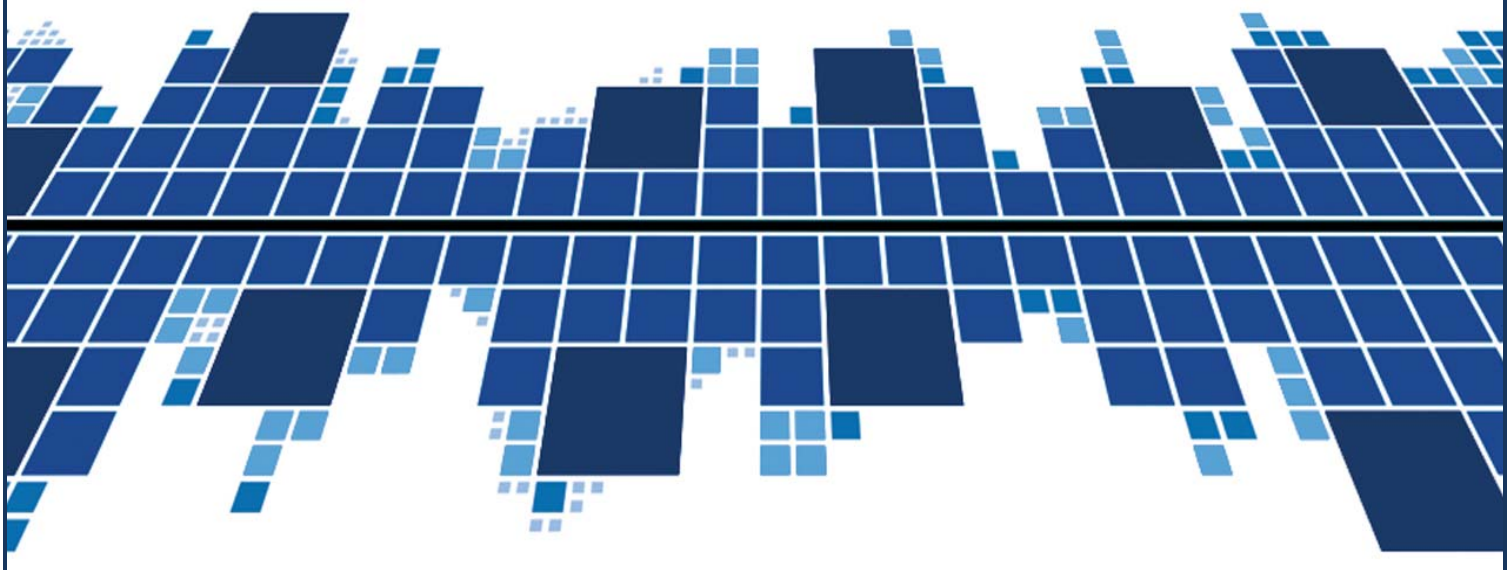
16530 Ventura Blvd., Suite 400
Encino, CA 91436
818.385.1500
www.entmerch.org

EMA Digital Supply Chain Roll-Out of Standards, Specifications & Best Practices for Digital Audio-Visual Distribution

December 5, 2013



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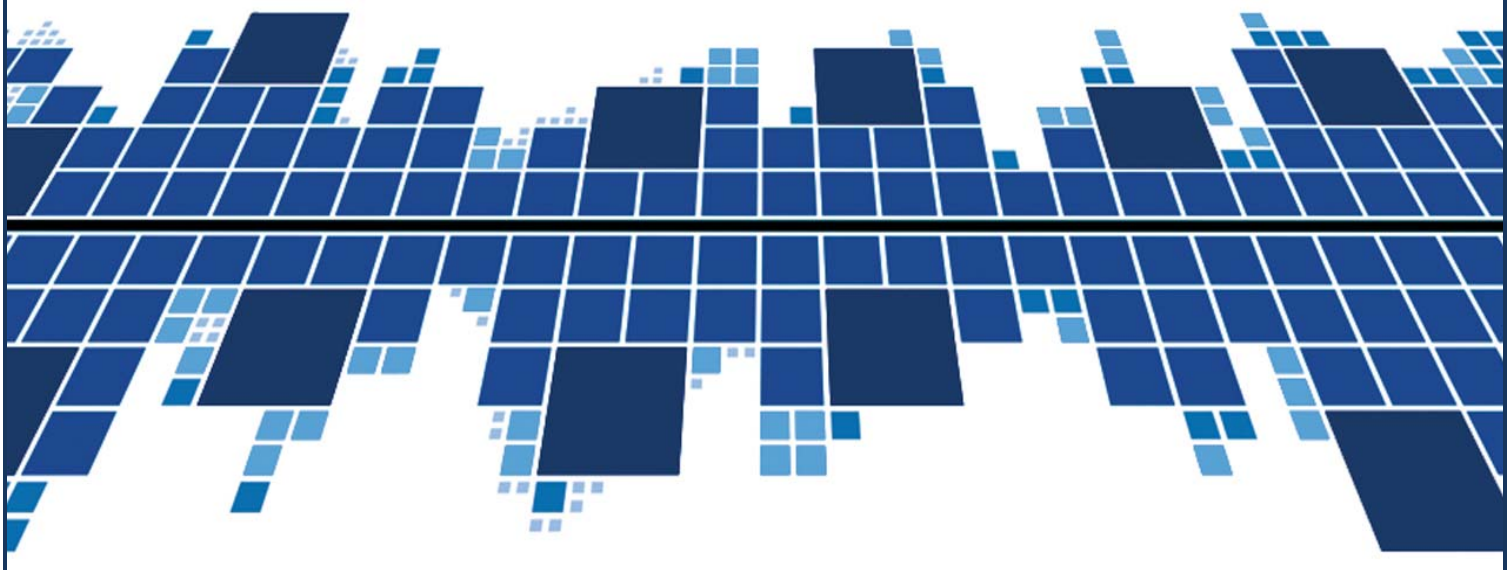
EMA Mezzanine File Creation Specification and Best Practices Version 1.0.1 for Digital Audio-Visual Distribution

December 5, 2013



INTRODUCTION

To All Stakeholders in the Digital Delivery of Audio Visual Entertainment –

EMA's Digital Supply Chain Committee was formed to seek solutions to optimize the delivery of digital content and its associated components from the content providers through service providers and then through retailers/distributors ultimately to the consumer. Opportunities to improve and standardize the consumer experience will be explored, as will new technology to bring speed and efficiencies to this supply chain.

One of the initial opportunities identified was to draft a recommended standard mezzanine file specification.

Why?

- At the request of their customers, content providers and post-house are creating mezzanine files unique to each of their retail partners. This causes unnecessary costs in the supply chain and constrains the flow of new content.
- There is a demand to make more content available for digital distribution more quickly. Sales are lost if content isn't available to be merchandised.
- Today's ecosystem is too manual. Standardization will facilitate automation, reducing costs and increasing speed.
- Quality control issues slow down today's processes. Creating one standard mezzanine file instead of many files for the same content should reduce the quantity of errors. And, when an error does occur and is caught by a single customer, it can be corrected for all retailers/distributors.

This EMA file spec has been developed over a series of meetings among retailers/distributors addressing their needs to fulfill delivery to the consumer. This is version 1.0.0.

Mark Fisher, President & CEO, EMA, on behalf of EMA's Digital Supply Chain Committee

EMA Mezzanine File Creation Specification and Best Practices version 1.0.1

For encoding of contribution quality content delivered to EMA member companies.

Developed by the Digital Supply Chain Committee (Mezzanine File Work Group)
of the Entertainment Merchants Association.

Table of Contents

Version History

- 1.0.0: Initial Release
- 1.0.1: Updated documentation for clarification.
- 1.5 In progress:
    - Ultra HD and 4K modes
    - H.264 High 4:2:2 mode for 10-bit 4:2:2
    - Transport Stream container
- Future:
    - Rec. 2020 and xvYCC
    - Hi444PP to allow 12-bit encoding and high dynamic range Rec. 2020?)
    - Stereoscopic 3D
    - Discuss HEVC and VP9

Introduction

- This is a spec that industry veterans from post production, delivery platforms, software vendors, and content creator's technical operations departments have come to agreement on.
- It is intended to define a common mezzanine format that all participants can create and ingest.
- The goal is to have a widely acceptable option to reduce duplicated work and provide optimal quality with a reasonable file size to enable fast transmission.
- EMA vendor companies have agreed that they can receive files following this specification.
- In no way are participants required to only provide or accept EMA spec files.
- Many technologies were considered for inclusion in 1.0.0 but were decided to be insufficiently supported today. These will be considered for future versions of the specifications. These include:
    - Mathematically lossless audio codecs (like FLAC or Apple Lossless)
    - 4:2:2 and 4:4:4 color
    - 10-bit or 12-bit precision
    - Specific stereo 3D modes
    - 4K/UHD
    - HEVC and other advanced codecs
- A XML manifest format would be highly useful to use with this specification,but the requirements shall be defined by a separate working group.

Technical goals

- Lower bitrates than MPEG-2 or ProRes for practical storage, transmission, and manipulation of these assets.
- Better source video quality than MPEG-2 mezzanines.
- Broad decode compatibility with existing video workflow tools.
- Support for uncompressed or compressed audio.
- Reasonable encoding and decoding speed
- No or low cost to begin creation or acceptance of assets in this spec.
- Creative decisions are made by content owners or post production stakeholders rather than resellers.

Status

- Version 1.0.1

Content Preparation Considerations

Because one of the goals of this specification is to improve output quality while increasing consistency of results, it is important to limit the number of allowable standards for content formatting and have common expectations for preprocessing.

Video Preparation

It is always preferable to receive content in its native format, meaning the format in which it was initially produced and not necessarily the format in which it was distributed. For example, if a TV program was shot on film at 23.976p, but then was initially broadcast in 59.94p, it is required that this asset be delivered in its native 23.976p progressive frame rate. This can be achieved with properly applying an Inverse-Telecine. Content that contains 3:2 pulldown or has been telecined will not be accepted.

Content must end and begin with 1 second of black with silence. No head or tail content like slates, bars and tone, web-callouts, advertisements, etcetera are to be included with the mezzanine; the content should be only what the viewer would see and hear. The content must not contain commercial blacks. Content must not contain any advertisements, commercials, VITC (Vertical Interval TimeCode), horizontal or vertical blanking lines within the content.

Mixed mode content should be conformed to a single progressive mode. For example, a 23.976p SD TV show in 3:2 pulldown with a 29.97i intro should be converted to 23.976p. A special feature clip that is made up primarily of 29.97i behind-the-scenes content with occasional 24p clips should become 59.94p.

Acceptable Formatting

#	VIDEO CODEC	FRAME RATE	SCAN TYPE	NOTES
1	AVC / H.264	23.976	Progressive	Preferred format for all HD and SD resolutions if content was natively produced in 23.976p.
2	AVC / H.264	59.94	Progressive	Only if sourced from true 59.94p content such as sports networks. No repeated/duplicate frames for telecine or up/ cross-conversions from 29.97i.
2a	AVC / H.264	60.00	Progressive	Only if sourced from true 60.00p content.

				No repeated/duplicate frames for telecine or up/ cross-conversions.
3	AVC / H.264	29.97	Progressive	For content that is native 29.97 progressive or 29.97 interlaced properly deinterlaced to 29.97 progressive. No intra-field motion (blended frames) and no unnecessary repeated/duplicate frames.
3a	AVC / H.264	30.00	Progressive	For content that is native 30.00 progressive. No intra-field motion (blended frames) and no unnecessary repeated/duplicate frames.
4	AVC / H.264	29.97	Interlaced	Only for content that was natively interlaced or converted to interlaced and no suitable recovery method is available to inverse telecine or deinterlace.
5	AVC / H.264	24	Progressive	For content that is native true 24.00 fps progressive.
6	AVC / H.264	25	Progressive	For content that is native 25 progressive, or content that was true 50 interlaced and properly deinterlaced to 25 progressive. No intra-field motion (blended frames) and no repeated/duplicate frames.
7	AVC / H.264	25	Interlaced	Only for content that was natively interlaced or converted to interlaced and no suitable recovery method is available for conversion to progressive.

8	MPEG-2	23.976	Progressive	A fallback option. ONLY allowed if vendor cannot provide suitable AVC encoding.
9	MPEG-2	59.94	Progressive	Same restrictions as #2 above. ONLY allowed if vendor cannot provide suitable AVC encoding.
10	MPEG-2	29.97	Progressive	Same restrictions as #3 above. ONLY allowed if vendor cannot provide suitable AVC encoding.
11	MPEG-2	29.97	Interlaced	Same restrictions as #4 above. ONLY allowed if vendor cannot provide suitable AVC encoding.
12	MPEG-2	24	Progressive	As for #5. ONLY allowed if vendor cannot provide suitable AVC encoding.
13	MPEG-2	25	Progressive	As for #6. ONLY allowed if vendor cannot provide suitable AVC encoding.
14	MPEG-2	25	interlaced	As for #7. ONLY allowed if vendor cannot provide suitable AVC encoding.

