



**ATSC**

ADVANCED TELEVISION  
SYSTEMS COMMITTEE

# **ATSC Standard A/331:2020 Amendment No. 1, “Multiple App Fixes”**

---

Doc. A/331:2020 Amend. No 1  
27 October 2020

**Advanced Television Systems Committee**  
1776 K Street, N.W.  
Washington, D.C. 20006  
202-872-9160

The Advanced Television Systems Committee, Inc., is an international, non-profit organization developing voluntary standards and recommended practices for digital television. ATSC member organizations represent the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries. ATSC also develops digital television implementation strategies and supports educational activities on ATSC standards. ATSC was formed in 1983 by the member organizations of the Joint Committee on Inter-society Coordination (JCIC): the Electronic Industries Association (EIA), the Institute of Electrical and Electronic Engineers (IEEE), the National Association of Broadcasters (NAB), the National Cable Telecommunications Association (NCTA), and the Society of Motion Picture and Television Engineers (SMPTE). For more information visit [www.atsc.org](http://www.atsc.org).

---

*Note:* The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to the validity of this claim or of any patent rights in connection therewith. One or more patent holders have, however, filed a statement regarding the terms on which such patent holder(s) may be willing to grant a license under these rights to individuals or entities desiring to obtain such a license. Details may be obtained from the ATSC Secretary and the patent holder.

---

Implementers with feedback, comments, or potential bug reports relating to this document may contact ATSC at <https://www.atsc.org/feedback/>.

### Revision History

Version	Date
Amendment approved	27 October 2020

## **ATSC Standard: A/331:2020 Amendment No. 1, “Multiple App Fixes”**

### **1. OVERVIEW**

#### 1.1 Definition

An Amendment is generated to document an enhancement, an addition or a deletion of functionality to previously agreed technical provisions in an existing ATSC document. Amendments shall be published as attachments to the original ATSC document. Distribution by ATSC of existing documents shall include any approved Amendments.

#### 1.2 Scope

This document defines two new attributes to the A/331 HELD signaling to support multiple Broadcaster Applications, namely @default and @appId. It also clarifies that only one Broadcaster Application can be running at a time, and updates the examples.

#### 1.3 Rationale for Changes

Although the A/331 HELD and much of A/344 discuss the idea of multiple Broadcaster Applications in the same Service, the existing HELD signaling fails to actually support it. While multiple packages can be defined in the HELD, there is no way to signal which one should be launched as the “default”. Further, the A/331 and A/344 text implies that the @appId can be used as a Broadcaster Application identifier, but this is not possible since the entire purpose of the @appId is to support multiple different Broadcaster Applications using the same resource cache. A new Broadcaster Application identifier is needed.

In addition, in Section 7.1.2.2, the first paragraph seems to lead one to believe that more than one Broadcaster Application can be simultaneously running, which is not the case.

Also, in 7.1.8.3, both examples need to be updated to show @default and @appId.

Finally, the second HELD example is confusing – several HELD entries seem to carry identical information which would not make sense to be broadcast as shown. For example, the last two entries both signal identical bbandEntryUrl for the same @appId, for the time period 930-1200. The last entry also has a bcstEntryPageUrl, but otherwise duplicates the prior entry.

#### 1.4 Compatibility Considerations

The changes described in this document are backward-compatible relative to the currently published version of the standard to which this Amendment pertains and any previously approved Amendments for that standard. Existing Receivers are required to ignore unknown (new) attributes and existing emissions do not need to include the new attributes since the use of multiple Broadcaster Applications in the same Service is not actually usable today.

### **2. CHANGE INSTRUCTIONS**

Change instructions are given below in *italics*. Unless otherwise noted, inserted text, tables, and drawings are shown in blue; deletions of existing text are shown in ~~red-strikeout~~. The text “[ref]” indicates that a cross reference to a cited referenced document should be inserted.

