# Media Asset Management

Joan Van Tassel, Ph.D.

The convergence of telecommunications, broadcast, and computer technologies makes it ever more important for decision makers to understand how the issues, opportunities, and strategies of their counterparts will impact their own business. Moreover, many enterprises have plans to enter new markets that are traditionally the home ground of another industry altogether. Local TV stations are looking at leasing bandwidth, webcasting, and data delivery. Film studios are gearing up to provide content for digital satellite platforms, DVDs, Internet websites, and telephone company DSL services. Telephone companies are getting into the entertainment and ISP businesses.

All this crossover activity makes it more important than ever to keep up with all the Jones's; but it's not always easy to follow what's going on, even for the insiders in their own industry. A good case in point was the recent 1998 convention of the National Association of Broadcasters (NAB). It seemed to be all about digital television (DTV). On the floor, chief engineers scurried to get the latest offerings of transmitters, cameras, and measurement equipment. Even the keynote address was computerized: Apple co-founder Steve Jobs appeared in front of the image-conscious broadcaster group in worn Levis and a black T-shirt, followed by computer industry presenters who demonstrated WebTV, The Interactive Channel, and WorldGate Communication.

Like an annoying commercial, the oft-repeated message hammered in that the payoff for DTV will be better pictures and more choice for consumers. Cheerleaders assured the broadcasters they would find opportunities and additional revenue streams with multichannel capabilities—forget that they may cannibalize their core business.

But repetition doesn't make the message right.

Many attendees may have missed the much quieter set of announcements and activities organized around an arcane technology called media asset management. It's a key technology for people who want to play the digital content game, whether it's delivered over the air or via satellite, cable, telephone lines, or computer networks. And while the media asset management buzz may have received little attention from the press, it captured plenty of notice from the CEOs of entertainment giants and station groups.

The highlights included something old, something new, something archived, and especially, something blue: CBS News declared it would install the IBM Digital Library and asset management system and WB selected IBM's content distribution and spot insertion system for its national network coverage. Flying high off its two successes, IBM held a two-hour press briefing. The Media Asset Management Association heralded its own birth and held its first meeting at the show. Moreover, a host of exhibits displayed hardware, software, transport and distribution technologies, and consulting services to the wannabe implementers of media asset management systems.

The irony is that media asset management may well prove to be the real benefit to the broadcast and entertainment industry wrought by the transition to digital television—of far more importance than transmitters, transceivers, or even clearer, cleaner images. The new digital landscape will require the broadcast industry to exercise more careful management of resources, operate with greater efficiency, and speed up market cycles. For any company even thinking about delivering content, in this

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new environment, media asset management won't be merely useful—it will be necessary for survival. New entrants from other industries will find themselves going up against lean, mean, fully-networked competitors because this NAB made clear that both network and local broadcasters understand the necessity of this streamlining new technology.

"Last year, people stopped at the booth and asked, 'What is media asset management?' This year, they all know what it is and want to know how they can get started," commented a young staffer working in the Cinebase software exhibit space.

The rest of this article will cover media asset management—what it is, what it does, and why film studios, production companies, special effects and post-production facilities, Internet content providers, and many Fortune 500 companies are adopting the technology.

## MAM 101

Media asset management (MAM) is the latest application of computer technology. It is not a single technology; rather, it is a complex combination of hardware, software, and business practices that allows companies to produce, market, and manipulate information products more efficiently. Its use is not restricted to information companies, although they are an obvious market for it. Any information-intensive business will find MAM useful, and organizations like the U.S. government and General Motors are already implementing MAM systems.

Even within information companies, MAM has several different names, depending on who is using it and how it developed within a particular line of business. It is variously called "media asset management" in film, "digital content management" in the Internet and computer world, the "server-based newsroom (or station)" in television stations, and the "automated station" in radio. Networks call it "automated playout."

