
SMPTE STABLE DOCUMENT



The attached SMPTE Engineering Document has been declared “Stable” by the controlling Technology Committee.

The SMPTE Operations Manual for Standards states:

A document should be stabilized if it is believed to be substantially correct, does not contain harmful or misleading recommendations, may still be relevant to equipment or practices in use, is stable, but does not represent current technology, and need not be subject to future reviews.

A Stable document shall still be made available and offered for sale by the Society, but it shall be prefaced by a cover page explaining its current status.

At any time, a Technology Committee may revise, amend, or otherwise initiate a new Project on a Stable document.

A Stable document is “In Force”, and not deprecated or withdrawn.

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Note:

SMPTE “Stable” documents were previously described as “Archived” and the attached document may be marked as “Archived”. The status of a SMPTE document described as “Archived” is exactly as described above for a “Stable” document.

Stable documents may not adhere to the latest style and format of SMPTE documents, or to current usage of normative language. Suitable care should be taken in interpretation.

SMPTE ENGINEERING GUIDELINE

Overview of Declarative Data Essence



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1 Scope

This guideline provides an overview of the declarative data essence standards, describes how the various documents and technical components are related, and provides informative material useful to the users of these standards.

2 Introduction

The initial group of standards were developed in SMPTE based on the Advanced Television Enhancement Forum (ATVEF) specification [ATVEF]. These are collectively known as declarative data essence (DDE) derived from the terminology developed in the joint SMPTE/EBU work found in [SMPTE-EBU]. This was further labeled as content level 1 after the ATVEF specification for 1.0, and in anticipation of both lower and higher content levels. Hence, the shorthand, DDE-1.

The ATVEF specification was broken into six separate SMPTE documents that cover the original ATVEF specification. These specifications are:

SMPTE 343M-2002, Television — Declarative Data Essence — Local Identifier (lid:) URI Scheme

SMPTE 357M-2002, Television — Declarative Data Essence — IP Multicast Encapsulation

SMPTE 361M-2002, Television — NTSC IP and Trigger Binding to VBI

SMPTE 363M-2002, Television — Declarative Data Essence — Content Level 1

SMPTE 364M-2001, Television — Declarative Data Essence — Unidirectional Hypertext Transport Protocol

SMPTE 366M-2002, Television — Document Object Model Level 0 (DOM-0) and Related Object Environment

The relationship of all six of these documents can be found in figure 1.

Finally, it is worth noting that there is ongoing work (not covered in this guideline) on wrappers for this content for carriage in SMPTE KLV; and there is very early work on a content level 2.

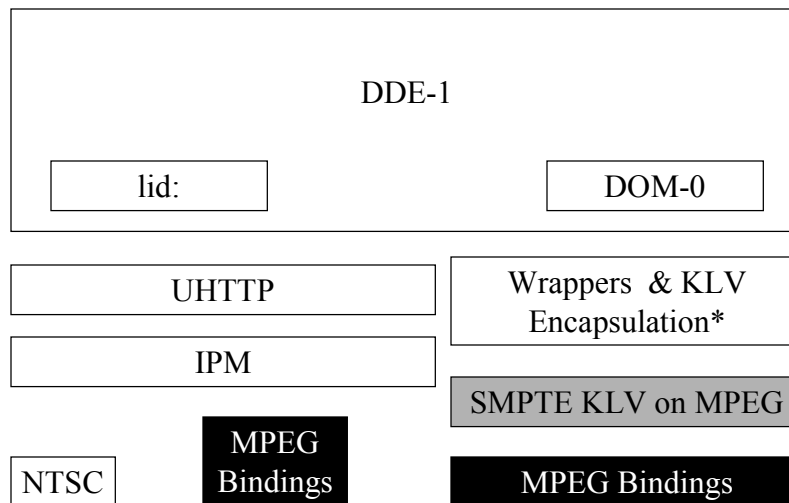


Figure 1 – Relationship of the DDE-1 standards

The collection of DDE-1 documents is fully ATVEF compliant, and is collectively known as Content Level 1, or DDE-1. No extensions were designed, and no new functionality was added. However, a considerable amount of new material was added to more fully specify the work for the purpose of providing interoperability. Specifically, there was significant additional work put into the following technology:

- DOM-0
- Triggers (defined in [DDE-1])
- Lid:

The DDE-1 document set is an authoring content standard. As such, it avoided as much as possible specific receiver behavior. However, expectations of receiver behavior are implied, and often overtly stated. Some more information on the expected behavior is covered in this guideline.

