SMPTE 408M-2006

SMPTE STANDARD

for Television — Material Exchange Format (MXF) — Operational Patterns 1c, 2c and 3c

Table of contents

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.

This SMPTE document was prepared by the Technology Committee W25 on Metadata and Wrappers.

1 Scope

This standard defines operational patterns 1c, 2c and 3c, as defined in SMPTE 377M section 7, for the exchange of MXF files that represent the following levels of file complexity:

OP1c: A choice of 2 or more alternate material packages that play out selected tracks of either a single file package or two or more synchronized file packages,

OP2c: A choice of 2 or more alternate material packages that play out selected tracks of either a sequence of single file packages, or a sequence of two or more synchronized file packages,

OP3c: A choice of 2 or more alternate material packages that play out selected portions of tracks (edit list) from one or more file packages each of which may be referenced and synchronized at any given position along the timeline.

Approved
April 5, 2006

In each case, a top-level file package is linked to an essence container where each essence container may comprise either a single essence element or an interleave of multiple essence elements. Furthermore, in each case, one or more of the essence containers may be internal or external to the file.

This standard defines the operating restrictions, structural metadata objects and individual attributes that shall be applied to the MXF file format specification to achieve interoperability when exchanging an MXF file with these operational patterns.

These operational patterns require the use of body partitions for internal essence containers. Subdivision of each essence container by using body partitions is optional.

2 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.

SMPTE 377M-2004, Television — Material Exchange Format (MXF) — File Format Specification

SMPTE 378M-2004, Television — Material Exchange Format (MXF) — Operational Pattern 1a (Single Item, Single Package)

SMPTE 391M-2004, Television — Material Exchange Format (MXF) — Operational Pattern 1b (Single Item, Ganged Packages)

SMPTE 392M-2004, Television — Material Exchange Format (MXF) — Operational Pattern 2a (Play-List Items, Single Package)

SMPTE 393M-2004, Television — Material Exchange Format (MXF) — Operational Pattern 2b (Play-List Items, Ganged Packages)

SMPTE 407M-2009, Television — Material Exchange Format (MXF) — Operational Patterns 3a and 3b

3 Glossary of acronyms, terms and data types

The full glossary of acronyms, terms and data types used in the MXF specification is given in the MXF file format specification. It is not repeated here to avoid any divergence of meaning.

Essence element: An essence container may contain many essence elements interleaved together. An essence element in this standard corresponds to a separable part of the interleave which is described by an MXF track, such as a picture track, a sound track, or a data track.

4 Introduction

This standard defines MXF operational patterns 1c, 2c and 3c. SMPTE 377M defines the properties of the generalized operational patterns, and SMPTE EG 41 describes the concepts of operational patterns and the general conditions for audio-visual material exchange and interoperability. The introductory sections of these documents are not repeated here.

4.1 Operational pattern overview

Generalized MXF operational patterns are defined as a combination of the two dimensions as defined in the MXF file format specification.

These two dimensions are broadly illustrated in informative figure 1.

