO** | Satellite delivery |
| **BR** | Recording for production, archival and play-out; film for television |
| **BS** | Broadcasting service (sound) |
| **BT** | **Broadcasting service (television)** |
| **F** | Fixed service |
| **M** | Mobile, radiodetermination, amateur and related satellite services |
| **P** | Radiowave propagation |
| **RA** | Radio astronomy |
| **RS** | Remote sensing systems |
| **S** | Fixed-satellite service |
| **SA** | Space applications and meteorology |
| **SF** | Frequency sharing and coordination between fixed-satellite and fixed service systems |
| **SM** | Spectrum management |
| **SNG** | Satellite news gathering |
| **TF** | Time signals and frequency standards emissions |
| **V** | Vocabulary and related subjects |

***Note***: *This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.*

*Electronic Publication*
Geneva, 2009

RECOMMENDATION ITU-R BT.1699-1

# Harmonization of declarative application* formats for interactive TV

(Questions ITU-R 13/6 and ITU-T 4/9)

(2005-2009)

**Scope**

This Recommendation is intended to harmonize the application environment for declarative applications for interactive TV. It specifies common elements, media types and APIs at the syntactic level of the declarative application environment.

The ITU Radiocommunication Assembly,

*considering*

a) that digital broadcasting services (satellite, terrestrial and cable) are becoming widely available and offer multimedia applications;

b) that multimedia applications comprising video, audio, still-picture, text, graphics, etc. associated with interactive features have been developed;

c) that multimedia applications planned or deployed in some Regions are using the declarative application environment;

d) that common application formats are desirable for production and international exchange of multimedia applications;

e) that ITU-T Recommendation J.200 defines, in addition to the definition above, the high-level architecture for a harmonized set of interactive application formats and application programming interfaces (APIs) and identifies the structure of application environment comprising the procedural application environment and the declarative application environment for digital television services;

f) that ITU-T Recommendation J.202 specifies the common core of procedural application formats in the procedural application environment for interactive TV applications;

g) that specification of harmonized declarative content formats in the declarative application environment is also required for interactive TV applications,

*recommends*

**1** that for interactive TV applications in the declarative application environment, the harmonized declarative application formats specified in Annexes 1-7 should be used.

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* ITU-T Recommendation J.200 provides the definition for “declarative application”: An application which primarily makes use of declarative information to express its behaviour; an XML document instance is an example of a declarative application.

# Annex 1

# Common core of the declarative application formats for interactive TV

## 1 Introduction

This Recommendation identifies functional commonality among the declarative application environments for interactive TV application specifications ACAP-X, BML and DVB-HTML. Elements which are common to these three standards are identified as a "Common Core". The value of the Common Core is to assist program authors to exchange declarative applications internationally using these standards. This Recommendation also notes features outside of the Common Core of the covered standards. The goal of this Recommendation is to note these differences to encourage efforts toward increasing commonality between the standards to further improve functionality and enhance economies of scale.

## 2 Overview

This Recommendation is intended to harmonize the application environment for declarative applications for interactive TV. It specifies common elements, media types and APIs at the syntactic level of the declarative application environment to satisfy regional application requirements for the three standards ACAP-X, BML and DVB-HTML as specified in the normative references below. This Recommendation is divided into seven annexes. Annex 2 describes the Common Core of the three standards. Annex 3 describes additional functionality outside the Common Core for BML. Annex 4 describes additional functionality outside the Common Core for ACAP-X. Annex 5 describes additional functionality outside the Common Core for DVB-HTML.

The format described in Annex 6 is an intermediate format for translation between formats including the Common Core and the standards covered in this Recommendation. The format described in Annex 7 is a framework to bind content authored in multiple formats into single content.

It is noted that there are other declarative formats such as ETSIMHEG-5, which are not covered in this Recommendation. However, the migration from environments in use to the harmonized environment is assisted by the identification of a Common Core and the translation using the intermediate format.

## 3 References

### 3.1 Normative references

| | |
|---|---|
| [1] BML | ARIB STD-B24 V5.2 |
| [2] ACAP-X | ATSC A/101 |
| [3] DVB-HTML | ETSI TS 102 812 V1.2.2 |
| [4] wTVML | ETSI TS 102 322 V1.1.1 |
| [5] NCL | ABNT NBR 15606-2 V2 |

Users of this Recommendation are encouraged to investigate the possibility of applying the most recent editions of the references listed above, whose maintenance is the responsibility of the issuing standard bodies. Content authors should refer to the cited documentation to ensure conformity with the semantics provided by those elements, media types and APIs.