3 Authoring guidelines

3.1 HTML4

Some operations taken for granted in computer-based browsers that decode HTML should often be avoided when using DDE-1. In general, anything that would require extensive use of an input device, such as pull-downs and similar input objects. In addition, the expectation of scrolling down or to the right to view a page may often result in parts of the display not being viewable due to limited (or unwilling) user input. It is a good idea to create pages that are a single screen, and avoid any assumption of input devices, certainly anything more than can be done on a standard remote control.

Absolute lengths and sizes should be avoided to permit consistent rendering on displays of varying resolutions. Using pixel coordinates will result in significant undesirable variations.

DDE-1 does not provide good means to ensure accurate positioning of the HTML elements with respect to the video. Since the video format can be altered during distribution from its original format when the DDE-1 was created, this poses interesting registration challenges at the decoder. For example, it can be as gross a change as a conversion from 16x9 to 4x3 letterbox. Authors are cautioned about making any assumptions about the registration between the video and the DDE-1 content at the decoder when the distribution is not well known. Authors should try to stay within the safe area and safe titling areas as defined in SMPTE RP26.3 [SAFE].

Authors are referred to the general interoperability warnings found within the HTML specification [HTML].

3.2 Style sheets and fonts

There is no default style sheet in DDE-1, and there is no requirement that a receiver choose any particular set of styles. Thus, without authoring and sending a style sheet along with the HTML content, the variation in rendering across manufacturers will be significant and perhaps undesirable. Authors are encouraged to make explicit use of CSS style sheets in order to control the display of their content.

As in HTML for positioning, percent sizes should be used wherever possible to provide display independence.

DDE-1 does not support downloadable fonts; however, there are two default fonts with specific font name sizes required to be supported. Authors are encouraged to make use of these fonts for better display control. The font sizes should be specified by their font name sizes.

3.3 ECMAScript

Authors should avoid using `eval()` that results in dynamically generated HTML. Doing this makes transcoding of the content computationally impossible, and thus may affect the quality in future generation enhancement systems.

3.4 DOM-0

Authors should avoid using `document.write()` with arguments other than constants. Doing this makes transcoding of the content computationally impossible, and thus may affect the quality in future generation systems.

3.5 URI schemes

DDE-1 supports the URI schemes tv: [TV], lid: [LID], javascript: [DDE-1] and http: [HTTP]. Only http: may be used for DDE-1 content that must be fetched from the Internet, which is always the case on Transport-A-only systems. The lid: scheme may not be used for Transport-A-only systems, because lid: implies that the content is broadcast as DDE-1 and cached locally, which is not the case with Transport A. On Transport-B systems, both lid: and http: schemes may be used as follows: either lid: or http: can be used for DDE-1 content that is broadcast and cached locally; only the http: scheme should be used for content that is not broadcast and not available locally, because the lid: scheme only works for locally cached content. Authors are specifically cautioned against using the common schemes, ftp:, https:, and shttp:.

NOTE – The javascript: URI scheme is supported with certain limitations (see annex A for details).

3.6 UUID

UUIDs would normally be generated automatically by the authoring tool through a call to the operating system to obtain one. UUIDs are often also called guids, and are available in some form on all popular operating systems.

