

AAF.

The "Super-EDL"

BY BOB TURNER

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This mostly digital re-creation of 1830s Paris was made for the French movie *Vidocq*, whose creators relied on AAF metadata.

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If you heard a story about someone who was still using 30-year-old television technology in post-production today, you'd probably smirk in disbelief. But, if you use post-production software from multiple manufacturers, or more than one computer platform for post production, or a second platform for

compositing, you may be using such outdated technology yourself.

CMX invented the edit-decision list (EDL) more than 30 years ago. The company closed up shop almost five years ago, yet many of us still use this ancient technology to share editing decisions. In our digital, nonlinear era, this is a disgrace. There is a solution, but manufacturers

need to know that customers would like them to implement it.

The solution is the Advanced Authoring Format, or AAF. It is a technology designed specifically for digital nonlinear post production and authoring. It is a "Super-EDL," but it is also much more. Its purpose is to solve the problems of cross-platform interoperability — operating post-production and authoring software from different manufacturers.

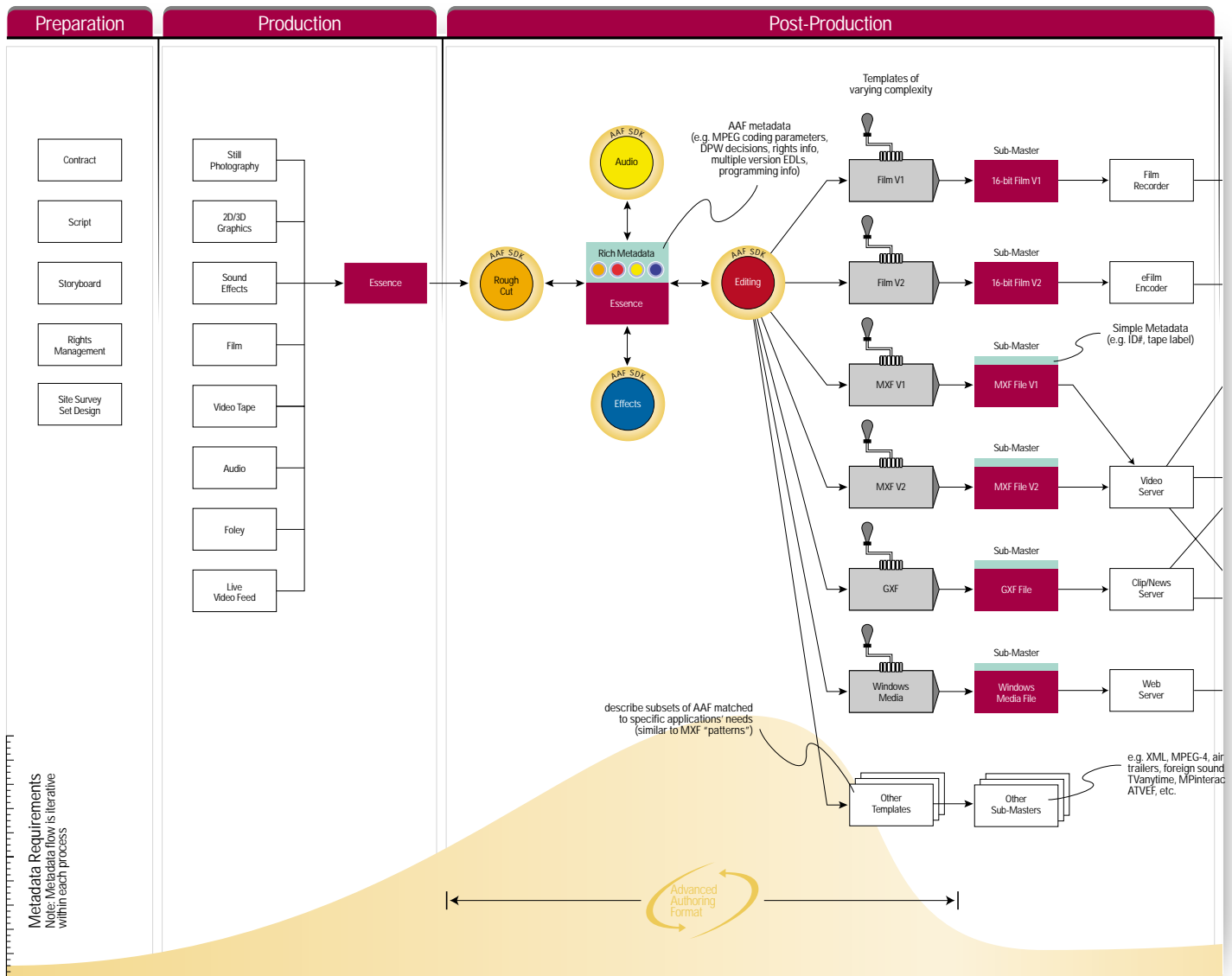
Today, we have a hodgepodge of video and audio formats that go into and out of the post production process. Furthermore, the media can make more "roundtrips" than the developers of EDL had anticipated. These media processes can include versioning, repurposing original content, outputting multiple formats to multiple delivery media, and workgroup processes (audio sweetening, graphics/effects compositing, offline, finishing).

