

**Draft SMPTE Engineering Guideline  
SMPTE XXX –  
Declarative Data Essence**

**WITHDRAWN**

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**PUBLICLY AVAILABLE SPECIFICATION**



INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DRAFT SMPTE ENGINEERING GUIDELINE SMPTE XXXX –  
DECLARATIVE DATA ESSENCE**

## FOREWORD

A PAS is a technical specification not fulfilling the requirements for a standard, but made available to the public and established in an organization operating under given procedures.

IEC-PAS 62292 was submitted by the SMPTE (Society of Motion Picture and Television Engineers) and has been processed by IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document:

Draft PAS	Report on voting
100/398/PAS	100/426/RVD

Following publication of this PAS, the technical committee concerned will investigate the possibility of transforming the PAS into an International Standard.

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
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## 1 Scope

This document 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 Organization

### 2.1 Table of contents

<b>1</b>	<b><u>SCOPE</u></b> .....	<b>1</b>
<b>2</b>	<b><u>ORGANIZATION</u></b> .....	<b>1</b>
2.1	<u>TABLE OF CONTENTS</u> .....	1
<b>3</b>	<b><u>INTRODUCTION</u></b> .....	<b>2</b>
<b>4</b>	<b><u>AUTHORING GUIDELINES</u></b> .....	<b>4</b>
4.1	<u>HTML4</u> .....	4
4.2	<u>STYLE SHEETS AND FONTS</u> .....	4
4.3	<u>ECMASCRIPT</u> .....	5
4.4	<u>DOM-0</u> .....	5
4.5	<u>URI SCHEMES</u> .....	5
4.6	<u>UUID</u> .....	5
<b>5</b>	<b><u>RECEIVER BEHAVIOR</u></b> .....	<b>6</b>
5.1	<u>RECEIVER MODEL</u> .....	6
5.2	<u>ENHANCEMENT CHARACTERIZATION</u> .....	6
5.3	<u>STATE MODEL</u> .....	7
5.3.1	<i><u>New Enhancement Triggers</u></i> .....	8
5.3.2	<i><u>Triggers for the Current Enhancement</u></i> .....	8
5.4	<u>CACHE MANAGEMENT</u> .....	9
5.4.1	<i><u>Size</u></i> .....	9
5.4.2	<i><u>Behavior</u></i> .....	10
5.5	<u>COOKIES</u> .....	10
5.6	<u>CSS-1 AND FONTS</u> .....	11
<b>6</b>	<b><u>DISTRIBUTION ISSUES</u></b> .....	<b>11</b>
<b>7</b>	<b><u>AD INSERTION SCENARIO DETAILS</u></b> .....	<b>11</b>
<b>8</b>	<b><u>EXAMPLES</u></b> .....	<b>13</b>

<a href="#">8.1</a>	<a href="#">O-FRAMES</a> .....	13
<a href="#">8.2</a>	<a href="#">FRAMESET</a> .....	14
<a href="#">8.3</a>	<a href="#">SINGLE DOCUMENT FRAMESET</a> .....	17
<b>9</b>	<b><a href="#">BIBLIOGRAPHY</a></b> .....	<b>19</b>

### 3 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 6 separate SMPTE documents that cover the original ATVEF specification. These specifications are:

- [DDE-1] SMPTE Proposed Standard 363M, “Declarative Data Essence, Content Level 1”.
- [DOM-0] SMPTE Proposed Standard 366M, “Document Object Model Level 0 (DOM-0) and Related Object Environment”.
- [LID] SMPTE Proposed Standard 343M, “The Local Identifier (lid:) URI Scheme”.
- [IPM] SMPTE Proposed Standard 357M, “Declarative Data Essence, IP Multicast Encapsulation”.
- [UHHTTP] SMPTE Standard 364M, “Declarative Data Essence - Unidirectional Hypertext Transport Protocol”.
- [NTSC] SMPTE Proposed Standard 361M, “NTSC IP and Trigger Binding to VBI”.