NOTE 1 – BML, ACAP-X, DVB-HTML, wTVML and NCL standards are available via the links in Appendix 1 to this Recommendation.

NOTE 2 – By agreement between ITU-R, ABNT, ATSC, ARIB and ETSI, the versions listed in § 3.1 were authorized for use by ABNT, ATSC, ARIB and ETSI, and accepted by ITU-R for inclusion in this Recommendation. Any subsequent versions of these standards which have not been accepted and approved by ITU-R are not part of this Recommendation.

### 3.2 Informative references

| | |
|---|---|
| [1] ETSI-MHEG | ETSI TS 202 184 V1.1.1 |
| [2] J.202 | ITU-T J.202 |
| [3] J.200 | ITU-T J.200 |

### 3.3 Terms and definitions

See the normative references listed in § 3.1.

# Annex 2

# Common core

## 1 Overview

Methodology for Common Core, Common Core of Media types, XML Markup, Stylesheet Markup, Monomedia and Behavioural APIs, which are based on the commonality between ACAP-X, BML and DVB-HTML are described below. Note that BML has four content profiles. Except where otherwise noted, all four profiles of BML are assumed.

### 1.1 Methodology

#### 1.1.1 Layer model

Graphics layer should lie on top of other layers such as video or text plane.

#### 1.1.2 Application life cycle

There should be a mechanism to destroy an application from outside the application itself.

### 1.2 Media type

Common media types are listed in Table 1.

TABLE 1

**Common media type**

| |
|---|
| Image/jpeg |
| Image/png |
| Text/css |
| Application/xhtml+xml |

### 1.3 Schema

Common schema is listed in Table 2.

TABLE 2

**Common schema**

| |
|---|
| http:// |
| https:// |

### 1.4 XML markup

Common XML markups are listed in Table 3.

TABLE 3

**Common XML markup module**

| |
|---|
| Structure |
| Text |
| Hypertext |
| List |
| Presentation |
| Bidirectional text |
| Forms |
| Image |
| Client Side Image Map |
| Object |
| Frames |
| Target |
| Meta Information |
| Scripting |
| Stylesheet |
| Style Attribute |
| Link |
| Base |

Common XML markups for BML for basic services (fixed terminal profile), ACAP-X and DVB-HTML are listed in Table 4.

TABLE 4

**Common XML markup for BML for basic services, ACAP-X and DVB-HTML**

| | | |
|---|---|---|
| Common attributes | | |
| Core attributes | | id<br>class |
| Style attributes | | |
| | | style |
| Core modules | | |
| Structure module | | |
| | body | %Core.attrib; |
| | head | |
| | title | |
| Text module | | |
| | br | %Core.attrib |
| | div(1) | %Common.attrib |
| | p(1), (2) | %Common.attrib |
| | span | %Common.attrib |
| Hypertext module | | |
| | a | %Common.attrib<br>accesskey<br>href |
| Forms module | | |
| | input(1) | %Common.attrib<br>accesskey<br>disabled<br>readonly<br>maxlength<br>type<br>value |
| Object module | | |
| | object(1) | %Common.attrib<br>data<br>type |
| Metainformation module | | |
| | meta | name<br>content |
| Scripting module | | |
| | script | |
| Stylesheet module | | |
| | style | |

(1) Only these elements can be a child element of .

(2) Only these elements and CDATA can be a child element of <p>.

## 1.5 Stylesheet

### 1.5.1 Common stylesheet properties

Common stylesheet properties are listed in Table 5.

TABLE 5

**Common stylesheet properties**

| | | |
|---|---|---|
| Background | Clear | Outline-color |
| Background-attachment | Clip | Outline-style |
| Background-color | Color | Outline-width |
| Background-image | Content | Overflow |
| Background-position | Counter-increment | Padding |
| Background-repeat | Counter-reset | Padding-bottom |
| Border | Display | Padding-left |
| Border-bottom | Float | Padding-right |
| Border-bottom-color | Font | Padding-top |
| Border-bottom-style | Font-family | Position |
| Border-bottom-width | Font-size | Right |
| Border-color | Font-style | Text-align |
| Border-left | Font-variant | Text-decoration |
| Border-left-color | Font-weight | Text-indent |
| Border-left-style | Height | Text-transform |
| Border-left-width | Left | Top |
| Border-right | Letter-spacing | Vertical-align |
| Border-right-color | Line-height | Visibility |
| Border-right-style | List-style | White-space |
| Border-right-width | List-style-image | Width |
| Border-style | List-style-position | Word-spacing |
| Border-top | List-style-type | Z-index |
| Border-top-color | Margin | Nav-index |
| Border-top-style | Margin-bottom | Nav-left |
| Border-top-width | Margin-left | Nav-right |
| Border-width | Margin-right | Nav-up |
| Bottom | Margin-top | Nav-down |
| Caption-side | Outline | |