UUIDs are constructed in part from the MAC address of the network adapter being used in the computer doing the authoring. In the rare occurrence that a UUID needs to be generated from a device without a network interface, then care must be taken to use an unused MAC address. This can be done by setting the most significant bit of the MAC address field (MAC address assignments use this to signal multicast destinations and would never be used for a real address). Alternatively, a statistically unique value can be generated through the hash of the field(s) as described further in RFC 2518, section 6.4.1 [WEBDAV].

4 Receiver behavior

This clause provides information which should be considered when implementing a decoder that decodes the DDE-1 content. Since DDE-1 content is an authoring standard and not a decoder standard, this may be helpful to manufacturers of any decoding equipment, including consumer electronics receivers. The term *receiver* here is generally meant to refer to any type of decoder.

4.1 Receiver model

Figure 2 shows the receiver block diagram.

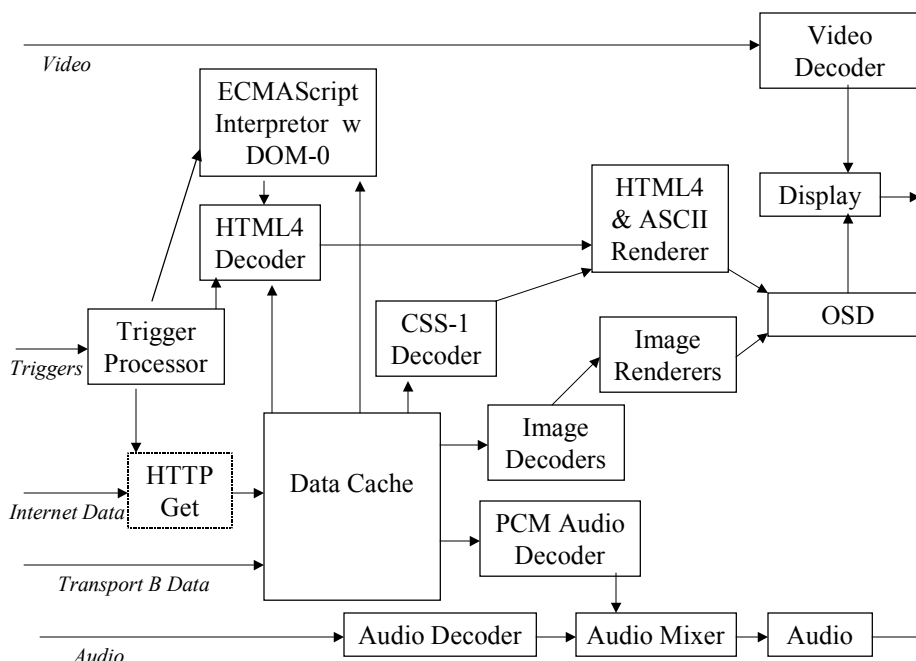


Figure 2 – Receiver block diagram

4.2 Enhancement characterization

An enhancement is defined as content added to a video/audio service. An enhancement can further be described by its behavioral characteristics as specified in [DDE-1]. From this point of view, an enhancement is a sequence of topmost HTML documents whose content is specified in [HTML]. The first HTML document of an enhancement, the initial topmost document, is always instantiated by means of a trigger. Subsequent topmost documents within an enhancement are instantiated as a result of a navigation from the current document initiated either by a trigger or a viewer selection (see figure 3).

