

IMF–TOOL

REPAIRING IMF PACKAGES USING IMF-TOOL

The initial development of this tool has kindly been sponsored by Netflix, Inc.

Contact

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Abstract

This document explains how certain defects in legacy IMF packages can be fixed. “Legacy” in that context refers to packages that are not compliant to the latest SMPTE standards published in 2016 (aka “IMF 1.1”). Legacy packages may also be missing metadata items like the CPL Essence Descriptor List, Multichannel Audio Descriptors etc.

IMPORTANT: Make sure a Java Runtime Environment Version 1.8 is installed on your system when running IMF-Tool ! Otherwise modified CPLs will not be compliant. IMF-Tool issues a warning (Pop-up window, see Figure 1) when Java is not installed properly.

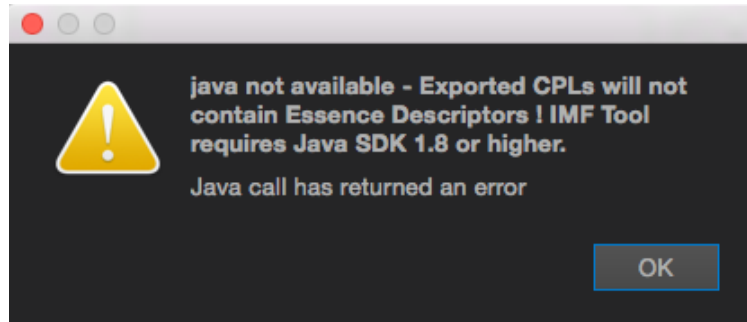


Figure 1: Java warning – CPLs will not contain proper essence descriptors

WARNING

Make a backup copy of your IMF package before conducting any of the tasks below!

Supported tasks

- Updating the CPL(s) of an IMF package to SMPTE ST 2067-3:2016
- Editing CPL metadata: Content Title, Issuer, Content Originator, Annotation, Issuer, Content Version List, Locale List
- Re-wrapping of Audio Track files to include MCA descriptors and MCA metadata fields
- Re-wrapping of Timed Text track files

All workflow elements listed above are optional.

Users are encouraged to save CPL changes as new CPL (including a new UUID), although IMF-Tool also allows for saving modified CPLs under the same UUID.

Warning: Saving modified CPLs with the same UUID they had before applying changes may lead to significant issues when using a Media Asset Management System and is strongly discouraged.

Updating CPLs to SMPTE ST 2067-3:2016

IMF-Tool modifies all CPLs being opened to be ST 2067-3:2016 compliant, as soon as any change has been applied. E.g. editing of a single metadata field in the “Details” tab is sufficient.

The CPL can be saved as a new CPL (encouraged) or it can be saved overwriting the existing CPL and keeping the former CPL UUID (discouraged). After saving as a new CPL, the former CPL can (and probably should be) deleted by using the right-click “Remove” option available in the IMP browser or pressing “Delete” on the keyboard.

The new CPL will also contain all Essence Descriptors. No manual step needed to create Essence Descriptors.

Warning: If IMF-Tool complains about a “Missing Java Runtime Environment” during startup, no Essence Descriptors will be generated! In that case the CPLs will not be compliant to ST 2067-3:2016.

Editing CPL metadata

Open a CPL and use the Tabs “Details”, “ContentVersionList” and “LocaleList” to modify CPL metadata. Again, the CPL can be saved as a new CPL (encouraged) or it can be saved overwriting the existing CPL and keeping the former CPL UUID (discouraged). After saving as a new CPL, the former CPL can (and probably should be) deleted by using the right-click “Remove” option available in the IMP browser or pressing “Delete” on the keyboard.