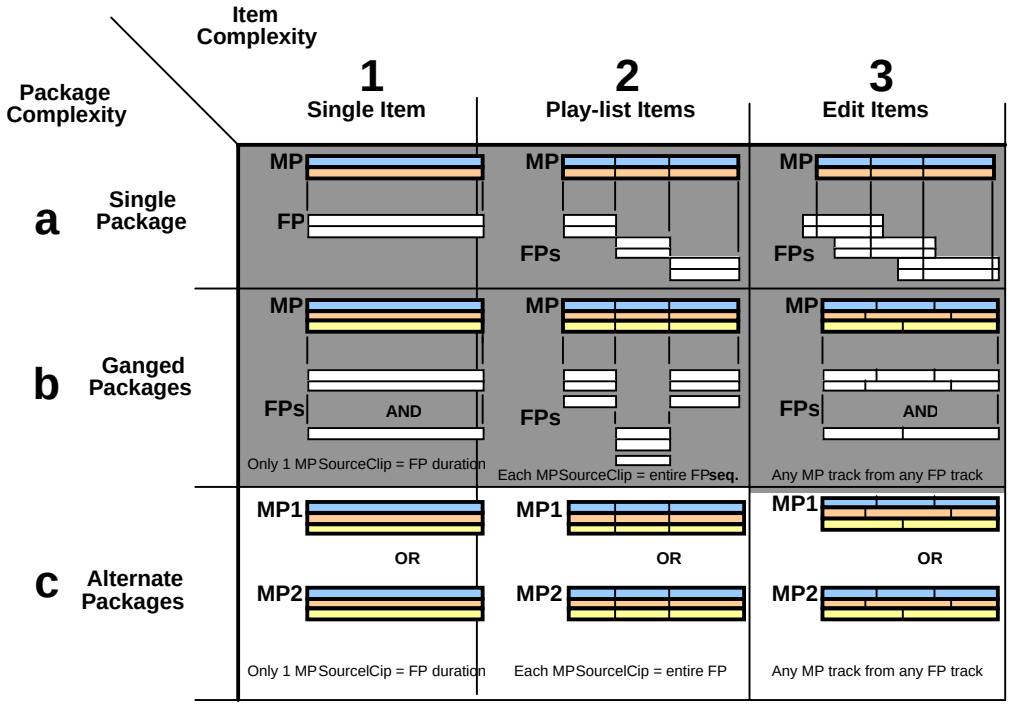

Figure 1 (informative) – Item and package complexity

This standard defines three generalized operational patterns as follows:

OP1c: A choice of 2 or more alternate material packages that play out selected tracks of either a single file package or two or more synchronized file packages.

This is illustrated in the leftmost column and bottom row.

The detailed specifications of operational pattern 1c are given in normative annex A.

OP2c: A choice of 2 or more alternate material packages that play out selected tracks of either a sequence of single file packages, or a sequence of two or more synchronized file packages.

This is illustrated in the center column and bottom row.

The detailed specifications of operational pattern 2c are given in normative annex B.

OP3c: A choice of 2 or more alternate material packages that play out selected portions of tracks (edit list) from one or more file packages each of which may be referenced and synchronized at any given position along the timeline.

This is illustrated in the rightmost column and bottom row.

The detailed specifications of operational pattern 3c are given in normative annex C.

None of these operational patterns apply constraints on the placement or use of descriptive metadata. general guidance on the use of descriptive metadata is given in SMPTE EG 42, SMPTE EG 41, and in SMPTE 380M. Implementers are encouraged to ensure descriptive metadata SourceClip references and descriptive metadata segments are kept consistent when essence references to file packages are modified.

Annex A (normative)
Specification of operational pattern 1c

A.1 MXF application

A.1.1 Material and top-level file package relationships

Other operational pattern specifications (e.g., SMPTE 378M, SMPTE 391M, SMPTE 392M, and SMPTE 393M) illustrate the relationship between the top-level file packages and lower-level source packages (as file or physical packages). This relationship is not repeated in figure A.1

.

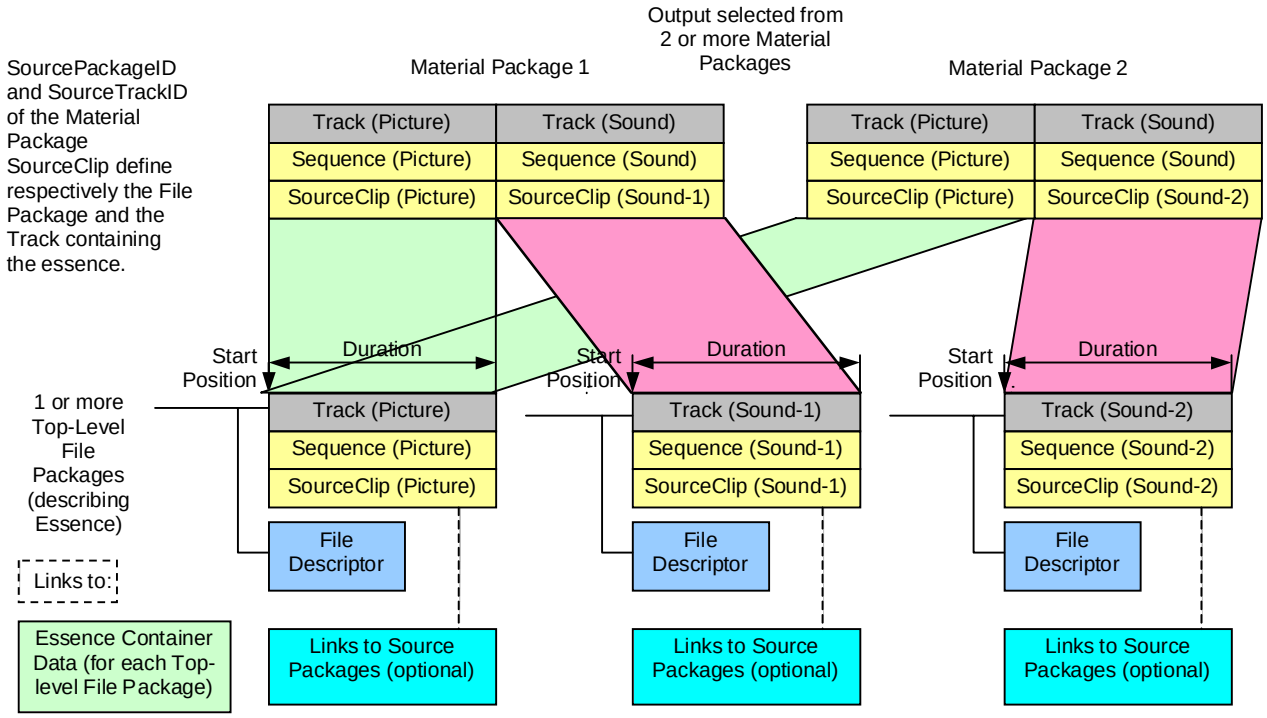

Figure A.1 (informative) – Outline of operational pattern 1c

A.1.2 General description

Operational pattern 1c is an extension of operational patterns 1a and 1b where the output comprises a choice of two or more synchronized playable essence containers containing the audio-visual items.

