SMPTE ST 335:2012
Revision of
SMPTE 335M-2001

SMPTE STANDARD

Metadata Element Dictionary Structure

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Approved
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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 ST 335 was prepared by Technology Committee 30MR on Metadata and Registers.

Intellectual Property

At the time of publication, no notice had been received by SMPTE claiming patent rights essential to the implementation of this Standard. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

1 Scope

This standard defines the structure of a dictionary of metadata elements that may be used in a range of applications such as production workflow applications, data exchange formats, and archival asset management systems.

The standard normatively defines universal identifiers, metadata element names, definitions, and standardized symbols, as well as other informative fields. These elements may be used as components in structured data models.

In addition to aiding the interoperability of data between applications, this standard also serves to distinguish similar elements through the unambiguous definitions of these elements and, when necessary, their application or conceptual context. The metadata elements defined by this standard include elements derived from both abstract semantics and application-specific elements.

Applications of individual metadata elements will vary but, when used, metadata shall conform to the definitions and formats in the metadata element dictionary.

Note: The previously published version of this document, SMPTE 335M-2001, had the title “Metadata Dictionary Structure”. The title was changed to better describe the role of this document among the set of dictionary structure documents.

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.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; followed by formal languages; then figures; and then any other language forms.

3 Normative References

Note: All references in this document to other SMPTE documents use the current numbering style (e.g. SMPTE ST 298:2009) although, during a transitional phase, the document as published (printed or PDF) may bear an older designation (such as SMPTE 298-2009). Documents with the same root number (e.g. 298) and publication year (e.g. 2009) are functionally identical.

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

SMPTE ST 298:2009, Universal Labels for Unique Identification of Digital Data

SMPTE ST 336:2007, Data Encoding Protocol Using Key-Length-Value

SMPTE ST 2003:2012, Types Dictionary Structure

SMPTE ST 2029:2009, Uniform Resource Names for SMPTE Resources

ISO/IEC 8825-1:2008, Information Technology – ASN.1 Encoding Rules – Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER), and Distinguished Encoding Rules (DER)

W3C Recommendation - Namespaces in XML 1.0 (Second Edition), World Wide Web Consortium, 16 August 2006. http://www.w3.org/TR/REC-xml-names/

4 Metadata Element Dictionary Structure

The metadata element dictionary provides flexibility in capturing metadata and exchanging it among applications through a standardized hierarchy of universal labels (ULs) that uniquely identify the metadata elements, grouped to aid their management within a small but comprehensive number of classes. Metadata classes are collections of metadata elements with common characteristics or attributes. Additional classes are provided for user-defined public, private, and experimental metadata.

The metadata element dictionary defined by this document provides two methods of referencing an individual item. The first is to use a unique, two-part, 16-byte universal label that is numerical (and hence language independent). The second method of referencing an item is to use its assigned symbol, which is a name that conforms to computer language syntax restrictions. Symbols are intended for use in computer languages such as the Extensible Markup Language (XML).

Note: The symbol, together with its namespace defined in Section 4.3.7, forms a unique identifier like the UL.

The exact format of the universal label shall be as defined in SMPTE ST 336. The first eight bytes of the universal label shall consist of the UL Header (2 bytes) and UL designator (6 bytes). The UL designator shall identify the item as belonging to a specific SMPTE register of a given category, structure, and version. The second eight bytes shall form the item designator as defined in SMPTE ST 336. The item designator shall be used to uniquely identify the meaning or definition of the item in the register.

A metadata element is an item of information of a single specified type with a defined representation. The type specified may itself be composed of a number of intimately related sub-items. For example a data type that specifies a date might include parts for day, month and year, or a type could be an array of items.

A value is an instance of information described by a metadata element. The dictionary also defines the required representation of values for each metadata element. The representation is composed of an assigned data type, a set of permissible values (if applicable), and the appropriate unit of measure (if applicable).

Individual data values can frequently be represented in more than one way — for example, it is possible to represent a textual value as an ISO 7-bit character or as Unicode, where the value is identical but the encoding is different. Certain encodings of a data value can be appropriate for use in some applications, but not others. If different representations of an element are required, then the last active byte of the item designator shall be used to define the representation in use — this byte is 00h for the representation first recorded in the metadata element dictionary. The mechanism by which the last active byte of the universal label is used to distinguish between different representations is described in more detail in SMPTE ST 336. Metadata elements identified in this way describe a single metadata element concept but differ in representation. For example, there are two metadata elements corresponding to "Organization Identifier Kind" in the current metadata element dictionary. One metadata element (06.0E.2B.34.01.01.01.04.01.01.10.02.00.00.00.00) is represented as a series of ISO 7-bit characters and has a defined maximum length of 32 bytes. The other metadata element (06.0E.2B.34.01.01.01.04.01.01.10.02.01.00.00.00) is represented as a UTF-16 (16-bit Unicode Transformation Format) string.

A single item in the metadata element dictionary shall not be used to describe metadata elements of different types.