There is a growing need for a solution that allows work to cross over multiple platforms, operating systems and software without the loss of creative decisions made on any one software package or platform. Users want to eliminate the redundancies of recreating those creative decisions (audio levels, custom effects, titling). We want to avoid the lose-lose choice between re-inputting original media or performing a time-consuming transcoding process because the media is incompatible with the process.

More importantly, we want more than an EDL limited to one video track and four audio tracks. We want an exchange interface that deals with different compression schemes, multilayer composites, multiple versions and multiple format outputs with multiple aspect ratios. We want EDLs to include:

- library information
- better audiovisual clip identification
- media asset management information
- scheduling data
- effects information
- information to facilitate interactive authoring
- ease of working in various frame rates across platforms





AAF metadata can start with scripts, time code logs, notes, etc, and this data can be attached to a multitrack EDL rough cut. The combined metadata can travel with the project to the finishing facility where the metadata is used in a workgroup environment. Then the finished project is archived with all the compositional metadata and sent as an MXF file where it can be delivered in a wide range of formats via a wide range of methods. Diagram courtesy of the AAF Association.

File interchange

AAF is to digital editing/compositing what the EDL was to linear editing. The AAF solution has several components:

- It supports the complex combination of a piece of essence and its associated metadata. This allows the content to be described as a media object.
- It facilitates the cross-platform interchange of metadata or program content. (It is designed to replace OMFI.)
- It allows operators to track the history of pieces of program content from source elements through final production.
- It allows access to networked content files on remote platforms or storage.
- It allows the combined essence in a selected format to be rendered later in

the post process.

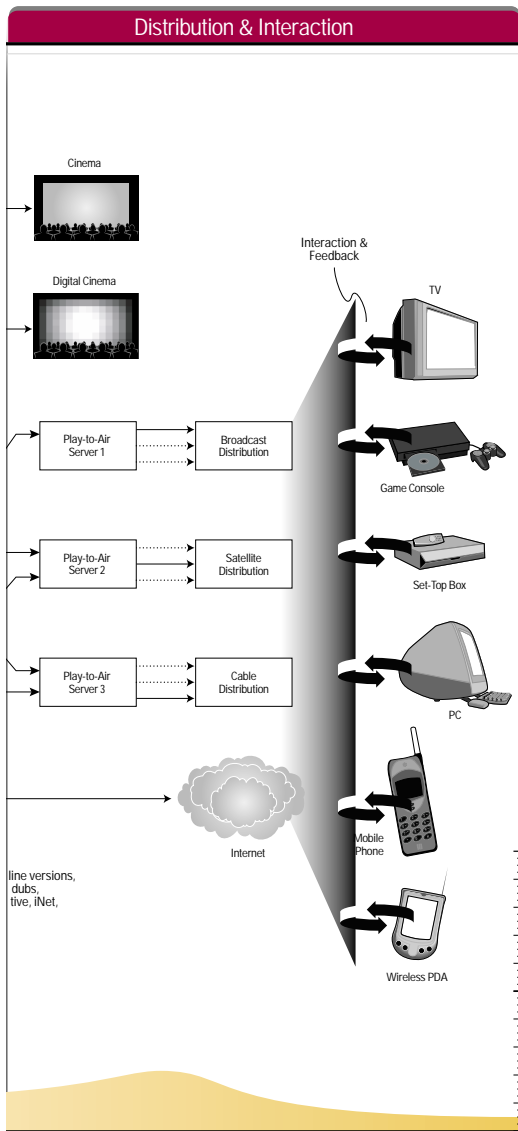
- It catalogs an extensive list of audio and video effects with a rich set of built-in standard effects.
- It provides a way to “wrap” elements of a project together for archiving.

