Parts that are more than the Whole: Asset Management in the IT Age

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ABSTRACT

Not long ago, “asset management” meant properly cataloging and shelving tapes containing finished productions. In this legacy tape library environment, metadata consisted of having the right labels on the tape boxes.

Now, with digital media located in server and file-based environments, the very notion of shelving a “finished production” evaporates. To maximize the value of media assets, elements that make for finished production must be available for re-use, which means they must be ingested properly at high bitrates, then identified, catalogued, and indexed by weaving the appropriate metadata into the media.

Since content owners must make a major investment to bring legacy content into the digital domain, it is essential that these steps be done properly to avoid having to repeat the process in the years ahead. Once properly prepared, content elements facilitate metadata-driven “flattening” - automated packaging and repackaging in an array of formats for distribution on a growing variety of platforms such as iPods, Video-on-Demand, and over-the-air playout. The metadata also provides the technical infrastructure needed for the emerging micro-media industry now coming to the fore with outlets like YouTube.

Micro-media is the natural complement to existing mass media and will become as ubiquitous as written messaging is today. Empowered by metadata, micro-media will possess exceptional utility and flexibility enabling rights management for content owners and value to consumers. Like content, promotion and advertising materials must also exist in this ready-to-mix form.

The key to realizing this asset management paradigm is through a new concept in broadcast management software that goes beyond traditional programming, traffic and billing software to integrate systems across the entire enterprise. Such Media Fabric Management (MFM) tools facilitate micro-media creation. They optimize workflow to weave together media assets however needed, track where they are allocated and monetize use while delivering searchable, customizable content that consumers will pay a premium to access.

An effective Media Fabric Management system allows content creators, broadcasters and other media distributors to seek out and serve today’s mobile and increasingly fragmented audiences. Media companies that do not adopt asset management systems that are MFM capable risk having to start over in the mid-term and play catch-up with those already moving forward with them today.

WHERE’S THE SHOW?

Until recently, media consumers have been a remarkably compliant group. They have accepted how, what and where media companies have wanted to deliver content to them. Now, changes in technology and society have created a need to allow for greater mobility and diversity in how media is consumed. But the legacy technical infrastructure cannot hope to keep up with this emerging marketplace.

New tools and concepts for asset management are necessary to accomplish this. But it will take far more than just a simple upgrade of tape libraries into server-based digital media storage. These systems can no longer be thought of as standalone operations. Instead, they must be tightly integrated elements of an enterprise-wide Media Fabric Management system. In this way, asset management allows for the marriage of mass and micro media with shared content resources serving a multitude of distribution platforms.

FROM SIMPLICITY TO COMPLEXITY

For many years, audiences received content only two ways. The film industry released its content through movie theaters while television offered “broadcast quality” programs delivered over-the-air. In this setting, audiences would dutifully gather when and where they were told and would gladly accept what was provided to them. Here, the only repurposing of material came with broadcast of the theatrical releases. Managing assets with tape libraries that mimicked traditional libraries for books worked well in such a media market. Relatively simple tools managed the tape catalog and manual intervention was the rule.

Then, the arrival of cable TV and home VCRs set in motion the fundamental changes we see today. Initially, these simply expanded the existing model by opening new delivery platforms for the same "broadcast quality" programs. But under the surface, a major shift had occurred. The traditional theatrical and broadcast media marketplaces were defined by a scarcity in the number of available time slots to present content. Suddenly, cable and video opened up a broad horizon limited only by the audience's attention and interest. VCRs, too, freed viewers to watch at their own convenience according to their own schedule.

Initial efforts to take advantage of this abundance began with "extras" offered on video to add value. Production elements, trailers and other bits and pieces associated with a program were tossed in providing a "bonus" above and beyond what was available through traditional broadcast outlets. Likewise, the need for massive amounts of content on cable TV offered opportunities for outtakes and other ancillary material to find use.

Distribution, however, remained locked to the same broadcast quality content for viewing on standard home televisions. The only additional complexity was repackaging content for home videocassette for playback on the same standard definition TV platform. For all the growth of content available for VCRs and cable TV, it could still be managed with traditional tools amplified by advances in computing technology. A variety of standalone applications focusing on particular functions including programming and traffic software addressed specific issues to alleviate local workflow bottlenecks.

PUSHING BEYOND THE BOUNDARIES

Throughout this evolution, these standalone systems assisted by manual intervention have grown up to carry out operations. Today, such side-by-side operations integrated by manual efforts are typical in even major cable TV networks. But the new demands for delivering on multiple platforms stretches such systems past the breaking point.