Fox Broadcasting lit up its Network Center, and now plays out all its programming, commercials, promotions, and long-form programs from networked video

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servers. And NBC is in the process of building the Genesis digital server system. Cable networks also employ servers for playout, including Viacom channels Showtime and MTV2. Indeed, probably the most sophisticated media asset management system in operation, as of early 1998, is the one used by Discovery Communications, which makes all of its owned material available to the different versions of the Discovery Channel, now available in 22 foreign territories.

Local television stations have been investigating and investing in video servers for the past four years. Servers were first adopted to insert commercials into the play-to-air or cable program stream. Now, local stations are putting servers in their newsrooms to edit and produce local news shows. Local broadcast executives also see that the server-based station is only a few years away.

In radio, automated stations operate with almost no human intervention at all, except a part-time engineer who makes sure the systems keep running. A computer draws down a syndicated signal, stores it, inserts local spots, and plays it out, reprocessing the signal to make it conform to the station's FCC-assigned channel. A salesman works outside the station, an accounting service handles the business administration, and an owner writes and cashes the checks.

Like all organizations, media companies, such as film studios, post-production facilities, and television and radio stations, have used computers for business administration—human resources, payroll, accounting, billing, and sometimes traffic. At the same time, digital equipment has become an ever-growing force in the arena of program creation. A third major area of digitization is post-production, and now digital machines provide nearly all special effects and titles. Finally, much of the signal processing for final distribution, including modulation for broadcast and multiplexing for cable, is accomplished digitally.

These digital islands—business, content creation, post-production, and distribution—developed as separate built-up silos of

activity and have remained isolated from one another. Media asset management can tie together some or all of these islands into a single, computerized domain, bringing the same efficiencies computers brought within each silo to activities across departments and even the entire organization.

## The Technology Platform

Four components make up a media asset management system: a hardware platform, software, a network, and a set of procedures for the acquisition, indexing, storing, retrieving, and tracking of material. Each element requires a thorough understanding of the implementing organization's current operation and needs, as well as a sense of how the needs will change over time.

The hardware includes a central computer or a distributed system of networked computers that function in parallel. Depending on the size of the organization, there may be any number of workstations attached to the network, accommodating upwards of several thousand simultaneous users. There are multiple layers of software to run the network and to provide security, communication, and user interfaces. Then, there is shared application software, such as asset management. Finally, local machines are loaded with the programs the users need to do their particular jobs.

The network can be a local area network (LAN), an organizational wide area network (WAN), a within-enterprise Intranet that uses HTTP, a telephone company-provided virtual private network (VPN), or even the public Internet. Many organizations use a combination of networks to link a wide variety of users—employees, suppliers, vendors, and customers.

The procedures and practices that define how the media asset management system works must be customized to fit the implementing organization. Few companies can adopt a turnkey system and expect a smooth transition to an all-digital operation. Automated radio stations and, to some extent, television stations may be exceptions, however, since they tend to have similar operational procedures even before bringing in a media asset management system.

## Benefits of Adoption

An end-to-end media asset management system brings business efficiencies wherever it is implemented. Organizations usually put in a system in one area of their business. For example, TV stations often start with just the newsroom. Or a film studio might begin by putting the video, still images, drawings, and text needed just for marketing, advertising, and publicity. Table 1 shows the benefits that accrue when MAM is implemented within specific activity centers.

A MAM system offers benefits beyond efficiency. It provides entirely new functions, such as remote collaboration among employees, suppliers, vendors, and customers. And more than one worker can access the same asset to perform work. This enables people to work in parallel on the same project or to complete multiple projects at the same time without waiting for someone else to finish their work and free up the original material.

Collaboration and multiple access also permit staff members to accomplish many tasks in less time than they did before the system was available. The contractual rights and obligations that are attached to a video or audio clip or a photograph can be tied to the material, allowing rapid determination of what the company owns, how it is allowed to use it, and how much should be paid for it. The system can simplify appropriate royalty payments. And executives can approve work quickly. All these functions reduce the cycle time to market when time is important, as is often the case with information products such as films, television programs, magazines, and books.