Common stylesheet properties for BML for basic services, ACAP-X and DVB-HTML are listed in Table 6.

TABLE 6

**Common stylesheet properties for BML for basic services, ACAP-X and DVB-HTML**

| |
|---|
| @media |
| Margin |
| Padding-top |
| Padding-right |
| Padding-bottom |
| Padding-left |
| Border-width |
| Border-style |
| Position |
| Left(1) |
| Top(1) |
| Width(1) |
| Height(1) |
| Z-index |
| Line-height |
| Display |
| Visibility |
| Overflow |
| Background-image |
| Background-repeat |
| Font-family |
| Font-size |
| Font-weight |
| Text-align |
| Letter-spacing |
| White-space |

(1) The elements <input>, <object>, , and <p> must have these property values. The elements <br>, <a>,  must not have these property values.

Furthermore, the following restrictions should be applied:

– display property
Only block element can be applied for <p>, , <body>, <input> and <object>.
Only inline values can be applied for <br>, <a> and .

– position property
Only absolute values can be applied for <p>, , <input> and <object>.
Only static values can be applied for <br>,  and <a>.

### 1.5.2 Common CSS selectors

Common CSS selectors are listed in Table 7.

TABLE 7

**Common CSS selectors**

| |
|---|
| Universal |
| Type |
| Descendant |
| Class |
| Id |
| :first-child pseudo-class |
| :link pseudo-class |
| :hover pseudo-class |
| :active pseudo-class |
| :focus pseudo-class |
| :lang pseudo-class |
| :pseudo-elements<br>(:first-child, :first-letter, :before, :after) |

Common CSS selectors for BML for basic services, ACAP-X and DVB-HTML are listed in Table 8.

TABLE 8

**Common CSS selectors for BML for basic services, ACAP-X and DVB-HTML**

| |
|---|
| Universal |
| Type |
| Dynamic(:focus and :active) |
| Class |
| Id |

## 1.6 Scripting language

Common scripting language is ECMAScript 2nd Edition with the following restriction:

– Number type supports integer operation only.

Common native objects for BML for basic services, ACAP-X and DVB-HTML are listed in Table 9.

TABLE 9

**Common native objects for BML for basic services, ACAP-X and DVB-HTML**

| Object | Methods, properties |
|---|---|
| (global) | NaN<br>parseInt(string, radix)<br>isNaN(number) |
| Object | All |
| Object.prototype | All |
| Function | prototype<br>length |
| Function.prototype | All |
| Array | All |
| Array.prototype | All |
| String | All |
| String.prototype | All |
| Boolean | All |
| Boolean.prototype | All |
| Number | Prototype<br>MAX_VALUE<br>MIN_VALUE<br>NaN<br>Number([value])<br>New number([value]) |
| Number.prototype | All |
| Date | prototype<br>Date([year [, month [, date [, hours [, minutes [, seconds [, ms ]]]]]]])<br>new Date([year [, month [, date [, hours [, minutes [, seconds [, ms ]]]]]]]) |
| Date.prototype | toString()<br>getFullYear()<br>getUTCFullYear()<br>getMonth()<br>getUTCMonth()<br>getDate()<br>getUTCDate()<br>getDay()<br>getUTCDay()<br>getHours()<br>getUTCHours()<br>getMinutes()<br>getUTCMinutes()<br>getSeconds()<br>getUTCSeconds()<br>getMilliseconds()<br>getUTCMilliseconds()<br>getImtezoneOffset()<br>setMilliseconds(ms)<br>setUTCMilliseconds(ms)<br>setSeconds(sec [, ms])<br>setUTCSeconds(sec [, ms])<br>setMinutes(min, [, sec [, ms]])<br>setUTCMinutes(min, [, sec [, ms]])<br>setHours(hours, [,(min, [, sec [, ms]])]<br>setUTCHours(hours, [,(min, [, sec [, ms]])]<br>setDate(date)<br>setMonth(mon [, date])<br>setUTCMonth(mon [, date])<br>setFullYear(year [, mon [, date]])<br>setUTCFullYear{year [, mon [, date]]}<br>toLocaleString()<br>toUTCString() |

For BML for basic services, the length to represent signed integer is 32 bits including sign.