The metadata element dictionary shall be organized into nodes and leaves. The dictionary classes form class nodes and below these are further nodes at each subclass. To aid the management of the dictionary, these nodes and subnodes shall be assigned a universal label, so as to give clear breaks in the structure. Entries within a subclass form leaves, which are the metadata element descriptions.

Nodes shall be used to define the overall structure of the metadata element dictionary; i.e., metadata classes and subclasses. The normative fields that define these classes/subclasses are specified in Section 4.3.

The nodes or leaves at each level shall be assigned either a level number in the range 1 to 127, encoded as a single byte within the UL, or a number greater than 128 encoded using multiple bytes as described by ISO 8825-1 BER Object Identifier Notation. This level number should be assigned sequentially, i.e. each new node or leaf under a node should be assigned a number one greater than the highest level number at the same level under the same node (or zero if it is the first). However, where a specific byte of all ULs under a node is set by another algorithm or taken from a set of permissible values specified in a defining document, a wildcard node may be used. In a wildcard node the first occurrence of "00h" in the UL identifying the node is a treated as a wildcard by the leaves underneath. For example, byte 12 of the universal labels used to identify SMPTE unique material identifiers (UMIDs) indicates the "number creation method" as defined in SMPTE ST 330.

The universal labels used in the metadata dictionary defined by this document elements shall be constructed as shown in Table 1, which complies with SMPTE ST 336.

Table 1 – Construction of universal labels for the metadata element dictionary

Byte Position	Description	Value	Meaning
	UL Header		
1	Object identifier	06h	Object identifier tag per SMPTE ST 298
2	UL length	0Eh	The byte length of the object identifier value is 14 bytes.
	UL designator		
3	UL code	2Bh	The administering organization is an ISO organization.
4	UL subcode	34h	The delegated organization is SMPTE.
5	Registry category designator	01h	The registry category is dictionaries.
6	Registry designator	01h	The specific register is a metadata element dictionary.
7	Structure designator	01h	The dictionary structure conforms to this SMPTE standard.
8	Version number	01h to 7Fh	This indicates the version number of the register.
9-16	Item designator	Defined by the metadata element dictionary	This identifies a specific metadata element within the metadata element dictionary.

Note: As defined in SMPTE ST 298, a value of 00h at any position in a UL is treated as a terminator and all further values within that UL are required to be zero also.

4.1 Compatibility with Other Metadata Structures

The metadata element dictionary structure is a framework that supports global interoperability by defining metadata elements in a way that enables the interchange of metadata from different sources, applications, and third-party organizations.

Note: Many different cataloging conventions are used by communities who focus on a specific domain or subject or who have specific needs for archive and retrieval of multimedia data including, for example, intellectual rights. The metadata element dictionary is not intended to replace conventions already in use, for example in textual naming or keywords. Within the framework of the metadata element dictionary structure, different content creation communities, media indexing professionals, or metadata extractors and users can develop metadata conventions that meet their specific requirements.

4.2 Individual Metadata Classes

Within the metadata element dictionary, metadata elements shall be organized into a hierarchical structure, where each is assigned to a metadata class as shown in the overview of Figure 1. The initial set of metadata classes in this standard consists of:

Class 1: Identification and location
Class 2: Administrative
Class 3: Interpretive
Class 4: Parametric

Class 5: Process
Class 6: Relational
Class 7: Spatio-temporal
Class 13: Organizationally registered for public use
Class 14: Organizationally registered as private
Class 15: Experimental

The number of metadata classes can be extended in the future to a maximum of 127, and the class numbers that have not been assigned here shall be reserved for use by SMPTE. Although dictionary classes can be populated with any metadata elements (such as those associated with still images, audio, or graphics), additional new classes may be created up to that limit to deal with specific metadata characteristics or attributes.

The processes for registration of new elements shall be as specified in normative Annex B.

Byte 9 of the UL identifies which of these metadata classes a metadata element belongs to. Subsequent bytes enable the hierarchical identification of subclasses.