Media asset management also lets rights-holders exploit the material they own more effectively. They have immediate access to rights and availabilities. They can repurpose and distribute material quickly. Further, they may find that they can market component elements of the product in addition to the finished product, providing another revenue stream.

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Table 1
**Benefits of Media Asset Management to Activity Areas
within Media Organizations**

| | Business | Content Creation | Post-Production | Distribution |
|---|---|---|---|---|
| **Business** | Greater overall efficiency throughout the organization. | Asset tracking. Improved work flow. Personnel and scheduling efficiencies. Collaboration both in and out of organization. Approval tracking. | Collaboration. Versioning. Approval tracking. | Asset exploitation and marketing. Rights management. Royalty payments. Availability and scheduling. |
| **Content Creation** | | X | Collaboration. Simultaneous multiple access to same material. Asset tracking. Versioning. Repurposing existing assets for new uses and markets. | Tracking. Exploitation of elements as well as finished material. |
| **Post-Production** | | | X | Repurposing and formatting material for different technologies. |

*Source*: J. Van Tassel

Finally, media asset management can save considerable amounts of money by reducing the number of times material is digitized and the considerable costs of transporting negatives, tapes, and reels from one location to another over the course of a project. Many companies send images and audio clips, sometimes even video clips, across the Internet or other computer networks.

**The Process of Managing Media Assets**

Consulting giant Price Waterhouse has helped a number of major clients plan for and implement MAM systems, including Disney, Dreamworks, the BBC, and the Italian television network RAI. PW has formulated the information in Figure 1 that shows the various steps that take place within a MAM system.

*Registration of Assets*

This set of activities occurs when content goes into the MAM system. Each bit of content is called an asset, which can include data, text files, photographs, drawings, and audio and video clips. The material may have been created originally, or it may have been digitized to be fed into the system.

The first step is called "input metadata," and it is crucial to the overall functioning of the system. Metadata refers to information that is attached to the asset and describes something about the asset. The descriptions

are usually customized to the particular use, but common information includes:

- The type of asset.
- The date, time, and manner of acquisition.
- The creator.
- The original acquisition format.
- Subsequent data transformations to the original.
- The history of the asset and changes to it, including the present version.
- A semantic description of the contents.
- The contractual rights attached to the asset.
- Royalty payments that should be made or received.
- Relevant talent, creator, legal, and executive approvals.
- Previous uses.
- Limitations on usage.

The metadata could also list the shape, color, texture, location, main subject, or pose.

It isn't always clear what the metadata attached to the asset should include. Much of the usefulness of the entire MAM process depends on the quality of the metadata and how well it describes the assets. Keywords

of the metadata are automatically written to an index. Later, when other workers want to retrieve the asset, they can use the index to locate the material they need.

Consider your own hard drive. Three years ago, most computer users had a 450MB capacity hard drive. Today, many machines have 2GB and more. With 450MB, you can probably remember most of the programs and files you have stored. Perhaps you have a system for naming your files. But with 2GB and the passage of time, it may be difficult for you to find your own work.

Now consider the problem of naming conventions and descriptions that would let someone else know what was in a given file on a system that may have terabytes of storage capacity. It is a daunting prospect that occupies the attention of researchers in library science and information systems.

There are many approaches. One is to use natural language descriptors, called a semantic index. Another is to predefine categories and require the person storing the asset to fill in the blanks according to the provided definitions.

