



## « A new international standard for the delivery of masters IMF (Interoperable Mastering Format): Are you ready? »



Collection: New technologies

Until now, the delivery of masters to distributors within the cinema and audiovisual industries was made using a multitude of supports and formats. The rise of digital cinema pushed the industry towards the need for a single standardised file based master format that would serve this need regardless of final distribution or delivery channel.

The work towards standardisation undertaken by a SMPTE workgroup comprising the 6 major Hollywood studios and experts such as Mesclado, has resulted in the development of IMF, an interoperable file format for the delivery of multimedia content.

**Background:** IMF is about to become the international standard format for file based exchange of cinema and audiovisual content. Every actor within the delivery chain, equipment manufacturers, creators, distributors, broadcasters, etc. will be affected by this change and must prepare in order to best take advantage of the benefits offered by IMF.

**Challenges:** What impact will IMF have on your organisation and your workflow? How will you adapt? What is the structure of an IMF package and how do you use it?

**Solutions:** This study describes and demystifies the new standard, the technical constraints related to each image format and the adaptations necessary for their use. We also explain how to better understand the way that IMF can for example, reduce the technical risks involved in interoperability or how its use can significantly reduce time to market.

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**Available in English and French (other languages upon request)**

Study delivered as a PDF - 34 pages

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### Executive Summary

The migration from tape work to file-based operations has become a reality in the Media Industry. Conscious of the opportunities and the great flexibility that video/IT platforms offer today, the industry actors of the Media world are facing huge challenges to make all these pieces of technology work together. How can we guarantee a feature film master can be seamlessly used by any outside facility, in the same way a 35mm film roll could just be loaded up?

This study presents how the Interoperable Master Format (IMF) was conceived and designed as a format that inherits from what already exists, rather than creating a new whole master format. We give an overview of IMF, and the AMWA AS-02 encapsulation format, the key of IMF interoperability. This application specification makes the best use of the ubiquitous MXF wrapping format.

We then present the architecture of IMF as a two level Core-Application design:

- The Core holds the common elements of an Interoperable Master Package (IMP)

- An Application contains the specific elements necessary to get the media content into the desired distribution chain.

Each application reflects in reality a particular codec. For instance, Application #2 is meant for SD or HD processes, with video stream coded in JPEG-2000. The IMF implementers are then free to define a new application whenever a new content compression technology shows up on the market. This is exactly the key to maintaining IMF durability in the future.

We also give examples of workflows that support IMF, in order to practically demonstrate the flexibility that the master offers and its efficiency in terms of cost-reduction and interoperability. The first example details how a specific version of a movie is ordered by a client and created from an IMF package, also known as an IMP, using track files and metadata. The second workflow details how “technical transformations” are performed on the same version in order to suit the customer’s distribution platform.

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Study overview and extracts

Imagine that a video can be uncompressed, or compressed using a range of possible standardised and most likely proprietary codecs. Same with audio track files. Then, imagine that each codec is offering multiple configuration options – the bit rate, the bit depth, the frame type, the colour space, the sampling (4:4:4, 4:2:2, 4:1:1, 4:1:0 ...) and many other options. A lot of combinations are possible!

Now, the issue with these combinations is the ability to ensure interoperability between equipment during a B2B file-based content exchange, as each manufacturer will choose a specific set of parameters and presents equipment most likely incompatible with the others on the market.

We add to that a video/IT revolution that requires more and more “ready-to-distribute” contents in tens and even hundreds of versions of the same finished work. The Industry is struggling to manage all these innumerable elements.

People then sat together and came up with a proposal that ties “media essence” and “metadata” into a structured “bundle”, with a “note” that indicates the way to make the desired version. The Interoperable Master Format (IMF) was born.

Main features of IMF applications

	App #2	App #3	App #2 Extended	App #1
<b>Video</b>	JPEG-2000 Broadcast Profile	SstP (Simple Studio Profile) Level 5 & 6	JPEG-2000 Profile 2	uncompressed
<b>Codec</b>	JPEG-2000	MPEG-4 Part 2	JPEG-2000	DPX, OpenEXR
<b>Definition</b>	HD max 10-bit max	4K max 12-bit max	4K max 16-bit max	4K max 16-bit max
<b>Status</b>	ratified (SMPTE ST 2067- 20)	ratified (SMPTE ST 2067- 30)	discussions	pending

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