Operational pattern 1c is intended to meet the requirements of multi-lingual or multi-resolution applications where the alternate audio-visual sources are contained in two or more essence containers.

In order to support this operational pattern, devices may require random access to the contents of the essence containers.

One or more essence containers may be external to the MXF file. Guidance on the use of external essence containers is given in SMPTE EG 41. For MXF files used for program exchange, the essence containers should be internal to the file. The nature of this operational pattern allows the playout of the file to be changed by selecting the desired material package from a choice of multiple material packages.

A.1.2.1 Essence container requirements

1. The essence containers shall contain either a single essence element or an interleave of essence elements with a duration that equals the duration of the material package tracks.

2. Any track of a material package shall only create references to file package tracks of the same type.

3. All essence containers shall provide for the continuous decoding of contiguous essence elements.

A.1.2.2 Example uses (informative)

This operational pattern allows the file playout to be versioned, typically providing for a choice of language track playout.

Other uses might include a choice of picture options where the file might contain pictures of different resolutions or different aspect ratios.

A.2 Operational pattern constraints

A list of general constraints for this operational pattern is given in table A.1.

Table A.1 – General constraints for operational pattern 1c

File Kind	MXF
"Operational Pattern"	1c: (Choice of output selected from one or more Essence Containers).
Role	Versioning of the file playout.
Essence	One or more Essence Containers, Operational Pattern Qualifiers apply (see Table A.2).
Material Packages	>1
Number of Material Package SourceClips for each Essence Track	1
Top-level File Packages	1 or more. Zero or more Top-level File Packages may be external to the file.
Number of Essence Container Types	1 or more
Lower-level Source Packages	0 or more. Essence described by Lower-level File Packages must be external to the file.
Partition limits	None
Body Partitions	Required when >1 Top-level File Packages. Note: when there are >1 Top-level File Packages, it is recommended that each Top-level File Package is contained in at least one Body Partition.
Index Tables	Optional, but recommended.
Editing Support	None.
Streaming Support	Conditional according to section A.3.4.2.

A.3 Header metadata specification

A.3.1 General

The structural metadata sets and the normative universal label used to identify this operational pattern are defined in SMPTE 377M with specific constraints and additions detailed below.

A.3.2 Constraints on the MXF packages

1. All constraints in SMPTE 391M section 6.2 apply unless overridden here.
2. There shall be two or more material packages.
3. All references to material package in SMPTE 391M section 6.2 apply to each material package.

A.3.3 Universal label for operational pattern 1c

The universal label value to define this operational pattern shall be as defined in table A.2.

Table A.2 – Value of the MXF operational pattern identification universal label

Byte No.	Description	Value (hex)
1-12	Defined in the MXF File Format Specification Operational Patterns Section	—
13	Operational Pattern: Item Complexity	01h
14	Operational Pattern: Package Complexity	03h
15	Operational Pattern: Qualifiers (application dependent)	(see SMPTE 377M)
16	Reserved for future use	00h

The meanings of the bytes in this label are specified in the operational pattern section of SMPTE 377M. Bytes 13 and 14 uniquely identify this operational pattern specification and byte 15 contains generic qualifiers which are defined in the MXF file format specification.

A.3.4 Operational pattern qualifiers (Byte 15)

This operational pattern shall support the qualifiers as specified in byte 15 of the operational pattern universal label. Each bit of byte 15 shall be correctly set, as defined by SMPTE 377M, to reflect the status of the essence containers.

A.3.4.1 Essence container location (Byte 15, bit 1)

This section shall comply with SMPTE 378M section 6.4.1 and SMPTE 391M section 6.4.1.

A.3.4.2 Interleaving of multiple essence tracks (Byte 15, bit 2)

This section shall comply with SMPTE 378M section 6.4.2 and SMPTE 391M section 6.4.2.

A.3.4.3 Number of essence tracks (Byte 15, bit 3)

This section shall comply with SMPTE 378M section 6.4.3 and SMPTE 391M section 6.4.3.

A.3.5 Minimum implementation (informative)

All constraints given in the MXF file format specification apply unless specifically overridden or extended in this standard.

