SMPTE RP 205:2009
Revision of RP 205-2000

SMPTE RECOMMENDED PRACTICE

Application of Unique Material Identifiers in Production and Broadcast Environments

Table of Contents

Page

Foreword 3
Intellectual Property 3
Introduction 3
1 Scope 3
2 Conformance Notation 3
3 Normative References 4
4 Glossary of Terms 4
5 Underlying Principles 4
6 Requirements 5
6.1 Global Uniqueness 5
6.2 Consistency 6
6.3 Granularity 6
6.4 UMID Generation 6
6.5 UMID Linking 7
6.6 Persistence 8
Annex A Example Usage (Informative) 10
A.1 UMIDs and Program Identifiers 10
A.2 Video Program Production 10
A.3 Rights 11
A.4 Research 11
Annex B Explanation of Logically, Functionally and Bitwise Identical Clones (Informative) 13
Annex C Frequently Asked Questions (Informative) 14
Annex D Bibliography (Informative) 18

Approved November 9, 2009

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 Recommended Practice RP 205 was prepared by Technology Committee 30MR.

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.

Introduction

This section is entirely informative and does not form an integral part of this Recommended Practice.

This practice outlines the role of the UMID in enabling links to the metadata associated with audio-visual material as well as example usage of any relationship of the UMID with other identifiers (for example, a possible program identifier) used in the production processes. It also outlines the application of the UMID as a logical, as opposed to a physical, identifier.

1 Scope

This Recommended Practice describes the recommended application of the SMPTE Unique Material Identifier (UMID) specified in SMPTE 330M when used in content production and broadcast environments. The UMID is one of a number of unique identifiers registered in the SMPTE metadata dictionary, SMPTE RP 210.

This recommendation includes requirements for the unique identification (tagging) of audio-visual material to enable its reliable access and tracking at appropriate levels of granularity. To this end the UMID has been specified to have both basic and extended versions.

The UMID provides an unambiguous method of identification for instances of audio-visual material and thus enables the material to be linked with its associated metadata. The UMID has as its primary area of application the identification of instantiated (i.e., recorded) material and this Recommended Practice specifically addresses such usage. It is, however, valid to use the UMID to identify material which has been captured in electronic or electromagnetic form but never been instantiated and some of the issues in this second area of application are covered in the examples in Annex C.

This practice outlines the fundamental role of the UMID in enabling bidirectional links to the metadata associated with audio-visual material as well as example usage of the UMID's relationship with other identifiers (for example, a possible program identifier) used in the production processes. It also outlines the application of the UMID as a logical, as opposed to a physical, identifier.

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 Reference

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 330M-2004, Television – Unique Material Identifier (UMID)

4 Glossary of Terms

The Glossary of Terms and definitions contained in SMPTE330M also applies to this document. In addition, the following term applies to this document:

Logically Identical: Losslessly identical in functional terms but not necessary physically or structurally identical (see also Annex B).

5 Underlying Principles

The UMID is used as a component in the identification of material to make reliably possible both its tracking in systems and ready access to it. Its primary purpose is to provide globally unique identification of material through the entire production chain from acquisition to emission, including any repositories, so as to enable the reliable linking of material with its metadata. Any other use, such as for the purpose of providing additional features within a closed domain, are secondary to this primary purpose.

UMIDs are attached to audio-visual material (e.g., by being embedded in it) and associated metadata may be held in a separate database.

Note: the UMID is a low level structural device and as such may not be visible to the day-to-day users of a system.

The following list identifies characteristics of the UMID:

1. Where material is managed using the UMID, the basic UMID shall be the primary identifier for identifying material. It forms the metadata “glue” enabling the linking of material with associated metadata generated by processes and systems.
2. The basic UMID should be used to cross-reference between audio-visual material and associated metadata records across associated databases, which may be distributed among many disparate physical locations. For example, it is the key linking element in enabling the location of associated metadata given only the material, or the location of the material given the results of a search on its associated metadata.
3. Basic UMIDs reference at the level of a bounded sequence of one or more contiguous SMPTE 330M material units.
4. “Who-when-where” metadata may be provided within the extended UMID both for the purpose of providing “origin” information from the originally (first generation) captured audio-visual material and enabling identification down to finer granularity than clip level (see Section 5.3.3). Additionally, it may provide limited but useful information when the cross-referencing links to associated databases have failed.
5. In order to uniquely identify all newly generated audio-visual material, a basic or extended UMID shall be applied at every operational step in the production chain. As long as the specific instantiation of audio-visual material remains unchanged, its UMID is not changed (see also Section 6.1.2).