Video Encoding

H.264 File Format Specifications (Preferred)

This section covers the preferred formats #1-7 in the Acceptable Formatting section above. The MPEG-2 formats should only be used in fallback cases where H.264 file generation is not possible.

H.264 Video Encoding All Resolutions

Codec	H.264 / AVC / MPEG-4 Part 10
Bit-depth	8-bit standard video range. 0-255 range is not allowed.
Subsampling /	4:2:0 Y'CbCr/YUV. RGB is not allowed.

color space	
Frame rate:	Same as the source frame rate, after any preprocessing. Fixed frame rate only (aka constant frame rate), no variable frame rate.
Scan type:	Progressive. If interlaced material is delivered for Format #7, it must have the Interlace Mode correctly set (MBAFF is allowed but not required) and the Field Order must be correctly assigned (Top or Bottom Field First) matching the encoded content.
Resolution	Only standard resolutions will be accepted. Please see Appendix for "Standard Resolutions and Sample Aspect Ratios"
Sample Aspect Ratio (Pixel Aspect Ratio)	Defined within the respective HD and SD specifications as well as in the Appendix for "Standard Resolutions and Sample Aspect Ratios"
Rate Control	Bitrate needs to be sufficient that a second generation encode from the mezzanine is visually identical to an encode generated with the same parameters from the original source. Acceptable rate control modes are, in order of preference based on quality at a given bitrate: 1. Constant Rate Factor (CRF) 2. Constant Quantizer (QP) 3. 2-pass Variable Bitrate (VBR) 4. 1-pass Variable Bitrate These options are encoder dependent. Resulting bitrate must stay within the constraints of the corresponding H.264 Profile/Level. See end of this document for example CRF usage. CRF value should be ≥ 8.
Entropy Encoding	CAVLC
Scene Change Detection	Enabled (Variable GOP)
GOP Length	2 seconds maximum.
GOP Style	Closed
B Frames	Maximum of 3 consecutive B Frames
Reference Frames	Maximum of 3 reference frames

Reference B Frames	If used, must adhere to Strictly Hierarchical pyramid structure
Required Stream Flags	aspect_ratio_idc, field_flag, sequence_parameter_set, picture_parameter_set

H.264 High Definition Specific Requirements

H.264 Profile	High
H.264 Levels	4.1 for 720p and HD up to 30 fps 5 only for 1080p59.94 and 1080p60
Maximum peak bitrate	• For 1080p25 down to 720p60 o 62,500 Kbps maximum for Level 4.1 (variable bitrate) • For 1080p59.94 and 1080p60.00 o 168 Mbps maximum for Level 5 (variable bitrate)
Sample Aspect Ratio (Pixel Aspect Ratio)	HD must be 1:1 (aka square pixels) only. No anamorphic squeezing allowed.
Required Stream Flags	aspect_ratio_idc, field_flag, sequence_parameter_set, picture_parameter_set

H.264 Standard Definition Specific Requirements

H.264 Profile	High
H.264 Level	3.2
Resolution Constraint	NTSC: 720x480 (486 lines not supported) PAL: 720x576
Sample Aspect Ratio (Pixel Aspect Ratio)	32:27 (NTSC 16x9 - 720x480) 40:33 (NTSC 16x9 - 704x480) 8:9 (NTSC 4x3 - 720x480) 10:11 (NTSC 4x3 - 704x480) 64:45 (PAL 16x9 720x576) 16:11 (PAL 16x9 704x576) 16:15 (PAL 4x3 720x576) 12:11 (PAL 4x3 704x576)
Required stream flags	aspect_ratio_idc, field_flag, sequence_parameter_set, picture_parameter_set

MPEG-2 File Format Specifications (Fallback)

This section covers Fallback Formats #8-14 in Acceptable Formatting section above. These formats are only to be used if suitable results cannot be achieved by a vendor for delivering Preferred Formats #1-7.

MPEG-2 Video Encoding All Resolutions

Container	MPEG-2 Transport Stream
Video Codec	MPEG-2
Frame Rate	Same as the source frame rate, after any preprocessing.
Scan Type	Progressive. If interlaced material is delivered for Formats #11 and #14, it must have the Picture Structure correctly set to Interlaced and the Field Order must be correctly assigned (Top Field First or Bottom Field First) matching the encoded content.
Resolution	Only standard resolutions will be accepted. Please see Appendix for "Standard Resolutions and Sample Aspect Ratios"
GOP Length	Maximum of 0.6 seconds Scene Change Detection strongly recommended
B Frames	Maximum of 2 consecutive B Frames (a P-Frame distance of 3)

MPEG-2 High Definition Specific Requirements

MPEG-2 Profile	Main or High
MPEG-2 Level	High
Sample Aspect Ratio (Pixel Aspect Ratio)	1:1 (Square Pixels)
Color Space	4:2:2 required for interlaced content 4:2:0 or 4:2:2 accepted for progressive

MPEG-2 Standard Definition Specific Requirements

MPEG-2 Profile	Main or High
MPEG-2 Level	Main
Sample Aspect Ratio (Pixel Aspect Ratio)	32:27 (NTSC 16x9 - 720x480) 40:33 (NTSC 16x9 - 704x480) 8:9 (NTSC 4x3 - 720x480) 10:11 (NTSC 4x3 - 704x480) 64:45 (PAL 16x9 720x576) 16:11 (PAL 16x9 704x576) 16:15 (PAL 4x3 720x576) 12:11 (PAL 4x3 704x576)
Subsampling	4:2:2 required for interlaced content 4:2:0 or 4:2:2 accepted for progressive

Audio Encoding

Codec	PCM or MPEG-4 AAC-LC for .mov 2.0 Stereo PCM only for MPEG-2 5.1 Surround AES3 302m for MPEG-2 5.1 Surround + 2.0 Stereo AES3 302m for MPEG-2 **Blu-Ray formatted PCM audio tracks will NOT be accepted.** We strongly recommend that a stereo track be included whenever possible, and always whenever there is an existing stereo mix.
Sample Rate	48000 Hz
Endianness	Little endian
Bits per Sample	16 or 24-bit integer, following the source
Channel Configuration	Mono 2.0 Stereo

1	Mono

2.0 Stereo	

	1 Left 2 Right
5.1 Surround	1 Left Front 2 Right Front 3 Center 4 LFE 5 Left Surround 6 Right Surround
5.1 Surround + 2.0 Stereo	1 Left Front 2 Right Front 3 Center 4 LFE 5 Left Surround 6 Right Surround 7 Left Total (Downmix Left) 8 Right Total (Downmix Right)
7.1 Surround	1 Left Front

	<table><tr><td></td><td><table><tr><td>2</td><td>Right Front</td></tr><tr><td>3</td><td>Center</td></tr><tr><td>4</td><td>LFE</td></tr><tr><td>5</td><td>Left Surround</td></tr><tr><td>6</td><td>Right Surround</td></tr><tr><td>7</td><td>Left Back Surround</td></tr><tr><td>8</td><td>Right Back Surround</td></tr></table></td></tr></table>
Minimum AAC Bitrates	Mono: 192 Stereo: 320 5.1: 640 Variable Bitrate modes recommended but not required

Container

Container Type	Must be a self-contained .mov file. See specification at: https://developer.apple.com/library/mac/#documentation/QuickTime/QTFF/QTFFChap3/qtff3.html#//apple_ref/doc/uid/TP40000939-CH205-SW1 Video (seen in spec table 4-1): Only allowed video sample description atom type must be 'avc1' **Required:** 'pasp' 'fiel' **Audio types allowed(seen in spec table 4-7):** in24

<table>
<tr><td></td><td>lpcm
twos
sowt

Other allowed atom types:
tmcd
stsd
nclc

Not allowed:
gama
clap
elst
sprt
twen
load
hint
qd3d
strm
rtp
vrsc
imgp
impn
vrni</td></tr>
<tr><td>Container Extension</td><td>.mov</td></tr>
<tr><td>Stream Order</td><td>Video + Stereo audio
<table><tr><td>Stream 0</td><td>AVC video</td></tr><tr><td>Stream 1</td><td>PCM or AAC stereo</td></tr></table>
Video + 5.1 audio + Stereo audio (audio on separate tracks)
<table><tr><td>Stream 0</td><td>AVC video</td></tr><tr><td>Stream 1</td><td>PCM or AAC 5.1 surround</td></tr><tr><td>Stream 2</td><td>PCM or AAC audio stereo</td></tr></table>
Stereo audio only for alternate language tracks
<table><tr><td>Stream 0</td><td>PCM or AAC audio stereo</td></tr></table></td></tr>
</table>

	5.1 audio only for alternate language tracks Stream 0 | PCM or AAC audio 5.1 surround
Language Labels	ISO 639-2

Timed-text

Subtitles and other timed text events will be addressed in the "CLOSED CAPTIONING OF IP-DELIVERED VIDEO PROGRAMMING BEST PRACTICES" document. All assets must be conformed (synced).

Helpful Hints

- Do not assume that your encoder and multiplexing software is generating files with all of the required metadata properly populated. Double check this explicitly.
- Do not assume that the metadata in all containers will be the same. Files with progressive video streams require different container data than interlaced streams.
- Do not assume that the web player is unchanging with time. Internet capabilities constantly improve. Use the best available elements and do not pre-filter.

Sample Materials

The below samples and examples are only provided for illustration purposes only. The EMA Mezzanine roadmap includes the group working with enterprise software/equipment providers to supply certified configurations/presets to create EMA compliant files.

Free high quality source footage for testing: Tears of Steel, is available here

- high quality 1920 x 800 @ 24p source material
- lossless sources available for audio and video
- stereo and surround tracks available

ffmpeg Example

Sample file creation using ffmpeg built with x264. At least 49 GB of space should be available for these operations to complete successfully. The following example command lines were tested under Mac OS X 10.8.4 using ffmpeg version 1.1 git-716dbc7.

1. Take the webm version of tears of steel, and compress it using ffmpeg built with x264

(Note the following: Use of crf 6 to create constant quality output, the asset is true 24 fps so frame rate is set to 24 rather than 24000/1001 for 23.976, keyint value is dependent on the asset's frame rate and should be a maximum value of fps x 2, the pad filter has been added to normalize the 1920x800 resolution to a standard resolution of 1920x1080 by adding black padding/mattes on the top and bottom).

```
ffmpeg -i tears_of_steel_1080p.webm -an -pix_fmt yuv420p -c:v libx264 -crf 6
-preset medium -x264opts nal-hrd=vbr:vbv-maxrate=62500:vbv-
bufsize=78125:keyint=48:ref=3:b-pyramid=strict:no-cabac:force-cfr=1 -r 24 -
tune film -sws_flags +accurate_rnd -vf "setsar=1/1,scale=1920:-
1,pad=1920:1080:(1920-iw)/2:(1080-ih)/2" -deblock -1:-1 -profile:v high -psy
1 -psy-rd 1.00:0.00 -wpredp 0 -8x8dct 1 -partitions all -rc-lookahead 40 -
me_method hex -me_range 16 -subq 6 -chromaoffset -2 -bf 3 -sc_threshold 40 -
qcomp 0.60 -qmin 4 -qmax 51 -qdiff 4 -i_qfactor 0.71 -c:a pcm_s24le -f mov
x264tears_video.mov
```

2. Encode audio (*.flac from download directory for Tears of Steel), properly tag channel mapping and mux it together with the h.264 video stream, to create a final EMA spec file, including metadata.

```
ffmpeg -i x264tears_video.mov -channel_layout "5.1(side)"
-i tearsofsteel-surround.flac -channel_layout downmix
-i tearsofsteel-stereo.flac -c:v:0 copy -c:a:0 pcm_s24le -c:a:1 pcm_s24le -
map 0:0 -map 1:0 -map 2:0 -metadata title="Tears of Steel" -metadata
artist="Blender Foundation" -metadata date="2012" -metadata copyright="(CC)
Blender Foundation | mango.blender.org" -metadata
license="http://creativecommons.org/licenses/by/3.0/" -metadata
description="EMA Mezzanine Encoding Spec Example File Beta 1" -
metadata:s:a:0 language=eng -metadata:s:a:0 description="DVD surround 5.1
mix" -metadata:s:a:1 language=eng -metadata:s:a:1 description="DVD stereo
mix" tears-of-steel-ema-example-file.mov
```

4. Move the atom to the front of the file using qtfaststart

```
~/qtfaststart/bin/qtfaststart tears-of-steel-ema-example-file.mov
qtfaststart-tears-of-steel-ema-example-file.mov
```

(Please note that the invocation of `qtfaststart` depends on how it was installed. With the ffmpeg package under Linux it is invoked with `qt-faststart`.)

libav + x264 Example

Sample file creation using libav and x264 . At least 49 GB of space should be available for these operations to complete successfully. The following example command lines were tested under a Linux operating system.