The minimum implementation of operational pattern 1c is recommended to have the following sets in reference to the MXF file format specification. This section is a recommendation because the exact number of sets depends on the number of material packages and top-level file packages and the number of tracks in each package.

1 preface set, 1 or more identification sets, 1 content storage set, and 2 or more essence container data sets.

Two or more material packages each including sets for:

- the time code track
- each picture track as required by the essence container
- each sound track as required by the essence container
- each data track as required by the essence container.

One or more top-level file packages each including sets for:

- each picture track as required by the essence container
- each sound track as required by the essence container
- each data track as required by the essence container
- each essence descriptor required to describe each essence track.

The annexes of the MXF format specification give the properties of the sets which should be implemented. All required set properties should be supported by MXF encoders that comply with this operational pattern.

A.4 MXF file interchange: Essence container issues

A.4.1 Essence container identification

Refer to SMPTE 391M, section 7.1.

A.4.2 Essence container requirements in operational pattern 1c

A.4.2.1 Number of essence elements

There are no constraints on the number of essence elements in an individual essence container.

A.4.2.2 Interleaving of essence elements

For operational pattern 1c, when supporting streaming capability for essence containers containing more than one essence element, the essence elements should be interleaved over a limited duration (typically 1 frame). Each essence element is encoded using KLV coding according to the rules in the essence container specification.

A.4.2.3 Continuity of essence elements

Each essence container shall provide for the continuous decoding of contiguous essence elements. The essence container or essence element specifications may add extra restrictions to this condition.

The essence container specification contains essence descriptor sets which define the source coding and any compression coding. Each essence descriptor property value which could otherwise prevent continuous decoding shall be constant for the duration of any material package track.

Examples of compression coding parameters which should remain continuous include any compression coding format (i.e., no switching of the compression type in mid-stream), and picture sampling parameters.

A.4.2.4 Number of essence tracks

Each picture, sound and data essence track in each top-level file package shall be linked to a picture, sound or data essence element in an essence container.

A.4.2.5 Use of body partitions

This operation pattern requires the use of at least one file partition for each internal essence container. If there are N internal essence containers, there will be at least N-1 body partitions within this file.

Annex B (normative)
Specification of operational pattern 2c

B.1 MXF application

B.1.1 Material and top-level file package relationships

Other operational pattern specifications (e.g., SMPTE 378M, SMPTE 391M, SMPTE 392M, and SMPTE 393M) illustrate the relationship between the top-level file packages and lower-level source packages (as file or physical packages). This relationship is not repeated figure B.1.