Modify 3.3 Acronyms and Abbreviations as follows:

**BA** – Broadcaster Application (~~see A/344 [46]~~)

Add to 3.4 Terms as follows:

**Broadcaster Application** – see A/344 [46]

**Receiver** – see A/344 [46]

Modify Section 7.1.2.2 as follows:

#### 7.1.2.2 Signaling of **Broadcaster** Application Properties

A Service can contain zero or more app-based features. For example, a linear Service could contain one app-based feature consisting of an **Broadcaster Application-app** that ~~runs in the background and~~ manages the insertion of targeted ads, and another **Broadcaster Application app-based feature** that contains a collection of **Broadcaster Applications-apps** that provide an interactive viewing experience to enhance the audio/video program. Each **Broadcaster Applicationapp-based feature** is separately signaled, so that the creators of diverse **Broadcaster Applicationsapps** do not need to coordinate their signaling.

Modify Section 7.1.8 as follows:

#### 7.1.8 HTML Entry pages Location Description (HELD)

##### 7.1.8.1 Semantics of HELD

The HELD shall be represented as an XML document containing a **HELD** root element that conforms to the definitions in the XML schema that has namespace:

tag:atsc.org,2016:XMLSchemas/ATSC3/AppSignaling/HELD/1.0/

The XML schema "xmlns" short name should be "held".

Table 7.4 provides an informative description of the semantics of the HELD. The normative XML schema for HELD shall be as specified in the file *HELD-1.0-20190122.xsd*. The normative semantics of the elements and attributes of the HELD follow Table 7.4.

**Table 7.1** HTML Entry pages Location Description (HELD) Semantics

Element Name	Use	Data Type	Description
<b>HELD</b>	1		Includes HTML entry page collection elements.
<b>HTMLEntryPackage</b>	1..N		Contains properties of the Entry Package.
@appId	1	anyURI	Defines the <b>Broadcaster</b> Application Context Identifier for this Entry Package.
@requiredCapabilities	0..1	sa:CapabilitiesType	Device capabilities needed for meaningful rendition of the Entry Page (as defined in A/332, "Service Announcement").

@appRendering	0..1	boolean	For a linear Service, indicates a broadcaster request that the Broadcaster Application be allowed to render the presentable component(s) of the Service.
@clearAppContextCacheDate	0..1	dateTime	Specifies that all files associated with the Broadcaster Application context before the indicated date and time can be deleted.
@bcastEntryPackageUrl	0..1	anyURI	URL of an Entry Package containing the Entry Page of a Broadcaster Application delivered by broadcast.
@bcastEntryPageUrl	0..1	anyURI	URL of an Entry Page of a broadcast-delivered Broadcaster Application.
@bbandEntryPageUrl	0..1	anyURI	URL of an Entry Page of a broadband-delivered Broadcaster Application.
@validFrom	0..1	dateTime	Indicates that the Entry Page contained in the Entry Package is to be loaded at the date and time of @validFrom, or at any time after the date and time of @validFrom and before the date and time of @validUntil when the Service is selected.
@validUntil	0..1	dateTime	Indicates that the Entry Page contained in the Entry Package is to be unloaded at the date and time of @validUntil.
@coupledServices	0..1	held:listOfUnsignedShort	Provides a space-separated list of linear Services sharing a common Broadcaster Application.
@lctTSIRef	0..1	held:listOfUnsignedInt	A list of one or more TSI values for an LCT channel which carries a Broadcaster Application Entry Package.
@default	0..1	boolean	This attribute, when present and set to "true" indicates the default Broadcaster Application to run on service acquisition and other events.
@appId	0..1	anyUri	Defines an identifier for the Broadcaster Application when @appContextId is not sufficient.

**HELD** – This root element contains one or more **HTMLEntryPage** elements.

**HTMLEntryPackage** – Each instance of this element contains information about one Entry Package that contains an HTML Entry Page.