1. Take the main video track out of the webm version of tears of steel, and turn it into an uncompressed file.

```
~/libav/avconv -i tears_of_steel_1080p.webm -f yuv4mpegpipe -pix_fmt yuv420p
-vf scale tears_of_steel_uncompressed_1920x800-master.y4m
```

2. Take the uncompressed file and compress it using x264
(Note the following: Use of crf 6 to create constant quality output, the asset is true 24 fps so frame rate is set to 24 rather than 24000/1001 for 23.976, keyint value is dependent on the asset's frame rate and should be a maximum value of fps x 2, tune parameter is set to match the source content as film)

```
~/x264/x264 tears_of_steel_uncompressed_1920x800-master.y4m --r 24 --crf 6 -
-profile high --level 41 --ref 3 --b-pyramid strict --bframes 3 --keyint 48
--tune film --preset medium --no-cabac --vbv-maxrate 62500 --vbv-bufsize
78125 --trellis 1 -o x264tears.mp4
```

3. Encode audio (*.flac from download directory for Tears of Steel), and mux it together with the h.264 video stream, to create a final EMA spec file, including metadata.

```
avconv -i x264tears.mp4 -i tearsofsteel-surround.flac -i tearsofsteel-
stereo.flac -c:v:0 copy -c:a:0 pcm_s24le -c:a:1 pcm_s24le -map 0:0 -map 1:0
-map 2:0 -metadata title="Tears of Steel" -metadata artist="Blender
Foundation" -metadata date="2012" -metadata copyright="(CC) Blender
Foundation | mango.blender.org" -metadata
license="http://creativecommons.org/licenses/by/3.0/" -metadata
description="EMA Mezzanine Encoding Spec Example File Beta 1" -
metadata:s:a:0 language=eng -metadata:s:a:0 description="DVD surround 5.1
mix" -metadata:s:a:1 language=eng -metadata:s:a:1 description="DVD stereo
mix" tears-of-steel-ema-example-file.mov
```

4. Move the atom to the front of the file using qtfaststart

```
~/qtfaststart/bin/qtfaststart tears-of-steel-ema-example-file.mov
qtfaststart-tears-of-steel-ema-example-file.mov
```

(Please note that the invocation of `qtfaststart` depends on how it was installed. With the ffmpeg package under Linux it is invoked with `qt-faststart.`)

Appendix

Standard Resolutions and Sample Aspect Ratios

	Resolution	Display Aspect Ratio (DAR)	Sample Aspect Ratio (SAR) aka Pixel Aspect Ratio (PAR)
High Definition (HD)	1920x1080	16x9	1:1
	1440x1080	4x3	1:1
	1280x720	16x9	1:1
	960x720	4x3	1:1
Standard Definition (SD)	720x480	16x9	32:27
	704x480	16x9	40:33
	720x480	4x3	8:9
	704x480	4x3	10:11
	720x576	16x9	64:45
	704x576	16x9	16:11
	720x576	4x3	16:15
	704x576	4x3	12:11

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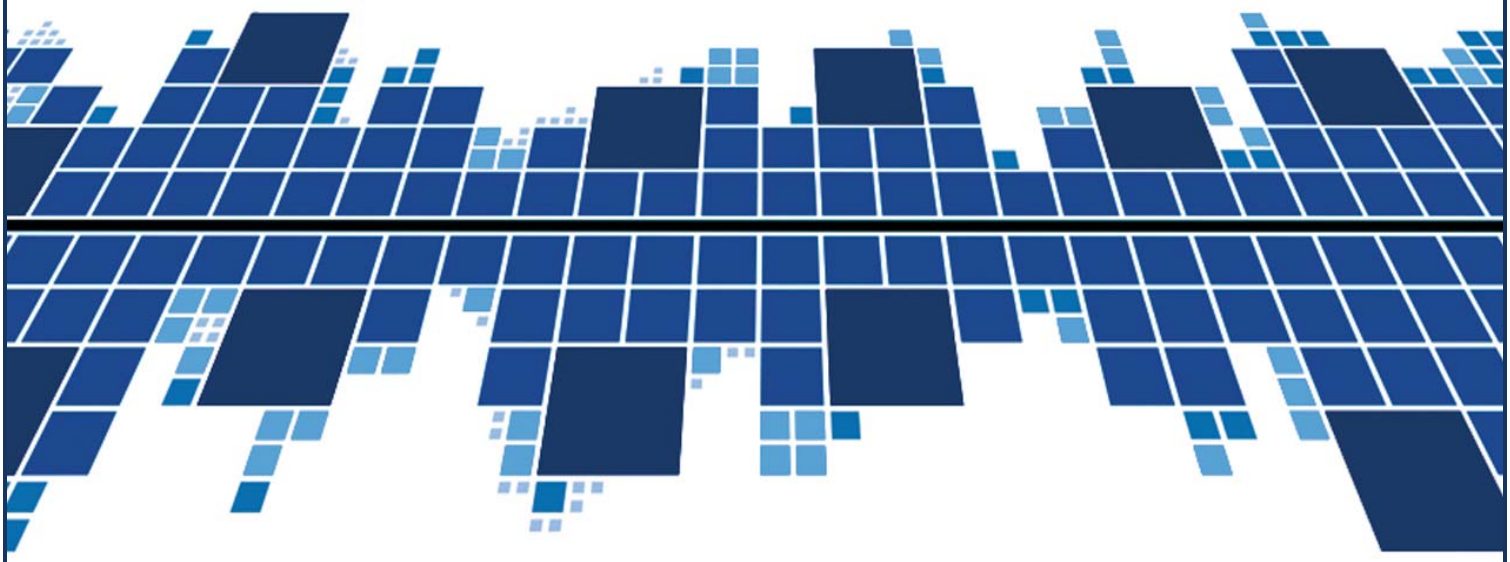
Best Practices & Standards For the Delivery of Metadata for Digital Audio-Visual Distribution

December 5, 2013



INTRODUCTION

EMA, with the support of MovieLabs, created the EMA Metadata structure. This structure robustly described structure and data fields to communicate descriptive, logical, and technical metadata from content providers to retailers/distributors and ultimately to consumers. EMA Metadata, along with work being done by DECE in developing UltraViolet's metadata needs, is the basis for the all-inclusive "Common Metadata" as published by MovieLabs.

After further development, and more recent collaboration with the DEG Media and Content Operations Committee, the DEG-EMA Core v1.3 is herewith published. This Core (formally Media Entertainment Core or MEC) describes those fields that are most critical to the retailer's ability to merchandise and distribute media assets. It is pared down from Common Metadata in order to ease marketplace adoption. However, it is structured to support individual adopters who elect to share additional metadata fields from "Common Metadata" as appropriate and as agreed.

Why is it needed?

- Metadata related to digital video distribution is too often communicated manually between trading partners.
- It is also communicated in a variety of inconsistent structures and formats that are requested by retailers/distributors or as supplied by various content providers.
- Bad metadata that is translated to supplier catalogs or retailer/distributor websites can cause lost sales.
- Late metadata can bottleneck the supply chain, delaying product availability.

A governance structure, including EMA, DEG, UltraViolet, EIDR, and MovieLabs has been developed. EMA members are encouraged to contact Jennifer Lane at jlane@entmerch.org with questions or suggested additions or changes.

Media Entertainment Core Metadata

‘mdmec’ namespace

CONTENTS

REVISION HISTORY

Version	Date	Description
1.0	January 5, 2010	EMA Metadata
1.2	November 1, 2011	EMA Metadata with EMA Core definition
2.0	January 3, 2013	DEG-EMA Media Entertainment Core Metadata.

1 INTRODUCTION

The Entertainment Merchant's Association (EMA) and the Digital Entertainment Group (DEG) have defined metadata for the description of information delivered from Publishers to Retailers. This document was developed by the EMA Digital Council and the DEG Media and Content Operations Committee with the objective of standardizing the metadata communication from content providers to digital retailers.

This document defines Media Entertainment Core Metadata v2.0. This is also referred to as MEC Metadata, or MEC.

MEC Metadata builds upon EMA Metadata and Common Metadata developed by Motion Picture Laboratories (MovieLabs), EMA, DEG and others. Common Metadata includes elements that cover typical definitions of media, particularly movies and television. Common Metadata has two parts: Basic Metadata and Digital Asset Metadata. Basic Metadata includes descriptions such as title and artists. It describes information about the work independent of encoding. Digital Asset metadata describes information about individual encoded audio, video and subtitle streams, and other media included. Package and File Metadata describes a single possible packaging scenario and ties in other metadata types. Ratings and Parental Control information is described.

Common Metadata is designed to provide definitions to be inserted into other metadata systems, such as was done here, EIDR metadata and UltraViolet metadata. Selected elements of the Common Metadata are used in derived specifications. Adopters then define additional metadata to cover areas not included in Common Metadata.

1.1 Document Organization

This document is organized as follows:

1. Introduction—Background, scope and conventions
2. Core Metadata –Definition of MEC Metadata.

1.2 Document Notation and Conventions

The document uses the conventions of Common Metadata [CM].

1.3 Normative References

[CM] TR-META-CM MovieLabs Common Metadata, v2.0, http://www.movielabs.com/md/md

[EIDR-TO] *EIDR Technical Overview*, November 2010. http://eidr.org/technology/#docs

All Common Metadata references are included by reference.

1.4 Informative References

[DECEMD] DECE Content Metadata. http://www.uvvu.com/techspec-archive.php

1.5 XML Namespaces

This document defines:

- mdmec: includes Media Entertainment Core Metadata-specific data

'mdmec' builds on

- md: Common Metadata corresponding with Common Metadata [CM]

1.6 Identifiers

Identifiers must be universally unique. Recommended identifier schemes may be found in Common Metadata [CM] and in DECE Content Metadata [DECEMD].

The use of Entertainment Identifier Registry identifiers (www.eidr.org) is strongly encouraged. Please see [EIDR-TO].

1.7 Status

This specification is completed and ready for implementation. Although tested, we anticipate that additional implementation experience will yield recommendation for changes. Implementers should anticipate one or more revisions. Reasonable measures will be taken to ensure changes are backwards compatible. See Backwards Compatibility Best Practices in [CM]

2 MEC CORE METADATA

The section defines the MEC Metadata. The rules for what must be included and how it is encoded is in this section and its references.

Note that the structure accommodates additional data which may be included optionally.

2.1 CoreMetadata-type

This defines the MEC metadata, including both the descriptive information (Basic Metadata) and the encoding information (Physical metadata). It is as follows:

Element	Attribute	Definition	Value	Card.
CoreMetadata-type				
Basic		Basic Metadata	md:BasicMetadata-type	
DigitalAsset		Digital Asset Metadata: encoding information for the assets	md:DigitalAssetMetadata-type	1..n
TitleInternalAlias		Title used by involved parties to refer to this content	xs:string	0..1
Source		Organization that created the metadata	mdmec:Publisher-type	0..1
CompanyDisplayCredit		Organizations associated with the asset, for display purposes.	md:CompanyCredits-type	0..n
GroupingEntity		The "Network" or "Studio" that the product should be merchandised under within a retailer's website. For example, “Warner Bros”.	md:GroupingEntity-type	0..n

2.1.1 Publisher-type

Element	Attribute	Definition	Value	Card.
Publisher-type			md:OrgName-type (by extension)	
	organizationID	Organization Identifier for the publisher. This is an ID use by the Publisher to refer to itself.		0..1

	retailerSpecificID	Identifier by which the Retailer knows the Publisher	xs:string	0..1
DisplayName		Name of Publisher in a displayable form. This is the name intended to be presented to a consumer.	xs:string	
SortName		Name of Publisher intended for sorting purposes. It is not necessary to include SortName if it is identical to DisplayName.		0..1
ContactInfo		Contact information for the publisher	md:ContactInfo-type	

SortName is typically used when a Publisher has variations on its name that may not sort properly (e.g., some instances have a prefix).

2.2 Common Metadata derived types

Common Metadata [CM09] includes elements that cover typical definitions of media, particularly movies and television. Basic Metadata includes descriptions such as title and artists. It describes information about the work independent of encoding. Digital Asset metadata describes information about individual encoded audio, video and subtitle streams, and other media included. Package and File Metadata describes one possible packaging scenario and ties in other metadata types. Ratings and Parental Control information is described.

Common Metadata is designed to provide definitions to be inserted into other metadata systems, such as EMA's. Although EMA uses some element from Common Metadata, it also defines additional metadata to cover areas specific to EMA's requirements.

The following MEC types are derived directly from Common Metadata:

MEC Type	Common Metadata Type
mdmec:BasicMetadata-type	md:BasicMetadata-type
mdmec:DigitalAssetMetadata-type	md:DigitalAssetMetadata-type

All mandatory elements and attributes must be included. Any optional elements may be included. The following elements and attributes are required for MEC usage, regardless of whether they are optional, except as noted.