Re-wrapping of Audio Track files to include MCA descriptors and MCA metadata fields

Step 1: Extracting the WAV files out of the MXF files

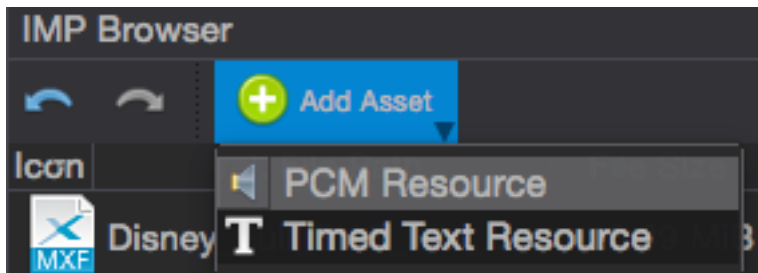
For this task, a third-party un-wrapper is required. We recommend `as-02-unwrap` from the `asdcplib` Library [1]. You may also use any other common editing tools.

Using this tool, unwrapping on the command line works as listed as an example in Figure 2.

```
$ as-02-unwrap -l bbb_English.mxf bbb_English_unwrapped
$ ls bbb_English_unwrapped*
bbb_English_unwrapped_01.wav  bbb_English_unwrapped_03.wav  bbb_English_unwrapped_05.wav
bbb_English_unwrapped_02.wav  bbb_English_unwrapped_04.wav  bbb_English_unwrapped_06.wav
```

Step 2: Creating new Assets using the WAV files from step 1.

Open the IMF package, add a new PCM Asset:



Browse for the WAV files, fill in all metadata fields. Make sure you correctly assign the channels to the WAV files!

Edit Resource
Select a single (multichannel) wav file or IMSC1/TTML1 file that should build a resource.

Soundfield group:	5.1
RFC 5646 Language Tag (e.g. en-US):	de-DE
MCA Title:	Default Title
MCA Title Version:	Domestic
MCA Audio Content Kind:	Master
MCA Audio Element Kind:	Composite Mix





[bbb_English_unwrapped_01.wav]	Channel 0 maps to:	Left
[bbb_English_unwrapped_02.wav]	Channel 0 maps to:	Right
[bbb_English_unwrapped_03.wav]	Channel 0 maps to:	Center
[bbb_English_unwrapped_04.wav]	Channel 0 maps to:	LFE
[bbb_English_unwrapped_05.wav]	Channel 0 maps to:	Left Surround
[bbb_English_unwrapped_06.wav]	Channel 0 maps to:	Right Surround


Browse Cancel Finish


After pressing “Finish”, the new Asset appears in the IMP browser:


IMP Browser

⏮ ⏭ + Add Asset

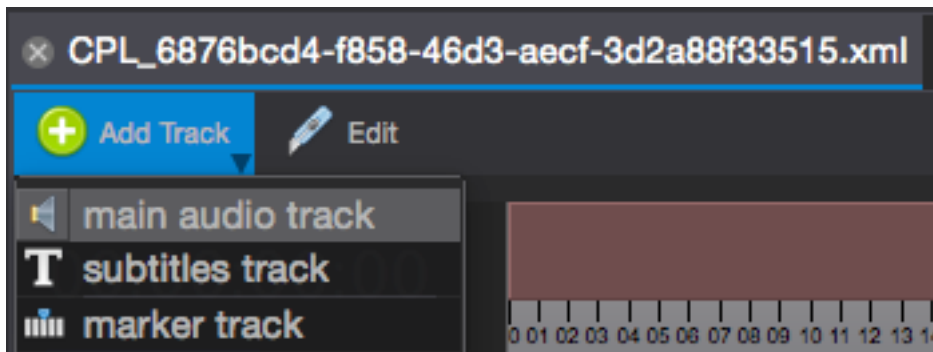
Icon	rel. File Path	File Size	Finalized	Annotation
	bbb_English.mxf	3.31 MiB	<input checked="" type="checkbox"/>	
	CPL_6876bcd4-f858-46d3-aecf-3d2a88f33515.xml	3.51 KiB	<input checked="" type="checkbox"/>	
	bbb.mxf	59.10 MiB	<input checked="" type="checkbox"/>	
	WAV_0a95b2d2-492f-48...	Not Finalized	<input type="checkbox"/>	