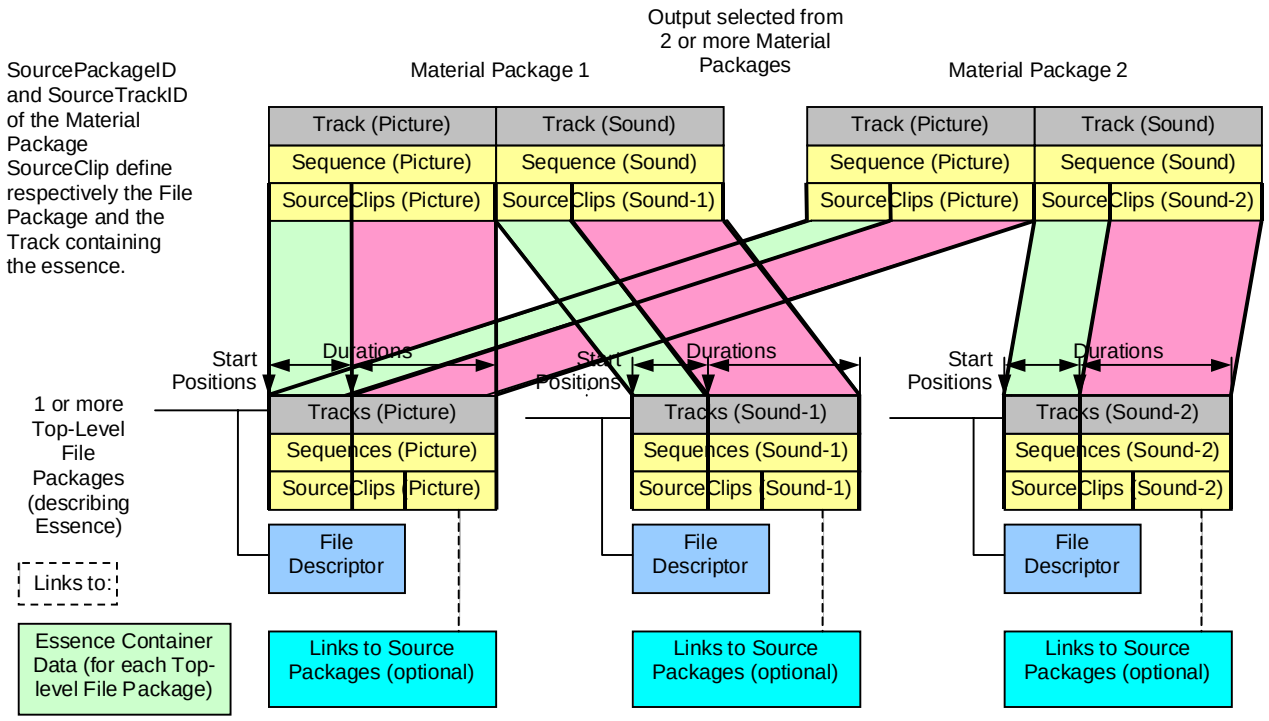

Figure B.1 (informative) – Outline of operational pattern 2c

B.1.2 General description

Operational pattern 2c is an extension of operational patterns 2a and 2b where the chosen material package selects a contiguous sequence of multiple synchronized essence containers containing the audio-visual items. The synchronized essence containers may contain a play-list of shots, a single clip or a single item of program material. The essence containers shall provide for the continuous decoding of contiguous essence elements.

In general, operational pattern 2c needs to be supported by devices that provide non-linear access to the audio-visual content of the essence containers. Where the essence containers contain interleaved essence elements and/or multiplexed essence containers and the choice of material package is selecting appropriate tracks from the interleaved or multiplexed essence container, linear access may be possible.

B.1.2.1 Example uses (informative)

This operational pattern provides for a choice of output audio-visual content that includes choices of sound language and choices of picture resolution or aspect ratio.

B.2 Operational pattern constraints

A list of general constraints for this operational pattern is given in table B.1

Table B.1 – General constraints for operational pattern 2c

File Kind	MXF
"Operational Pattern"	2c: (Choice of a play-list of items with one or more synchronized Essence Containers)
Role	Provision of files that can be played out with different audio-visual tracks to support multi-lingual and multi-resolution requirements.
Essence	Two or more Essence Containers, Operational Pattern Qualifiers apply (see Table B.2)
Material Packages	>1
Number of Material Package SourceClips for each Essence Track	>1
Top-level File Packages	>=2 (up to number of Material Package SourceClips times the number of Material Package Tracks). Zero or more Top-level File Packages may be external to the file.
Number of Essence Container Types	1 or more
Lower-level Source Packages	0 or more. Essence described by Lower-level File Packages must be external to the file.
Partition limits	None.
Body Partitions	Required. Note: It is recommended that each Top-level File Package is contained in at least one Body Partition.
Index Tables	Optional, but recommended.
Editing Support	Choice of play-list outputs.
Streaming Support	Streaming support is possible with this Operational Pattern only by using interleaved Essence Containers and/or multiplexed Essence Containers where the interleave and multiplex durations are appropriately short. An indication of streaming support is defined in section B.3.4.2.

NOTES

1. The "Number of Material Package SourceClips" in table B.1 refers only to essence tracks. Operational patterns are intended to constrain the essence handling of an MXF application, so in the case where the essence is continuous and only the metadata in a file has multiple SourceClips, it is likely that the file is an operational pattern lower than 2c.

2. "1 or more" essence container types is also subject to the continuity of essence condition in section B.4.2.3 for each and every track. When using the MXF essence container, it is possible that there will be several different essence container labels being signaled in a file (e.g. one for audio and one for video).

B.3 Header metadata specification

B.3.1 General

The structural metadata sets and the normative universal label used to identify this operational pattern are defined in SMPTE 377M with specific constraints and additions detailed below.

B.3.2 Constraints on the MXF packages

1. All constraints in SMPTE 393M section 6.2 apply unless overridden here.
2. There shall be two or more material packages.
3. All references to material package in SMPTE 393M section 6.2 apply to each material package.

B.3.3 Universal label for operational pattern 2c

The universal label value to define this operational pattern shall be as defined in table B.2.

Table B.2 – Value of the MXF operational pattern identification universal label

Byte No.	Description	Value (hex)
1-12	Defined in the MXF File Format Specification Operational Patterns Section	—
13	Operational Pattern: Item Complexity	02h
14	Operational Pattern: Package Complexity	03h
15	Operational Pattern: Qualifiers (application dependent)	(see SMPTE 377M)
16	Operational Pattern: OP2c qualifiers	(see SMPTE 393M, table 3)

The meanings of the bytes in this label are specified in the operational pattern section of SMPTE 377M. Bytes 13 and 14 uniquely identify this operational pattern specification and byte 15 contains generic qualifiers which are defined in the MXF file format specification. Byte 16 contains qualifier bits which are defined in SMPTE 393M, table 3.

