ISDCF Mixed Distribution Package Subcommittee

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Introduction

As SMPTE DCP's start becoming available, there will be a strong need to allow the distribution of media containing a mixture of Interop DCP's and SMPTE DCP's. For example, when the first SMPTE DCP trailer is released, there may be a need to distribute it on a single hard drive along with several Interop DCP's. The duration during which this functionality will be needed will be a minimum of several months and may be several years.

The final goal of the ISDCF Mixed Distribution Package subcommittee is to propose a recommended practice that all vendors can follow in order to reliably use content on media with both SMPTE and Interop DCP's. The target audience of this document includes those that master DCP's, content distributors, player manufacturers, and theater management system manufacturers.

There are four different methods below that can be used to provide this functionality.

Multiple Top-level Directories

Advantages:

- The ability to allow multiple asset maps on a single disk has often been requested by to make it easier to combine content from multiple sources.
- This method avoids the need to merge asset map files which can introduce errors into the distribution package.
- Many systems already support this method.

Disadvantages:

- This would require a revision to the SMPTE standard 429-9.
- This adds the requirement of scanning multiple directories. However, this additional step is only necessary if there is not an asset map in the root. Additionally, a modern operating system caches disk access and should not be perceptibly slowed down by this.

Description:
In this method, the current Interop and SMPTE standards would be extended to also allow ASSETMAP or ASSETMAP.xml files in directories immediately below the root directory.

Example Directory Listing:

```
\MyInteropTrailer1\
     ASSETMAP
     VOLINDEX
     PKL1.xml
     CPL1.xml
     Video1.mxf
     Audio1.mxf
\MySMPTETrailer1\
     ASSETMAP.xml
     VOLINDEX.xml
     PKL1.xml
     CPL1.xml
     Video1.mxf
     Audio1.mxf
\MyInteropTrailers2and3\
     ASSETMAP
     VOLINDEX
     PKL2.xml
     CPL2.xml
     Video2.mxf
     Audio2.mxf
     PKL3.xml
     CPL3.xml
     Video3.mxf
     Audio3.mxf
```

Media without an asset map in the root but with top-level directories shall be treated as if each top-level directory were a different drive.

Only the root and the directories immediately within the root directory (top-level directories) need to be checked for asset maps. Directories within top-level directories do not need to be checked for asset maps, although they may contain assets referenced by an asset map. If an asset map exists in the root, no other directories must be searched for other asset maps. DCP's in top-level directories shall not refer to assets in other top-level directories.

Note that when asset maps are in subdirectories, referenced asset file names are relative to the directory containing the asset map file, not the root directory.

The pseudo-code to identify the content on media is recommended to be as follows:

1. If ASSETMAP.xml exists in the root, then parse it according to SMPTE standards and stop looking for additional asset maps on the media.
2. If ASSETMAP exists in the root, then parse it according to Interop standards and stop looking for additional asset maps on the media.
3. For all top-level directories in the root, perform the steps below.
    a. If the directory name is exactly lost+found or RECYCLER, then ignore the directory and process the next directory.
    b. If ASSETMAP.xml exists, then parse it according to SMPTE standards and process the next directory.
    c. If ASSETMAP exists, then parse it according to Interop standards and process the next directory.
    d. Otherwise (no asset map found), ignore the directory and process the next directory.

Different algorithms for parsing media for content are allowed provided that all correctly structured content is identified.

Dual Asset Maps

Advantages:

- No SMPTE standard changes are necessary.

Disadvantages:

- Since the behavior of reading media with two asset maps is currently undefined, there will likely need to be implementation changes and a recommended practice documented.

Description:
In this method, the root directory could contain both ASSETMAP.xml and ASSETMAP. ASSETMAP.xml will reference all SMPTE packing lists and assets. ASSETMAP will reference all Interop packing lists and assets.

Example Directory Listing:

```
ASSETMAP
ASSETMAP.xml
VOLINDEX
VOLINDEX.xml
InteropPKL1.xml
InteropCPL1.xml
InteropVideo1.mxf
InteropAudio1.mxf
SMPTEPKL1.xml
```

```
SMPTECPL1.xml
SMPTEVideo1.mxf
SMPTEAudio1.mxf
```
Note that it will never be the case that an asset is used by both SMPTE and Interop DCP's.

Single Asset Map (Rejected by ISDCF)

Disadvantages:

- This would require a revision to the SMPTE standard 429-9.

Description:
In this method, the SMPTE standard would be extended to allow a SMPTE ASSETMAP.xml file to reference Interop packing lists, CPL's, and other assets. A single ASSETMAP.xml file could reference zero or more SMPTE packing lists as well as zero or more Interop packing lists. There would be no indicators in the asset map that specifies which assets are SMPTE vs. Interop.

Example Directory Listing:

```
ASSETMAP.xml
VOLINDEX.xml
InteropPKL1.xml
InteropCPL1.xml
InteropVideo1.mxf
InteropAudio1.mxf
SMPTEPKL1.xml
SMPTECPL1.xml
SMPTEVideo1.mxf
SMPTEAudio1.mxf
```

In the unexpected case that both ASSETMAP.xml and ASSETMAP exist in the root, the parser for a SMPTE-complaint system shall use ASSETMAP.xml and ignore ASSETMAP.

Multiple Partitions (Rejected by ISDCF)

Disadvantages:

- Operating system configurations may not mount partitions other than the first one. Compliance could therefore require low-level operating system changes as well as application changes.
- This solution is limited to hard drives. Other media, such as DVD's and USB memory sticks, cannot be partitioned in a well-supported manner.

Description:
In this method, a hard drive can be partitioned into multiple partitions. Each partition could contain either ASSETMAP.xml or ASSETMAP in the root and be parsed according to current standards.