Legacy operations simply cannot manage the new complexity to take advantage of emerging opportunities. With advances in technology and changes in society, audiences are increasingly unwilling to follow the dictates of content distributors. To continue to be successful and to maximize the value of content, media companies must understand and appreciate how and where audiences wish to access content. Then, the challenge is to deliver it there.

This is a practical impossibility with the tangle of unintegrated systems creating an unbreakable bottleneck and strangling efficiency. Beyond accomplishing these basic production issues, the existing infrastructure lacks the ability to add fundamental value essential for the emerging "micro-media" marketplace.

But metadata-driven tools allow for new efficiencies in asset management by empowering multi-platform production automation. These tools also provide content owners the ability to track distribution and manage rights. Likewise, they give content important value-adds for consumers by providing text-like search capabilities.

The conspicuous success of online outlets like YouTube just scratches the surface of the coming opportunities. This next-wave Dot-Com success is to the coming micro-media market what the first generation (circa 1995) online search engines are to today's Google. Leaps in consumer utility and acceptance drive a thriving next-generation market that is as unexpected as it is exceptional.

DEFINING MEDIA FABRIC MANAGEMENT

To take advantage of these opportunities requires far more than simply trading tapes for server-based digital archives to shuffle programs for broadcast more efficiently. It requires rethinking and reengineering the entire enterprise to place operations under an end-to-end tightly integrated software solution. Today's standalone systems must be knit together into a single fabric that runs through the entire media enterprise.

This new category of systems, dubbed Media Fabric Management (MFM) software, is designed to bring previous standalone packages including programming, traffic, scheduling, billing, digital library management, and automation into a unified, interoperable whole. This advance is akin to the move away from disparate word processing, database and spreadsheet applications in the DOS era to today's integrated office suites.

THE INGEST INVESTMENT

Under this new operational interface, although a wholesale replacement of existing operations would be ideal, realistically; piecemeal replacements of individual systems are likely to be the rule. However, individual upgrades should be carried out within the context of the emerging MFM environment.

It is especially important that existing media assets are ingested at a high bit rate to facilitate repackaging and repurposing in whatever platform that may provide opportunities in the years to come. At this stage in the transition, the goal is to carry out an ingest process that avoids having to go back to the original tapes. Ingesting the legacy content today with an eye to future multiplatform use can achieve that.

The reason for focusing on ingest is simple. Ingesting content is probably the most expense step in operating an asset management system. Ingest requires extensive manual intervention requiring direct supervision throughout the process. Monitoring for and applying an organization's technical requirements (tech evaluation) requires that content be ingested in real-time so that it can be monitored frame-by-frame. Should any technical issues emerge (e.g. audio level problems), then manual intervention is required. Occasionally, content may actually need to be passed through an edit suite for preparation before another, final ingest can be completed. All of this effort takes time and significant expense.

Resolution of the ingested components needs to be high enough to support both the end operations and formats that the organization anticipates using. If the organization expects to edit and manipulate content, then an I-Frame, frame-accurate ingest format must be used. If editing is not important, then the bit rate of the ingest must still be high enough to support all of the anticipated end formats and bit rates without creating any noticeable compression or transcoding artifacts.

KEYS TO MICRO MEDIA: "FLATTENING", RIGHTS MANAGEMENT & UTILITY

Moving beyond the traditional broadcast model to develop the nascent micro-media marketplace requires two factors. First, the cost of repurposing content must be minimal. Second, a new metadata / rights management infrastructure needs to allow for communication between rights holders and those using their content. Together, these will create new markets and new opportunities that will reshape the media industry much like the arrival of VCRs and DVDs.

Rather than replace traditional outlets as initially feared, VCRs and DVDs created an unexpected bonanza for repackaging media assets. Micro-media, too, will exist alongside mass media to reinvigorate the entire media industry.

COST-EFFECTIVE REPACKAGING

Once ingested, the cost of repackaging digital content for multiple platforms and target audiences must be negligible. Beyond prepping content for playout in the traditional broadcast setting, the newly ingested content must also be suitable for "flattening", a process where tools dynamically package content combining desired elements and then finishing them in whatever format needed. Producers simply select what they want and for what platform. The MFM system automatically pulls content elements from archives, weaves them together, and then turns them into a finished product. Ideally, the process becomes completely automated and there is no need for intervention by human editors or producers.

An emerging generation of products and systems that anticipate the larger MFM architecture by carrying out this flattening process are already deployed. The SeaChange QuickSilver workstation is an example of an off-the-shelf MFM-ready component delivering real value today. At PBS member station WHYY in the Philadelphia area, the SeaChange system is in use preparing and delivering VOD content for distribution to cable operators and Web-based material for online audiences. This is a simple, seamless way for WHYY to program and repurpose content for multiple platform distribution eliminating the need for manual intervention. WHYY is able to effectively leverage server-based programming assets for additional market opportunities without adding staff to manage it. It is an example of an emerging generation of products and solutions.