The following table uses the following conventions:

- Structure is given by table indentation. Parent level elements to the left.
- Attributes begin with '@'. For example, @ContentID refers to the ContentID attribute

2.2.1 Basic Metadata Usage

Element or Attribute			Usage Rules
BasicMetadata-type			Required
	@ContentID		Required
	UpdateNum		Shall be included if the record is an update (i.e., not the first record distributed)
	LocalizedInfo		At least one instance required
		@language	Required
		default	must be included for one instance of LocalizedInfo for the language of original production
		TitleDisplay60	Required. Note that TitleDisplay19 no longer required.
		TitleSort	Required
		OriginalTitle	Required
		Summary190	Description that is unique to that content
		Summary400	Recommended
		Cast	if applicable
		Genre	Exactly one primary genre shall be included. It will be from http://www.movielabs.com/md/mec/mec_primary_genre.html @source='http://www.movielabs.com/md/mec/mec_primary_genre.html'. @level='0'. Any additional genres may be included.
		ArtReference	At least one instance is mandatory, additional instances are optional
		CopyrightLine	Required
		AlternateTitle	Required
	RunLength		Specify to at least seconds. Zero is recommended for season and series.
	ReleaseYear		Required
	ReleaseDate		should include the highest date/time resolution available

	ReleaseHistory ReleaseType		Original Release date must be included with ReleaseType='original'. When applicable Local Release date must be included with ReleaseType='local'. When applicable DVD Release date must be included with ReleaseType='DVD
	WorkType		Required
	PictureColorType		optional, but it should be included
	PictureFormat		optional, but it should be included
	AltIdentifier		optional, but it should be included for all commonly used identifiers. For example, if ISAN is available, it should be included.
	RatingSet		SHALL be included for all available ratings in the regions where Retailers are authorized to sell this content. All elements and attributes should be included if applicable to the rating. The condition attribute should be used if the primary purpose of the edit is a derivation from a parent for the purposes of ratings change (e.g., airline edit or 'unrated edition').
	People		Include Actor(s), Director(s) and Producer(s) as applicable.
	CountryOfOrigin		defined as the "generally accepted country of reference".
	PrimarySpokenLanguage		Language should be included for the language(s) in which the video was shot (i.e., the language the "lips move to.") Movies such as Babel may have multiple PrimarySpokenLanguage elements. This should not be used for languages spoken incidentally and subtitled; for example, "RU" (Russian) in *The Hunt for Red October.*
	SequenceInfo Parent		SHALL be included for the following work types: Season, Episode, Promotion, Excerpt, Supplemental
		Number	Required
		HouseID	Shall be used for production ID in episodic content
	Parent		Shall be included for work type of Non-episodic Show if that show is part of a season or series. Should be included for derived works such as Director's Cut and promotional activity.

2.2.2 Digital Asset Metadata Usage

Element or Attribute	Usage Rules
DigitalAssetMetadata-type	Shall be included for each track included
Audio	Required
Type	Required
Encoding	Required
Codec	Required
CodecType	The IANA namespace shall be used
BitrateMax	Required
SampleRate	Required
SampleBitDepth	Required
Language	Required
Channels	Required
Video	Required
Type	Required
Encoding	Required
Codec	Required
CodecType	The IANA namespace SHALL be used
BitrateMax	Required
Picture	Required
AspectRatio	Required
ColorType	Required
SubtitleLanguage	Shall be included if the video contains visible subtitles.
Subtitle	If applicable

		Format	Required
		Type	Required
		FormatType	Required
		Language	Required

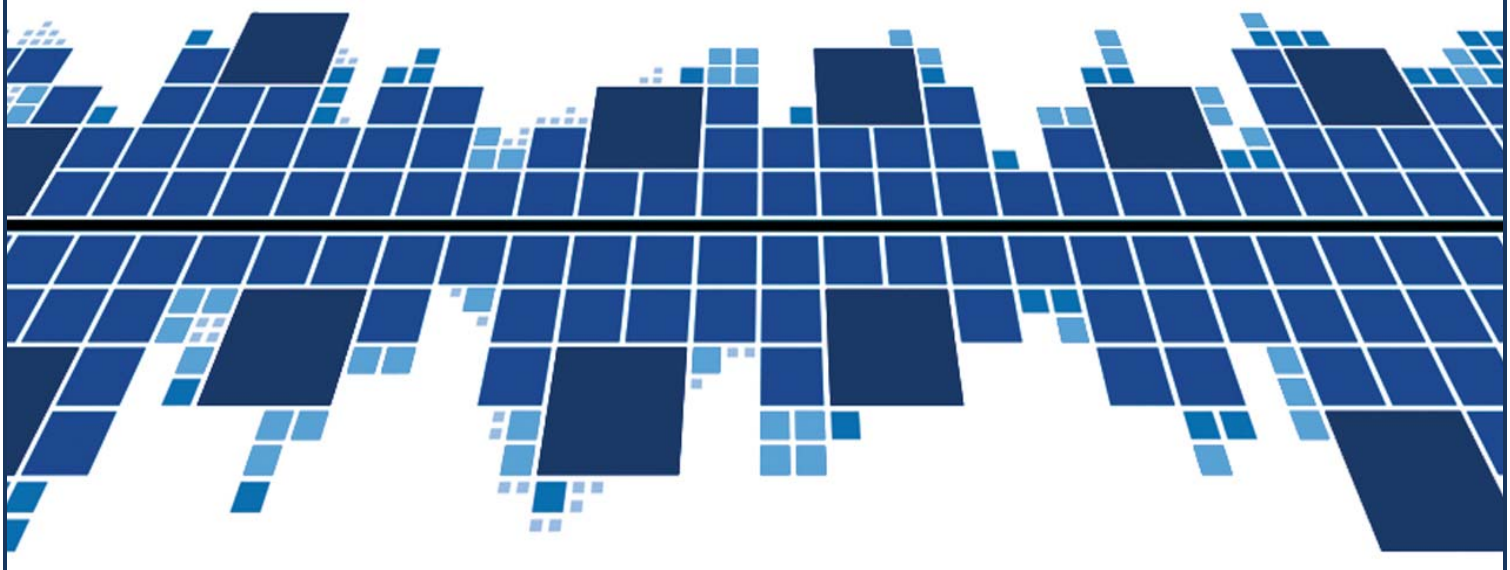
2.2.3 Additional Usage Rules

- Original Release/Air Date (Year for features; Date for episodic television) – should be defined as the original release date in the target region of distribution.
- StartsWith search titles are included in `TitleAlternate` with `type` '`StartsWith`'.
- ReleaseHistory should apply to distribution target.

16530 Ventura Blvd., Suite 400
Encino, CA 91436
818.385.1500
www.entmerch.org

Best Practices & Standards For the Delivery of Avails for Digital Audio-Visual Distribution

December 5, 2013



INTRODUCTION

EMA's Digital Supply Chain work groups and committees have been working diligently on defining a standard metadata structure, recommended mezzanine file specs, a set of recommended image files, and captioning issues.

One pain-point that has not yet been addressed may be a fairly simple one to resolve – the inconsistency and inaccuracy of avails information.

Why is it needed?

Each studio currently provides avails to retailers in different formats (e.g., in the body of emails, Excel spreadsheets, PDFs, and sometimes even as image files) typically via email. These avails are arguably the most important data we handle:

- Importance to Studios:
  - Dates need to be accurately communicated so a title doesn't go live earlier than planned, and comes down in time so not to violate terms with highly valued Pay TV partners (e.g., HBO, Showtime) or other licensees/licensors they have agreements with.
  - An inaccurate start date that delays the release of a title will result in missed revenue opportunities.

- Importance to Retailers:
  - Avail notices kick off the scheduling and production workflow (ordering and fulfillment); a missed avail notice can delay the release of a title, resulting in missed revenue opportunities.
  - Going live too early or keeping a title up too long (outside of avail window) can negatively impact relationships with the studios.
  - Delay in release of film creates a negative consumer experience with platform, especially for high profile titles where home video release dates are advertised.

- No standards exist across any of the studios or retailers
  - Studios: notices can come in a variety of formats (e.g., body of email, Excel spreadsheets, PDFs) and often require manual work for a retailer to ingest, bringing with it a high risk of entry error and/or a high cost in resource needs (e.g., in auditing all entries).
  - Retailers: many have their own templates or portals, which are a burden on studios to complete for each. Studios are then resistant to using retailer templates because of resource limitations and liability; the often manual conversion to templates -- and inherent risk of entry error -- would be pushed to the studio's side.

- Notices often come at inconsistent intervals; few studios send notice on a consistent/predictable schedule.

Retail members of the EMA have developed a proposed standard set of avails in an organized set of accessible formats (both XML and Excel) to meet everyone's needs.

EMA Content Availability Metadata (Avails)

CONTENTS

REVISION HISTORY

Version	Date	Description
1.0	January 3, 2013	Original Version
1.4	December 1, 2013	Updated to sync with EMA Avails Excel template v1.4. Added closed caption annotation for United States.

Content Availability Metadata (Avails)

Ref: TR-META-AVAIL
Version: 1.4
Date: December 3, 2013

1 INTRODUCTION

The Entertainment Merchant's Association (EMA) has defined the means to delivery Content Availability (Avails) data. 'Avails' is an industry term for business information regarding the availability of assets to be offered. It includes information such as region of available, times of available and business terms. This document was developed by the EMA Digital Council with the objective of standardizing the metadata communication from content providers to digital retailers.

This document defines EMA Avails.

The document describes encoding for Avails data in both spreadsheet form and in XML form. Although spreadsheets may serve an interim purpose, migration to XML is encouraged.

EMA Avails Metadata builds upon Media Entertainment Core (MEC) Metadata, and also Common Metadata developed by Motion Picture Laboratories, EMA, DEG and others.

1.1 Document Organization

This document is organized as follows:

1. Introduction—Provides background, scope and conventions
2. Avails—The definition of Avails data. This includes encoding information that applies to both spreadsheets and XML; and the XML definition.
3. Rules for Spreadsheet Encoding – Information on using Section 2 definitions within spreadsheets. Also, information on mapping between spreadsheets and XML.

1.2 Document Notation and Conventions

1.2.1 XML Conventions

XML is used extensively in this document to describe data. It does not necessarily imply that actual data exchanged will be in XML. For example, JSON may be used equivalently.

This document uses tables to define XML structure. These tables may combine multiple elements and attributes in a single table. Although this does not align with schema structure, it is much more readable and hence easier to review and to implement.

Although the tables are less exact than XSD, the tables should not conflict with the schema. Such contradictions should be noted as errors and corrected.

1.2.1.1 Naming Conventions

This section describes naming conventions for Common Metadata XML attributes, element and other named entities. The conventions are as follows:

- Names use initial caps, as in InitialCaps.
- Elements begin with a capital letter, as in InitialCapitalElement.
- Attributes begin with a lowercase letter, as in initiaLowercaseAttribute.
- XML structures are formatted as Courier New, such as `md:rightstoken`
- Names of both simple and complex types are followed with "-type"

1.2.1.2 Structure of Element Table

Each section begins with an information introduction. For example, "The Bin Element describes the unique case information assigned to the notice."

This is followed by a table with the following structure.

The headings are

- Element—the name of the element or type
- Attribute—the name of the attribute
- Definition—a descriptive definition. The definition may define conditions of usage or other constraints
- Value—the format of the attribute or element. Value may be an XML type (e.g., "string") or a reference to another element description (e.g., "See Bar Element"). Annotations for limits or enumerations may be included (e.g.," int [0..100]" to indicate an XML xs:int type with an accepted range from 1 to 100 inclusively).
- Card—cardinality of the element. If blank, then it is 1. Other typical values are 0..1 (optional), 1..n and 0..n.

The first row of the table after the header is the element being defined. This is immediately followed by attributes of this element, if any. Subsequent rows are child elements and their attributes. All child elements (i.e., those that are direct descendents) are included in the table. Simple child elements may be fully defined here (e.g., "Title", " ", "Title of work", "xs:string"), or described fully elsewhere ("POC", " ", "Person to contact in case there is a problem", "md:ContactInfo-type"). In this example, if POC was to be defined by a complex type defined as md:ContactInfo-type. Attributes immediately follow the containing element.

Accompanying the table is as much normative explanation as appropriate to fully define the element, and potentially examples for clarity. Examples and other informative descriptive text may follow. XML examples are included toward the end of the document and the referenced web sites.

1.2.2 General Notes

All required elements and attributes must be included.

When enumerations are provided in the form 'enumeration', the quotation marks ('') should not be included.