@appContextId – This required xs:anyURI attribute represents a Broadcaster Application Context Identifier as a URI that indicates possible shared use of Broadcaster Application resources among multiple Broadcaster Applications. Resources associated with a Broadcaster Application and hence an Application Context Identifier shall be made available to another Broadcaster Application if and only if each has the same Application Context Identifier. Refer to A/344, “Interactive Content” [46] for the definition of a Broadcaster Application and how

absolute URLs are formed from the relative URLs associated with broadcast-delivered resources based on the value of the `@AppContextId`.

Resources are delivered over the LCT channel(s) identified by the `@lctTSIRef` attribute and are made available to only the Broadcaster Applications associated with the particular Application Context Identifier.

For a given **HTMLEntryPackage** element present in the HELD, any files delivered over the LCT channels identified by the `@lctTSIRef` attribute for that **HTMLEntryPackage** element instance shall be associated with the Application Context Identifier defined for the same **HTMLEntryPackage** instance.

`@requiredCapabilities` – When present, this optional `sa:CapabilitiesType` attribute shall describe additional device capabilities needed for meaningful rendition of the Entry Page contained within this Entry Package (beyond those defined in A/344, “Interactive Content” [46]). The syntax and semantics of the `@requiredCapabilities` attribute shall be the same as the `sa:Capabilities` element specified under the Content fragment in A/332, “Service Announcement” [5]. When the `@requiredCapabilities` attribute is not present, the capabilities required to provide a meaningful rendition of the Entry Page are as defined in A/344, “Interactive Content” [46].

`@appRendering` – This optional `xs:boolean` attribute shall indicate, when present and set to “true”, that for the associated linear Service, a broadcaster’s request that the Broadcaster Application, via the Application Media Player as defined in A/344, “Interactive Content” [46], be allowed to render the presentable component(s)<sup>1</sup> of the Service. The `@appRendering` attribute shall only be present for Services for which the value of the **SLT.Service@serviceCategory** is equal to “1” (indicating a linear A/V Service with **an Broadcaster aApplication** enhancement). At the manufacturer’s discretion, **rReceivers** may choose to disregard this flag and upon initial acquisition of the Service, always begin rendering such Services using the Receiver Media Player as defined in A/344, “Interactive Content” [46]. When the `@appRendering` attribute is “false” or not present, the broadcaster has not requested that the Broadcaster Application be allowed to render the presentable component(s) of the Service.

`@clearAppContextCacheDate` – This optional `xs:dateTime` attribute shall indicate to receivers that the broadcaster wishes all files associated with the **Broadcaster aApplication** context with a date and time before the specified date and time to be deleted from the cache used for the **aApplication eContext** identified by `@appContextId`. The date and time of each file are reflected in their Last-Modified HTTP header parameters. The Last-Modified value of a file is defined using signaling as described in A/344, “Interactive Content” [46]. Setting this attribute overrides any hints that may have been provided to extend the availability of a file, such as the `Expires` parameter. When not present, there is no default value.

`@bcastEntryPackageUrl` – This optional `xs:anyURI` attribute shall reference an Entry Package containing the Entry Page of **an Broadcaster aApplication** delivered by broadcast. The package referenced by the `@bcastEntryPackageUrl` attribute shall be present in the broadcast emission. For broadcast-delivered content, the `@bcastEntryPackageUrl` attribute shall point to an object delivered via ROUTE, and shall be a relative URL. Specifically, the object delivered in ROUTE is a signed package and has an `EFDT-Instance.File@Content-Location` that matches the value provided in the `@bcastEntryPackageUrl`. Note that while the syntax requires a URL,

---

<sup>1</sup> A Presentable Component is a component that is presented in a continuous media stream (e.g., audio, video or closed captioning) that is intended for presentation to the user.

it is sufficient that the strings of these two elements match. Either the @bcastEntryPackageUrl attribute or the @bbandEntryPageUrl attribute or both shall be present.