6. There are two distinct UMID application methodologies – the "physical approach", where different digital entities shall not have the same UMID, and the "logical approach" where different digital entities may share the same UMID if they are logically identical.

   It is also a logical extension of the latter methodology to use the UMID to identify "virtual" material which never physically exists but is derived from other "real" material which does exist.

7. The UMID provides, in effect, a container for several kinds of Unique Identifiers and includes a different label for each so that the uniqueness of each is maintained.

6 Requirements

6.1 Global Uniqueness

6.1.1 The fundamental property of the UMID is that it is globally unique

6.1.2 A new basic UMID value (i.e. material number and instance number combination) shall be created for and attached to each and every instantiation of a specific bounded sequence of contiguous material units.

Note: this stringent requirement is inclusive of all copies (including by default bit for bit exact digital copies), so that all copies of existing, instantiated, material will have a newly created (i.e. replacement) UMID allocated to them. A new basic UMID value (i.e. material number and instance number combination) will also be created for and attached to each and every copy of any portion of a specific bounded sequence of contiguous material units.

The only permitted exception is in the case of a logically identical digital copy of the whole of the bounded sequence. If, for example, a file is copied and the copy is guaranteed to be logically identical to the original, then the UMIDs may also be identical.

Note 1: It is essential to guarantee that system management cannot become confused when handling copies with identical basic UMID values, particularly across large systems where such copies may reside on different, possibly separated, storage systems. This includes all common operations such as file moving, deletion, updating or overwriting. If it is not possible to give such a guarantee, then the default requirement of generation a new basic UMID applies. In practice, the file management system may be able to give addition file information that might be used to aid file management in the event of finding files with identical basic UMID values.

Note 2: Making a logically identical copy of only a part of a file results in a new file that is not logically identical to (the whole of) the originating file and consequently a new UMID is required.

Note 3: A bit for bit clone of a file will be logically identical to it. Note, however, that a logically identical copy is not necessarily a bit for bit clone.

Note 4: A fuller explanation of logically and functionally identical copies is contained in Annex B.

6.1.3 Any meaning embedded in the UMID material number is accidental to the method of creating the globally unique value. The value of the material number shall be capable of being treated as a single dumb number under all circumstances. Equally, the material number and instance number combination shall be capable of being treated as a single dumb number under all circumstances.

6.1.4 Differentiation between potentially duplicate UMID material numbers generated by different creation methods (for example SMPTE method, UUID method, IEEE 1394 Network method) is provided by the SMPTE label prefixing the UMID material number and which forms part of the UMID itself as specified in SMPTE 330M.

6.1.5 The SMPTE label prefixing the UMID material number and which forms part of the UMID itself as specified in SMPTE 330M provides additional uniqueness to avoid potential collision of UMID material numbers with the material numbers generated by different identification schemes such as those specified by the International Standards Organization.

6.2 Consistency

Operational consistency in the use of UMIDs and associated metadata and in applying Standards is essential. For example, users must define specific rules for the treatment of UMIDs associated with multiple streams inputting to a process and these must be applied consistently.

6.3 Granularity

6.3.1 A basic UMID shall be generated at the start of creation of each new sequence of contiguous material units and applied to the whole sequence.

6.3.2 The frequency of UMID insertion in streaming applications is dependant on the business requirement (including user application and usage). Insertion frequency may take into account factors such as the available bandwidth, particularly for audio and data material. Similarly for storage applications, where considerations such as file chunking, database structures, searching criteria, network traffic and access time may be taken into account. In some cases it may be appropriate to apply a basic or an extended UMID to every SMPTE330M material unit — for example, in a tape-based system to overcome limitations when referencing the UMID.

6.3.3 When the extended UMID is embedded in each material unit, it can enable granularity down to material unit level by using SMPTE330M source pack time-stamp (“when”) information in conjunction with the basic UMID to identify individual material units within a bounded sequence.

Note: The level of granularity which can be obtained has some limitations – for instance, if a single frame from a picture source is repeated.