## 1.7 DOM API

Common DOM APIs in DOM level 1 are listed in Table 10.

TABLE 10

**Common DOM level 1 APIs**

| | |
|---|---|
| Core fundamental | DOMException |
| | DOMImplementation |
| | DocumentFragment |
| | Document |
| | Node |
| | NodeList |
| | NamedNodeMap |
| | CharacterData |
| | Attr |
| | Element |
| | Text |
| | Comment |

Common DOM level 1 APIs for the BML for basic services, ACAP-X and DVB-HTML are listed in Table 11. Interfaces listed in Table 11 that have no specified attributes or methods cover all attributes and methods of the interfaces.

TABLE 11

**Common DOM level 1 APIs for BML for basic services, ACAP-X and DVB-HTML**

| | Interface | Attributes, Methods |
|---|---|---|
| Core fundamental | DOMImplementation | |
| | Document | implementation<br>documentElement |
| | Node | parentNode<br>firstChild<br>lastChild<br>previousSibling<br>nextSibling |
| | CharacterData | data<br>length |
| | Element | tagName |
| | Text | |

# Annex 3

# Additional elements, media types and APIs for BML

Elements, media types and APIs for BML in addition to those listed in Annex 2 are described below. Items marked "BD)" are common to BML and DVB-HTML. Items marked "BA)" are common to BML and ACAP-X.

## 1 Additional BML media types

Additional BML media types are listed in Table 12.

TABLE 12

**Additional BML media types**

| |
|---|
| Multipart/mixed |
| Text/xml[BD)] |
| Text/xsl |
| Text/html |
| Text/plain[BD)] |
| Text/css |
| Text/X-arib-bml;charset="euc-jp" |
| Text/X-arib-bml;charset="UTF-16" |
| Text/X-arib-bml;charset="Shift_JIS" |
| Text/X-arib-bml;charset="UTF-8" |
| Text/X-arib-jis8text |
| Text/X-arib-ecmascript;charset="euc-jp" |
| Text/X-arib-ecmascript;charset="UTF-16" |
| Text/X-arib-ecmascript;charset="Shift_JIS" |
| Text/X-arib-ecmascript;charset="UTF-8" |
| Image/gif |
| Image/X-arib-png |
| Image/X-arib-mng |
| Image/X-arib-mpeg2-I |
| Image/X-arib-mpeg4-I-simple |
| Image/X-arib-mpeg4-I-core |
| Image/X-arib-H264-I-baseline |
| Image/X-arib-H264-I-main |
| Audio/X-arib-mpeg2-aac |
| Audio/X-arib-mpeg2-bc |
| Audio/X-arib-mpeg4 |
| Audio/X-arib-aiff |

TABLE 12 (*end*)

| |
|---|
| Audio/X-arib-additional |
| Audio/X-arib-romsound |
| Application/X-arib-stream-text;charset="euc-jp" |
| Application/X-arib-stream-text;charset="UTF-16" |
| Application/X-arib-stream-text;charset="Shift_JIS" |
| Application/X-arib-stream-text;charset="UTF-8" |
| Application/X-arib-stream-jis8text |
| Application/X-arib-stream-png |
| Application/X-arib-stream-jpeg |
| Application/X-arib-stream-mpeg2-I |
| Application/X-arib-stream-mpeg4-I-simple |
| Application/X-arib-stream-mpeg4-I-core |
| Application/X-arib-mpeg2-tts |
| Application/X-arib-bmlclut |
| Application/X-arib-btable |
| Application/X-arib-drcs |
| Application/X-arib-PDI |
| Application/X-arib-resourceList |
| Application/X-arib-stream-H264-I-baseline |
| Application/X-arib-stream-H264-I-main |
| Application/X-arib-mpeg2-ts |
| Application/X-arib-rootcertificate |
| Application/X-arib-contentPlayContrl |
| Application/X-arib-streamControlInfo |
| Application/X-arib-meta+xml;charset="UTF-8" |
| Application/X-arib-meta+xml;charset="UTF-16" |
| Video/X-arib-mpeg1 |
| Video/X-arib-mpeg2 |
| Video/X-arib-mpeg4-simple |
| Video/X-arib-mpeg4-core |
| Video/X-arib-H264-baseline |
| Video/X-arib-H264-main |

## 2 Additional BML XML markup

Additional BML XML markups are listed in Table 13.