1.3 Normative References

[CM] TR-META-CM MovieLabs Common Metadata, version 2.1, http://www.movielabs.com/md/md

[MECMD] DEG-EMA Media Entertainment Core Metadata, version 2.1, http://www.movielabs.com/md/mec

[RFC2141] R. Moats, *RFC 2141, URN Syntax*, May 1997, http://www.ietf.org/rfc/rfc2141.txt

[RFC3629] Yergeau, F., et al, *RFC 3629, UTF-8, a transformation format of ISO 10646*, November, 2003. http://www.ietf.org/rfc/rfc3629.txt

[RFC3986] Berners-Lee, T., et al, RFC 3986, Uniform Resource Identifier (URI): Generic Syntax, January 2005, http://www.ietf.org/rfc/rfc3986.txt

[RFC5646] Philips, A, et al, *RFC 5646, Tags for Identifying Languages*, IETF, September, 2009. http://www.ietf.org/rfc/rfc5646.txt

[IANA-LANG] IANA Language Subtag Registry. http://www.iana.org/assignments/language-subtag-registry

[ISO3166-1] Codes for the representation of names of countries and their subdivisions -- Part 1: Country codes, 2007.

[ISO3166-2] ISO 3166-2:2007Codes for the representation of names of countries and their subdivisions -- Part 2: Country subdivision code

[ISO4217] Currency shall be encoded using ISO 4217 Alphabetic Code. http://www.iso.org/iso/currency_codes_list-1

[ISO8601] ISO 8601:2000 Second Edition, *Representation of dates and times, second edition*, 2000-12-15.

[CEA766] ANSI/CEA-766-C, U.S. and Canadian Rating Region Tables (RRT) and Content Advisory Descriptors for Transport of Content Advisory Information Using ATSC Program and System Information Protocol (PSIP). April 2008.

1.4 Informative References

[RFC4647] Philips, A., et al, *RFC 4647, Matching of Language Tags*, September 2006. http://www.ietf.org/rfc/rfc4647.txt

European Broadcast Union, Tech 3295 – P_META Metadata Library, http://www.ebu.ch/en/technical/metadata/specifications/notes_on_tech3295.php

1.5 XML Namespaces

This document refers to the following XML namespaces:

- md: Common Metadata corresponding with Common Metadata.

- mdmec: Media Entertainment Core Metadata. Note that mdmec: references md: schemas
- avails: includes Avails data. Note that avails: references md: and mdmec: schemas

1.6 Identifiers

Identifiers must be universally unique. Recommended identifier schemes may be found in Common Metadata and in UltraViolet Content Metadata.

1.7 Status

This specification is completed and ready for pilot implementation. Although tested, we anticipate that additional implementation experience will yield recommendation for changes. Implementers should anticipate one or more revisions. Reasonable measures will be taken to ensure changes are backwards compatible.

2 AVAIL INFORMATION

The top level element for Avails are `Avail` and `AvailList`. The top-level XML type for Avails are `Avail-type` and `AvailList-type`.

2.1 Avail List

An Avail List contains on or more Avials.

Element	Attribute	Definition	Value	Card.
AvailList		Element for an Avail List	avails:AvailList-type	

Element	Attribute	Definition	Value	Card.
AvailList-type				
Avail		An Avail	avails:Avail-type	1..n

2.2 Avail

The Avail element is defined as follows:

Element	Attribute	Definition	Value	Card.
Avail		Element continuing a single Avail	avail:Avail-type	

The Avail-type complex type is defined as follows:

Element	Attribute	Definition	Value	Card.
Avail-type				
Disposition		Information about the Avails message such as whether it is a new Avail or if it replaces a previous Avail message.	avails:AvailDisposition-type	

Licensor		The entity issuing the Avail	mdmec:Publisher-type	
Asset		Each instance defines an asset subject to the Avail instructions	avails:AvailAsset-type	1..n
Transaction		Each instance includes transaction information regarding the Avail	avails:AvailTransaction-type	1..n
OfferingContentStructure		Description of relationship of the asset to each other in the form of a Common Metadata Compliation.	md:CompObj-type	0..1

2.2.1 AvailDisposition-type

Element	Attribute	Definition	Value	Card.
AvailDisposition-type				
EntryType		Indication of whether this Avail is new, update or deletion.	xs:string	0..1
EntryID		An identifier unique to the Licensor that identifies this Avail. EntryID is used to match Avails for Update and Delete operations. It can also be used by respective parties to refer to the Avail.	md:id-type	0..1
IssueDate		Date this Avail was issued. If necessary, recipients can use IssueDate to reconstruct the order of issuance. Although this may be xs:gYear only or xs:date, it is strongly recommended that the xs:dateTime form be used.	md:YearDateOrTime-type	0..1
ReplacesEntryID		An EntryID in an Avail previously sent. Used to match for purposes of updating or deleting.	md:id-type	(optional choice)
ReplacesEntryDate		An EntryDate in an Avail previously sent. Used to match for purposes of updating or deleting.	md:YearDateOrTime-type	(optional choice)
<any>		Any other element	any ##other	0..n

EntryType shall have one of the following values:

- "Create" – Creates a new Avail.
- "Update" – Updates a matching Avail. See note below on matching. This Avail will replace the previous Avail in its entirety.
- "Delete" – Deletes the matching Avail. See note below on matching.
- "Full Extract" – All avail entries provided for a title's version within a territory should overwrite all previous avail entries for that version within that territory.
- "Other" – The recipient should evaluate the current Avail against existing Avails and determine whether this Avail is new or an update. It is recommended that "Update" be used instead of "Other".

An Avail matches an earlier Avail if the new Avail's ReplacesEntryID matches the earlier Avail's EntryID, or the new Avail's ReplacesEntryDate matches the earlier Avail's EntryDate.

If EntryType is absent, the following is used to match

If Transaction/@AvailID is present

- If an avail associated with AvailID is present at the Retailer
  - If EntryType is "Delete", the avail is deleted
  - Otherwise, EntryType is ignored and the avail is updated
- If an avail associated with AvailID is not present at the Retailer, and EntryType is not "Delete", an avail is created.

If Transaction/@AvailID is not present, the retailer attempts to match the avail based on ProductID, ContentID, Region and StoreLanguage. Any overlap (e.g., overlapping regions or languages) constitutes a match.

- If a match exists, action is taken based on the value of EntryType as follows
  - Delete: remove matching avail
  - Update: update matching avail
  - Other: update matching avail
  - <absent>: update matching avail
- If a match does not exist, action is taken based on the value of EntryType
  - Delete: no action avail
  - Update: create avail
  - Other: create avail
  - <absent>: create avail

AvailID must be unique within a given Licensor. It also must be unique to the title, region and language in question. If there is any overlap (e.g., a record for worldwide and another record for US), matching could fail. Note that EntryType is intended to refer to a set of avails, rather than individual items so one set of records can replace another set of records (e.g., a single worldwide avail can be updated to multiple regional avails).

2.2.2 AvailAsset-type

Element	Attribute	Definition	Value	Card.
AvailAsset-type				
	contentID	Asset Identifier. This should be an EIDR.	md:ContentID-type	
WorkType		Work type as enumerated in Common Metadata, and repeated below.	xs:string	
TitleInternalAlias		Title used by involved parties to refer to this content.	xs:string	
ProductID		An identifier mutually agreed upon by sender and recipient. ProductID must be unique within a licensor. It is preferable that it be globally unique, such an EIDR.	xs:string	0..n
VersionDescription		A brief description of the version.	xs:string	0..1
Metadata		Metadata describing Asset	avails:AvailMetadata-type	
SeriesMetadata		Additional metadata describing series information, such as seasons and series. This shall only be included if the asset is part of a series (e.g., an episode)	avails:AvailSeriesMetadata-type	0..1

WorkType shall be enumerated to one of the following (categories are to support the definition, but are not included in the enumeration).

Music related:

- 'Album' – A collection of songs

- 'Song'
- 'Music Video' – Music Video, not 'Performance'
- 'Ring Tone'
- 'Other Music'

Film related:

- 'Movie' – A full length movie regardless of distribution (e.g., theatrical, TV, direct to disc, etc.) and content (e.g., includes documentaries).
- 'Short' – a film of length shorter than would be considered a feature film.

TV, web and mobile related:

- 'Series' – a show that might span one or more seasons or might be a miniseries.
- 'Season' – a season of a Series. It will contain one more episodes.
- 'Episode' – an episodes of a season or miniseries. A pilot is also an episode. If episode is a 'webisode', 'mobisode' or other specialized sequence, it should be noted in Keywords.
- 'Non-episodic Show' – TV or other show that is non-episodic; for example, sports and news.
- 'Promotion' – promotional material associated with media. This includes teasers, trailers, electronic press kits and other materials. Promotion is a special case of 'Ad'.
- 'Ad' – any form of advertisement including TV commercials, informercials, public service announcements and promotions not covered by 'Promotion'. This does not include movie trailers and teasers even though they might be aired as a TV commercial.

Other:

- 'Excerpt' – An asset that consists primarily of portion or portions of another work or works; for example, something having the 'isclipof' or 'iscompositeof' relationship.
- 'Supplemental' – Material designed to supplement another work. For example, and extra associated with a Movie for a DVD.
- 'Collection' – A collection of assets not falling into another category. For example, a collection of movies.
- 'Franchise' – A collection or combination of other types, for example, a franchise might include multiple TV shows, or TV shows and movies.

2.2.2.1 AvailMetadata-type

Element	Attribute	Definition	Value	Card.
AvailMetadata-type				
TitleDisplayUnlimited		Display title, no length limit. Same as TitleDisplayUnliminted in Common Metadata.	xs:string	0..1
RunLength		Total run time. Same as RunLength in Common Metadata.	xs:duration	0..1
AltIdentifier		Other identifiers referring to the same asset. Same as AltIdentifier in CommonMetadata.	md:ContentIdentifier-type	0..n
ReleaseHistory		History of release such as air dates or DVD release information. Defined in Common Metadata, 4.1.1.	md:ReleaseHistory-type	0..n
CaptionIncluded		Are captions included in encoding. 'true' means yes.	xs:boolean	0..1
CaptionRequired		Are captions required anywhere in the regions specified for the transaction. 'true' means yes.	xs:boolean	0..1
CaptionsExemptionReason		Captions are not required for the reason specified in this element. If present, CaptionIncluded must equal 'false' and CaptionRequired must equal 'false'	xs:string	0..1
<any>		Any other element	any ##other	0..n

CaptionIncluded and CaptionRequired are required for Avails whose Territory is the United States.

2.2.2.2 AvailSeriesMetadata-type

Element	Attribute	Definition	Value	Card.
AvailSeriesMetadata-type				
SeriesID		Identifier for Series. Preferably an EIDR.	md:id-type	
SeasonID		Identifier for Season. Preferably an EIDR.	md:id-type	
SeriesTitle		Title for series in language mutually agreed upon by sender and receiver. Same as Core Metadata TitleInternalAlias	xs:string	
SeasonTitle		Title for season. Same as Common Metadata TitleDisplayUnlimited for WorkType 'Season.	xs:string	
LocalSeriesTitle		Local series title, if applicable. Same as Common Metadata TitleDisplayUnlimited for WorkType 'Series'	xs:string	0..n
	language	Language for local series title	xs:language	
LocalSeasonName		Local season title, if applicable. Same as Common Metadata TitleDisplayUnlimited for WorkType 'Season.	xs:string	0..n
	language	Language for local series title	xs:language	
SeasonNumber		Season number as defined in Common Metadata. Parties should agree upon which numbering scheme to use.	md:ContentSequenceInfo-type	
SeasonEpisodeCount		Number of episodes in this season.	xs:positiveInteger	0..1
SeriesAltIdentifier		Other identifiers for the series.	md:ContentIdentifier-type	0..n
SeasonAltIdentifier		Other identifiers for the season.	md:ContentIdentifier-type	0..n
<any>		Any other element	any ##other	0..n

2.2.3 AvailTrans-type

Element	Attribute	Definition	Value	Card.
AvailTrans-type				
	AvailID	Avail Identifier Must be unique to Avail window/entry.		
LicenseType		Type of transaction. See below.	xs:string	
Description		A free-form description of the transaction.	xs:string	
Locale		Region or regions where transaction applies. Default is worldwide. Note that if both Locale and LocaleExcluded are absent, default is worldwide.	md:Region-type	0..n
LocaleExcluded		Region or regions where transaction does not apply. Default is nowhere, and Locale takes precedence.	md:Region-type	0..n
StoreLanguage		Language or languages to which transaction applies. If absent, then all languages is assumed.	xs:language	0..n
LicenseRightsDescription		Description of License or Rights granted. See below.	xs:string	
FormatProfile		Indicates the format profile covered by the transaction. This typically refers to HD, SD or 3D.	xs:string	
Terms		Terms described in pre-defined values.	avails:AvailTerms-type	0..1
OtherTerms		Terms described as name/value pairs.	md:NVPair-type	0..1
OtherTerms		Monetary terms described as name/value pairs.	md:NVPairMoney-type	0..1
OtherInstructions		Any other instructions. Free text.	xs:string	0..1
Start		Start of terms. If Start and ContStart are absent, terms begin immediately.	xs:dateTime	(optional choice with CondStart)

CondStart		Conditional Start of terms	avails:AvailTransCond Date-type	(optional choice with Start)
End		End of terms. If End and CondEnd are absent, terms continue indefinitely.	xs:dateTime	(optional choice with CondEnd)
CondEnd		Conditional ending period	avails:AvailTransCond Date-type	(optional choice with End)

LicenseType should have one of the following values, although additional values may be used by agreement between sender and receiver:

- 'EST' (Electronic Sell Through)
- 'VOD' (Video on Demand) – Download or streaming based on individual transactions (e.g., payment per use).
- 'SVOD' (Subscription VOD) – Streaming on a subscription service

Note that any of these models can be paid or free.