6.4 UMID Generation

6.4.1 UMIDs shall be generated automatically and dynamically in any location, including that of original material capture as well as subsequent processing, without prior or current reference to a system database or other central resource. The sole exception shall be that of a tightly managed closed system which has been designed specifically to reference such a database and where system integrity can be guaranteed (see example illustrations in Annex C). Source pack metadata fields in the extended UMID for which values cannot be accurately determined or guaranteed shall be filled with zeros. In the case of equipment in fixed geographic locations, it may be practical to manually allocate accurate fixed location and other details as necessary; this would be a one-off requirement at installation. Legacy material with no UMID shall have a UMID allocated at the earliest practicable point during the processing of the audio-visual material.

6.4.2 Any process which results in the creation of a new configuration of material requires the generation and application of a new UMID for each of the material types affected. The precise updating method will depend on application: in a closely managed environment such as outlined in Section 6.4.1, the new UMID value may be generated by the issuing of a new instance number alone provided that the uniqueness of this instance number can be guaranteed — for instance by reference to a local registration authority. Otherwise, both the material number and instance number (with value zero) shall be newly generated to give the new UMID value.

6.4.3 There is no inherent requirement for a defined relationship between UMIDs for different types of material, though such a relationship will have application advantages in some systems: thus, for example, related audio and video for a production will involve many UMIDs for each of the audio or video tracks but in many cases there will be no defined relationship between the UMIDS, other than that provided by linking via a database.

6.5 UMID Linking

6.5.1 UMIDs identify unique material with a unique identifier. The UMID shall be recorded alongside other metadata associated with material (or a single essence), but not necessarily alongside the material itself so that the associated metadata and its material can be linked together at all stages in the production chain (see Figure 1). This UMID-enabled link need not be direct, but must be unbreakable.

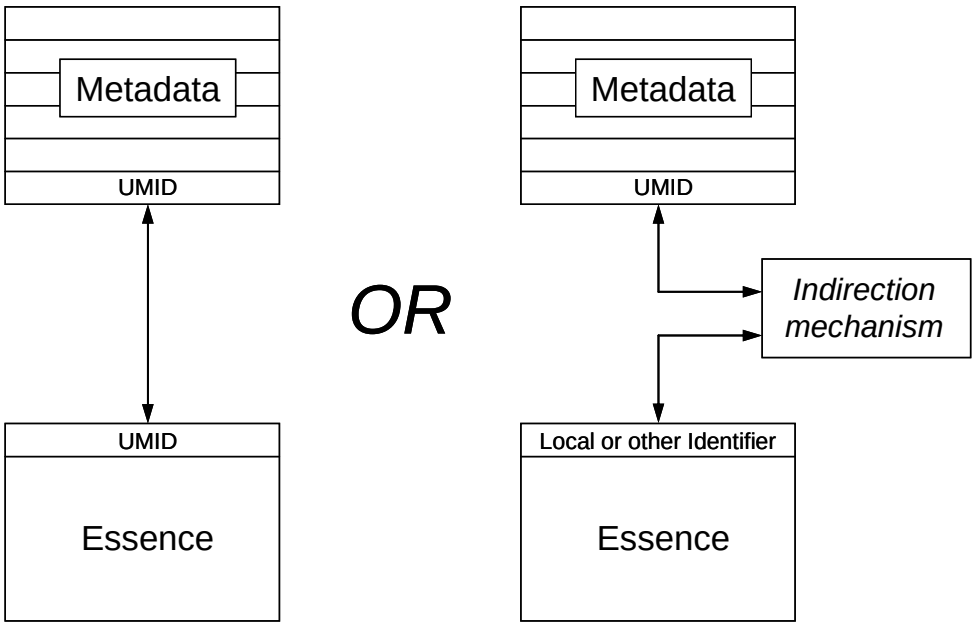

Figure 1 – UMID Direct and Indirect Linking Examples

6.5.2 It is essential for both operational and legal reasons that material can be identified and its metadata referenced at any point in the production chain. This necessitates UMIDs travelling through the chain with the material they identify and remaining unaltered so that an audit trail may be maintained and the history of the audio-visual material determined. Where indirection has been used to link a UMID with the material it identifies any linking mechanism should not be unidirectional (see Figure 2) because a unidirectional link could prevent the original material's UMID and hence any of its associated metadata from being found given the material it identifies. This requirement calls for particular attention when dealing with operations on only part of an original file.