A customized, enterprise-scale MFM installation is also in place at the PBS Media Operations Center (see case study below). The PBS corporate solution to content preparation or flattening utilizes an automation driven approach designed to handle more complex content preparation than the QuickSilver or transcoder manages. PBS utilizes Harris automation control of a device chain consisting of a high resolution server playout port, an aspect ratio converter, audio and image branding tools, closed captioning system, Nielsen encoder and finally an encode port capable of generating video files in the desired resolutions and formats. This design has allowed PBS to not only prepare files for distribution but to also modify them, brand them and monetize them all under automatic control of the MFM system.

METADATA OPENS NEW MARKETS WITH REPURPOSED CONTENT

Once content has been successfully ingested, it can be repurposed on various platforms for use within a media organization as well as for external distribution. Internally, proxy versions may have many uses. For example, many organizations carry out content screening and review (often referred to as Standards and Practices or S&P). This is an ideal use of a medium / high resolution proxy generated from a successful ingest. This digital file (produced as an MPEG, Windows Media, Flash, etc. file) can be shared instantly throughout the organization and viewed concurrently.

Note that screening / S&P is also an ideal time to gather detailed metadata about the content including language, violence, nudity, embedded objects like web tags and product placements, etc. Once collected and stored

within the MFM system, this screening information can then be consistently and easily shared within and outside of the organization. For networks, such information can help support affiliates by making it simpler to review content and apply whatever local Standards and Practices that may exist.

Metadata's utility extends far beyond such typical broadcast uses and opens up many opportunities. Metadata provides the technical infrastructure to unlock the full utility of micro-media for consumers by adding the same search capabilities as text. It also enables rights management to support whatever business model can properly leverage this value-add for consumers.

A key challenge for the media industry as a whole is developing standards to facilitate tracking metadata about assets and maintaining the accuracy of this information. As Media Fabric Management systems advance, they should address this issue directly. Metadata creation and modification should be straightforward and accessible throughout the organization. In many cases, it can even be carried out automatically. This must happen alongside organizational change to make sure that proper focus, procedures and workflow are in place to support effective management of metadata.

New concepts in external metadata use could prove revolutionary, opening new horizons for the media industry. Today's approach is to embed limited metadata within distributed assets / objects. Through the emergence of new standards and ubiquitous interconnectivity through the growth of the Internet, capabilities for a uniform and consistent method of querying metadata would greatly increase the power of that information. Ultimately, any external individual could use the embedded information within an asset to query the originating organization for metadata updates.

This advance would parallel the arrival of the networked computer environment. Before, software updates had to be delivered manually on physical media. Now, they can be accomplished automatically through any Internet connection. In the same way, metadata is quickly evolving into a dynamic communications tool, to the point that it could be delivered in an XML document format, ready either for display, indexing or consumption by other systems.

ASSET MANAGEMENT MORE THAN JUST ARCHIVES

The arrival of inexpensive content repurposing along with a new rights management infrastructure will realize the promise of the emerging MFM model for an IT-based multiplatform media distribution enterprise. This extends far beyond the traditional broadcast concept.

Broadcasting relies on the compliance of the audience to accept content in a set fashion. But the monolithic audience eagerly sitting in front of televisions according to the network schedule is fast evaporating. Instead, media companies must now vie for the attention of mobile individuals interested in a wide variety of entertainment on multiple platforms, from gaming consoles, to online attractions, to content downloaded on iPods. The challenge is to identify who and where customized packages of content tailored to specific interests can be sent. As promised in the heyday of the Dot Com boom, the future consists in "narrowcasting" to gain the attention of specific market segments.

Another business model that parallels MFM's likely development is the direct mail marketing industry. Desktop publishing transformed direct mail marketing by eliminating much of the traditional production costs associated with it. The technology made producing the "content" that goes into mailings simple and inexpensive. There is no longer any need for a full-fledged art department utilizing a large creative team to construct pieces. Instead, a talented, technology-enabled individual can operate a successful operation. The limit here is not the cost of production but rather printing costs, mailing expenses and the investment in developing the database of existing and potential customers.

An MFM-enabled media operation leveraging an extensive library of media assets should operate much the same way. The cost of assembling and repackaging content components for a target audience must be negligible. Then, tracking rights to monetize the delivery of assets provides the financial incentive for content creators to produce for the emerging medium.