TABLE 13

**Additional XML markups**

| Module | Tag |
|---|---|
| Table[BA)] | All |
| Intrinsic events[BA)] | All |
| Name identification[BA)] | All |
| Applet | All |
| Basic forms | All |
| Basic table[BD)] | All |
| Server side image map | All |
| Iframe[BD)] | All |
| Legacy | All |
| BML extension | Bml, bevent, beitem, body&, div&, p&, span&, a&, bdo&, object& |

## 3 Additional BML CSS properties

Additional BML CSS properties are listed in Table 14.

TABLE 14

**Additional CSS properties**

| |
|---|
| Clut[(1)] |
| Color-index[(1)] |
| Background-color-index[(1)] |
| Border-color-index |
| Border-top-color-index[(1)] |
| Border-right-color-index[(1)] |
| Border-bottom-color-index[(1)] |
| Border-left-color-index[(1)] |
| Outline-color-index |
| Resolution[(1)] |
| Display-aspect-ratio[(1)] |
| Grayscale-color-index[(1)] |
| Used-key-list[(1)] |
| nav-index[(1)] |
| nav-up[(1)] |
| nav-down[(1)] |

TABLE 14 (*end*)

| |
|---|
| nav-left[(1)] |
| nav-right[(1)] |
| -wap-marquee |
| -wap-marquee-style |
| -wap-marquee-loop |
| -wap-marquee-dir |
| -wap-marquee-speed |
| -wap-accesskey |
| -wap-input-format |
| -wap-input-required |

(1) These attributes are employed for BML for basic services.

## 4 Additional BML DOM APIs

Additional BML DOM level 1 APIs are listed in Table 15.

TABLE 15

**Additional BML DOM level 1 APIs**

| | |
|---|---|
| Core extension[BA)] | CDATASection |
| | DocumentType |
| | Notation |
| | Entity |
| | EntityReference |
| | ProcessingInstruction |
| HTML | HTMLCollection[BA)] |
| | HTMLDocument[BA)] |
| | HTMLElement[BA)] |
| | HTMLAnchorElement[BA)] |
| | HTMLFormElement[BA)] |
| | HTMLInputElement[BA)] |
| | HTMLOptionElement[BA)] |
| | HTMLSelectElement[BA)] |
| | HTMLTextAreaElement[BA)] |
| | HTMLImageElement[BA)] |
| | HTMLObjectElement[BA)] |
| | HTMLBodyElement[BA)] |
| | HTMLBlockquoteElement |
| | HTMLPreElement |
| | HTMLHeadingElement |

TABLE 15 (*end*)

| | |
|---|---|
| HTML (*cont.*) | HTMLHRElement |
| | HTMLDivElement(1) |
| | HTMLParagraphElement(1) |
| | HTMLQuoteElement |
| | HTMLBRElement(1) |
| | HTMLModElement |
| | HTMLBaseElement |
| | HTMLLinkElement |
| | HTMLDListElement |
| | HTMLOlistElement |
| | HTMLUListElement |
| | HTMLLIElement |
| | HTMLButtonElement |
| | HTMLFieldSetElement |
| | HTMLLabelElement |
| | HTMLLegendElement |
| | HTMLOptGroupElement |
| | HTMLTableCaptionElement |
| | HTMLTableColElement |
| | HTMLTableElement |
| | HTMLTableSectionElement |
| | HTMLTableCaptionElement |
| | HTMLTableColElement |
| | HTMLTableElement |
| | HTMLTableSectionElement |
| | HTMLTableCellElement |
| | HTMLTableRowElement |
| | HTMLAreaElement |
| | HTMLMapElement |
| | HTMLParamElement |
| | HTMLFrameSetElement |
| | HTMLFrameElement |
| | HTMLIFrameElement |
| | HTMLMetaElement(1) |
| | HTMLTitleElement(1) |
| | HTMLScriptElement(1) |
| | HTMLStyleElement(1) |
| | HTMLHeadElement(1) |
| | HTMLHtmlElement(1) |

(1) These elements are employed for BML for basic services.

BML extensions of DOM APIs are listed in Table 16.