Probably it is a fact of human nature that every organization has its own informal means to identify assets. The people who

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## Figure 1
## Price Waterhouse Content Management Archive
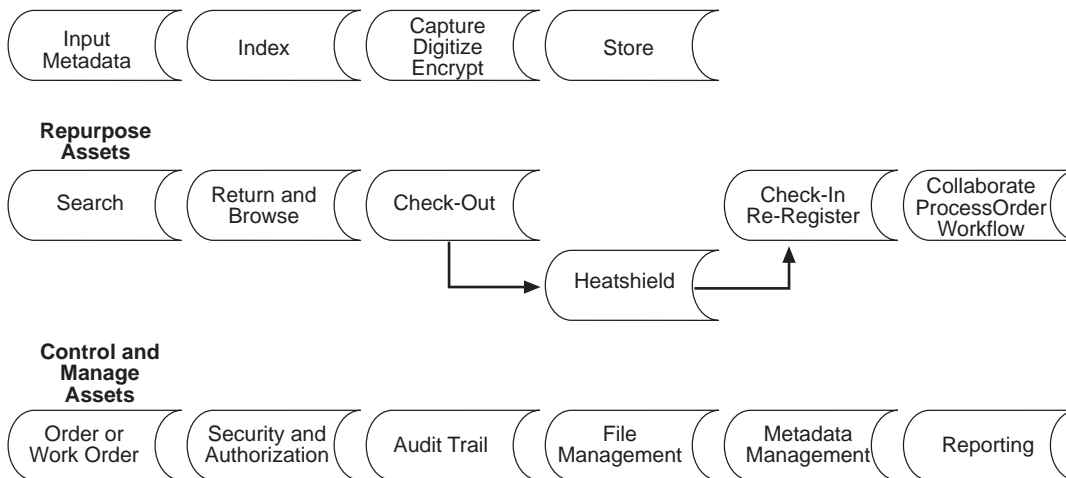


*Source*: J. Van Tassel

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work closest to the material will have a way to find the first draft of the asset, later drafts, the approved version, the one the client liked best, the final asset, the latest version, the one that will work best for a given use, and so forth.

A common way to get both the asset and the metadata into a MAM system is to have the people who create the asset write the metadata when they store their work. This strategy is often defined as "get the metadata once and at the source." This is the least expensive manner of putting both assets and their associated metadata into the system, although asset registration is never without substantial cost.

The process may require expensive scanners for text and still images or telecine machines to digitize film and video. This work cannot, at present, be animated and, at a minimum, demands the time and effort of skilled personnel to make sure that the digital version maintains the aesthetic intent and quality of the original material.

### Retrieving Assets: Search/Results/Browse/Select

When users sit down to find and pull out a needed asset, the process begins with a search. Using the metadata, they define the parameters of the search. The system returns results that users browse, selecting the assets that seem to fit the bill.

The search is confounded by the logic of computers, which is powerful but strange. Given the word "silhouette," the machine will return every image that is dark with light behind it. But it won't be able to find "mother and child"—an image unmistakable to almost every human being!

Search engines and database indices work well for text and adequately for still images. But they are woefully insufficient for audio and moving images, even when video is stored at lower resolutions. These types of files are called BLOBS for Binary Large Objects, and schemes to search for them are works in progress.

Several companies have developed search profiles for moving images where the

computer looks for scene changes, cuts, dissolves, or some other structural element. Similarly, a computer would be able to identify certain instruments and perhaps a rhythm structure. But neither of these algorithms tell a searcher anything about the actual content. In many situations, a search request based on structure would return many inappropriate assets—and fail to return important ones that should be considered. As a result, metadata systems almost always include a verbal description that allows computers to search the database semantically.

At the end of the search process, the viewer then receives the "returns" from which to select the needed assets. The returns are not usually the actual asset. For video, the returns will be "key frames" from the clip, and audio returns will be short segments. Still image returns are either scaled down thumbnails or recreated proxies of the actual material.

### Revising and Repurposing Assets

Workers search for material because they need to work on it, either to change it or to use it in some other project. A rapidly-changing worldwide marketplace that encompasses many cultures and languages, multiple platforms, venues, and uses, and many different licensing agreements for digital content make constant revision and repurposing an essential feature of today's business enterprise. By allowing workers in different locations to access materials immediately, even when others are using it, a MAM system can save significant time and money.