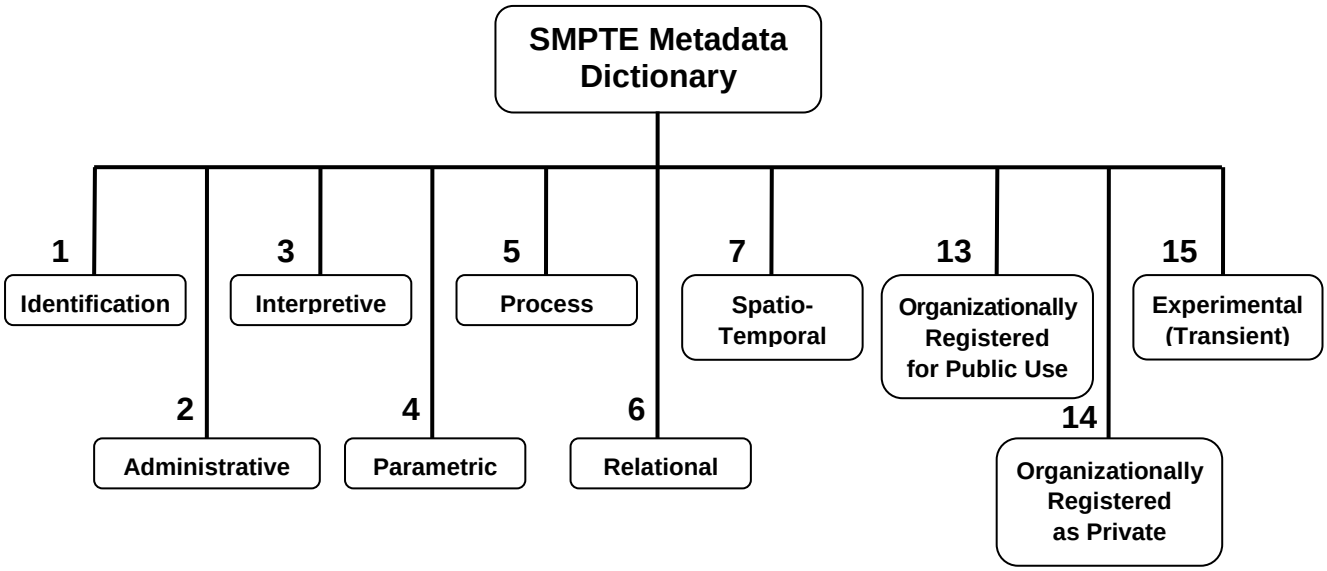

Figure 1 – Metadata class structure

4.2.1 Class 1: Identification and location

Metadata in this class shall consist of IDs and other identifying information that describe the essence of the overall bit stream or file. A critical part of class 1 metadata is unambiguous identification of the essence using a single, recognized number or label such as the SMPTE unique material identifier (SMPTE ST 330). Information in this class shall include global and local identifiers as well as identifying information about the metadata elements themselves. Examples of subclass titles in this class are:

- Globally unique identifiers
- ISO identifiers
- Object identifiers
- Device identifiers
- Unique IPR identifiers
- Local locators
- Titles

Other subclasses may be added through the process defined in Annex B.1.1.

4.2.2 Class 2: Administrative

Metadata in this class shall consist of administrative or business data that describe the essence or metadata that are relevant to its application. Information on authorized use and restrictions on use, and encryption are in this metadata class. Cost information and information needed to protect intellectual property or to protect ownership shall also be contained in class 2. Examples of subclass titles in this class are:

- Supplier
- Rights
- Financial information
- Security
- Publication outlet
- Participating parties
- Broadcast and repeat statistics

Other subclasses may be added through the process defined in Annex B.1.1.

4.2.3 Class 3: Interpretive

Metadata in this class shall consist of descriptive information which is normally considered either a subjective or a human-generated description of the essence or a computational result from machine examination of the essence. Interpretive information shall consist of, but not be limited to, textual terms (for example, keywords, synopsis, titles, or genre), or computational metrics (for example, color histograms, texture maps, object shapes, or facial features). Information in class 3 shall be principally used for indexing, cataloging, administering, searching, and retrieving the content of essence. Examples of subclass titles in this class are:

- Fundamental (such as language code, length, and time systems)
- Descriptive (human-assigned)
- Categorization
- Assessments
- Descriptors (machine-assigned or computed)

Other subclasses may be added through the process defined in Annex B.1.1.

4.2.4 Class 4: Parametric

Metadata in this class shall consist of information that describes the technical characteristics of the camera, sensor, or system that originates the essence or metadata. Information about the technical characteristics of the essence or metadata is also provided, including but not limited to its creation parameters and the configuration of the originating system. Examples of subclass titles in this class are:

- Video essence encoding characteristics
- Audio essence encoding characteristics
- Data essence encoding characteristics
- Metadata encoding characteristics
- Audio test parameters
- Film pulldown characteristics
- Fundamental sequencing and scanning
- MPEG coding characteristics
- Time code characteristics

Other subclasses may be added through the process defined in Annex B.1.1.

4.2.5 Class 5: Process

Metadata in this class shall consist of information that describes how the essence was processed or otherwise changed or enhanced after its origination. This class shall include, but not be limited to, many of

the parameters in an edit decision list. Additional information in class 5 shall be an audit trail (heritage) of all changes to the original content over time. Also included shall be a record of compression/decompression steps and any changes in storage media or format. Examples of subclass titles in this class are:

- Process indicators
- Manipulation
- Downstream processing history
- Enhancement or modification
- Audio processor settings (device-specific)
- Editing information

Other subclasses may be added through the process defined in Annex B.1.1.