TABLE 16

**Additional BML extensions**

| | |
|---|---|
| BML extension | BMLDocument (1) |
| | BMLCSS2Properties(1) |
| | BMLEvent(1) |
| | BMLIntrinsicEvent(1) |
| | BMLBeventEvent(1) |
| | BMLDocument(1) |
| | BMLElement |
| | BMLBlockquoteElement |
| | BMLPreElement |
| | BMLHeadingElement |
| | BMLHRElement |
| | BMLDivElement(1) |
| | BMLSpanElement(1) |
| | BMLParagraphElement(1) |
| | BMLQuoteElement |
| | BMLBRElement(1) |
| | BMLModElement |
| | BMLAnchorElement(1) |
| | BMLLinkElement |
| | BMLDListElement |
| | BMLOListElement |
| | BMLUListElement |
| | BMLLIElement |
| | BMLButtonElement |
| | BMLFieldSetElement |
| | BMLFormElement |
| | BMLInputElement(1) |
| | BMLLabelElement |
| | BMLLegenedElement |
| | BMLOptGroupElement |
| | BMLOptionElement |
| | BMLSelectElement |
| | BMLTexAreaElement |
| | BMLTableCaptionElement |
| | BMLTableColElement |
| | BMLTableElement |

TABLE 16 (*end*)

| | |
|---|---|
| BML extension (*cont.*) | BMLTableSectionElement |
| | BMLTableCellElement |
| | BMLTableRowElement |
| | BMLImageElement |
| | BMLAreaElement |
| | BMLMapElement |
| | BMLObjectElement(1) |
| | BMLFrameSetElement |
| | BMLFrameElement |
| | BMLIFrameElement |
| | BMLBodyElement(1) |
| | BMLBmlElement(1) |
| | BMLBeventElement(1) |
| | BMLBeitemElement(1) |

(1) These elements are employed for BML for basic services.

## 5 Markup language switch

A function added to ECMAScript to launch another declarative application environment is listed in Table 17.

TABLE 17

**Markup language switch function**

```
Number startExtraBrowser(
input String browserName,
input Number showAV,
input String returnURI,
input String uri
)
```

# Annex 4

# Additional elements, media types and APIs for ACAP-X

Elements, media types and APIs for ACAP-X in addition to those listed in Annex 2 are described below. Items marked "AD)" are common to ACAP-X and DVB-HTML. Items marked "AB)" are common to ACAP-X and BML.

## 1 Additional ACAP-X media types

Additional ACAP-X media types are listed in Table 18.

TABLE 18

**Additional ACAP-X media types**

| |
|---|
| Application/acap-j |
| Application/acap-certificate |
| Application/acap-digest |
| Application/acap-permission |
| Application/acap-signature |
| Application/acap-x |
| Application/acap-x-metadata |
| Application/font-tdpfr |
| Application/java |
| Application/zip |
| Application/xhtml+xml |
| Audio/ac3 |
| Audio/basic |
| Audio/mpeg[AD)] |
| Image/mpeg[AD)] |
| Text/ecmascript[AD)] |
| Video/mng |
| Video/mpeg |
| Video/mpv |

## 2 Additional ACAP-X XML markup

Additional ACAP-X XML markups are listed in Table 19.

TABLE 19

**Additional ACAP-X XML markups**

| Module | Tag |
|---|---|
| Table[AB)] | All |
| Intrinsic Events[AB)] | All |
| Name Identification[AB)] | All |

## 3 Additional ACAP-X CSS properties

Additional ACAP-X CSS properties and selectors are listed in Table 20.

TABLE 20

**Additional ACAP-X CSS properties and selectors**

| Properties | Atsc-dynamic-refresh |
|---|---|
| Selectors | Child |
| | Adjacent sibling |
| | Attribute and attribute values |

## 4 Additional ACAP-X stylesheet attributes

Additional ACAP-X stylesheet attributes are CSS level 2, CSS-BOX, CSS-COLOR, CSS-TV, CSS-UI and their related DOM APIs.

## 5 Additional ACAP-X DOM APIs

Additional ACAP-X DOM level 2 APIs are listed in Table 21.