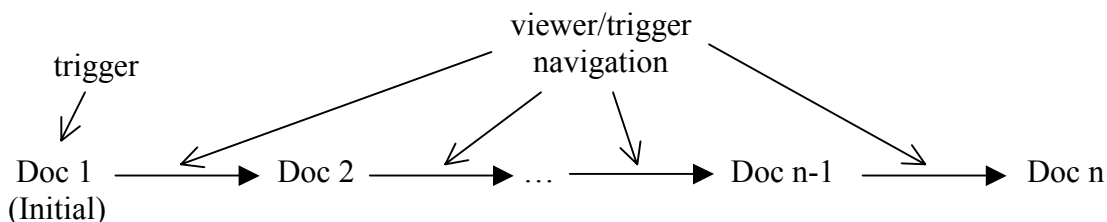


Figure 3 – DDE-1 enhancement

4.3 State model

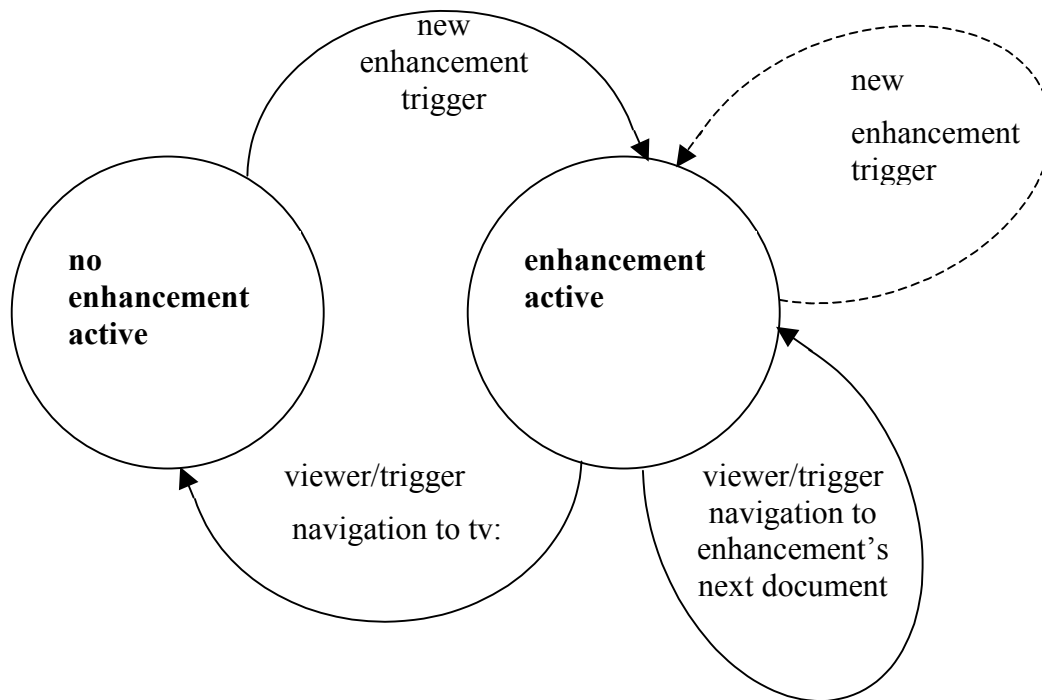


Figure 4 – Diagram for enhancement behavior

Figure 4 shows the state diagram for enhancement behavior. Table 1 describes the basic types of triggers. The enhancement state model is described from the point of view of the state transition arcs in figure 4. Each state transition can result from either a new enhancement trigger or a trigger for the current enhancement.

Table 1 – Basic trigger types

Trigger type	Enhancement active?	Trigger Description ¹
New enhancement trigger	NO	Trigger with “name” attribute, and URL DIFFERENT from the last topmost document of immediately preceding enhancement
	YES	Trigger with “name” attribute, and URL DIFFERENT from current enhancement’s current topmost document ²
Trigger for current enhancement	YES	Trigger with URL EQUAL the URL of the current enhancement’s current topmost document ²
NOTES ¹ When determining whether two URLs are DIFFERENT or EQUAL, characters in the URLs including and following the first ? or # are ignored in the comparison. ² May result in implementation specific behavior.		

4.3.1 New enhancement triggers

As shown in table 1, a new enhancement trigger is a trigger with a name attribute, and with either:

- a URL different from the last topmost document of the immediately preceding enhancement if no enhancement is active; or
- a URL different from the current enhancement’s current topmost document if an enhancement is active.

New enhancement triggers are used to initiate a new enhancement.

From the no enhancement active state, an enhancement is initiated by a new enhancement trigger. An enhancement can only be initiated by a new enhancement trigger.