While designed to eliminate incompatibility and redundant tasks to expedite project management, AAF also allows a manufacturer to include proprietary metadata, while maintaining exclusive access to it.

There is a growing need for a solution that allows work to cross over multiple platforms, operating systems and software.

- It encapsulates HTML and XML content, includes translators, and supports HTML/XML output.
- It provides for application program interfaces (APIs).

An example might be a feature like Avid’s script-notation alternative to bins-based media management. Avid holds a semi-exclusive license for this technology, and it can be included in the



AAF proprietary metadata that Discreet, Quantel, Media 100, Adobe or FAST products cannot access. By the same token, the other manufacturers can add proprietary metadata that Avid's product cannot access. Thus, the AAF format allows for a compilation of standardized metadata and proprietary metadata.

At NAB2002, one of the biggest announcements in the Avid booth was the company's AAF-based MetaSync tracks on the Avid timeline. Avid demonstrated how the MetaSync tracks could be used for creating iTV programming, as well as everything from Web publishing and DVD authoring to creating amusement-park virtual-reality rides. Research firm Emarketer predicts that iTV will grow from 12.7 million U.S. households in 2001 to 22.1 million by the end of 2002.

The MetaSync AAF metadata required to accommodate this growth is an excellent example of why a CMX EDL is no longer sufficient data.

Even Quantel, formerly known for high-quality (albeit expensive) closed-system/proprietary OS products, has recently announced a Generation Q series of products with an AAF-compatible family of post-production, graphics and broadcast-news solutions.

Open-source standard

AAF development is the responsibility of the AAF Association, incorporated in February 2000 as a nonprofit group. It is made up of hardware and software manufacturers and end-users who want to advance media and metadata interchange. (The association's Web site is www.aafassociation.org.)

At NAB2001, the AAF Association announced that its board of directors voted to make the technology open-source and available on Source Forge for a download. (LINUX is another example of an open-source solution.) This means that the software development kit (SDK) is free and downloadable from the Web site. Four hundred downloads have occurred in the past year since that announcement.

Version 1.01, incorporating AAF member contributions over the last year, is now available for download. The AAF Association has recently put those contributions through a process of testing and porting to all of AAF's supported platforms. The association also announced Version 1.5 implementation guidelines for edit interchange. This is an AAF Association guide to using AAF to model edit decisions (and you can use the v1.01 toolkit to implement these design implementations).

One new component of Version 1.01 is the availability of an AAF Explorer, which works in Windows to open and play AAF files. Also included are an EDL-to-AAF converter and an MPEG plug-in.

Shaping the technology

You may wonder why anyone would want to be a member of the association if the software is free. The answers include opportunities to shape the future evolution of the software and prioritize new features, as well as benefit from the association's publications and developer

AAF membership

Principal members

- Avid
- British Broadcasting Corp.
- Cable News Network
- Discreet
- Fox News Corp.
- Liberty Livewire
- Microsoft
- National Imagery and Mapping Agency
- Panasonic
- Pinnacle
- Quantel
- Sony
- Turner Entertainment Networks