TABLE 21

**Additional ACAP-X DOM level 2 APIs**

| Core fundamental[AD)] | DOMException |
|---|---|
| | DOMImplementation |
| | DocumentFragment |
| | Document |
| | Node |
| | NodeList |
| | NamedNodeMap |
| | CharacterData |

TABLE 21 (*continued*)

| | |
|---|---|
| Core fundamental[AD] (*cont.*) | Attr |
| | Element |
| | Text |
| | Comment |
| Core extension[AB] | CDATASection |
| | DocumentType |
| | Notation |
| | Entity |
| | EntityReference |
| | ProcessingInstruction |
| HTML[AB] | HTMLAnchorElement |
| | HTMLBodyElement |
| | HTMLCollection |
| | HTMLDocument |
| | HTMLElement |
| | HTMLFormElement |
| | HTMLInputElement |
| | HTMLObjectElement |
| | HTMLOptionElement |
| | HTMLSelectElement |
| | HTMLTextAreaElement |
| | HTMLImageElement |
| View | AbstractView |
| | DocumentView |
| Style sheets[AD] | DocumentStyle |
| | LinkStyle |
| | MediaList |
| | Stylesheet |
| | StylesheetList |
| CSS | Counter |
| | CSSCharsetRule |
| | CSSFontFaceRule |
| | CSSImportRule |
| | CSSMediaRule |
| | CSSPageRule |
| | CSSPrimitiveValue |
| | CSSRule |
| | CSSRulesList |
| | CSSStyleDeclaration |

TABLE 21 (*end*)

| | |
|---|---|
| CSS (*cont.*) | CSSStyleRule |
| | CSSStyleSheet |
| | CSSUnknownRule |
| | CSSValue |
| | CSSValueList |
| | DocumentCSS |
| | DOMImplementationCSS |
| | ElementCSSInlineStyle |
| | Rect |
| | RGBColor |
| Event[AD)] | ViewCSS |
| | Event |
| | EventException |
| | EventListner |
| | EventTarget |
| EventSet | KeyEvent |
| | KeyModifiers |
| | MouseEvent[AD)] |
| | MutationEvent[AD)] |
| | UIEvent[AD)] |
| | VirtualKeys |

ACAP-X extensions of DOM APIs are listed in Table 22.

TABLE 22

**Additional ACAP-X extensions**

| | |
|---|---|
| ACAP-X Extension | DOMExceptionExt |
| | HTMLAnchorElementExt |
| | HTMLDocumentExt |
| | HTMLImageElementExt |
| | HTMLFormElementExt |
| | HTMLObjectElementExt |
| | HTMLTriggerObjectElementExt |
| | HTMLOptionsCollection |
| | DocumentViewExt |

# Annex 5

# Additional elements, media types, and APIs for DVB-HTML

Elements, media types and APIs for DVB-HTML in addition to those listed in Annex 2 are described below. Items marked "DB)" are common to DVB-HTML and BML. Items marked "DA)" are common to DVB-HTML and ACAP-X.

## 1 Additional DVB-HTML media types

Additional DVB-HTML media types are listed in Table 23.

TABLE 23

**Additional DVB-HTML media types**

| |
|---|
| Application/xml |
| Application/dvbj |
| Application/dvb.pfr |
| Audio/mpeg[DA)] |
| Image/gif |
| Image/mpeg[DA)] |
| Text/ecmascript[DA)] |
| Text/plain[DB)] |
| Text/css |
| Text/xml[DB)] |
| Text/dvb.utf8 |
| Multipart/dvb.service |
| Video/dvb.mpeg.drip |

## 2 Additional DVB-HTML XML markups

Additional DVB-HTML XML markups are listed in Table 24.

TABLE 24

**Additional XML markups**

| |
|---|
| Basic Table[DB)] |
| Iframe[DB)] |

## 3 Additional DVB-HTML CSS properties

Additional DVB-HTML CSS properties and selectors are listed in Table 25.

TABLE 25

**Additional DVB-HTML CSS properties and selectors**

| | |
|---|---|
| Properties | Direction |
| | Unicode-bidi |
| | Min-width |
| | Max-width |
| | Min-height |
| | Max-height |
| | Font-stretch |
| | Font-size-adjust |
| | Table-layout |
| | Empty-cells |
| | Speak-header |
| | Opacity |
| | Nav-first |
| | Clip-video |
| | Compose-rule |
| Selectors | Child |
| | Adjacent sibling |
| | Attribute and attribute values |

## 4 Additional DVB-HTML DOM APIs

### 4.1 Additional DVB-HTML DOM level 1 APIs

Additional DVB-HTML DOM level 1 APIs are listed in Table 26.