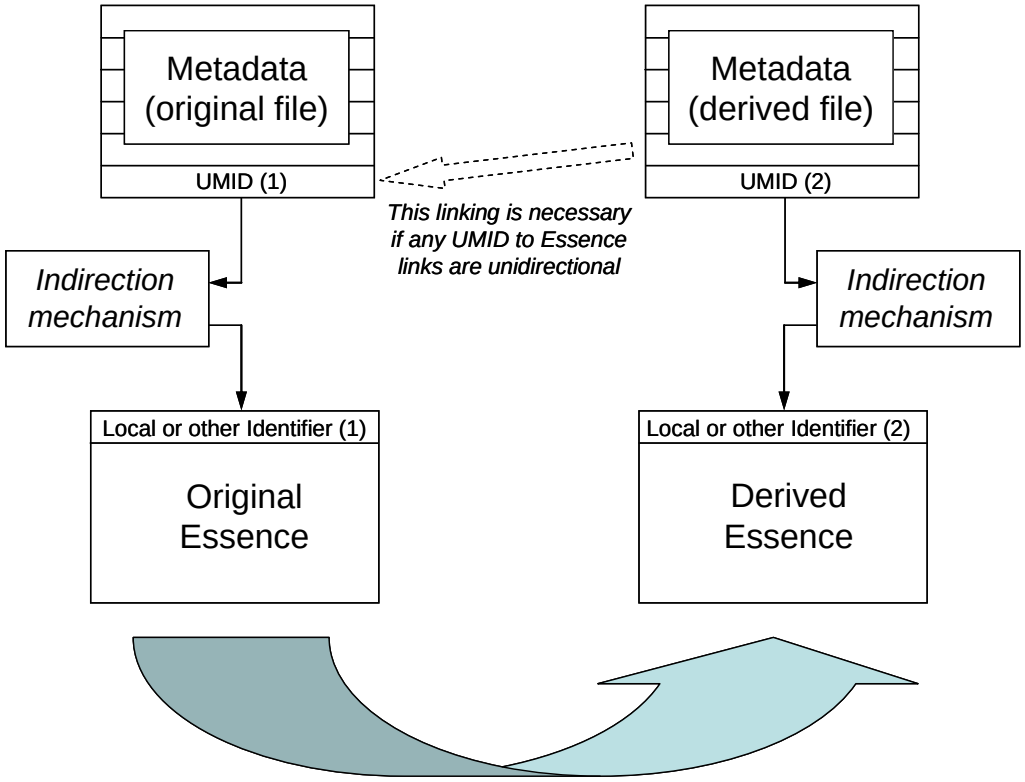

Figure 2 – *Prevention of unidirectional linking mechanism for indirect linking*

6.5.3 Where a new UMID is generated, an audit trail should also be generated using UMIDs from previous generations of the material. In any such audit trail, at least the UMIDs of both the original (i.e. first generation) material (containing the number of the earliest extant form of the material) and the UMIDs of the immediately preceding generation of material used to generate this new UMID should be entered in the associated metadata for each of the material types involved. In the case of a mix or montage, there could, therefore, be many metadata entries.

Note: In some applications, granularity metadata, such as switching point cue metadata, will also need to be carried through processing.

6.5.4 Where metadata associated with audio-visual material is created, changed or modified, the UMID should remain unchanged because the essence itself has not changed.

Note: Where metadata is in the same file as the essence the file structure requires a separate mechanism to track changes in metadata.

6.6 Persistence

6.6.1 A UMID may persist as metadata beyond the life of its material. This ensures the correct referencing between metadata held in systems after the material itself is no longer available. In these situations the UMID becomes common metadata – for example in archive, research or legal applications.

6.6.2 In the special case of backup material, UMIDs saved within the backup may be the same as in the original material used as the source for the backup. However, when such backups are restored, new UMIDs shall be created unless the restored material can be guaranteed to be logically identical to the original material used as the source for the backup. This requirement is to eliminate any possibility of UMID collisions between restored material and the original material.

6.6.3 As described in Section 6.4, “who-when-where” metadata, captured at the time that content was originally created, may be provided within the extended UMID for the purpose of providing “origin” information about the essence being identified by the UMID. This metadata shall therefore pass unchanged across UMID generations only so long as the essence within the material unit to which it relates is unchanged: if the essence in the material unit is modified in any way, such as during a mix or other effect, new essence has been created which has its own “who-when-where” metadata. An application may or may not choose to include any or all of this new metadata in the UMID extension, but shall never include erroneous “who-when-where” metadata.

Annex A Example Usage (Informative)

A.1 UMIDs and Program Identifiers

The following proposals are sample statements illustrating the relationship between the unique material identifier (UMID) and a possible program identifier.

