INTERNATIONAL STANDARD

ISO 26430-4

First edition
2009-12-15

Digital cinema (D-cinema) operations —

Part 4: Log record format specification

Opérations du cinéma numérique (cinéma D) —

Partie 4: Spécification du format d'enregistrement des résultats

Reference number
ISO 26430-4:2009(E)

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Published in Switzerland

Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 26430-4 was prepared by the Society of Motion Picture and Television Engineers (as SMPTE 430-4-2008) and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 36, *Cinematography*, in parallel with its approval by the ISO member bodies.

ISO 26430 consists of the following parts, under the general title *Digital cinema (D-cinema) operations*:

— *Part 1: Key delivery message* [equivalent to SMPTE 430-1]

— *Part 2: Digital certificate* [equivalent to SMPTE 430-2]

— *Part 3: Generic extra-theater message format* [equivalent to SMPTE 430-3]

— *Part 4: Log record format specification* [equivalent to SMPTE 430-4]

— *Part 5: Security log event class and constraints* [equivalent to SMPTE 430-5]

— *Part 6: Auditorium security messages for intra-theater communications* [equivalent to SMPTE 430-6]

— *Part 9: Key delivery bundle* [equivalent to SMPTE 430-9]

Introduction

This part of ISO 26430 comprises SMPTE 430-4-2008, together with Annex ZZ (which provides equivalences between ISO standards and SMPTE standards referenced in the text) and the following additional information related to subclause 6.1 (Record Text Extension Type) concerning the “RecordDescriptionText” element.

> The optional language attribute is an `xs:language` language code and indicates the language used for Record Description Text . If the `language` attribute is not present, the default value `en` is used.

SMPTE 430-4-2008

SMPTE STANDARD

D-Cinema Operations — Log Record Format Specification

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Approved
March 3, 2008

Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Administrative Practices.

SMPTE Standard 430-4 was prepared by Technology Committee DC28.

Introduction

Many devices in D-Cinema exhibition environments must generate log records, which can record all manner of events in the normal and exceptional operation of systems. In order to achieve interoperability, it is desirable that log records are presented in a common basic format.

1 Scope

The purpose of this document is to define XML structures and schema for individual log records and sequences of those records in D-Cinema applications. While not all log records require authentication, this specification provides for optional authentication of records and sequences of records, using digital signatures. Authentication requirements are established by separate application specifications. This document does not define a communications protocol, but is limited to specifying the structure and format of log records and their content. This document does not define a format that devices must use internally, but it does define a format that is to be used when log records are interchanged with other devices.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

[XML-SCH-1] XML Schema Part 1: Structures URL http://www.w3.org/TR/xmlschema-1-20041028/

[XML-SCH-2]XML Schema Part 2: Datatypes http://www.w3.org/TR/xmlschema-2-20041028/

Internet Engineering Task Force (IETF) (1997, May) URN Syntax, [WWW document]. URL http://www.ietf.org/rfc/rfc2141.txt

[RFC 3280] Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile URL: http://www.ietf.org/rfc/rfc3280.txt

[xml-c14n] Canonical XML Version 1.0 W3C Recommendation 15 March 2001 http://www.w3.org/TR/xml-c14n/

[xml-dsig] "XML-Signature Syntax and Processing" W3C Recommendation 12 February 2002
http://www.w3.org/TR/xmldsig-core/

[RFC 3275] "XML-Signature Syntax and Processing" http://www.ietf.org/rfc/rfc3275.txt

[DCMLTypes] XML Data Types for Digital Cinema. (SMPTE 433-2008)

[DC-Cert] D-Cinema Digital Certificate (SMPTE 430-2-2006)

[SHA-1] “FIPS PUB 180-1 Secure Hash Standard” http://www.itl.nist.gov/fipspubs/fip180-1.htm

[RFC 2253] “Lightweight Directory Access Protocol (v3): UTF-8 String Representation of Distinguished Names” http://www.ietf.org/rfc/rfc2253.txt

4 Overview (Informative)

The Log Record Format standardizes the reporting format for information that documents the usage and behavior of a Digital Cinema system. This format is intended to be used for communicating log event information at such points in the system where interoperability or a common format is a requirement. This format may be used to construct records that are unidirectional in nature, meaning that a bi-directional communications channel is not required in order to interpret the record content. However, additional efficiencies and features such as dynamic text internationalization can be achieved in a bi-directional communications environment.

In order to provide for maximum flexibility while maintaining interoperability, the Log Record format is designed to support a number of features which may be optional or required depending on any requirements which may be imposed by an application specification which uses this format. This format supports both authenticated and non-authenticated log records for security and non-security logging purposes, respectively. The format also supports record "sequences", or Log Reports, to reduce authentication overhead, and provides for "filtering" of authenticated record sequences in cases where it may be desirable to excise information contained in Log Reports while preserving a record of that information's existence.

In order to accomplish these objectives, the Log Record structure is broken down into three major sub-parts: Header, Body, and Signature, the first of which is required in a Log Record, and the second and third of which are optional. In addition, a number of fields in these sub-parts are optional for Log Records which are not required to support authentication, but available and may be required where authentication is a requirement. In Log Reports, some Body sections may be removed by filtering, so the Header is the only required part of a Log Record in a Log Report.

The Log Record Header contains enough information to identify the source, time, and classification of the log record. It may also include hashes to support data integrity and authentication. Conceptually, the Log Record Header contains just enough information to support automated classification and sorting of log events, without revealing information that may be considered sensitive or non-public.