4.2.6 Class 6: Relational

Metadata in this class shall consist of information that describes relationships among objects in the content or among any combination of essence, objects, and metadata. Examples of subclass titles in this class are:

- Generic relationships
- Relatives
- Essence-to-essence relationship
- Metadata-to-essence relationship
- Metadata-to-metadata relationship
- Object-to-object relationship
- Metadata-to-object relationship
- Related production material
- Numerical sequence
- Relationship structures

Other subclasses may be added through the process defined in Annex B.1.1.

4.2.7 Class 7: Spatio-temporal

Metadata in this class shall consist of information about aspects of the content or the originating camera, sensor, or system relating to time, place, or space. Geospatial information in class 7 shall be any information that defines the positions or places (either absolute or relative) of objects, scenes, individuals, or any other component of the essence. Temporal elements such as dates, time codes, synchronization marks, temporal keywords, and motion (vector) parameters shall also be part of class 7 metadata. Examples of subclass titles in this class are:

- Position and space vectors
- Absolute position
- Image positional information
- Rate and direction of positional change
- Abstract locations
- Angular specifications
- Distance measurements
- Operational date and time information
- Absolute date and time
- Relative durations
- Rights date and time
- Setting date and time (characterized time period)
- Delay
- Latency

Other subclasses may be added through the process defined in Annex B.1.1.

4.2.8 Class 13: Organizationally registered for public use

Metadata in this class shall consist of individual elements of metadata that have been registered by a specific organization and are therefore reserved and managed separately from the other classes (1 -7) of metadata. Subclasses and metadata elements used by the class 13 registrant shall be published in the metadata element dictionary. Class 13 metadata shall be managed by the SMPTE Registration Authority and its approval shall be consistent with Annex B.2.

4.2.9 Class 14: Organizationally registered as private

Metadata in this class shall consist of individual elements of metadata whose definitions are held by a specific organization and are therefore reserved and managed separately from the other classes (1 -7) of metadata. Each allocated top-level node shall be publicly identified in the metadata element dictionary and universal labels under that shall be reserved for use by the registered organization. Metadata elements used by the class 14 registrant shall not be published in the metadata element dictionary. Allocation of top-level nodes in class 14 shall be managed by the SMPTE Registration Authority and its approval shall be consistent with Annex B.3.

Note: If a device or application is required to parse instances of class 14 metadata, it will require a definition that is supplied by the owning organization rather than attempting to use any version of the SMPTE register defined by this document.

4.2.10 Class 15: Experimental

Class 15 metadata shall only be used in multimedia research or other limited access, experimental environments where experimentation with new metadata elements and applications does not depend on strict conformance to approved standards and which remain within a test or laboratory environment.

4.3 Dictionary Structure and Format

Each metadata element or metadata class/subclass shall be described by a number of fields, which are classified as normative, informative, queried, stated, or calculated.

The fields that apply to leaves or nodes are indicated in the following subsections. In the metadata element dictionary, nodes describe classes/subclasses and leaves describe metadata elements.

Normative fields of the metadata element dictionary are those that are required for the description of a metadata element or class/subclass. They may be omitted only if they are not applicable. The only normative fields that may not be applicable to all metadata elements are the defining document and unit of measure.

Informative fields provide additional information that is intended to help users of the metadata element dictionary. In the case of a conflict of interpretation, normative fields take precedence over informative fields.

Queried fields are derived by using an identifier (universal label) to look up information contained in the normative fields of another register. The source register, rather than the metadata element dictionary, shall be considered the normative reference for these fields.

Stated fields contain values that were stated by the originator of the item and were used to derive the normative fields. Derivation may be manual (i.e., by the document editor) or calculated by formula. In some cases, derived normative fields belong to a different register, such as the Types Register.

Calculated fields are non-normative fields that are derived from other fields. Note that this definition excludes derived normative fields. In the case of conflict between a calculated field and a normative field, the normative field takes precedence.

The following sections list the specific normative and informative fields. Descriptions of the stated, calculated, and queried fields are also given. The order in which the fields appear in the register need not reflect the order in which they are presented below.

Table 2 – Classification of fields used in the metadata element dictionary

Field(s)	Description	Classification	Scope	Required?	Format
Register	4.3.1	normative	nodes, leaves	Required	Text (enumerated)
Dictionary version at introduction	4.3.2	calculated	nodes, leaves	Derived	Integer
Node or leaf	4.3.3	normative	nodes, leaves	Required	Text
Level	4.3.4	calculated	nodes, leaves	Derived	Integer
SMPTE designator and item designator	4.3.5	stated	nodes, leaves	Required for derivation of normative UL	16 hexadecimal bytes (as individual fields)
URN representation of the universal label	4.3.6	normative	nodes, leaves	Required	URN representing the UL
Namespace Name	4.3.7	normative	nodes	Required for top-level class 13/14 node	URI
Symbol	4.3.8	normative	nodes, leaves	Required	Text restricted to character pattern defined in 4.3.8
Name	4.3.9	normative	nodes, leaves	Required	Text
Definition	4.3.10	normative	nodes, leaves	Required	Text
URN representation of the type UL	4.3.11	normative	leaves	Required	URN representing the UL
Type symbol	4.3.12	queried	leaves	Derived	As per symbol
Value length	4.3.13	stated	leaves	Optional	Text
Value range	4.3.14	stated	leaves	Optional	Text
Unit of measure	4.3.15	normative	leaves	Optional	Text (enumerated)
Defining document	4.3.16	normative	nodes, leaves	Optional	Text
Context scope	4.3.17	informative	leaves	Required	Text (enumerated)
Applications	4.3.18	informative	nodes, leaves	Optional	Text
Notes	4.3.19	informative	nodes, leaves	Optional	Text
isDeprecated	4.3.20	Normative	nodes, leaves	Required	Boolean