A.1.1 When a program is first commissioned, it will probably be allocated an identifier which can be globally, organisationally or locally registered. At this stage, this identifier does not relate to any material and is used to track metadata (for example, costing information) associated with the commissioned program.

A.1.2 Such program identifiers can be registered and allocated by different program makers and broadcasters without the need to maintain global uniqueness or a common format. If a program is moved from one organization to another, the receiving organization might apply its own program identifier to the material; however, the UMIDs within it are unchanged.

A.1.3 At the point of capture, any program identifier given by the original commissioning body can be recorded in the metadata associated with the captured material and linked to it by the UMID. Each UMID can be linked to any number of programs, or none at all. Alternatively, material received from the field, for instance, amateur and freelance sources, can be logged against the program, linked again by the UMIDs.

A.1.4 When the final edited version of the program is completed the entire program will have single UMID(s) applied to the audio-visual material. Links can be made between the program's component and final UMID(s) and any program identifiers. Thus, the program identifier does not replace the UMID, being an entry in the metadata tables linked to the audio-visual material.

A.2 Video Program Production

A.2.1 A UMID is created and applied to captured material on a "clip by clip" basis, where a "clip" is a bounded sequence of material units. Any associated metadata, including commissioning metadata if available, is entered into the field recording system and referenced to the "clip" using the UMID. Associated metadata can be wrapped or embedded with the material or stored in a database linked to the material by the UMID. Embedded metadata can be more difficult to access and update than metadata stored separately from the audio-visual material itself and it might be desirable to extract it for more rapid access.

A.2.2 During production processes, including editing, new UMIDs will be created at every operation. The history will be incorporated into an audit trail within the metadata wrapped or embedded with the material or will be retained in databases and linked to the audio-visual material by the UMID. An application such as the tracking of the editing process and heritage can then be realised using such metadata.

A.2.3 Off-line editing at reduced resolutions is essentially a work-in-progress process with its own UMIDs being generated and applied without reference with any on-line or conforming process.

A.2.4 Any change whatsoever to the audio-visual material which results in new, stored material requires the issuing of a new UMID; for example, a re-edited version of the material to correct a spelling mistake.

A.2.5 When the completed editing process produces a final program, this final edit is fundamentally no different from any other edit, and the new material is allocated a new UMID.

A.3 Rights

A.3.1 Context

The growth in demand for program content, growing awareness of its value, and the availability of new technology to exploit it is leading to pressure for increased protection of creator's rights (for writers, performers, specialist cameramen). Interactive viewing and greater control over usage of content by the end consumer exacerbates the rights issues and hence the pressure for protection.

This leads to a demand for ownership accounting at finer levels of granularity than ever before, across more distribution outlets, and functional within domains subject to increased automation.

A.3.2 UMID Usage

A.3.2.1 Rights metadata must, therefore, be capable of association with the UMID identifying constituent material at any level of editorial granularity; e.g., program, item, shot, still.

A.3.2.2 For management of primary and secondary distribution rights (without re-versioning) the referenced UMID will be at the editorial level of program or item. Versioning is defined as where creative change takes place to meet differing program objectives — for instance, different audiences or time slots.

A.3.2.3 For management of contributor rights through re-versioning, extracts or re-editing, the relevant UMID is at the level of editorial shot, still or clip, with the capability to identify single frames.

A.4 Research

A.4.1 Context

The process of making programs is a creative one, reliant on the spawning of ideas, conceptual thought and human creativity. Any editing is a late stage in this process and play-out is irrelevant to it.

The key to the early formative stages in the process of realizing a completed program from the initial idea is the undertaking of detailed research, usually by a small team of research staff dedicated to the individual program. An organization's archive is its most important asset in finding already validated authoritative background material, in avoiding unnecessary and expensive duplication of work already done in both production based and technology based skill areas, and in minimizing payment of rights and royalties to third parties.

Because sources are currently diverse and researching an anarchic process, much of the current researcher's art is based on tacit knowledge gained from experience of the methodologies most likely to yield the best results. Contacts lists, information sources, and useful media are, as a result, jealously guarded even within one organization.

Significant added value can be realized from archived material if the data held about it can be readily and unambiguously accessed so that footage can be repurposed for new programs, previously validated research work accessed and information about previous or potential research sources readily found.

A.4.2 UMID Usage

A.4.2.1 The UMID will be used as a key to metadata stored on distributed databases across an organization, much of which will not be wrapped or embedded with the material — researcher's notes and scripts for instance — but which needs to remain associated with it if the full value of the archive is to be realized.