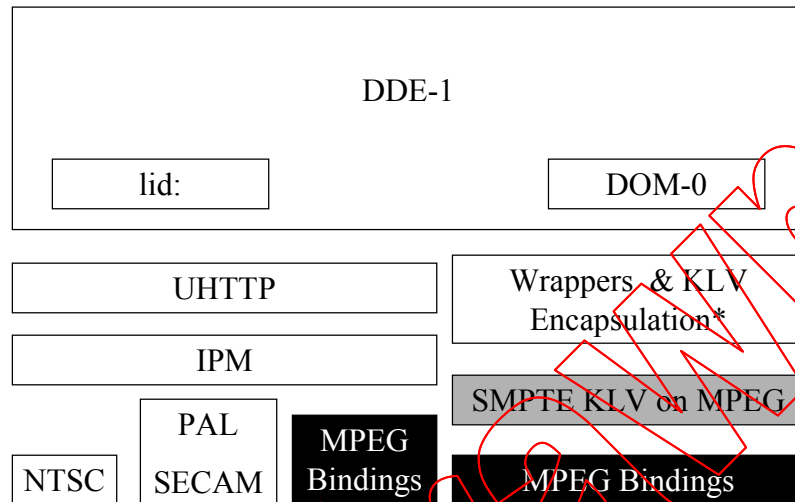
In addition, there is a new PAL/SECAM binding:

- [PAL] SMPTE Draft Standard xxxx, “PAL/SECAM IP and Trigger Binding to VBI (625 Line Television Systems)”.

The relationship of all 7 of these documents can be found in Figure 3-1 below.



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



**Figure 3-1. 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 document.

## 4 Authoring Guidelines

### 4.1 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 being unviewable 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 positioning 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].

### 4.2 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 sizes required to be supported. Authors are encouraged to make use of these fonts for better display control. The fonts sizes are specified in pixels, so there will be some amount of display variation if specific sizes are chosen.

### 4.3 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.

### 4.4 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.

### 4.5 URI Schemes

DDE-1 supports the URI schemes, `tv: [TV]` and `lid: [LID]`. And, in the case of transport A, the use of `http: [HTTP]`. It is important to note that other schemes are specifically not supported and their use would result in non-interoperable behavior. Authors are specifically cautioned against using the common schemes, `ftp:`, `https:`, and `shttp:`.

### 4.6 UUID

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

UUID's 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].

## 5 Receiver Behavior

This section 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.