@bcastEntryPageUrl – This optional xs:anyURI attribute shall indicate the URL of the broadcast-delivered ~~application-Entry~~ **pointPage**, e.g. the file in the package with a Content-Location value matching the value given in the @bcastEntryPageUrl attribute. When the @bcastEntryPackageUrl attribute is present, the @bcastEntryPageUrl attribute shall also be present.

@bbandEntryPageUrl – This optional xs:anyURI attribute shall be a URL of an Entry Page of a broadband-delivered **Broadcaster** ~~Application~~. The @bbandEntryPageUrl attribute shall reference a file that shall be available for download from the referenced broadband server and shall be an absolute URL. Either the @bcastEntryPackageUrl attribute or the @bbandEntryPageUrl attribute or both shall be present.

A change in either of these two URLs shall be an indication that a new ~~application-Entry~~ Page is available.

@validFrom – This optional xs:dateTime attribute shall indicate that, when the Service is selected, the Entry Page (the page referenced by the @bcastEntryPageUrl attribute or the @bbandEntryPageUrl attribute) is intended to be loaded starting at the indicated date and time, or at any time after the indicated date and time and before the date and time indicated by @validUntil. When this attribute is not present, the ~~application-Entry~~ Page is valid now and the ~~application-Entry~~ Page is intended to be loaded at the time this HELD is received. The value of the @validFrom attribute may indicate a time in the future.

@validUntil – This optional xs:dateTime attribute shall indicate that the Entry Page (the page referenced by the @bcastEntryPageUrl attribute or the @bbandEntryPageUrl attribute) is intended to be unloaded starting at the indicated date and time. When the @validUntil attribute is not specified, the ~~application-Entry~~ Page indicated by the @bcastEntryPageUrl attribute or the @bbandEntryPageUrl attribute is intended to stay loaded for the indefinite future. The value of the @validUntil attribute, when present, shall indicate a time in the future relative to the delivery time of this instance of the HELD, and shall represent a time farther in the future than the time given in the @validFrom attribute, when the @validFrom attribute is present. When this attribute is not present, the ~~application-Entry~~ Page is valid indefinitely.

@coupledServices – This optional held:listOfUnsignedShort attribute shall consist of a space-separated list of linear Services sharing a common Broadcaster Application. Each Service shall be represented as a 16-bit unsigned integer value of the **SLT.Service@serviceId**. The ~~R~~Receiver may use the information in the @coupledServices attribute as a caching hint, to preferentially retain the ~~Application~~ **eContent** in cache upon a Service change, since a tuned-to Service may employ the same **Broadcaster** ~~Application~~.

@lctTSIRef – This optional held:listOfUnsignedInt attribute shall consist of a space-separated list of TSI values identifying an LCT channel which carries **Broadcaster** ~~Application~~-related files, when they are delivered over broadcast. When this attribute is not present, there is no default value.

@default – This optional attribute shall signal the Broadcaster Application to start upon Service acquisition and other events that trigger the Receiver to examine and start a Broadcaster Application from the HELD. When multiple **HTMLEntryPackage** elements are present the @default attribute shall be present on exactly one of those elements.

@appId – This optional attribute shall uniquely identify the Broadcaster Application when the HELD contains two or more **HTMLEntryPackage** elements. The syntax of this attribute shall be the same as the **appContextId**. When present at all, this attribute shall be present on all **HTMLEntryPackage** elements.

### 7.1.8.2 HELD Broadcaster Application Distribution Timing

All application files referenced in the HELD shall be available for retrieval from the Broadcast Stream or accessible from a broadband server (as appropriate to the delivery path). For example, if the HELD is updated to indicate an ~~application~~ Entry Package that is valid at a time six hours from now, the files associated with that **Broadcaster a** Application (as indicated by the **@bcastEntryPackageUrl** attribute) shall be available to the ~~r~~**R**Receiver at the time of the HELD update, even though the launch time is six hours in the future.