A.4.2.2 The use of the UMID will be bidirectional; it will be used both to recover all the metadata and material of a clip given the UMID and to determine the UMID of a potentially useful clip as a result of having searched many databases on other metadata parameters.

A.4.2.3 The UMID audit trail must always lead back to the clip in its earliest extant, unchanged form. Frequently, the original source material or the metadata associated with it (e.g., intellectual rights) will be required if any portion of the video shot/audio clip is to be repurposed for use in a new program.

A.4.2.4 The UMID must be robust. It must not be affected in any way by other processes subsequently performed on the clip for any purpose whatsoever.

Annex B Explanation of Logically, Functionally and Bitwise Identical Clones (Informative)

It is possible to produce a functionally perfect copy of a file within the digital domain without the copy necessarily being digitally identical to the original. This happens when the copying is done in such a way that the process is totally transparent and copies are, in functional terms, lossless digital copies while at the same time not bit-for-bit perfect copies. Examples of this are when a digital copy is made but the partition sizes of the original and copy are not the same; where padding bits are inserted as a consequence of alignment grid differences; where disk storage parameters are different from the original file parameters or where parameters change as data is streamed to or from a storage device.

In all the above cases the essence copy is logically identical to the original: i.e., it is a functional and logical copy. An extreme example of a logically identical copy might be considered to be where original material has been losslessly compressed or even “zipped” to produce the copy, although in these cases consideration will have to be given to how the material is recovered to base-band or useable form.

If the copy is identical to the original at the bit-level – that is, it is bit for bit identical with the original — it is a bit-wise copy (a *clone*) and is, at the same time, logically and functionally identical to the original.

It is a logical extension of this principle to use the UMID as a level of indirection in linking to material — for example, as an intermediate referencing or linking agent between “virtual material”, such as can be produced when rendering a set of playout instructions to derive a desired output, and the “real material” from which the output is derived.

Annex C Frequently Asked Questions (Informative)

Q 1: What do the Basic and Extended UMID identify, i.e., what is the scope of each identifier?

The Basic UMID identifies a single contiguous section of audio-visual material, *e.g.*, a video "clip" of any duration, while the Extended UMID identifies each material unit in the audio-visual material, *e.g.*, an audio AES3 block or a video frame. This is schematically illustrated in Figure C.1:

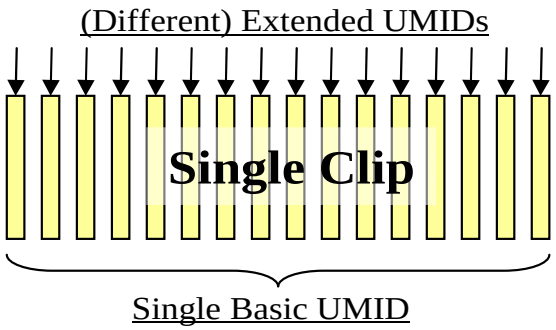

Figure C.1 – Material to be identified by UMID

Q 2: When to update the Basic UMID?

The Basic UMID needs to be updated at every operational step to distinguish all materials (including clones and copies) generated through the production chain. Specifically, as shown in Figure 2.C, it is the responsibility of each device to transfer audio-visual material with the updated UMID to the subsequent device.

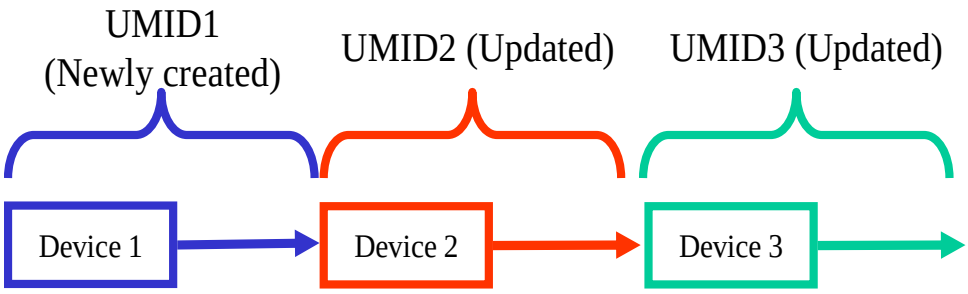

Figure C.2 – When to update a UMID

In each case of recording, the recording device would update the UMID of a material *before* recording; *i.e.*, it is a material with the updated UMID which is to be stored on media, and it is transferred *as is* when played. Based on this UMID operation, UMID collisions can be avoided even when material is transferred and recorded simultaneously by more than one device.