LicenseRightsDescription should have one of the following values:

- 'New Release' – New release
- 'Library' – Catalog title
- 'Mega-Library' – High value library
- 'DD-Theatrical' – EST, VOD or Subscription availability, Day and Date withTheatrical
- 'Pre-Theatrical' – EST, VOD or Subscription availability prior to theatrical availability
- 'DD-DVD'–Day and Date DVD
- 'Early EST' – EST prior to DVD availability
- 'Preorder EST' – preorder EST prior to DVD availability (order, but not download or play)
- 'Early VOD' – VOD prior to DVD availability, also Preorder VOD
- 'Preorder VOD' – preorder VOD prior to DVD availability (order, but not download or play)
- 'DTV' – Direct to Video

FomatProfile should have one of the following values

- 'HD' – High Definition
- 'SD' – Standard Definition
- '3D' – 3D, non-specific of resolution
- '3DHD' – 3D High Definition
- '3DSD' – 3D Standard Definition
- 'HFR' – HD High Frame Rate
- '3DHFR' – 3D High Frame Rate
- '4K' – 4K (4096x2160) format or 4xHD (3840x2160)
- '3D4K' – 3D 4K

2.2.3.1 AvailTransCondDate-type

Element	Attribute	Definition	Value	Card.
TransInfo-type				
Event		The event to which this condition is tied	xs:string	0..1
Condition		Indication of before, after, etc.	xs:string	
Locale		Locale of the condition	md:Region-type	0..1
Lag		Indication of how much before or after the event. This shall always be positive and the direction is assumed from the Condition.	xs:duration	0..1

Event may have any value as listed under Release Information Encoding as described in the Common Metadata Specification.

The following are accepted values for Condition

- 'before' – indicates Lag before Event
- 'after' – indicates Lag after Event
- 'simultaneous' – indicates it happens at the same time. Lag should not be included, but ignored if it is.

2.2.3.2 AvailTerms-type

These are supplied as determined by mutual agreements. These can generally be excluded if sufficient information is provided elsewhere such as contracts external to the Avails data or in OtherTerms.

Element	Attribute	Definition	Value	Card.
AvailTerms-type				
Tier		Offering Tier. This is typically a reference to a tier in a contract.	xs:string	0..1
RentalDuration		Duration of rental period in hours	xs:duration	0..1
WatchDuration		How long user has to complete viewing once started, in hours	xs:duration	0..1
WSP		Wholesale price	md:Money-type	0..1
SRP		Suggested Retail Price	md:Money-type	0..1
SeasonWSP		Wholesale Price for an entire season.	md:Money-type	0..1
<any>		Any other element	any ##other	0..n

CaptionExemptionReason shall hold one of the following values

- 'Never on TV' – This content has never aired on television in the U.S.
- 'TV without captions' – This content has only aired on television in the U.S. without captions.
- 'No captions since 20120930' – This content has not aired on U.S. television with captions since September 30, 2012
- 'Not full length programming' – This content does not consist of full-length video programming.
- 'N/A per FCC Reg' – This content does not fall within a category of online programming that currently requires captions under FCC regulations (49 C.F.R. § 79.4(b)).
- 'Exempted' – The FCC and/or U.S. Congress has granted an exemption from captioning requirements for this content.

2.2.4 Money-type and NVPairMoney-type (should be Common Metadata)

Element	Attribute	Definition	Value	Card.
Money-type				
	currency	Currency as expressed in ISO 4217 Currency Alphabetic Code. For example, "USD" for US Dollars. If absent, then local currency is assumed.	xs:string	0..1
Value		Value	xs:decimal	

[ISO4217] typically allows two or three digits after the decimal. However, Value in this element may have as many decimal places as necessary.

NVPairMoney-type is like NVPair-type except the Value is currency-based.

Element	Attribute	Definition	Value	Card.
NVPairMoney-type				
Name		Identification of the parameter being specified	xs:string	
Value		Value specified for Name.	md:Money-type	

3 RULES FOR SPREADSHEET ENCODING

The Excel structure is a subset of what can be encoded in the XML structure. This section defines rules for translating between schema and spreadsheet.

Note that spreadsheets may be transmitted as Microsoft Excel spreadsheets or common separated values (CSV) files.

3.1 Mapping Spreadsheet to XML Document

Spreadsheet		XML	Mapping
Licensor	DisplayName	//Licensor/DisplayName	1:1
AvailTrans	StoreLanguage	//Transaction/StoreLanguage	1:1
AvailTrans	Territory	//Transaction/Territory	1:1
Avail Asset	WorkType	//Asset/WorkType	1:1
Disposition	EntryType	//Disposition/EntryType	1:1
Avail Asset	TitleInternalAlias	//Asset/TitleInternalAlias	1:1
AvailMetadata	TitleDisplayUnlimited	//Asset/Metadata/TitleDisplayUnlimited	1:1
AvailTrans	LicenseType	//Transaction/Type	1:1
AvailTrans	LicenseRightsDescription	//Transaction/LicenseRightsDescription	1:1
AvailTrans	FormatProfile	//Transaction/FormatProfile	1:1
AvailTrans	Start	//Transaction/Start	1:1
AvailTrans	End	//Transaction/End	1:1
AvailTrans	Description	//Transaction/Description	1:1
AvailTrans	OtherTerms	//Transaction/OtherTerms	Name/Value pairs in parentheses, separated by semicolon (*name*;*value*)
AvailTrans	OtherInstructions	//Transaction/OtherInstructions	1:1
Avail Asset	ContentID	//Asset/@contentID	1:1
Avail Asset	ProductID	//Asset/ProductID	1:1
Avail Asset	AvailID	//Transaction/@AvailID	1:1
Avail Asset	Metadata	//Asset/VersionDescription	1:1
AvailMetadata	AltID	//Asset/Metadata/AltIdentifier	First instance
AvailMetadata	ReleaseHistoryOriginal	//Asset/ReleaseHistory/Date	Where ReleaseType='original' and DistrTerritory matches
AvailMetadata	ReleaseHistoryPhysicalHV	//Asset/ReleaseHistory/Date	Where ReleaseType='DVD' and DistrTerritory matches
AvailTerms	RentalDuration	//Transaction/Terms/RentalDuration	1:1

AvailTerms	WatchDuration	//Transaction/Terms/WatchDuration	1:1
AvailTerms	WSP	//Transaction/Terms/WSP	1:1
AvailTerms	Tier	//Transaction/Terms/Tier	
AvailTerms	SRP	//Transaction/Terms/SRP	1:1
AvailTerms	CaptionIncluded	//Asset/Metadata/CaptionIncluded	1:1
AvailTerms	Caption Required	//Asset/Metadata/CaptionRequired	1:1
AvailTerms	Any		
AvailMetadata	Total Run Time	//Asset/Metadata/RunLength	1:1

3.2 Mapping XML Document to Spreadsheet

XML	Spreadsheet		Mapping
//Disposition/EntryType			None
//Disposition/EntryType	Disposition	EntryType	1:1
//Disposition/IssueDate			None
//Disposition//ReplacesEntryid			None
//Disposition/ReplacesEntryDate			None
//Licensor/@organizationID			None
//Licensor/@idType			None
//Licensor/@retailerSpecificID			None
//Licensor/DisplayName	Licensor	Display Name	1:1
//Licensor/SortName			None
//Licensor/AlternateName			None
//Licensor/ContactInfo			None
//Asset/@contentID	Avail Asset	ContentID	1:1
//Asset/WorkType	Avail Asset	WorkType	1:1
//Asset/TitleInternalAlias	Avail Asset	TitleInternalAlias	1:1
//Asset/ProductID	Avail Asset	ProductID	1:1
//Asset/VersionDescription	Avail Asset	Metadata	1:1

//Asset/Metadata/AltIdentifier	AvailMetadata	AltID	First instance
//Asset/Metadata/TitleDisplayUnlimited	AvailMetadata	TitleDisplayUnlimited	1:01
//Asset/Metadata/RunLength	AvailMetadata	TotalRunTime	1:01
//Asset/ReleaseHistory/Date	AvailMetadata	ReleaseHistoryOriginal , ReleaseHistoryPhysicalHV	ReleaseHistory/Date maps where ReleaseType='original' and ReleaseType='DVD'
//AssetReleaseHistory/ReleaseType			Maps in cases above
//AssetReleaseHistory/DistrTerritory			Maps in cases above
//AssetReleaseHistory/Description			None
//Asset/ReleaseOrg			None
//Asset/Metadata/CaptionIncluded	AvailTerms	CaptionIncluded	1:1
//Asset/Metadata/CaptionRequired	AvailTerms	CaptionRequired	1:1
//Asset/SeriesMetadata			Future
//Transaction/Description	AvailTrans	Description	1:1
//Transaction/Territory	AvailTrans	Territory	Only first instance. Must have a new row for each combination.
//Transaction/Language	AvailTrans	Language	
//Transaction/TerritoryExcluded			This cannot be represented. If necessary, all other Locales included in Locale.
//Transaction/LicenseRightsDescription	AvailTrans	LicenseRightsDescription	1:1
//Transaction/FormatProfile	AvailTrans	FormatProfile	1:1
//Transaction/Type	AvailTrans	LicenseType	1:1
//Transaction/Terms/Tier	AvailTrans	Tier	1:1
//Transaction/Terms/RentalDuration	AvailTerms	RentalDuration	1:1
//Transaction/Terms/WatchDuration	AvailTerms	WatchDuration	1:1
//Transaction/Terms/WSP	AvailTerms	WSP	1:1
//Transaction/Terms/SRP	AvailTerms	SRP	1:1
//Transaction/Terms/SeasonWSP			Future

//Transaction/OtherTerms	AvailTrans	Any	Name/Value pairs in parentheses, separated by semicolon (*name*;*value*)
//Transaction/OtherFinanceTerms			None
//Transaction/OtherInstructions		Any (if not otherwise used)	
//Transaction/Start	AvailTrans	Start	1:1
//Transaction/CondStart			None
//Transaction/End	AvailTrans	Start	1:1
//Transaction/CondEnd			None
//OfferingContentStructure			None
//CoreMetadata			None