General members

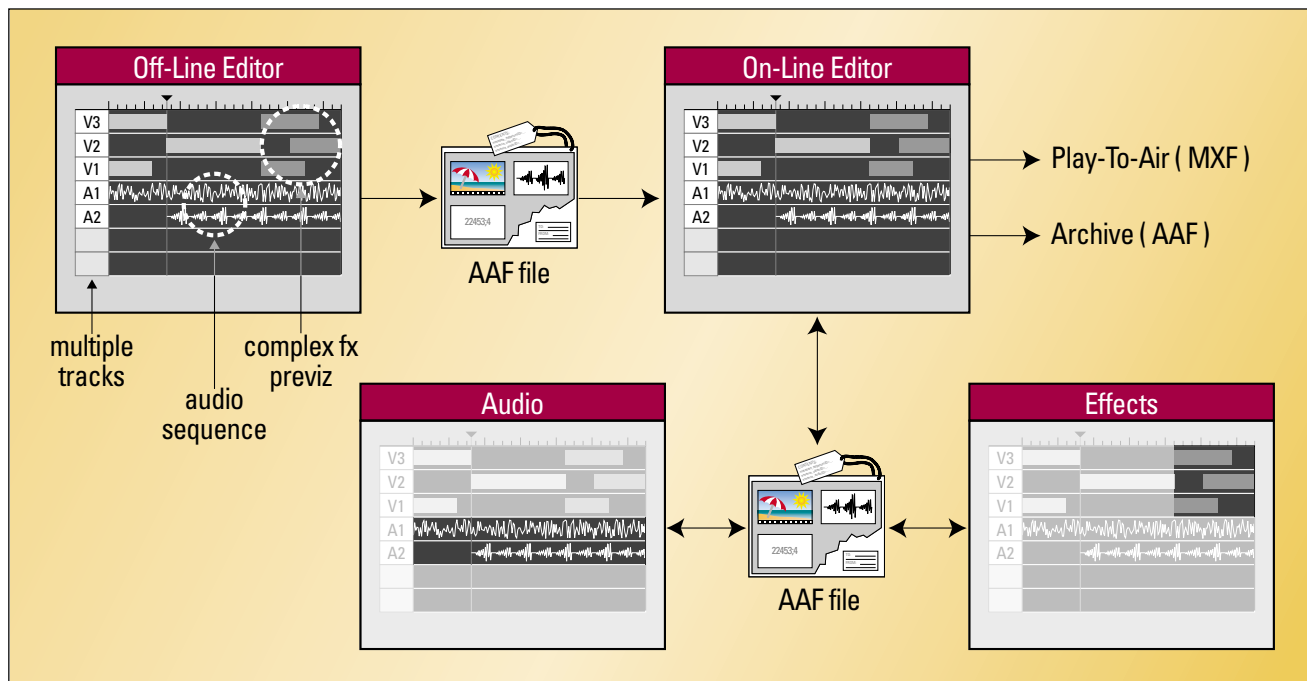
- AIST – Animated Image Systems Technology GmbH
- Ascential Software
- EMC
- Encoda Systems
- Grass Valley Group
- Leitch
- Matrox
- NL Technology, LLC
- Omneon
- Pandora
- Phillips
- Post Impressions
- Smoke & Mirrors
- Snell & Wilcox
- Sonic Foundry
- Tecmath
- Warner Bros.

Associate members

- eMotion
- Front Porch Digital
- Dutch Broadcasting Services Corp. (NOB)

Supporters

- International Digital Cinema Festival



AAF enhances workflow by allowing specific parts of a composition to be sent to an appropriate application for treatment and then gathered back into the whole. Diagram courtesy of the AAF Association.

technical support.

In addition to its planned compliance with umbrella metadata standards under the SMPTE and EBU, the AAF Association is working with the International Standards Organization (ISO) and has a close development relationship with the Pro-MPEG Forum.

At NAB2002, there was an Industry Interoperability Center in the Las Vegas Convention Center where six manufacturers' systems displayed the benefits of such interchange technologies. In that center, one company, Oliver Morgan's MetaGlue (www.metaglue.com), offered test,

measurement and validation software for MXF and AAF interoperability as well as consultancy services for users, designers and implementers of metadata-intensive television-production systems. In addition, there were at least eight AAF-compatibility

The BBC announced its implementation of "Project Mercury" to create an AAF-based open-system architecture designed for the 21st century. This design incorporates both common media files and AAF metadata. Along with this announcement came a joint an-

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presentations on the convention floor at various manufacturers' booths.

Essence data

While AAF was designed to deal with metadata either married to essence media or linked to essence media but located elsewhere, AAF can be a native essence media file format. Such a file format, with essence wrapped in metadata, is mainly designed for post production needs. Remember that the ancestry of AAF includes the OMF interchange format.

One new development trend is using MXF media files with AAF metadata. Because of the depth of metadata associated with AAF media, there are advantages to associate the metadata with a separate but compatible media file format. (See sidebar "MXF and AAF" for additional information.)

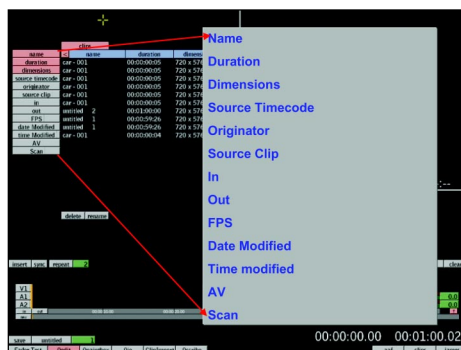
nouncement that the BBC purchased 600 seats of AIST's new AAF-compliant Cinegy NLE software.