B.3.4 Operational pattern qualifiers (Bytes 15 & 16)

This operational pattern shall support the qualifiers as specified in byte 15 of the operational pattern universal label. Each bit of byte 15 shall be correctly set, as defined by SMPTE 377M, to reflect the status of the essence container.

B.3.4.1 Essence container location (Byte 15, bit 1)

Refer to SMPTE 393M section 6.4.1 for details.

B.3.4.2 Interleaving of multiple essence tracks (Byte 15, bit 2)

Refer to SMPTE 393M section 6.4.2 for details.

B.3.4.3 Number of essence tracks (Byte 15, bit 3)

Refer to SMPTE 393M section 6.4.3 for details.

B.3.4.4 Qualifiers specific to this operational pattern (Byte 16)

Refer to SMPTE 393M section 6.4.4 for details.

Note that these bits provide additional qualification of the matching bit of the generic qualifiers contained in byte 15. The generic qualifiers shall be used if they apply, and the specific qualifier may be used in any combination with the generic qualifiers.

B.3.5 Minimum implementation (informative)

All constraints given in the MXF file format specification apply unless specifically overridden or extended in this standard.

The minimum implementation of operational pattern 2c is recommended to have the following sets in reference to the MXF file format specification. This section is a recommendation because the exact number of sets depends on the number of top-level file packages and the number of tracks in each top-level file package.

1 preface set, 1 or more identification sets, 1 content storage set, and 4 or more essence container data sets.

Two or more material packages including sets for:

- the time code track
- each picture track as required by the essence container
- each sound track as required by the essence container
- each data track as required by the essence container.

Two or more top-level file packages each including sets for:

- each picture track as required by the essence container
- each sound track as required by the essence container
- each data track as required by the essence container
- each essence descriptor required to describe each essence track.

The annexes of the MXF format specification give the properties of the sets which should be implemented. All required set properties should be supported by MXF encoders that comply with this operational pattern.

B.4 MXF file interchange: Essence container issues

B.4.1 Essence container identification

The value of the essence container universal label is be defined by the appropriate essence container specification document. This value shall be recorded in the essence containers property of the preface set and all partition packs and in the essence container property of the appropriate essence descriptor set.

B.4.2 Essence container requirements in operational pattern 2c

Refer to SMPTE 393M section 7.2 for details.

B.4.2.1 Number of essence elements

Refer to SMPTE 393M section 7.2.1 for details.

B.4.2.2 Interleaving of essence elements

Refer to SMPTE 393M section 7.2.2 for details. Note that where the text in SMPTE 393M mentions “operational pattern 2b” it refers to “operational pattern 2c” in this document.

B.4.2.3 Continuity of essence elements

Refer to SMPTE 393M section 7.2.3 for details. Note that where the text in SMPTE 393M mentions “operational pattern 2b” it refers to “operational pattern 2c” in this document.

B.4.2.4 Number of essence tracks

Refer to SMPTE 393M section 7.2.4 for details.

B.4.2.5 Use of body partitions

Refer to SMPTE 393M section 7.2.5 for details.

Annex C (normative)
Specification of operational pattern 3c

C.1 MXF application

C.1.1 Material and top-level file package relationships

Other operational pattern specifications (e.g., SMPTE 378M, SMPTE 391M, SMPTE 392M, and SMPTE 393M) illustrate the relationship between the top-level file packages and lower-level source packages (as file or physical packages). This relationship is not repeated in the figure below.