The Log Record Body contains either the detail of the logged information in human-readable form, or index information to enable the translation of the log detail into human readable form, or both. This includes all available information about the logged event, except that which is conveyed in the Log Header. The Log Record Body is not encrypted, but may be authenticated through a hash of its contents, which is contained in the corresponding Log Record Header, which may be signed by a Log Signature. The (optional) Log Signature provides authentication of the header(s) of the current Log Record, or optionally authentication over a number of log records in a sequence.

This document does not specify the internal format for log records kept within a device. Rather, this document specifies the format for producing authenticated log records, if a device is required to do so.

5 Definitions

5.1 Definition of Terms

- Log Event – Any state or change of state in a system that is desirable to record in a log. Such an event results in the recording of log data.
- Log Data – Log Event information that is recorded and stored in a Log Record.
- Log Record – Standardized XML structure representing a discrete logged event.
- Log Report – Standardized XML structure containing one or more log records.

5.2 Namespace Prefixes

The following table lists the namespace prefixes used in the XSDL and XML examples in this document. Please refer to the normative references in this document and in [DCMLTypes] for specific references to the namespaces referred to in this table. Note that the prefixes themselves are not normative, and that instance documents may assign alternative prefixes in practice.

Prefix	Namespace Reference
xs	XMLSchema
ds	Xmldsig
xsi	XMLSchema-Instance
dcml	DcmlTypes
lr	LogRecord [This Document]

5.3 Log Record Namespace

The types defined in this document shall be included in an XML namespace, whose Namespace Name (URI) shall be:

```
http://www.smpte-ra.org/schemas/430-4/2008/LogRecord/
```

When published, the version number of the XML Schema representation of the namespace shall be set to "1.0", where "1" is the major part of the version number, and "0" is the minor part. If the namespace is subsequently revised to add new types not defined in this standard, but not to modify any of the existing types in a way that breaks reverse compatibility, the minor part of the version number shall be incremented by one. If the namespace is subsequently modified with result of changing any of the types defined in this document in a way that breaks reverse compatibility, the major part of the version number shall be incremented by one. The version number shall be specified by the version attribute the xs:schema element of the XML schema that this namespace represents.

6 Component Data Type

This section describes component data types, which shall be used in the construction of a Log Record. See [XML-SCH-2] and [DCMLTypes] for the definitions of the underlying XML data types.

6.1 Record Text Extension Type

The RecordTextExtension type is meant to contain human readable text and optionally positional parameter replacement codes. The purpose of this data type is to provide for human readable interpretations of record content, in multiple languages where appropriate.

Requesting a set of these description items for a particular language can be done at any time that log records need to be consolidated or interpreted. An XML element based on this type must include one and only one recordTextID element, but may contain more than one recordDescriptionText element in order to express the content in more than one language.

6.1.1 Record Text Extension Fields

The RecordTextExtension Type shall consist of the following elements.

6.1.1.1 Record Text ID

The RecordTextID element shall be a UUID that represents the conceptual information expressed in the RecordDescriptionText field, regardless of the language used to express it.

6.1.1.2 Record Description Text

The RecordDescriptionText element shall be a block of UTF-8 encoded text that describes the meaning of the record in human readable form. The record text may include positional replacement markers in place of which values from the Parameters List of the record may be substituted.

6.1.2 Schema Representation

Expressed in XSDL, the RecordTextExtension Type shall be defined as follows:

```
<xs:complexType name="RecordTextExtensionType">
   <xs:sequence>
      <xs:element name="RecordTextID" type="dcml:UUIDType" minOccurs="1"/>
      <xs:element name="RecordDescriptionText" type="dcml:UserTextType"
minOccurs="1" maxOccurs="unbounded"/>
   </xs:sequence>
</xs:complexType>
```

6.2 Event Token Types

In the header and body sections of Log Records, XML "tokens" are used to represent the values of the record fields. The following XML type extends the XML "token" type to include optional scope attributes in order to specify the allowable values for those fields.

6.2.1 Event Type Type

The Event Type Type shall be used to specify types and subtypes of Log Events in Log records. This Type shall be defined in XSDL as follows:

```
<xs:complexType name="eventTypeType">
   <xs:simpleContent>
      <xs:extension base="xs:token">
         <xs:attribute name="scope" type="xs:anyURI" use="required"/>
      </xs:extension>
   </xs:simpleContent>
</xs:complexType>
```

Note that the "scope" attribute is required but not specified, and no default scope is provided. For each application specification that uses this Log Record Format Specification, that specification document must specify one or more scope URIs for this type, and specify the list of allowed tokens defined by that scope.

6.3 Reference ID Types

In the body section of Log Records, it is frequently necessary to identify an entity both by name and by a UUID. The following Types define the framework to be used in expressing these name/value pairs.

6.3.1 Reference ID Type

The Reference ID Type defines a name/value pair which is scoped to indicate the range of possible names for the identifiers. This Type shall be defined in XSDL as follows:

```
<xs:complexType name="ReferenceIDType">
        <xs:sequence>
                <xs:element name="IDName" type="dcml:scopedTokenType"/>
                <xs:element name="IDValue" type="dcml:UUIDType"/>
        </xs:sequence>
</xs:complexType>
```


Reference ID scopes and scope URIs may be defined by other documents as needed, but the specific definitions are outside the scope of this document, as they as are application-specific.

6.3.2 Referenced ID List Type

In the body section of a Log Record, elements of type Reference ID shall be grouped in a list. The list Type shall be defined in XSDL as follows:

```
<xs:complexType name="ReferencedIDListType">
        <xs:sequence>
                <xs:element name="ReferencedID" type="lr:ReferenceIDType"
minOccurs="1" maxOccurs="unbounded"/>
        </xs:sequence>
</xs:complexType>
```