When any version of the register is made available for ballot, or published in any form, all fields classified in Table 2 as normative or informative shall be included. Other fields may be included.

4.3.1 Register

This normative field shall identify the register to which an item belongs, for example, “Elements”, “Groups”, “Types”, or “Labels”. For the dictionary defined by this standard, this field shall have the value “Elements”.

4.3.2 Dictionary version at introduction

This calculated field shall record the version number of the dictionary which first recorded the allocation of a metadata element or class/subclass description against its UL.

For all entries in classes 1-7, and for any nodes registered in class 14, the version number shall be the version of the dictionary which first contained the entry. Class 13 entries may use the same method for

selecting version numbers, or another method at the discretion of the organization responsible for those entries.

Byte 8 of the UL shall also hold the version number.

4.3.3 Node or leaf

This normative field shall define whether the item is a node or a leaf as defined in Section 4.

4.3.4 Level

This calculated field shall indicate the level of an item in the class hierarchy of the metadata element dictionary. It shall be calculated from the position of the last active byte of the item designator.

4.3.5 SMPTE designator and item designator

These stated fields shall contain the 16 individual bytes of the universal label in hexadecimal notation.

The SMPTE designator (first 8 bytes) shall be consistent with the provisions of Table 1.

The item designator (last 8 bytes) uniquely identifies the specific item in the dictionary in a hierarchical fashion. Classes are designated with the first byte in the item designator and subsequent bytes enable the hierarchical identification of subclasses and/or individual metadata elements. The item designator shall reflect the class/subclass that is most appropriate for that item and shall not be identical to the item designator assigned to another item in any draft or published version of the dictionary.

4.3.6 URN representation of the universal label

This normative field shall be derived from the value of the universal label as defined by Section 4.3.5 and represented in a normative text format that has been approved for use in SMPTE registers. This provides a consistent textual format for representing the underlying UL.

The normative text format of the universal label is the internationally recognized Uniform Resource Name (URN) notation. SMPTE ST 2029 defines the urn:smpte:ul representation of a SMPTE ST 298 UL, which shall be used for this value.

4.3.7 Namespace Name

This normative field shall define the scope over which symbols, which are defined in Section 4.3.8, are unique. For classes 1-7 the Namespace Name shall be identified by the Uniform Resource Identifier (URI) http://www.smpte-ra.org/reg/335/<revision>, where <revision> shall be a string denoting the year of publication of this structure standard as 4 decimal digits, and may be appended with 2 month decimal digits in the range 01-12. For classes 13 and 14, a Namespace Name shall be specified by the registrant for the top-level node and may be specified for any sub-node.

Organizations that have defined metadata in classes 13 and 14 may choose any valid Namespace Name (URI) for the symbols identifying this metadata in accordance with the XML-Namespace recommendation; this is subject to the restriction that this Namespace Name shall not correspond to the XML namespace used for class 1-7 symbols. The Namespace Name (URI) shall be specified as a normative field of the class 13 or 14 node to which this namespace applies. All sub-nodes shall belong to this namespace, unless another namespace has been specified. Therefore, if no Namespace Name (URI) for a node is given, it shall be inherited from the ancestor node.

4.3.8 Symbol

This normative field shall define the symbol. A symbol is a name that conforms to computer language syntax restrictions, and it is intended for use in computer languages such as the Extensible Markup Language (XML). To enable the use of symbols in a wide range of computer languages, a symbol shall be

a string composed only of the characters A-Z, a-z, 0-9, and _, and it shall begin with an alpha character (A-Z, a-z) or an underscore (_).

Symbols shall be defined for both nodes and leaves and shall be unique within the XML namespace identified by Section 4.3.7.

Note 1: This implies that class 1-7 symbols are unique within the metadata element dictionary.

Note 2: The combination of Namespace Name and Symbol produce a unique identification for an element in the same way that *namespace name* and *local name* are used in W3C REC-xml-names to form an *expanded name*.

4.3.9 Name

This normative field shall be the name for the metadata element or class/subclass identified by the universal label or symbol. It shall be written in U.S. English. The name should use title case capitalization and should follow SMPTE guidelines for element or node naming to ensure the name is descriptive and unambiguous.