Q 3: Is the UMID only applicable to new material created by a "UMID ready" capturing device?

No. Any legacy materials without a UMID can be introduced into the "UMID world" when it is processed with a "UMID ready" devices. As discussed in Q.2 above the UMID needs to be updated before material is recorded and therefore material without a UMID will be assigned a newly created UMID before it is recorded. The source pack can be also created and attached at the same time (when applying the Extended UMID) though it would contain information describing the initial introduction of the material to the UMID world rather than when/where/who information about the originally created material.

Q 4: What is an overview of UMID behaviour in the production chain?

Figure C.3 schematically illustrates the UMID behaviour in the production chain.

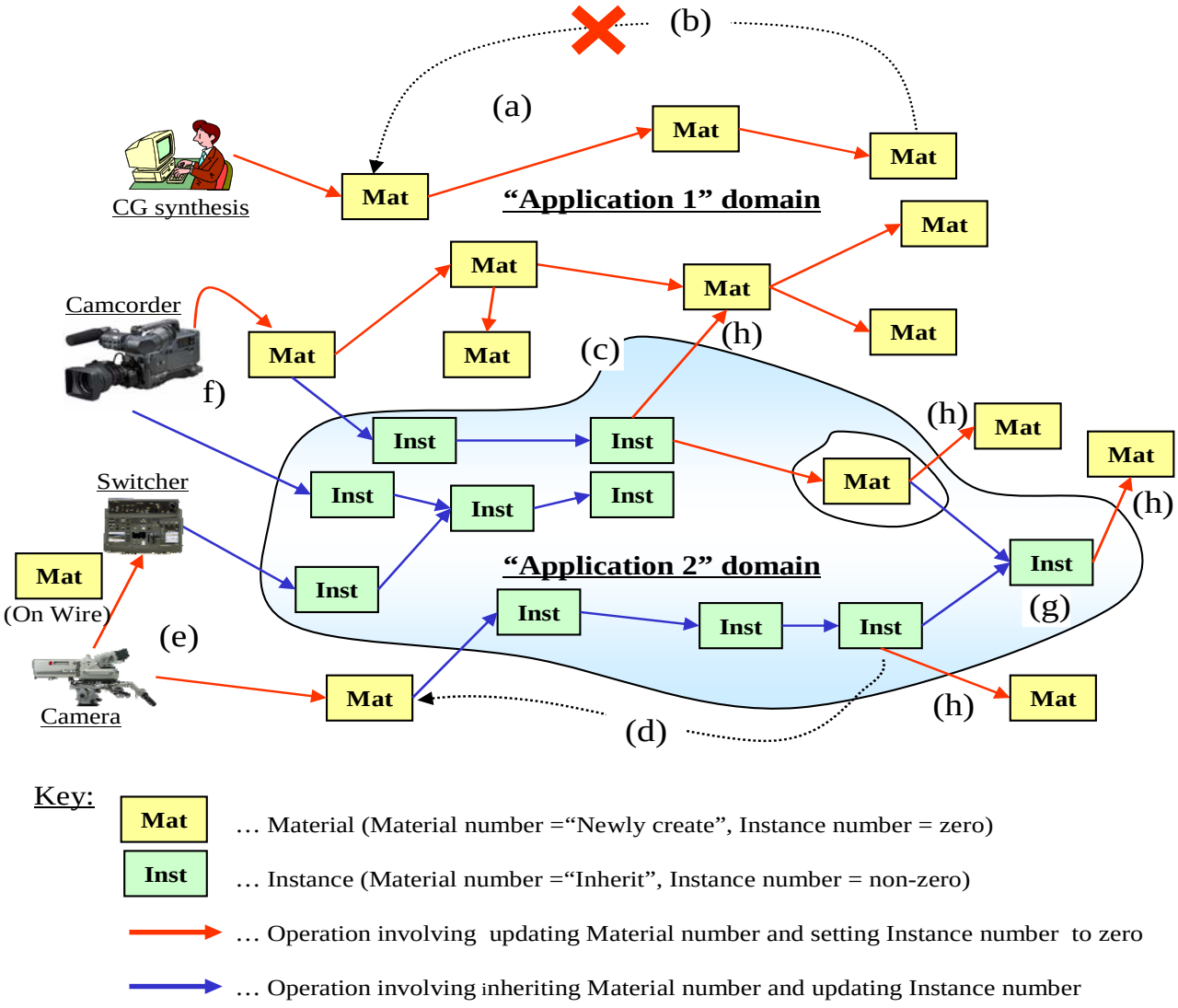

Figure C.3 – UMID operation in the production chain

In the figure, the yellow box with “Mat” represents an item of material with a UMID having a newly created Material Number while the green box with “Inst” represents the case of an inherited Material Number.