EMA Avails Excel Spreadsheet Fields v1-4

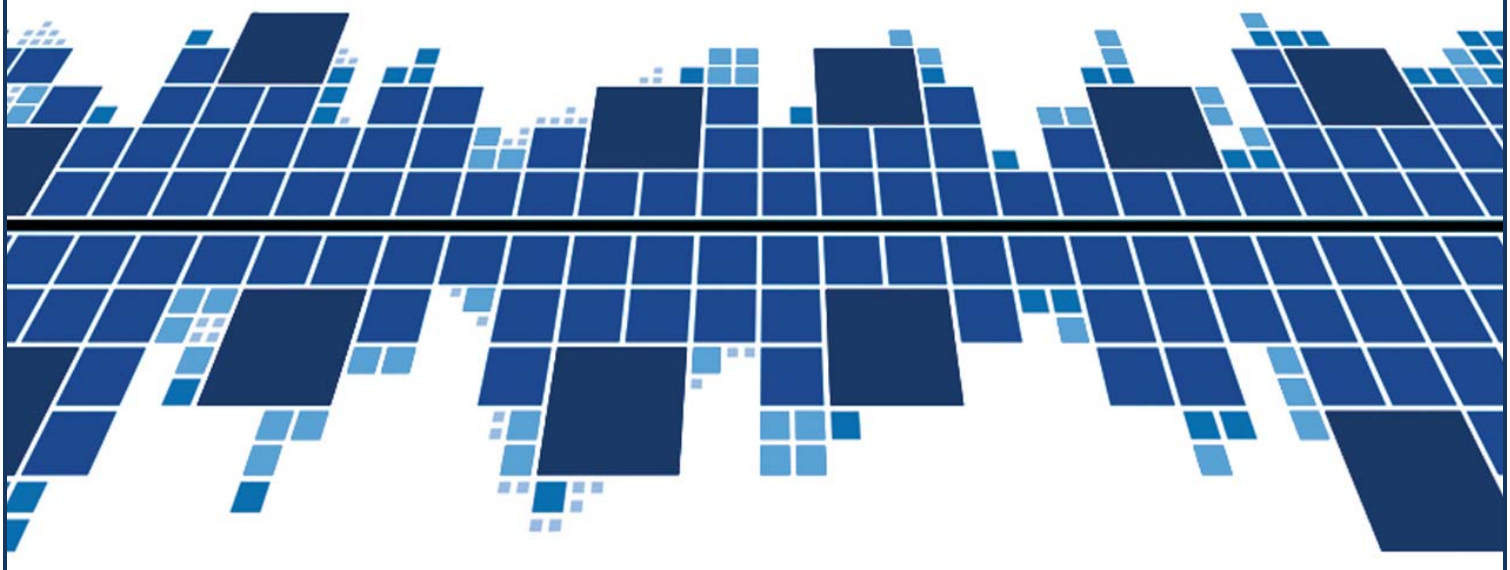
Licensor	Display Name	//REQUIRED. The name of your company.	//e.g., Rockstar Films
AvailTrans	Language	//Optional. ISO 639-1 language code for spoken language of the intended audience, not necessarily the audio language. For example, a non-English language film with English subtitles is for an English-speaking audience.	//e.g., EN, DE, FR
AvailTrans	Territory	//REQUIRED. ISO 3166-1 alpha-2 country code for the country or territory of this avail.	//e.g., US, CA, GB
Avail Asset	WorkType	//REQUIRED. Work type as enumerated in Common Metadata.	//e.g., Movie, Short
Disposition	EntryType	//Optional if sufficient ID is provided in ContentID, ProductID, AvailID, and/or AltID. EntryType is information about the avail entry as to whether it is a new avail entry or if it replaces a previous avail entry. The use of "Full Extract" means that all avail entries provided for a version within a territory should overwrite all previous avail entries for that version with that territory. Please note: if this field is blank, then the default handling of it will be "Full Extract."	//e.g., Create, Update, Delete, Full Extract
Avail Asset	TitleInternalAlias	//REQUIRED. Title used by involved parties to refer to this content.	//e.g., First Dance, The
AvailMetadata	TitleDisplayUnlimited	//Optional. Display title, no length limit. Same as TitleDisplayUnliminted in Common Metadata.	//e.g., The First Dance
AvailTrans	(License) Type	//REQUIRED. Type of transaction.	//e.g., EST, VOD, SVOD
AvailTrans	LicenseRightsDescription	//Optional. Description of License or Rights granted.	//e.g., New Release, Library, Early EST
AvailTrans	FormatProfile	//REQUIRED. Indicates the format profile covered by the transaction.	//e.g., HD, SD, 3D
AvailTrans	Start	//REQUIRED. Start of term in YYYY-MM-DD format.	//e.g., 2013-05-14
AvailTrans	End	//REQUIRED. End of term in YYYY-MM-DD format.	//e.g., 2019-02-17
AvailTrans	Description	//Optional. A free-form description of the transaction.	//e.g., Box office info. Significant digital home entertainment release campaign planned.
AvailTrans	Other Terms	//Optional. Any additional monetary terms.	//e.g., Eligible for promo discount if bundled with prequel. Please contact marketing team for details if interested.
AvailTrans	Other Instructions	//Optional. Any additional instructions.	//e.g., Please make available only with pre-quel.

Avail Asset	Content ID	//Optional. Title Identifier. This should be the Title Level EIDR.	//e.g., 10.5240/1489-49A2-3956-4B2D-FE16-5
Avail Asset	Product ID	//Optional. Asset Identifier. This should be the Version Level EIDR.	//e.g., 10.2340/1489-49A2-3956-4B2D-FE16-6
Avail Asset	AvailID	//Optional. Avail Identifier. This should be unique to the avail window/entry.	//e.g., 34530345-ABD-WE
Avail Asset	Metadata	//Optional. Metadata describing Asset.	//e.g., Fully localized, multi-language.
AvailMetadata	AltID	//Optional. Other identifiers referring to the same asset. Same as AltIdentifier in CommonMetadata.	//e.g., FIRSTDANCE_FR
AvailMetadata	Release History (Original)	//Optional. First date of distribution for a title, typically theatrical release date. If available for territory of avail, otherwise first theatrical release date WW (e.g., US) would suffice. Format is YYYY-MM-DD.	//e.g., 2013-01-30
AvailMetadata	Release History (DVD)	//Optional. Release date for initial physical home video release. If available for territory of avail, otherwise first physical home video release date WW (e.g., US) would suffice. Format is YYYY-MM-DD.	//e.g., 2013-05-14
AvailTerms	Rental Duration	//Optional. Duration of rental period in hours. 720 hours = 30 days.	//e.g., 720
AvailTerms	Watch Duration	//Optional. Duration or playback period after playback start, in hours.	//e.g., 24, 48, 72
AvailTerms	WSP	//Optional if sufficient pricing information is otherwise provided. Wholesale price in local currency.	//e.g., 10.50
AvailTerms	Tier	//Optional if sufficient pricing information is otherwise provided. Tier information applied to avail.	//e.g., 1, 3, A, B
AvailTerms	SRP	//Optional if sufficient pricing information is otherwise provided. Suggested retail price in local currency.	//e.g., 9.99, 12.99
AvailTerms	CaptionIncluded	//REQUIRED if in US. Communicating if caption file will be delivered.	//e.g., Yes, No
AvailTerms	Caption Required	//REQUIRED in US. Communicating if caption file is required or not. It is not required if it is an except category as defined by FCC requlations. It is not required for non-US avails.	//e.g., Yes, No.
AvailTerms	Any	//Optional. Any other element.	//e.g., Free if combined with bundle. Contact marketing team if interested.
AvailMetadata	Total Run Time	//Optional. Total run time as HH:MM:SS.	//e.g., 1:56:20

16530 Ventura Blvd., Suite 400
Encino, CA 91436
818.385.1500
www.entmerch.org

Best Practices & Specifications For the Delivery of Image Artwork for Digital Audio-Visual Distribution

December 5, 2013



INTRODUCTION

EMA's Digital Supply Chain Committee was formed to seek solutions to optimize the delivery of digital content and its associated components from the content providers through service providers and then through retailers/distributors ultimately to the consumer. Opportunities to improve and standardize the consumer experience will be explored, as will new technology to bring speed and efficiencies to this supply chain.

One of the initial opportunities identified was to draft best practices for, and a recommended standard set of, image artwork files for digital audiovisual content.

Why is it needed?

- At the request of their customers, content providers are creating image files unique to each of their retail partners. This causes unnecessary costs in the supply chain and often delays the availability of new products to the consumer.

- Often times, individual retailers/distributors will edit and adapt studio-supplied image files to meet their merchandising needs. This is usually followed by a lengthy manual chain of re-edits and approvals for each piece of artwork, wasting a lot of staff time and often delaying the proper merchandising of content.

- Today's ecosystem is too manual. Standardization will facilitate automation, reducing costs and increasing speed.

- Quality control issues slow down today's processes. Creating a standard set of image files instead of many alternative files should reduce the quantity of errors. And, when an error does occur and is caught by a single customer, it can be corrected for all retailers/distributors.

This EMA file spec has been developed over a series of meetings among retailers/distributors addressing their needs to fulfill delivery to the consumer. It is anticipated that all participating retailers/distributors will be able to fulfill their normal needs within this set of image files.

EMA's Best Practices & Specs for the Delivery of Image Artwork for Digital Audio-Visual Distribution

Movies

Sizes Required

Box Art - 3:4 - Minimum of 1000 pixels wide
Horizontal Image - 4:3 and 16:9 - Minimum of 2000 pixels wide

File Format

Both a layered PSD file and either a png or jpeg need to be available.
PSD files should contain any titles, branding, or text in a separate layer. (Key art with title treatment layers removed should not show major gaps in design.)

Color

RGB
TV Safe Colors

Image Guidelines

No Tag lines
No Ratings
No Critic Quotes
No Dates
No Cast/Credits
Image must be recognizable from 10ft away on an SD TV that is 38-40 inches
If key artwork alternative, image provided must have one focal point (i.e., not too crowded/busy - 1 - 2 people max.)

Naming

Use EIDR if available
If no EIDR available, please refer to the naming conventions agreed upon by the Studio/Network and Digital Distributor

Foreign Releases

Need the localized name
Would prefer art used in the local territories

No key art available

Choose an image to be consistent across platforms such as a still frame or images from other promotional materials

Additional Images

Minimum of two stills in each of above sizes that are relevant to the audience (i.e., violent vs. conservative image.)

TV Shows

Sizes Required

Box Art - 3:4 - Minimum of 1000 pixels wide
Horizontal Image - 4:3 or 16:9 - Minimum of 2000 pixels wide
Square Image - 1:1- 800x800 pixels

File Format

Both a layered PSD file and either a png or jpeg need to be available.
PSD files should contain any titles, branding, or text in a separate layer. (Key art with title treatment layers removed should not show major gaps in design.)

Series/Season/Episode Requirements

Required: Series and Season artwork
Option: Episode artwork

Color

RGB
TV Safe Colors

Image Guidelines

No Tag lines
No Ratings
No Critic Quotes
No Dates
No Cast/Credits
Image must be recognizable from 10ft away on an SD TV that is 38-40 inches
If key artwork alternative, image provided must have one focal point (i.e., not too crowded/busy - 1 - 2 people max).
Lower 1/8 of portrait art is clear of important details

Naming

Use EIDR if available
If no EIDR available, please refer to the naming conventions agreed upon by the Studio/Network and Digital Distributor

Foreign Releases

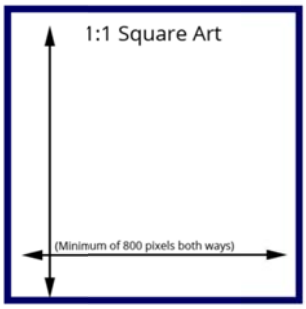
Need the localized name
Would prefer art used in the local territories
Use “series” instead of “season’ when applicable.

No key art available

Choose an image to be consistent across platforms such as a still frame or images from other promotional materials

Additional Images

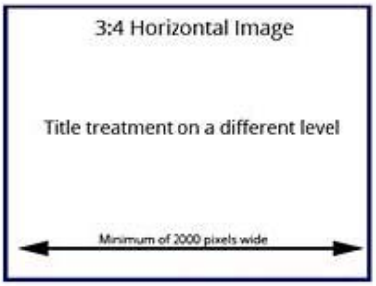
Minimum of two stills in each of above sizes that are relevant to the audience (i.e., violent vs. conservative image.)



SQUARE (1:1) IMAGE

BOX ART (3:4) IMAGE

HORIZONTAL (16:9 and 3:4) IMAGES



The EMA Digital Supply Chain Image File Work Group

Meg Campbell, Google/YouTube – Work Group Chair

Best Buy – Randy Pierce

Google/YouTube – Matt Darby and Mark Fleming

Microsoft – Ellen Kim

Netflix – Patrick McGowan and Nick Nelson

Vudu – Adam Simpson and Heather Carrie

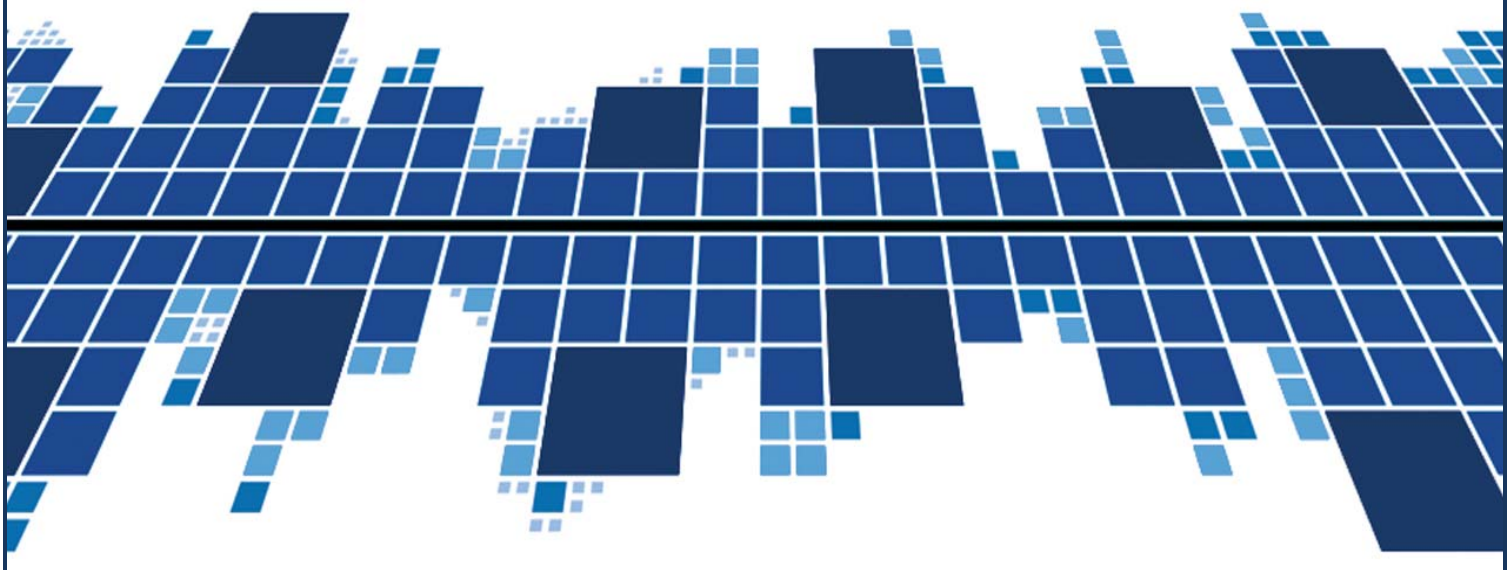
EMA Staff – Mark Fisher, Jen Lane, Steve Apple

For further information, please contact Sean Bersell, EMA, sbersell@entmerch.org or Jennifer Lane Burnell, EMA, jlane@entmerch.org.