### 7.1.8.3 HELD Examples

This section provides illustrative examples of HELD instances.

The first example is the simplest. This HELD only signals one ~~application e~~**Entry p**ointPage delivered via broadcast, and gives no indication of any future expiration time.

```
<HELD>
  <HTMLEntryPackage appId="http://kids.pbs.org" appContextId="http://kids.pbs.org"
    bcastEntryPackageUrl="app" bcastEntryPageUrl="index.html"/>
</HELD>
```

The second example illustrates several principles:

- The ability to distribute and signal **Broadcaster a** Applications targeted at ~~r~~**R**Receivers with different capabilities (**a2**).
- The ability to pre-announce the timing of a URL switch, and the **Broadcaster a** Application resources that will be needed at the time of the switch (**a1-a2 – see more below examples**).
- The ability to announce the ~~e~~**Entry p**Page via broadband-downloadable only (**a5**), or both broadcast-delivered and broadband-downloadable (**a6**).
- Identifying the default Broadcaster Application to launch (**a1**).
- Signaling different **appContextIDs** (**a1-a3** versus **a4-a6**).
- Unique **appId** values (**a1-a6**).

```
<HELD>
  <HTMLEntryPackage appId="http://kids.pbs.org/a1" appContextId="http://kids.pbs.org"
    bcastEntryPackageUrl="app" bcastEntryPageUrl="p1/index.html"
    validUntil="2016-07-17T09:30:47Z" default="true"/>
  <HTMLEntryPackage appId="http://kids.pbs.org/a2" appContextId="http://kid.pbs.org"
    bcastEntryPackageUrl="app" requiredCapabilities="0700050E 058E |"
    bcastEntryPageUrl="p1a/index.html" validUntil="2016-07-17T09:30:47Z"/>
  <HTMLEntryPackage appId="http://kids.pbs.org/a3" appContextId="http://kids.pbs.org"
    bcastEntryPackageUrl="app" bcastEntryPageUrl="p2/index.html" validFrom="2016-07-
    17T09:30:47Z" validUntil="2016-07-17T12:00:47Z"/>
  <HTMLEntryPackage appId="http://kids.pbs.org/a4" appContextId="http://kids.pbs.org/alt"
    bcastEntryPackageUrl="app" requiredCapabilities="0700"
    bcastEntryPageUrl="p2a/index.html" validFrom="2016-07-17T09:30:47Z" validUntil="2016-
    07-17T12:00:47Z"/>
```



```
<HTMLEntryPackage appId="http://kids.pbs.org/a5" appContextId="http://kids.pbs.org/alt"
  bbandEntryPageUrl="http://xyz.comkids.pbs.org/a5/index.html" validFrom="2016-07-
  17T09:30:47Z" validUntil="2016-07-17T12:00:47Z"/>
<HTMLEntryPackage appId="http://kids.pbs.org/a6" appContextId="http://kids.pbs.org/alt"
  bcastEntryPackageUrl="app" bcastEntryPageUrl="p2a/index.html"
  bbandEntryPageUrl="http://xyz.comkids.pbs.org/a6/index.html" validFrom="2016-07-
  17T12:30:47Z" validUntil="2016-07-17T3012:00:47Z"/>
</HELD>
```

Note that the first **HTMLEntryPackage** element contains a URL and a `@validUntil` attribute indicating a future time after which the **Broadcaster Application at p1/index.html** application is no longer valid. The second instance of the **HTMLEntryPackage** element contains a URL referencing a different **Broadcaster Application at (p1a/index.html)** and a `@requiredCapabilities` attribute indicating that the **Receiver** must support a runtime environment capability not specified in the version of the ATSC Standards the **Receiver** was built to support (code ~~0700~~ 050E or 058E). Receivers that recognize and support the capabilities identified with the ~~0700~~050E or 058E codes are expected to execute **the Broadcaster Application at p1a/index.html** as opposed to `p1/index.html`.

– End of Document –