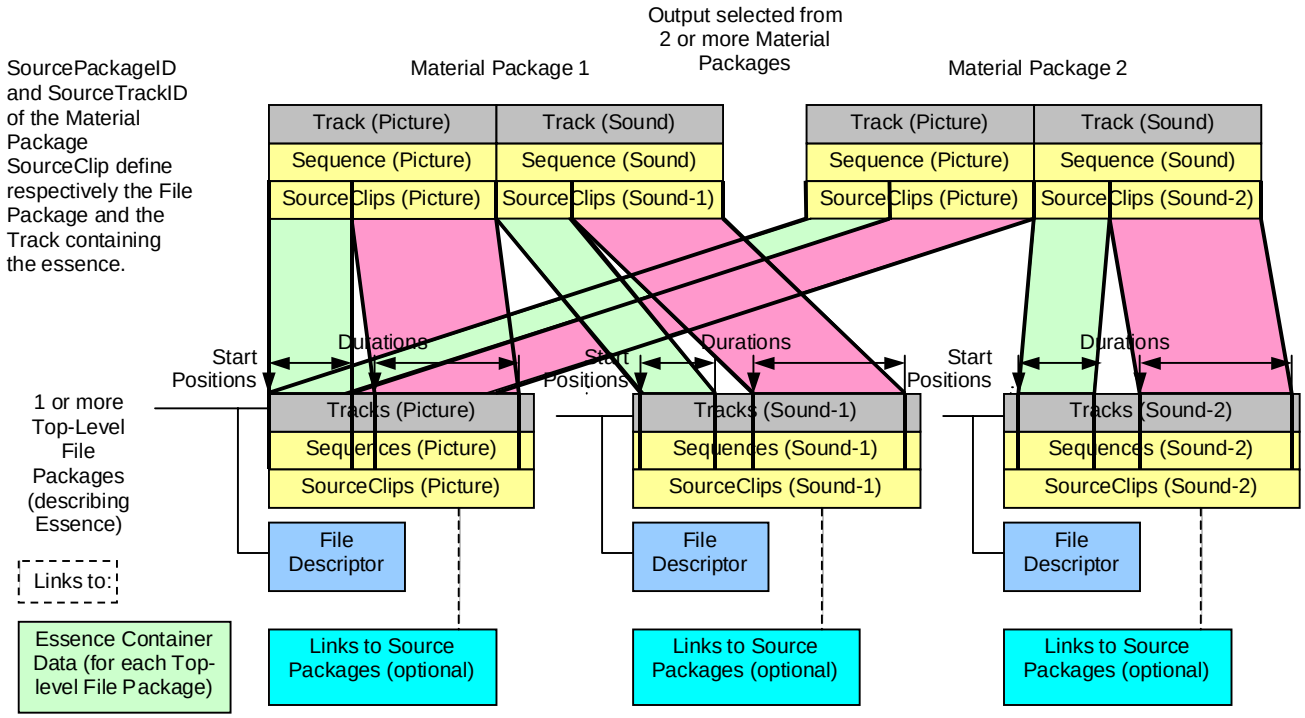

Figure C.1 (informative) – Outline of operational pattern 3c

C.1.2 General description

Operational pattern 3c is an extension of operational patterns 3b where the output comprises a choice of non-linear edit lists (a non-contiguous sequence) each of synchronized essence containers containing the audio-visual items. The synchronized essence containers provide for the carriage of multiple essence types that are designed to be accessed along the same timeline for synchronized playout. Unlike OP2c, the start points and durations of the synchronized essence containers do not have to be identical.

Operational pattern 3c is intended to meet the requirements of non-linear editing applications where there is a choice of playout options where each playout is sourced from one or more synchronized essence containers in multiple files.

In order to support this operational pattern, devices will require random access to the contents of the essence containers.

C.1.2.1 Example uses (informative)

This operational pattern allows a selection of alternate playouts each from an edit list. By its nature, this operational pattern generally requires the use of non-linear storage devices so that the playout of the selected material package tracks appears to be continuous. In this operational pattern, it is most likely that each essence container will contain only a

single essence track although multiple essence tracks are permitted. An analogy would be a choice from several EDLs that each access a video recorder and an audio recorder as separate physical devices.

As with operational patterns 3a and 3b (SMPTE 407M), this operational pattern can be used to provide a time-lined output of a single picture (so that the single picture appears for a defined duration) and to provide 'stuttering', 'flashback' and other picture and/or sound repeat effects.

C.2 Operational pattern constraints

A list of general constraints for this operational pattern is given in table C.1

Table C.1 – General constraints for operational pattern 3c

File Kind	MXF
"Operational Pattern"	3c: (Choice of edit-lists of items with one or more synchronized Essence Containers)
Role	Interchange of multiple edit lists using workgroup shared Essence Containers with synchronized audio visual content and exchange of multiple versions of files.
Essence	Four or more Essence Containers, Operational Pattern Qualifiers apply (see Table C.2)
Material Packages	>1
Number of Material Package SourceClips for each Essence Track	>1
Top-level File Packages	>=1 (up to number of Material Package SourceClips times the number of Material Package Tracks). Zero or more Top-level File Packages may be external to the file.
Number of Essence Container Types	1 or more
Lower-level Source Packages	0 or more. Essence described by Lower-level File Packages must be external to the file.
Partition limits	None.
Body Partitions	Required. Note: It is recommended that each Top-level File Package is contained in at least one Body Partition.
Index Tables	Optional, but recommended.
Editing Support	Choice of multiple edit lists.
Streaming Support	This Operational Pattern does not provide for streaming support.

NOTES

1. The "Number of Material Package SourceClips" in table C.1 refers only to essence tracks. Operational patterns are intended to constrain the essence handling of an MXF application, so in the case where the essence is continuous and only the metadata in a file has multiple SourceClips, it is likely that the file is an operational pattern lower than 3c.

2. "1 or more" essence container types is also subject to the continuity of essence condition in section B.4.2.3 for each and every track. When using the MXF essence container, it is possible that there will be several different essence container labels being signaled in a file (e.g. one for audio and one for video).

C.3 Header metadata specification

C.3.1 General

The structural metadata sets and the normative universal label used to identify this operational pattern are defined in SMPTE 377M with specific constraints and additions detailed below.