Two application domains are shown — Application 1 with unmanaged UMIDs, Application 2 having the capability of tightly managing the allocation of UMID Instance numbers.

The red and blue arrows in the figure indicate operations causing UMID updates for Application 1 and Application 2, respectively.

The labels inserted in Figure C.3 indicate as follows:

(a) Application 1 is applicable anywhere, including within the Application 2 domain (See (c) below), because it guarantees all the UMIDs in the domain to be globally unique. (This is because a zero Instance Number is only allocated for a newly created Material Number and therefore cannot be duplicated).

(b) No link to a source material is established in Application 1 and if it is required it must be provided by some external method.

(c) Application 2 is applicable to certain closed domains in which the UMID Instance numbering is appropriately managed and the Instance numbers are known to be unique for a given Material number.

(d) A link to a source material is always established for the Instances in Application 2.

(e) Material newly created within a device such as a camera and not yet instantiated (i.e. it exists only “on the wire”) will always have a zero Instance number. However, when it is recorded, the resulting UMID can be created by either of the two application methods.

(f) It follows from (e) that the UMID updating methodology used for material recorded within a camcorder is application dependant. However, in most cases defaulting to creating a new Material number with a zero Instance number will maintain system consistency,

(g) In Application 2, material synthesized from more than one source material can inherit the Material number of only one of the source materials and the decision as to which will be application dependent — perhaps, for example, according to relative data size, etc.

(h) Any UMID created as a result of material leaving the Application 2 closed domain must have a zero Instance number and a newly created Material number in order to guarantee its global uniqueness once out of the managed, closed, domain.

Q 5: What happens to UMID in the Live or “on the wire” environment?

In all the above examples, a UMID is created whenever material is instantiated in a persistent form (i.e., recorded) and this is its intended primary area of application. In this application, a new UMID ***must*** be created whenever material is instantiated.

A second application area is where material has never been persisted (such as a live feed) or it is not known if material has been persisted (such as material from an unknown source). In this application a new UMID ***can*** be created whenever material changes its form of electronic or electromagnetic “commitment” — for example at a sensor, graphics device, replay head or mix-effects device:

Sensor: A material’s form prior to a sensor can be light or acoustic energy and the output of the sensor can be an electronic analogue or digital representation of that original material. A new UMID can be created for this electronic representation and embedded into it. Note that it would be perfectly valid operationally for such a signal to pass directly through a transmission chain from sensor to consumer without ever being recorded and although any UMID created for it would never exist in persisted form, references to it can be contained in associated databases.

Graphics device: A graphics device used to generate original material is clearly not a sensor in the same way as a camera or microphone, but because it is the device in which new material is first committed to electronic form, its output can be treated in the same way as the output from a sensor as above.

Replay Head: At a recording head, material is clearly committed to magnetic, optical or other storage and the creation of a UMID is mandatory at this point although in practice the UMID will be created at the associated electronic circuitry driving the head itself. It might be considered valid to additionally create a new UMID also when the material is retrieved through a replay head, but in practice this is unlikely to have any benefit and will introduce unnecessary complication, particularly with regard to audit trails.

Mix effects device: A mix effects device can operate in two ways and the creation of UMIDs will depend upon the application.

If the application is that of providing routing from source to output and the only time new material is actually created is during a transition between sources, then only that transition will generate new material (and require a new UMID to be created, though this can in practice inherit the material number part from a particular source). When material is being routed straight through, the incoming UMIDs can be passed without change. Such an application might be in a transmission playout area.

If the application is to create new program material, as in the case of a studio or edit mixing desk, then the mix/effects device will be the device in which the program resulting is first committed to electronic form and the output stream of the mixing desk will have a new UMID created for the duration of that output.

Annex D Bibliography (Informative)

SMPTE RP 210, Metadata Dictionary Registry of Metadata Element Descriptions

ISO 2108:2005, Information and Documentation — International Standard Book Number (ISBN)

ISO 15706:2002, Information and Documentation — International Standard Audio-Visual Number (ISAN)