4.3.10 Definition

This normative field shall be the detailed and unambiguous definition of the metadata element or class/subclass. It shall be written in U.S. English. The definition of metadata elements in classes 1-7, except for those metadata elements that differ only in representation (see Section 4), shall be unique. Therefore, conceptual redundancies shall not be allowed in classes 1-7.

4.3.11 URN representation of the type UL

This normative field shall identify the representation category of values allowed for this element in order to permit the correct interpretation of a value.

The type UL shall identify the type description in the Types Register.

4.3.12 Type symbol

This queried field shall identify the type symbol.

The type symbol is a type name that shall conform to the same computer language syntax restrictions as defined for the metadata element symbol in Section 4.3.8. The type symbol shall be derived by using the type UL to query information in the Types Register.

Where the type is a class 13 or class 14 type, this field shall be composed of the Namespace Name for the type, a colon, and the Symbol for the type. Both the Namespace Name and the Symbol shall be taken from the element in the types dictionary that defines the type. For all other classes of type, this field shall contain the symbol taken from the corresponding element of the types dictionary.

4.3.13 Value length

This stated field shall specify any limitations on the permitted length in bytes or characters of the value of the metadata element. In some cases, such as a text string, the length is not defined or limited, and the value length is described as variable.

Note: In practice, a variable length value may be limited by the application specification.

4.3.14 Value range

This stated field shall specify any limitations on the range of permitted values of a metadata element.

Note: The defining document might place restrictions on the value range that have not already been defined by the underlying data type.

4.3.15 Unit of measure

This normative field shall specify the measurement units that are associated with a value. This field is optional since certain elements in the dictionary are not measurements but informational. Where specified, the unit of measure should use the standard abbreviation rather than the full name, for example for a unit of microseconds the value of this field would be "µs" not "microseconds".

4.3.16 Defining document

This normative field shall reference the primary standard or authoritative document that provides further information about an item, if such a reference is available. For example, the value range may be specified by the defining document rather than listed explicitly in a register, when the interpretation of those values requires an understanding of the defining document as a whole.

4.3.17 Context scope

This informative field shall indicate if a metadata element has been defined within a specific application or context.

- Defined context: An element that has a defined context has been defined within a specific application or context. An example is a metadata element that is a property of a specific group defined in the groups register. Other applications may use this element provided that due regard is given to the data relationships defined by the original application or context.
- Abstract context: An element that is defined as abstract may be used anywhere that the semantics of the element description apply. Abstract elements can be used to map and re-use data across diverse applications.
- Unknown: An element with an unknown context scope has a context scope that has not been determined. Note: This means that the metadata element description is incomplete. It is a warning that the interpretation of a data value may differ between applications.

The values used to identify the context scope shall be “DefinedContext”, “AbstractContext”, and “UnknownContext”, respectively.

4.3.18 Applications

This informative field shall be an informative listing of some known applications that use a particular metadata element.

4.3.19 Notes

This informative field may be used to provide additional information that may assist in the interpretation and correct application of the metadata element or a class/subclass of metadata elements. This information cannot be deduced from the other normative and informative fields.

4.3.20 isDeprecated

This normative field is an indication to system designers that the element should no longer be used.

The field shall contain a boolean value that is true for elements that have been classified as deprecated according to the processes described in Annex B.1.3 or Annex B.2.3. All other entries shall carry the value false. Where a node is flagged as deprecated no new nodes or leaves shall be allocated under that node. Leaves under a deprecated node may be flagged as deprecated or left usable.

Note: Deprecation can be used in situations where it has been determined that the entry is erroneous or could cause compatibility problems, so great care is required to avoid them. However some situations can require use of an element after it has been deprecated, such as reading from a large archive of material that contains the element. In these situations developers will need to exercise great caution.

5 Metadata Element Dictionary Maintenance

The principles for maintenance and administration of the metadata element dictionary are defined in the following clauses:

5.1 Dictionary Version Information

The following information shall be provided by the SMPTE Registration Authority with each update to the metadata element dictionary:

Standard name: Metadata Element Dictionary

Structure designator: One-byte unsigned integer that indicates that the metadata element dictionary is defined by this structure document. The structure designator shall have a value of 01h.

Version number: One-byte unsigned integer in the range of 1 to 127

Effective date: Date of publication of any updates to the register on the web site of the SMPTE Registration Authority (www.smpte-ra.org) as provided by the SMPTE Administrative Practices.

Register administrator: SMPTE Registration Authority

Contact information: Text provided on the SMPTE Registration Authority's website, www.smpte-ra.org

Users of the metadata element dictionary should check the SMPTE-RA web site regularly for updates to the register.

5.2 Dictionary Management and Compatibility Requirements

To ensure reliable and correct interpretation of legacy material in the future, changes to the metadata element dictionary shall be carried out in accordance with the registration procedures defined in Annex B. Annex B specifies the provisions and corresponding requirements for additions, deletions, deprecations, and changes to items in classes 1-7 (Annex B.1), class 13 (Annex B.2), and class 14 (Annex B.3).