C.3.2 Constraints on the MXF packages

1. All constraints in SMPTE 407M section B.3.2 apply unless overridden here.
2. There shall be two or more material packages.
3. All references to material package in SMPTE 407M section B.3.2 apply to each material package.

C.3.3 Universal label for operational pattern 3c

The universal label value to define this operational pattern shall be as defined in table C.2.

Table C.2 – Value of the MXF operational pattern identification universal label

Byte No.	Description	Value (hex)
1-12	Defined in the MXF File Format Specification Operational Patterns Section	—
13	Operational Pattern: Item Complexity	03h
14	Operational Pattern: Package Complexity	03h
15	Operational Pattern: Qualifiers (application dependent)	(see SMPTE 377M)
16	Operational Pattern: OP3c qualifiers	(see SMPTE 393M, table 3)

The meanings of the bytes in this label are specified in the operational pattern section of SMPTE 377M. Bytes 13 and 14 uniquely identify this operational pattern specification and byte 15 contains generic qualifiers which are defined in the MXF file format specification. Byte 16 contains qualifier bits which are defined in SMPTE 393M, table 3.

C.3.4 Operational pattern qualifiers (Bytes 15 and 16)

This operational pattern shall support the qualifiers as specified in byte 15 of the operational pattern universal label. Each bit of byte 15 shall be correctly set, as defined by SMPTE 377M, to reflect the status of the essence container.

C.3.4.1 Essence container location (Byte 15, bit 1)

Refer to SMPTE 393M section 6.4.1 for details.

C.3.4.2 Interleaving of multiple essence tracks (Byte 15, bit 2)

Refer to SMPTE 393M section 6.4.2 for details.

C.3.4.3 Number of essence tracks (Byte 15, bit 3)

Refer to SMPTE 393M section 6.4.3 for details.

C.3.4.4 Qualifiers specific to this operational pattern (Byte 16)

Refer to SMPTE 393M section 6.4.4 for details.

Note that these bits provide additional qualification of the matching bit of the generic qualifiers contained in byte 15. The generic qualifiers shall be used if they apply, and the specific qualifier may be used in any combination with the generic qualifiers.

C.3.5 Minimum implementation (informative)

All constraints given in the MXF file format specification apply unless specifically overridden or extended in this standard.

The minimum implementation of operational pattern 3c is recommended to have the following sets in reference to the MXF file format specification. This section is a recommendation because the exact number of sets depends on the number of top-level file packages and the number of tracks in each top-level file package.

1 preface set, 1 or more identification sets, 1 content storage set, and 2 or more essence container data sets.

Two or more material packages including sets for:

- the time code track
- each picture track as required by the essence container
- each sound track as required by the essence container
- each data track as required by the essence container.

Two or more top-level file packages each including sets for:

- each picture track as required by the essence container
- each sound track as required by the essence container
- each data track as required by the essence container
- each essence descriptor required to describe each essence track.

The annexes of the MXF format specification give the properties of the sets which should be implemented. All required set properties should be supported by MXF encoders that comply with this operational pattern.

C.4 MXF file interchange: Essence container issues

C.4.1 Essence container identification

The value of the essence container universal label is be defined by the appropriate essence container specification document. This value shall be recorded in the essence containers property of the preface set and all partition packs and in the essence container property of the appropriate essence descriptor set.

C.4.2 Essence container requirements in operational pattern 3c

Refer to SMPTE 393M section 7.2 for details.

C.4.2.1 Number of essence elements

Refer to SMPTE 393M section 7.2.1 for details.

C.4.2.2 Interleaving of essence elements

Refer to SMPTE 393M section 7.2.2 for details. Note that where the text in SMPTE 393M mentions “operational pattern 2b” it refers to “operational pattern 3c” in this document.

C.4.2.3 Continuity of essence elements

Refer to SMPTE 393M section 7.2.3 for details. Note that where the text in SMPTE 393M mentions “operational pattern 2b” it refers to “operational pattern 3c” in this document.

C.4.2.4 Number of essence tracks

Refer to SMPTE 393M section 7.2.4 for details.

C.4.2.5 Use of body partitions

Refer to SMPTE 393M section 7.2.5 for details.

Annex D (informative)
Bibliography

ANSI/SMPTE 298M-1997, Television — Universal Labels for Unique Identification of Digital Data

SMPTE 336M-2001, Television — Data Encoding Protocol Using Key-Length-Value

SMPTE 380M-2004, Television — Material Exchange Format (MXF) — Descriptive Metadata Scheme-1

SMPTE EG 41-2004, Material Exchange Format (MXF) — Engineering Guideline

SMPTE EG 42-2004, Material Exchange Format (MXF) — Descriptive Metadata

SMPTE RP 224, SMPTE Labels Registry