Once users find and retrieve the needed asset, if it is stored online, they can download it to their local computer for revision or repurposing. Downloading an asset is called "check out," named after the library term.

When people have finished their work, they check the asset back in. A MAM system compares the checked-in material to the original asset and, if it is different, then the user must provide new metadata. Versioning—the tracking feature that monitors the history of the asset—is an important

and valuable feature of MAM systems that allow anyone who needs to use an asset to examine how the asset has changed over time.

## Control and Management of Assets

A pervasive concern about using media asset management systems to store content is security. It is important to all organizations, but nowhere is the protection of digital assets more crucial than in the entertainment and information industries, where these assets are the core business and the source of profit.

Recent research confirms the perception of security problems. A study by the Computer Security Institute and the FBI revealed that about 50% of computer crimes originate from the public Internet, while the other 50% comes from internal sources. Another study by WarRoom Research LLC found that an outsider breached the systems of a majority of Fortune 1000 companies. More than 50% said they had more than 30 unauthorized entries, and 60% resulted in losses of more than $200,000 per break-in.

The computer industry has been working hard to solve security problems for many years. Most corporate systems have a log-on and authorization process that may include different levels of access, privilege, and communication rights. Allowable activities may vary from mere browsing to creation and revision, to the authority to add or delete material altogether depending on the type of work the user needs to perform. Typically, the software will also create an audit trail of a user's activities so that, if unauthorized persons somehow gain access, the company will be able to follow their path and discover what they did while in the system.

There are developing solutions for some specific security problems. For example, proving that a digital image has been stolen may be difficult, so research is developing techniques to electronically "watermark" the image. This technique unobtrusively secretes information in the bitstream that can be decoded with special equipment. It doesn't affect the quality of the picture, and it

cannot be removed. However, as soon as text or an image appears on a computer screen, the watermark is gone and the image must be compared with the digital original. Another partial solution is to store the original assets in a library and put only low-resolution thumbnails or representational proxies on the digital system.

One major difficulty is the lax administration of many systems. Network personnel fail to change passwords from time to time, or to delete users who have left the company or vendors and suppliers that no longer provide their wares. The system should also incorporate procedures to protect against inadvertent loss. So, when an asset has been changed, both assets should reside in memory for a time, preventing destruction of the original.

## Barriers to Adoption

The cost of large-scale media asset management systems can be daunting, in both money and time. Implementing the system requires much planning and a careful, thorough introduction. There are also the important issues that are not entirely solved, such as methods of indexing and cataloguing, search and retrieval techniques, and system security.

Corporate culture and departmental rivalry may also be powerful barriers to the adoption of MAM. These systems have profound effects on work flow. For example, automating work that was previously performed with the assistance of hordes of paper shufflers will face significant blocking moves by those whose jobs are threatened. The flattening of information-handling hierarchies is called "disintermediation," or the elimination of intermediaries who package and format information for other parties.

## The Key to Adoption: Doing the Impossible

There are at least a dozen reasons why diverse industries and enterprises are now focusing on media asset management systems. But they can all be summarized

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into two categories: MAM will either save money or make money.

However, this truism and the long lists of reasons often invoked to explain why MAM is becoming so important as to obscure the most crucial factor: MAM allows organizations to accomplish tasks that cannot otherwise be done at all.

No company in any industry can perform rapid worldwide marketing without a fast, efficient means of preparing the advertising and publicity messages that support their efforts. Firms that rely on CAD/CAM-based design and manufacturing must have a way of versioning their designs across multiple divisions and work groups. Television stations that transmitted one signal simply can't originate five digital signals without some kind of tracking system.

MAM is a technology of transformation. It will revolutionize the entertainment industry and all content provider businesses in the next decade. It changes the truism "Doing the merely difficult will take a few days; doing the impossible will take a little more time" into "…doing the impossible will take a little *less* time."    ΠΤΩ