16530 Ventura Blvd., Suite 400
Encino, CA 91436
818.385.1500
www.entmerch.org

Best Practices for Closed Captioning of Internet Protocol-Delivered Video Programming

DRAFT
December 5, 2013



EMA's Best Practices for Closed Captioning of Internet Protocol-Delivered Video Programming in the United States*

DRAFT – December 5, 2013

The EMA Closed Captions Working Group was created to develop a better understanding of, and appropriate best practices for compliance with, the legal requirements imposed by federal law and regulation for closed captioning of Internet Protocol-delivered video programming and to identify other best practices for the conversion of television closed caption files for transmission over the Internet.

Certification If Captions Are Not Provided

The Twenty-First Century Communications and Video Accessibility Act of 2010 and accompanying regulations promulgated by the Federal Communications Commission require that all full-length video delivered via the internet be able to be viewed with closed captions if the video airs on broadcast or cable television with closed captions on or after the applicable effective date. There are various effective dates for the requirement, which are dependent on whether the video programming is pre-recorded and whether it has been edited for the Internet:

- September 30, 2012, for all prerecorded programming that is not edited for Internet distribution;
- March 30, 2013, for all live and "near-live" programming [programming that is performed and recorded within 24 hours prior to its initial airing on television];
- September 30, 2013, for all prerecorded programming that is edited for Internet distribution.

* This document is a working draft and is subject to revision. Participation in the working group should not be considered endorsement of all of the draft recommendations.

No effort is being made by EMA or the EMA Digital Council to in any way obligate any market participant to adhere to the Best Practices for Closed Captioning of Internet Protocol-Delivered Video Programming. Whether to utilize the Best Practices for Closed Captioning of Internet Protocol-Delivered Video Programming in whole or in part is left entirely to the individual discretion of individual market participants, using their own independent business judgment. Moreover, EMA and the EMA Digital Council disclaim any warranty or representation as to the suitability of the Best Practices for Closed Captioning of Internet Protocol-Delivered Video Programming for any purpose, and any liability for any damages or other harm you may incur as a result of utilizing them.

There are special rules for video programming that is already in the library of the video programming provider/distributor before it is shown on television with closed captions. Starting in March 2014, those videos must be captioned within 45 days of being shown on television with captions. The window is reduced to 30 days in 2015 and 15 days in 2016.

The regulations do not cover user-generated content (unless that content is included in the video programming as broadcast on television).

The content licensor ("video programming owner") is to provide the closed captioning file to the online video service ("video programming distributor" or "video programming provider"). The content licensor and the online video service are to establish a mechanism for ongoing communication whether a particular video is covered by the closed captioning requirement, and the online video service must make a "good faith effort" to identify covered programming using that mechanism. An online video service is entitled to rely on a certification from the content provider that a particular video is not subject to the closed captioning requirement.

Recommended Best Practice for Certification if Captions Are Not Included (Manual Delivery):

If a closed caption file is not provided for intended IP-delivered video programming, the video programming owner should provide the following certification:

[Partner name] certifies that captions are not required for this video upload because:

- ☐ *This content has never aired on television in the U.S.*
- ☐ *This content has only aired on television in the U.S. without captions.*
- ☐ *This content has not aired on U.S. television with captions since September 30, 2012*
- ☐ *This content does not consist of full-length video programming.*
- ☐ *This content does not fall within a category of online programming that currently requires captions under FCC regulations (49 C.F.R. § 79.4(b)).*
- ☐ *The FCC and/or U.S. Congress has granted an exemption from captioning requirements for this content.*

Recommended Best Practice for Certification if Captions Are Not Included (Electronic Delivery):

If a closed caption file is not provided for intended IP-delivered video programming, the video programming owner should provide the above certification in both the avails and the metadata for that programming. The Media Entertainment Core Metadata (MEC) and EMA Content Availability Metadata (EMA Avails) provide the means to transfer the certification and reasons electronically.

Recommended Captioning Formats

In order for a broadcast video to be delivered over the Internet with closed captions, the closed caption file must be converted from the CEA-608-E [CEA 608] protocol used for television closed captions to a format suitable for Internet delivery (of which there are several), after which the captions can be edited to display properly. This conversion and editing can be done manually (extremely difficult and time-consuming), from scratch (very expensive), or by using software to extract and reformat the captioning data (preferred).

Even with closed captioning software, conversion can be challenging, especially when it involves a broadcast closed caption file in a legacy format.

The intent of these recommendations is to enable transfer of closed captions in a manner that completely preserves their original presentation. Most, if not all, captions in the United States are authored within the CEA-608 specification. It is, therefore, important to have recommendations that efficiently and accurately deliver CEA-608 captions.
It is possible, however, to have captions that exceed CEA-608 capabilities, such as CEA-708-D digital television captions. Consequently, recommendations are included that support captions with capabilities beyond CEA-608. (Although the advanced caption recommendations can support CEA-608, we anticipate the CEA-608 recommendations will be preferred for conveying CEA-608 captions.)

There are two applicable standards for delivering CEA-608 captions. The first is Scenarist Closed Caption (SCC), a de facto standard for the conveyance of CEA-608 data. The second is SMPTE-TT, which was standardized by the Society of Motion Picture and Television Engineering (SMPTE), and is a profile of the Timed Text Markup Language (TTML), sometimes referred to as DFXP. There are many ways to ensure compliance with the statutory and regulatory requirements to faithfully present closed captions, and users of CEA-608 captions are encouraged to understand the “safe harbor” provisions associated with compliant SMPTE-TT in the FCC regulations implementing the Twenty-First Century Communications and Video Accessibility Act of 2010 [47 C.F.R. 79.4(c)(1)(i)].

<u>Recommended Best Practice for CEA-608 Caption Delivery:</u>

Option 1: Delivery of CEA-608 closed caption files in SCC format

Closed captions are delivered using SCC files. SCC offers a simple means to transfer CEA-608 equivalent data. CEA-608 caption data is tied by frames as a byproduct of which frames include the data. SCC substitutes timecodes for frame synchronization, but otherwise uses CEA data exactly.

These files shall use the .scc extension.

Option 2: Delivery of CEA-608 closed caption files in SMPTE-TT format

CEA-608 data is conveyed using SMPTE-TT as constrained by the following profile:

1. Structural Constraints

a. *A document MUST contain a tt element.*
b. *A document MUST contain both a head and body element.*
c. *A document MUST contain a ttp:profile attribute on the tt element where the value of the attribute is [???].*

2. Parameter Constraints

a. *A document MUST NOT contain a ttp:markerMode attribute.*

3. Styling Constraints

a. *A document MUST NOT contain a* ***<length>*** *expression that uses the px unit of measure unless (1) the* ***<length>*** *expression appears in a tts:extent attribute on the tt element, or (2) a tts:extent attribute appears on the tt element.*
b. *A document MUST NOT contain a* ***<length>*** *expression that uses the c (cell) unit of measure unless a ttp:cellResolution attribute appears on the tt element.*
c. *A document MUST NOT contain a* ***<length>*** *expression that uses the em unit of measure.*
d. *A document MUST NOT contain a tts:overflow attribute.*

4. Layout Constraints

a. *A document MUST NOT contain a region such that the computed values of the origin and extent properties of the region would result in it extending outside the root container region.*
b. *A document MUST NOT contain two regions such that the spatial extent of the two regions would (visually) overlap.*
c. *A document MUST NOT contain content such that more than four regions would be selected into a given synchronic intermediate document.*

5. SMPTE Extension Constraints

a. *A document MUST NOT contain a smpte:image element.*
b. *A document MUST NOT contain a smpte:backgroundImage attribute.*
c. *A document MUST NOT contain a smpte:backgroundImageHorizontal attribute.*
d. *A document MUST NOT contain a smpte:backgroundImageVertical attribute.*

6. Encoding Constraints

a. Content Authors MUST adhere to the following constraints:

i. A document MUST be concretely represented as a well-formed [XML10] entity.

ii. A document MUST be concretely represented using the UTF-8 character encoding [UNICODE].

The use of other features defined in SMPTE-TT is not precluded, and the use of other profiles that implement the features of this profile are acceptable. Video programming distributors that have additional or alternative preferences should clearly communicate those preferences.

Recommended Best Practice for CEA-708 Caption Delivery:

Captions are conveyed using the CEA-708 tunneling methods described in CEA-708.

Recommended Best Practice of Advanced Captions, Subtitles, and Other Timed Text and Images:

SMPTE-TT is used with the constraints of Common File Format Timed Text (CFF-TT).

Recommendations Regarding Other Timed Text Methods:

Also acceptable is Simple Delivery Profile (SDP), which is in process with the W3C TT Working Group. Other formats are not recommended because either they are proprietary and not open source or they present technical issues.

Frame Rates

Closed caption data files are separate from the video data files. Ideally, the caption frame rate should match the native frame rate of the source. However, they often do not, and synchronization of the two can be a problem.

Television in North America is generally broadcast at a standard rate of 29.97 frames per second (FPS). Internet video delivery, however, can support a variety of frame rate formats, and a number of distributors of IP-delivered video programming require films and TV shows to be at a frame rate of 23.976 or 25 FPS.

These varying frame rate requirements mean that the closed caption files that were created for North American broadcast will not match the Internet video frame rate. As a result, the frame rate of the caption file must be reconfigured to the frame rate utilized by the Internet video

content distributor (such as 23.976 FPS), and if necessary, the time code must be stretched or shrunk.

This can be a challenge for a number of reasons. In many cases, the caption file has SMPTE-based timestamps and fails to specify the frame rate. In such cases, one has to guess the frame rate until the correct frame rate is identified. In other cases, the video has been transcoded to a slightly different frame rate, or the captions were generated using a differently transcoded or edited version of the video.

To address this issue, some Internet video content distributors require the content provider to provide a closed caption data file that is already synchronized to the video data file. Others have developed processes to fix the caption files in-house.

Recommended Best Practice:

> *If the Internet video content distributor does not require the closed caption data file to be already synchronized to the video data file, the closed caption data file may be submitted in any frame rate in which it was created, so long as the frame rate is clearly indicated in the file name, metadata, or code. However, for .SCC files, the file name should indicate whether the file is drop-frame (DF) or non-drop-frame (NDF) and the timecode should be hours:minutes:seconds:frames for non-dropframe timebase and hours:minutes:seconds;frames for dropframe timebase.*

References

[CEA-608]	CEA-608-E, "Line 21 Data Services", April 1, 2008
[CEA-708]	CEA-708-D, "Digital Television (DTV) Closed Captioning", August 1, 2008
[CFF-TT]	Common File Format Timed Text, [add reference]
[EMA-Avails]	EMA Avails Metadata, [add reference]
[MEC]	Media Entertainment Core Metadata, [add reference]
[SCC]	Scenarist Closed Caption Format, http://www.theneitherworld.com/mcpoodle/SCC_TOOLS/DOCS/SCC_FORMAT.HTML [editors note: Although there is no de jure standard, this seems to be the best reference for SCC.]
[SDP]	Simple Delivery Profile, http://www.w3.org/TR/ttml10-sdp-us/
[SMPTE-TT]	SMPTE ST2052-1:2010, "Timed Text Format (SMPTE-TT)"
[SMPTE-608]	SMPTE RP2052-10:2012, "Conversion from CEA-608 Data to SMPTE-TT"
[SMPTE-708]	SMPTE RP2052-11, "Conversion from CEA-708 Data to SMPTE-TT"
[TTML]	W3C Timed Text Markup Language (TTML) 1.0 (Second Edition) http://www.w3.org/TR/ttaf1-dfxp/

The EMA Closed Captions Working Group (names and employers of Working Group Participants are for information only)

Amazon – Andy Bruncke, Steve Geiger, Joe Pavey
Best Buy – Brigit Lee
Google – Ken Harrenstien, Steve Maher
Microsoft Corp. – Michelle Burbridge, Dennis Cronin, Laura Smith
MovieLabs – Craig Seidel
Netflix – Dae Kim
Rovi Corporation – David Hazlett, James Moore
Vudu – Aaron Martin, Adam Simpson
EMA Staff – Sean Bersell, Jennifer Lane Burnell, Mark Fisher,

For further information, please contact Sean Bersell, EMA, sbersell@entmerch.org, or Jennifer Lane Burnell, EMA, jlane@entmerch.org.