TABLE 26

**Additional DVB-HTML DOM level 1 APIs**

| | |
|---|---|
| HTML | DVBHTMLCollection |
| | DVBHTMLDocument |
| | DVBHTMLElement |
| | DVBHTMLAnchorElement |
| | DVBHTMLButtonElement |
| | DVBHTMLFormElement |
| | DVBHTMLInputElement |
| | DVBHTMLOptionElement |

TABLE 26 (*end*)

| | |
|---|---|
| HTML (*cont.*) | DVBHTMLSelectElement |
| | DVBHTMLTextAreaElement |
| | DVBHTMLImageElement |
| | DVBHTMLAreaElement |
| | DVBHTMLMapElement |
| | DVBHTMLObjectElement |
| | DVBHTMLFrameSetElement |
| | DVBHTMLFrameElement |
| | DVBHTMLIFrameElement |

## 4.2 Additional DVB-HTML DOM level 2 APIs

Additional DVB-HTML DOM level 2 APIs are listed in Table 27.

TABLE 27

**Additional DVB-HTML DOM level 2 APIs**

| | |
|---|---|
| Core fundamental[DA)] | DOMException |
| | DOMImplementation |
| | DocumentFragment |
| | Document |
| | Node |
| | NodeList |
| | NamedNodeMap |
| | CharacterData |
| | Attr |
| | Element |
| | Text |
| | Comment |
| View | AbstractView |
| | DocumentView |
| Style sheets[DA)] | DocumentStyle |
| | LinkStyle |
| | MediaList |
| | Stylesheet |
| | StylesheetList |

TABLE 27 (*end*)

| | |
|---|---|
| Event[DA)] | DocumentEvent |
| | Event |
| | EventException |
| | EventListner |
| | EventTarget |
| EventSet[DA)] | MouseEvent |
| | MutationEvent |
| | UIEvent |

# Annex 6

## Presentation interoperability through translation

Some service providers may find the core functionality a little limiting for their purposes, though they still wish to target the multiple presentation engines identified in this Recommendation.

As a supplement to the core functionality, the Worldwide Television Markup Language (wTVML) specified in ETSI TS 102 322 defines a format to author such interactive services, which can then be mechanically translated to any desired presentation markup language. The wTVML format uses an XML data structure with declarative behaviour and little or no scripting, and as such is easier to translate to other markup languages. Because wTVML expresses the author's intent, rather than implementation, the richer non-core features of each supported markup become available for use.

In addition, wTVML can also be used as a native presentation language.

When using wTVML as the intermediate format for format translation of the declarative application, the following may require careful consideration for translation of the original application to wTVML in particular organization of the application:

– broadcast message signal, such as that carried by DSM-CC stream event;

– additional functions in scripting language, such as that for cache control.

# Annex 7

## Presentation interoperability by management framework of multiple formats for declarative applications

Some service providers may wish to employ multiple formats identified in this Recommendation including the common core. Usage of the multiple formats can be in many ways, such as concurrent use, switch of one format to another, and so on. This means management framework for content employing multiple formats is required.

As a framework for management of multiple declarative application formats, Nested Context Language (NCL) specified in ABNT NBR 15606-2 defines a format to bind content authored in multiple formats into single content. NCL is a glue language based on XML that holds media objects together in a multimedia presentation, no matter which is each object type.

When using NCL as the framework to bind content authored in different declarative application formats, following may request careful consideration to organize binding content:

– System time base can only be in NCL, not in each media object. In particular, time based event such as an event triggered by normal play time should be handled in NCL. LuaScript is one of the processing mechanisms for this kind of behaviour in NCL.

# Appendix 1

## Standards

BML

ACAP-X

DVD-HTML

wTVML

NCL

NOTE 1 – BML standard is available at <http://www.arib.or.jp/english/html/overview/sb_ej.html>.

NOTE 2 – ACAP-X standard is available at <http://www.itu.int/rec/R-REC-BT.1699-0-200502-I/en>.

NOTE 3 – DVB-HTML standard is available at <http://www.itu.int/rec/R-REC-BT.1699-0-200502-I/en>.

NOTE 4 – wTVML standard is available at http://webapp.etsi.org/workprogram/Report_workitem.asp?WKI_ID=19886.

NOTE 5 – NCL standard is available at <http://abnt.iso.org/livelink/livelink/fetch/2000/2827/7589984/8699711/8727725/ABNTNBR15606%2D2_2007Ing_2008Vc2_2009.pdf>.