QuickTime is focused on information needed to play or stream the file. The AAF technology has a different focus. It is married to metadata that carries a history of processes from the original creation or storyboard through the final editing. Such information can make it easier to repurpose content, or provide distribution capabilities through media with differing aspect ratios, resolutions, etc.

At the show, the AAF organization indicated plans to wrap an AAF metadata container around any media file, so QuickTime or any other media could become part of an AAF metadata system.

A call to action

AAF technology can improve the



AAF metadata contains far richer information than the traditional EDL. Each clip listed on this Quantel iQ screen can be embedded with the above metadata, and a non-Quantel AAF-compliant edit system will be able to access the data. Image courtesy Quantel.

post-production process. It can eliminate many tedious steps, saving time and simplifying project management. And it can preserve information normally lost when going from process to process. AAF makes it possible to select the best software for each process without data loss.

AAF products are available now. There were a large number of popular editors and composers demonstrating AAF compatibility. If you want the benefits of AAF technology, contact your systems' manufacturer and ask when it will be available.

But many manufacturers have not yet begun AAF implementation. They say, in effect, "We are interested, but we just have not seen the demand yet. And it won't be that hard for us to incorporate AAF technology when the time is right."

The AAF Association has had a hard time communicating the benefits of this technology to the average user. But as soon as users understand how it will save them time and

money, provide better quality and maybe even offer more creative choices, the demand will grow strong and loud.

Find out what AAF could mean for you. The benefits described here are only a part of what AAF will offer in the future. We can have a true cross-platform, cross-OS, cross-manufacturer transfer of content solution, and we will be able to select the software solutions we want without compromise. **BE**

Bob Turner is a 30-year veteran film and video editor and nonlinear editing system consultant.

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MXF and AAF

Most broadcasters are probably familiar with Material eXchange Format (MXF), created by the ProMPEG Forum. It is essentially an essence media and metadata subsystem of AAF. MXF shares the AAF object model but not the binary file format. By making the MXF design a subset of the essence-oriented parts of AAF (but with a different binary format), the AAF organization has the option to use MXF or AAF as the essence container. You can expect to see a future version of the AAF toolkit supporting direct access to MXF's binary format. MXF was designed for video servers and streaming. The smaller mediafile metadata containers make the format a good choice for less demanding news editing operations. Because of its less complex file structure, it is faster for archiving and online/near-line mediafile solutions.

The limited MXF metadata can be accepted in an AAF metadata post-production environment, and the AAF metadata can be filtered to fit an MXF metadata file. In other words, they are relatively compatible. This means that a broadcaster can have a facility where the post-production department can share media and metadata with the news editors and the media and metadata can reside on the same servers. Because of the search and access speed for MXF essence media source material, there is a trend by manufacturers to use AAF metadata associated with the MXF source media and not use the more complex AAF media with the complex metadata container. At this year's NAB, Mike Rockwell, CTO of Avid Technology, indicated that Avid's media files would be heading in exactly this "MXF with AAF associated metadata" direction. He pointed out that, with an MXF header to point to – any media file, from QuickTime to .wav – could have AAF associated with it.

Data dictionary

Essence data or essence media: All program content consists of two parts: essence data and metadata.

Essence data is the actual audio/visual media, such as:

- Video data – uncompressed video, RGB, HDTV, proprietary video file architectures, or common compressed video formats such as MPEG-2, QuickTime, .avi and DV
- Audio data – any digital audio source (audio clip from a single track on an NLE, .aiff, .wav, or DAT)
- Graphics/CG/animation – graphics, animation or text formats (.tif, .tga, .jpg, .pix)

Metadata: All the data that cannot be seen or heard, such as EDLs, timecode and sync/blanking information. Metadata comes in two categories: descriptive metadata and structural metadata.

Descriptive metadata can include:

- *Identification and location metadata* – anything that can identify essence media (e.g., file source type or location of a videotape)
- *Process metadata* – How essence media is assembled (how the media is composited or edited). This data may be used to automatically assemble a new essence media.
- *Administration metadata* – digital rights, encryption, user access, air date scheduling and other business administration
- *Interpretive metadata* – language descriptions, scene/take, character, artists
- *Parameters metadata* – signal coding, storage type, streaming parameters

Structural metadata can include:

- *Relational metadata* – links, synchronization or relationships of essence media
- *Spatial and temporal metadata* – creation dates, durations, event times, delays, layer of object