### 5.1 Receiver Model

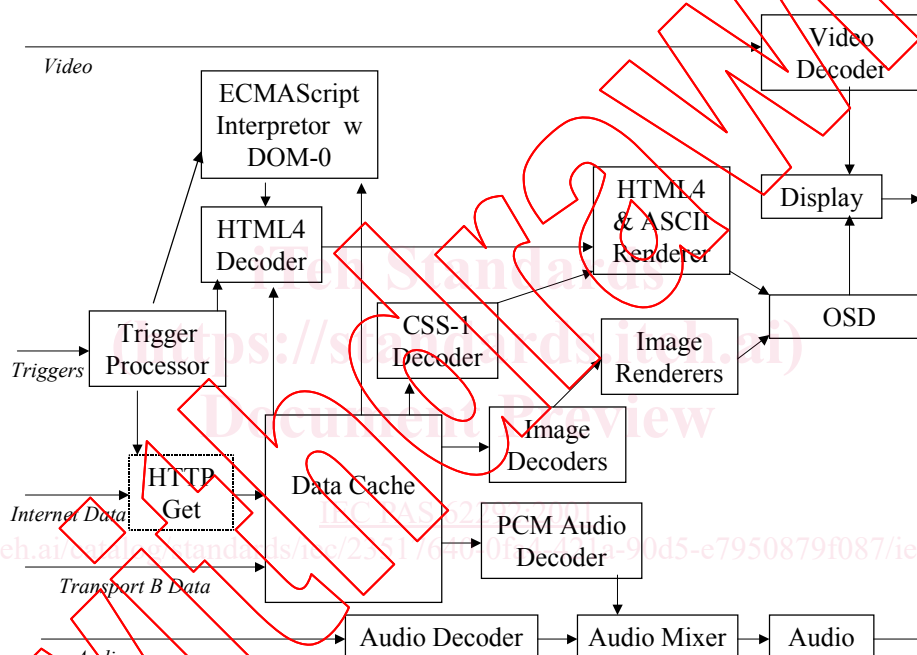


Figure 5-1. Receiver Block Diagram

### 5.2 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 5-2).

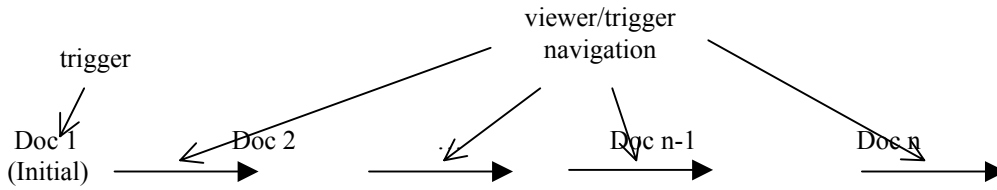


Figure 5-2. DDE-1 Enhancement

### 5.3 State Model

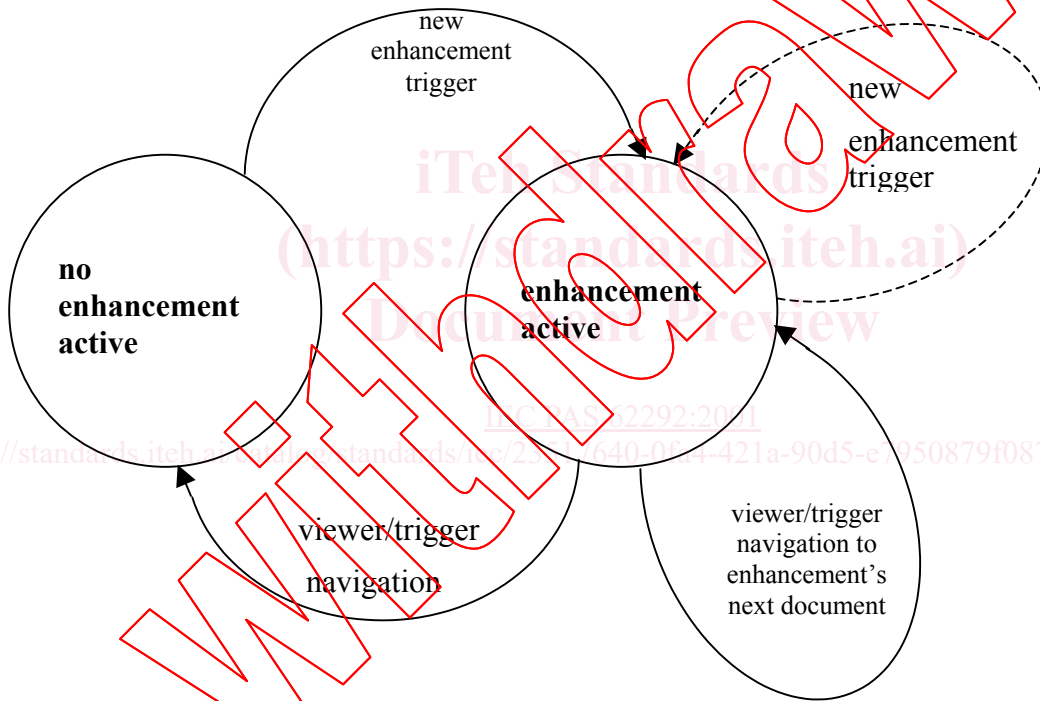


Figure 5-3. Diagram for enhancement behavior.

Figure 5-3 shows the state diagram for enhancement behavior. Table 5-1 describes the basic types of triggers. The enhancement state model is described from the point of view of the state transition arcs in figure 5-3. Each state transition can result from either a “new enhancement trigger” or a “trigger for the current enhancement.”

Trigger Type	Enhancement active?	Trigger Description <sup>1</sup>
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<sup>1</sup> When determining whether two URLs are **DIFFERENT** or **EQUAL**, characters in the URLs including and following the first “?” or “#” are ignored in the comparison.

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 <sup>2</sup>
Trigger for Current Enhancement	YES	trigger with URL EQUAL the URL of the current enhancement’s current topmost document

Table 5-1. Basic Trigger Types

### 5.3.1 New Enhancement Triggers

As shown in table 5-1, 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.

From the “enhancement active” state, a new enhancement trigger may replace the current enhancement with a new enhancement in an implementation specific manner. In order to ensure interoperable behavior, a content developer should terminate an enhancement by means of a navigation to “tv:” (either by the viewer or by a trigger for the current enhancement) before sending a new enhancement trigger.

### 5.3.2 Triggers for the Current Enhancement

As shown in table 5-1, a “trigger for the current enhancement” is a trigger with a URL equal to the URL of the current enhancement’s current topmost document. Triggers for the current enhancement are used to:

- navigate to an enhancement’s next topmost document,
- terminate an enhancement,
- change the display and/or state of an enhancement.

<sup>2</sup> May result in implementation specific behavior.