	Essence Type: PCM	Duration: 00:00:04:00
	Sampling Rate: 48000 Hz	Bit Depth: 24 bit
	Channels: 6	Channel Configuration: 5.1

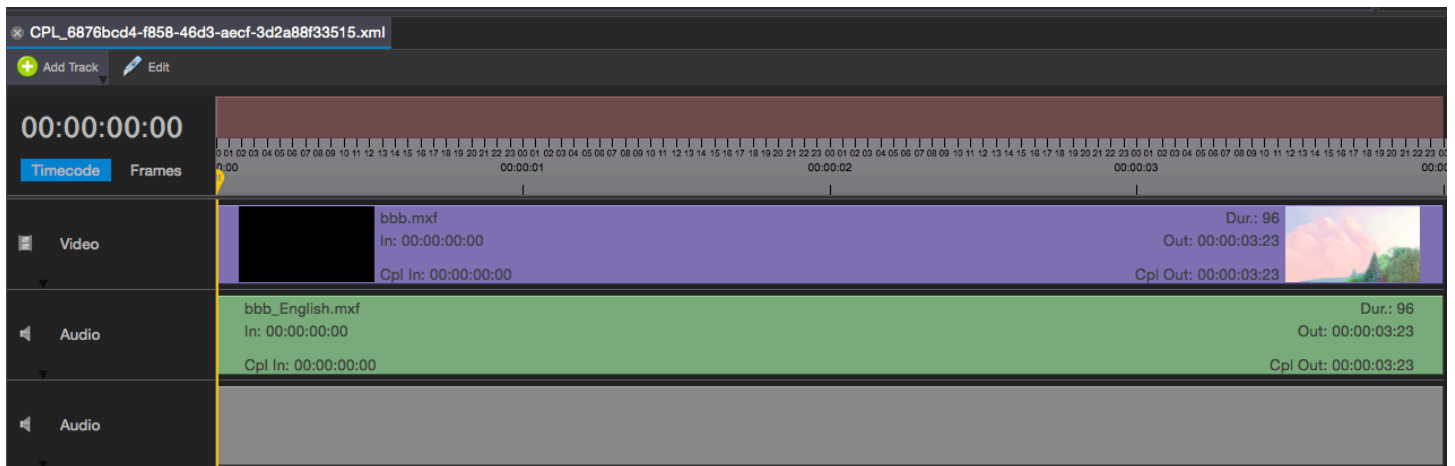
	Essence Type: JPEG2000	Duration: 00:00:04:00
	Frame Rate: 24	Stored Resolution: 1920 x 1080
	Aspect Ratio: 1.77778 (16:9)	Displayed Resolution: 1920 x 1080
	Color Mode: RGB(4:4:4)	Color Depth: 8 bit
	Primaries: ITU709	OETF: ITU709

	Essence Type: PCM	Duration: 00:00:04:00
	Sampling Rate: 48000 Hz	Bit Depth: 24 bit
	Channels: 6	Channel Configuration: 5.1
	Language: de-DE	

Add a new audio track to the CPL:

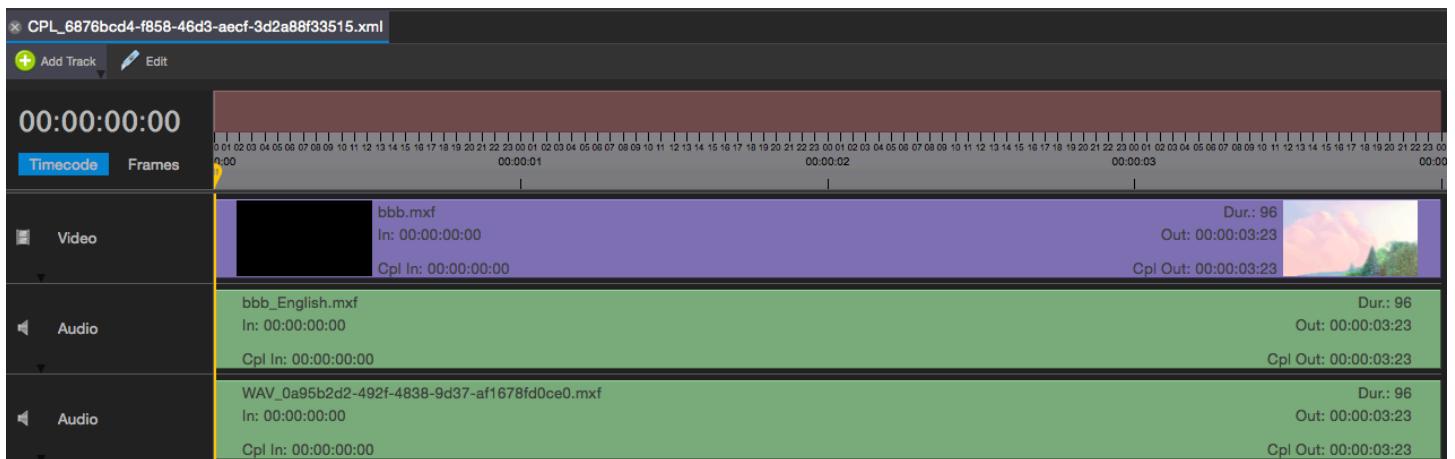


Your timeline looks like this, the track is initially empty:

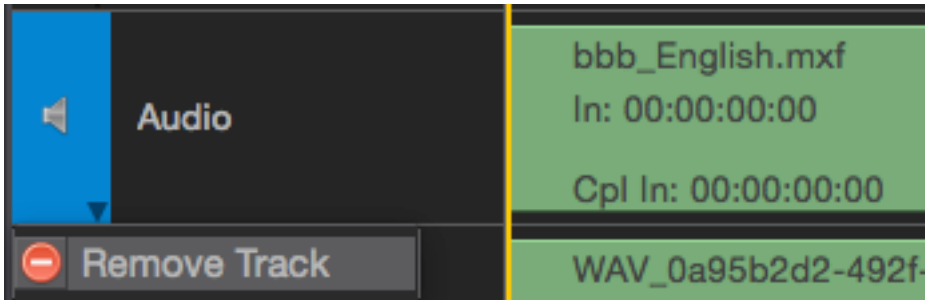


Drag & Drop the WAV Asset from the IMP browser into the timeline:

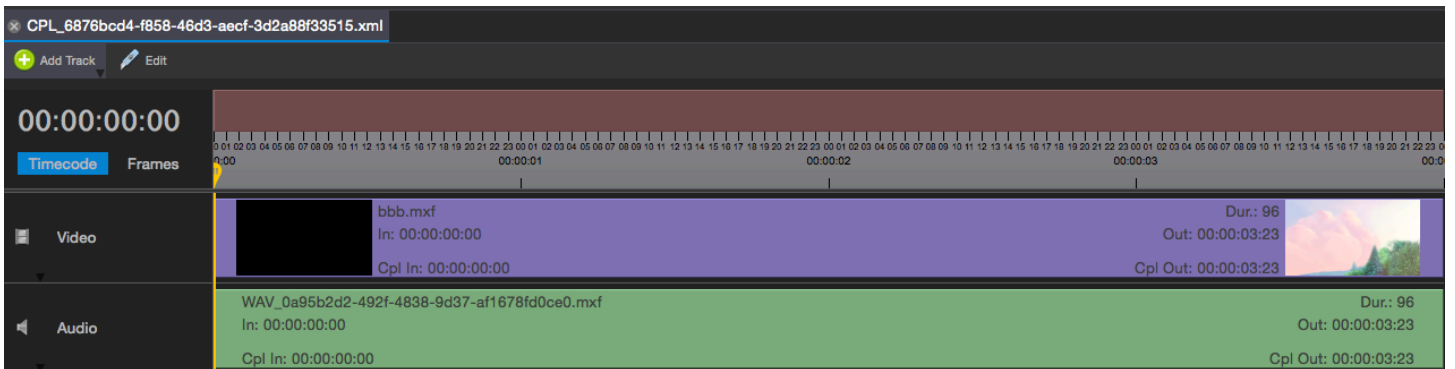
Note: Make sure to set edit point and duration by trimming like they were set before!