The addition process shall be carried out and documented in accordance with Annex B by the SMPTE Registration Authority. It shall occur on request from the appropriate SMPTE technology committee and shall be administered in accordance with Annex B. The version number of the dictionary shall be incremented each and every time an addition (or group of additions) is approved since this is critical to ensuring the operational compatibility of metadata decoders. The incrementing of the version number shall not prevent use of unaffected universal labels, structure, or contents by a decoder that conforms to the prior version.

Note: It is inevitable, given the above addition process, that eventually the dictionary will become cluttered with legacy entries to the point where the responsible SMPTE technology committee determines it has reached the limit of its usefulness. At this stage, or when other changes to the dictionary contents, to an existing approved dictionary structure, or to relationships among metadata classes that prevent backward compatibility are necessary, a new structure standard and the associated register will be created. These will be made readily accessible online by the SMPTE Registration Authority to allow upgrades to decoders. The superseded standard will then undergo no further revision unless essential under the SMPTE five-year rule.

5.3 Dictionary Availability

The latest version of the metadata element dictionary shall be made available on the SMPTE Registration Authority website, www.smpte-ra.org, in a defined electronic publishing format with an accompanying document specification. A minimum of the two immediate previous versions should also be available in a clearly indicated archive.

Annex A Glossary of Terms (Normative)

A.1 Attribute: A characteristic of a metadata element.

A.2 Content: The sum total of the essence (video, audio, data, etc.) and the metadata.

A.3 Context: The circumstance, purpose, and perspective under which something is defined or used.

A.4 Data element: A unit of data for which the identification, definition, representation, and set of permissible values are specified by means of a set of attributes.

A.5 Designator: A sub-identifier within a universal label.

A.6 Essence: Identified by the EBU/SMPTE Task Force for Harmonized Standards for the Exchange of Program Material as Bitstreams (TFHS) as the digital representation of video, audio, and/or data information. Essence can therefore also be graphics, telemetry, photographs, or other information.

A.7 Identifier: A sequence of numbers or characters, capable of uniquely identifying that with which it is associated, within a specified context.

A.8 Item (register): An object in a register that instantiates a defined set of attributes. An item in the metadata element dictionary is a description of a metadata element or class/subclass.

A.9 Item designator (SMPTE ST 336): The last 8 bytes of the universal label, which uniquely identify a particular item within the context of the UL designator.

A.10 Level number: The last non-zero value of a UL of a node or leaf. Which value in a UL is the level number depends on the level of the entry, i.e. how many entries are above it in the hierarchy.

A.11 Metadata: Generally referred to as data that defines or describes other data. More specifically, metadata is information that is considered ancillary to or otherwise directly complementary to the essence. Metadata can be described as any information that a content provider considers useful or of value when associated with the essence being provided.

A.12 Metadata class: The broad category of metadata that forms the first level of hierarchy for all registered metadata.

A.13 Metadata element dictionary: The register, as defined by this standard, of approved metadata element identifiers and the attributes of the metadata elements that they identify.

A.14 Metadata element: A data element defined by the metadata element dictionary.

A.15 Registry: An information system for registering metadata (e.g. metadata elements, types, groups).

A.16 Register: The information store or database maintained by a registry.

A.17 Registration authority: An organization responsible for maintaining a register.

A.18 Representation: The representation is composed of an assigned data type, a set of permissible values (if applicable), and the appropriate unit of measure (if necessary).

A.19 Type: Information about the representation of the metadata or data value. The type is identified by a UL that specifies the type exactly in the Types Register.

A.20 Top-level node: A node in class 13 or 14 under which an individual or organization other than SMPTE controls the entries.

A.21 Types Register: The metadata types register defined by SMPTE ST 2003.

A.22 Universal label: Specifically a SMPTE-administered universal label, which is 16 bytes. The syntax of the universal labels used in the metadata element dictionary is defined in SMPTE ST 336, which describes the mechanism by which the UL is used as a key that explicitly identifies a predefined value or group of values.

A.23 UL designator (SMPTE ST 336): A sequence of sub-identifiers (bytes 3-8 of a 16-byte universal label) designating the ISO/ITU organization, registry category, registry, registry structure, and version number.

A.24 Value: The instance of information.

Annex B Registration Criteria (Normative)

This annex defines the specific registration criteria for items in each of the defined metadata classes.

B.1 Criteria for Modifications to Entries in Classes 1-7

Classes 1 to 7 of the register shall be administered by the Metadata and Registers Committee 30MR, or another body as appointed by the Standards Committee from time-to-time. All changes shall only take place after successful completion of a ballot of the administering body.

Changes may be instigated by the administering body, or by any organization or individual that is a member of SMPTE upon providing the following information:

1) Contact information for the organization, individual, or committee requesting the change;

2) Details of the requested change of the registered metadata element along with a justification for the change;

3) Details of any supporting document that may require the change of the registered metadata element.

