

SMPTE STANDARD

for Television — Material Exchange Format (MXF) — Operational Patterns 3a and 3b



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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.

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

1 Scope

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

OP3a: A material package that plays out an edit list from one or more file packages where only a single file package may be referenced at any given position on any material package timeline.

OP3b: A material package that plays out an edit list from two or more file packages each of which may be referenced and synchronized at any given position along the material package timeline.

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)

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 3a and 3b. 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.

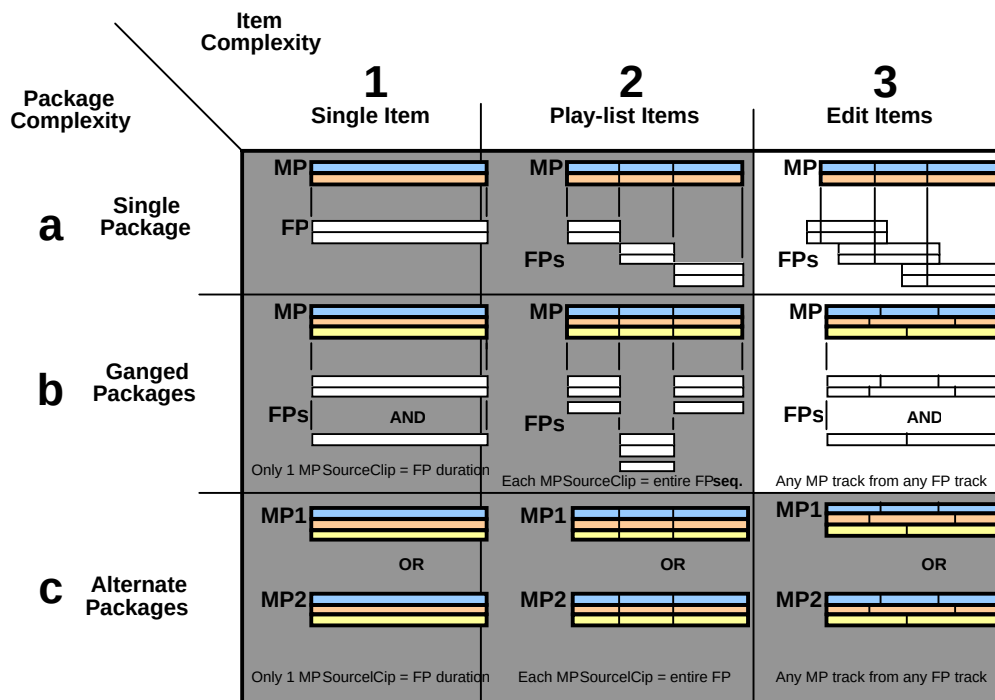


Figure 1 (informative) – Item and package complexity

This standard defines two generalized operational patterns as follows:

OP3a: A material package that plays out an edit list from one or more file packages where only a single file package may be referenced at any given position on any material package timeline.

This is illustrated in an informative manner in the rightmost column and top row.

Note that split editing is possible with this OP even though the figure suggests that all tracks must be aligned.

The detailed specifications of OP 3a are given in normative annex A.

OP3b: A material package that plays out an edit list from two or more file packages each of which may be referenced and synchronized at any given position along the material package timeline.

This is illustrated in an informative manner in the rightmost column and center row.

The detailed specifications of OP 3b are given in normative annex B.

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 3a

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.

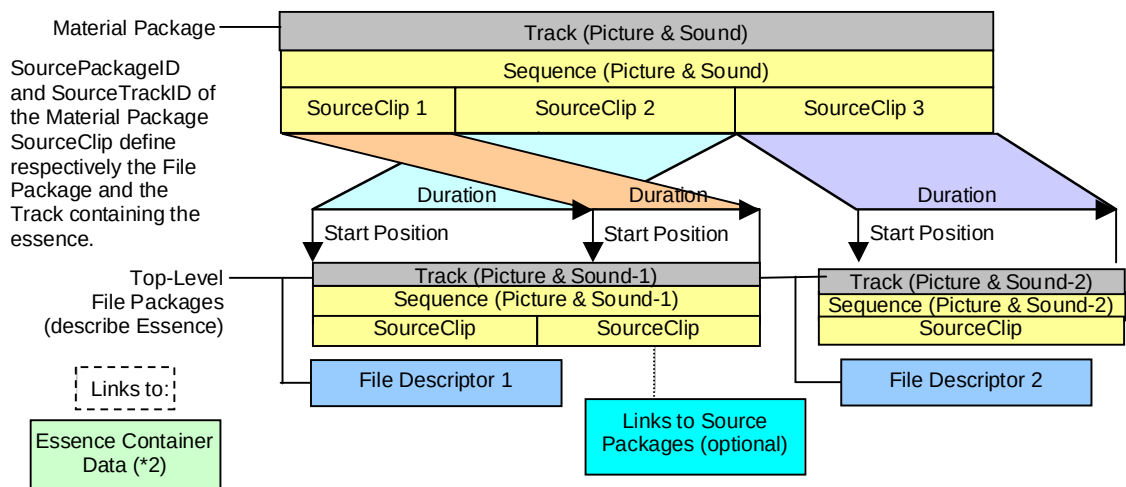


Figure A.1 (informative) – Outline of operational pattern 3a

A.1.2 General description

Operational pattern 3a is an extension of operational patterns 1a and 2a where the output comprises a non-linear edit list (a non-contiguous sequence) of essence containers containing the audio-visual items.

Operational pattern 3a is intended to meet the requirements of non-linear editing applications where the payout is sourced from one or more essence containers in a single file or in multiple files.

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

A.1.2.1 Example uses (informative)

This operational pattern closely resembles the structure of an off-line edit system. However, this operational pattern generally requires the use of non-linear storage devices so that the payout of the material package tracks appears to be continuous.

An application of this operational pattern is 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 repeat effects.

A.2 Operational pattern constraints

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