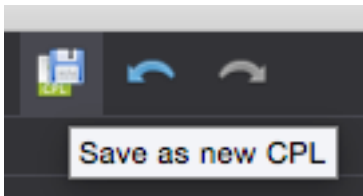
Remove the former audio track:



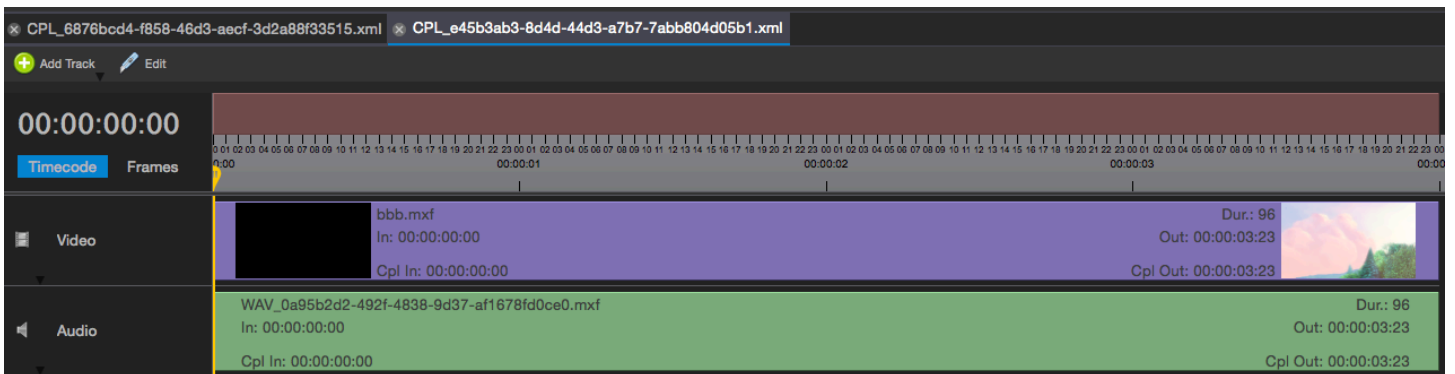
Your timeline looks like this:



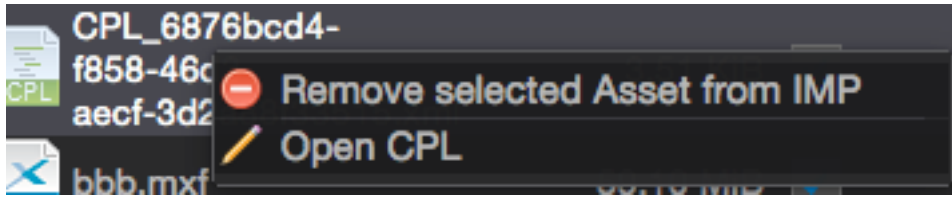
Save the timeline as a new CPL:



The new CPL appears in the second tab:



It is advisable to remove the old CPL from the package:



Finally, write the modified package to disk!

Note: The former CPL and the former audio track file will still exist on disk, although they are not referenced in the ASSETMAP and the PKL: You may safely delete them manually.



Re-wrapping of Timed Text track files

Works similar to the task for audio track files detailed above.

Notes

IMF Tool does not support video wrapping.

Contact & Support

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<http://www.github.com/IMFTool/IMFTool>