B.1.1 Additions to Entries in Classes 1-7

Additions to the register in classes 1 to 7 shall be subject to review for adequacy of information, including technical description, non-conflict with existing engineering documents, and compliance with the requirements in this section. Class 1 to 7 additions shall not require a supporting SMPTE engineering document.

B.1.2 Changes to Entries in Classes 1-7

During the ballot process for a change of an entry whose class is in the range 1 to 7, negative votes based upon procedural issues, including adequacy of technical description, shall be accepted.

B.1.3 Deprecation of Entries in Classes 1-7

Any request for flagging of a registered metadata element as deprecated shall result in the posting of an appropriate public notice describing the proposed deprecation.

B.1.4 Deletion of Entries in Classes 1-7

Entries in classes 1 to 7 shall not be deleted.

B.2 Criteria for Modifications to Entries in Class 13

Class 13 of the register shall be administered by the Metadata and Registers Committee 30MR, or another body as appointed by the Standards Committee from time-to-time.

Nodes in class 13 may be allocated to a specified organization which becomes responsible for instigating changes under that node. A node shall be allocated after successful completion of a consensus vote of the administering body. The allocated node shall be regarded as the top-level node for that organization within the class 13 register.

All changes in class 13 entries are at the discretion of the appropriate organization. All changes shall be reviewed for adequacy of information and compliance with the provisions of this document.

Changes may be instigated upon submitting the following information to the administering body:

1) Contact information for the organization, individual, or committee requesting the change;

2) Details of the requested change of the registered metadata element along with a justification for the change;

3) Details of any supporting document that may require the change of the registered metadata element.

The administering body shall check that all required information has been supplied and include the modifications in the next published version of the register.

B.2.1 Additions to Entries in Class 13

Additions to the register in class 13 shall be subject to review for adequacy of information; this shall be limited only to compliance with the requirements in this section. Class 13 additions shall not require a supporting SMPTE engineering document.

B.2.2 Changes to Entries in Class 13

Changes to class 13 entries shall be subject to review for adequacy of information this shall be limited only to compliance with the requirements in this section.

B.2.3 Deprecation of Entries in Class 13

Any request for flagging of a registered metadata element as deprecated should result in the posting of an appropriate public notice describing the proposed deprecation.

B.2.4 Deletion of Entries in Classes 13

Entries in class 13 shall not be deleted.

B.3 Criteria for Modifications to Entries in Class 14

Class 14 of the register shall be administered by the Metadata and Registers Committee, 30MR or another body as appointed by the Standards Committee from time-to-time.

Nodes in class 14 may be allocated to a specified organization which becomes responsible for all entries under that node. A node shall be allocated after successful completion of an administrative vote of the administering body. The allocated node shall be regarded as the top-level node for that organization within the class 14 register.

A request for a class 14 node shall include the following information:

1) Contact information for the organization, individual, or committee requesting the node;

2) Statement of intention to apply the registered metadata node, and intended date of first use.

Note: A fee might apply for the registration of a class 14 node.

Changes to the register in class 14 shall not be subject to review.

Annex C Organization of References (Informative)

No single standard can contain all of the information needed to describe and encode metadata. Hence, a layered approach is used to convey the information so the user can select the applicable standard(s) for the level of implementation needed. The SMPTE normative standards for metadata include:

- The standard for the groups register structure (SMPTE ST 395) and the groups register itself;
- This standard for the metadata element dictionary structure and the metadata element dictionary itself;
- The standard for the metadata types register structure (SMPTE ST 2003) and the types register itself;
- The standard for the SMPTE labels structure (SMPTE ST 400) and the labels register itself;
- The standard for key-length-value (KLV) data encoding (SMPTE ST 336).

Annex D Bibliography (Informative)

Note: All references in this document to other SMPTE documents use the current numbering style (e.g. SMPTE ST 330:2004) although, during a transitional phase, the document as published (printed or PDF) may bear an older designation (such as SMPTE 330M-2004). Documents with the same root number (e.g. 330) and publication year (e.g. 2004) are functionally identical.

SMPTE ST 330:2004, Television — Unique Material Identifier (UMID)

SMPTE ST 395:2003, Television — Metadata Groups Registry Structure

SMPTE ST 400:2004, Television — SMPTE Label Structure

ISO/IEC 646:1991, Information Technology — ISO 7-Bit Coded Character Set for Information Interchange

ISO/IEC 11179-1:2004, Information Technology — Metadata Registries (MDR) — Part 1: Framework

The Unicode Consortium. The Unicode Standard, Version 5.1.0, defined by: *The Unicode Standard, Version 5.0* (Boston, MA, Addison-Wesley, 2007. ISBN 0-321-48091-0), as amended by *Unicode 5.1.0* (http://www.unicode.org/versions/Unicode5.1.0).

Extensible Markup Language (XML) 1.0 (Fifth Edition), W3C Recommendation, 26th November 2008, http://www.w3.org/TR/2008/REC-xml-20081126/

Merriam Webster's Collegiate Dictionary, 11th Edition, July 2003, Merriam-Webster