The possibilities for micro-media marketing are enormous. Unlike direct mail, it is not hindered by material costs and the cost of delivery can also be negligible. Properly realized, the MFM model becomes a pure marketing play. Success will come from gathering detailed information about target audiences and custom crafting content to meet their lifestyle needs.

While Media Fabric Management appears to take us far beyond what we now typically think of as "asset management", it is a logical consequence of the concept placed in context of the rising diversity of media platforms. While still a visionary concept, the reality is far closer than many might imagine. Most importantly, anyone planning to ingest legacy content into the digital domain is well advised to consider the MFM context and to be prepared for it.

MEDIA FABRIC MANAGEMENT CASE STUDIES:

PBS' PREP FOR ASSET MANAGEMENT

BroadView Software has pioneered the new category of fully integrated Media Fabric Management solutions at numerous notable broadcast operations. At the PBS Media Operation Center, BroadView designed and implemented an MFM framework over a next-generation server- and file-based broadcast engineering environment. The system totally integrates scheduling and trafficking with post-production functions and forms a foundation that can easily add distribution platforms as needed, including Video-on-Demand.

The three-year project has brought all operations under BroadView's unified graphical user interface. The system is fully automated from receiving content through initial encoding and archiving, then to playout and repurposing of material for multiplatform distribution.

The new system is the result of close collaboration between BroadView, PBS technical staff, and numerous other vendors and consultants to ensure both the technical integrity of content alongside accurate, complete metadata. The end result is a step beyond traditional engineering architecture and processes to achieve workflow innovation. It achieved the design goal of radically reducing the need for re-entry of content-related data and the data-entry errors that ensue.

The cornerstone of this MFM approach is accurate and updated metadata. Metadata enables the flattening process for repurposing and repackaging of programs. The end result is a substantial savings in production time, materials and human resources while raising the technical quality of programs delivered to PBS member stations. At the same time it enables seamless production and delivery to other distribution platforms such as IP delivery, VOD and Web-based media.

AN END-TO-END SOLUTION

The MFM system for the PBS Media Operation Center begins with how producers submit content. Before any source material arrives at PBS, content creators send a Media Inventory via the Internet that provides program metadata including frame-accurate timing. Once reviewed and approved by PBS, the MFM system generates a printable bar code label that is attached to the physical media and then is scanned upon delivery. Once marked as "arrived" in the system, the MFM system generates an advanced authoring format (AAF) file along with a work order so that technicians have everything needed to prep the material so that it is properly ingested. The last step at ingest is archiving the original material in various formats so that it can be reworked as needed. This makes it simple to add additional features such as closed captioning, DVI, program-specific tagging, Nielsen monitoring information, etc. Once ingested, requests for such changes submitted through the MFM system create a work order for editors while summoning up all the required program material. This streamlines manual intervention. Editors can get to work immediately instead of having to prep by gathering necessary elements.

The ingest process requires a great investment in staff time to carry out the technical evaluation of the content. But the return for this investment is enormous. It becomes possible to explore endless opportunities for repurposing and repackaging with negligible production costs. In most cases, the MFM system allows for repackaging programs automatically by manipulating metadata, eliminating the need for costly manual intervention. For example, switching out an advertiser's embedded spot or promotional item can be accomplished completely within the system. The MFM system removes existing elements and stitches in replacements by referencing the metadata for the different pieces to ensure a seamless whole. This "flattening" saves hours of content re-ingestion, editing room manipulation and tape recreation. Through the same flattening process, the MFM system automatically creates the final program file for distribution to PBS member stations.

While Media Fabric Management marks a fundamental departure from traditional broadcast engineering, it is adapted from well-established IT-driven manufacturing methodologies. It delivers the same kind of mass-customization applied to both durable goods and consumer products allowing for carefully tailored, individual production packages created without significant losses in efficiency or cost effectiveness.

This initial implementation at PBS can easily be advanced without major changes in the new infrastructure. For example, metadata creation will be pushed to the edges of the workflow. Content creators will eventually encode metadata as part of the production process prior to assembling the finished content. Rather than deliver content on legacy tape media, sending digital files fully described with metadata tied to the production elements will streamline PBS' ingest process.

BET BRINGS TOGETHER STANDALONE APPS UNDER MEDIA FABRIC MANAGEMENT

Viacom subsidiary Black Entertainment Television (BET), the leading African American multi-media entertainment company, has committed to adopt

BroadView's MFM strategy to enhance its ability to leverage metadata. This opens new opportunities across multiple distribution platforms to add value for its audience by effectively managing its growing library of both created and acquired content.

BET's situation was typical for many organizations. The operation has been run by a patchwork of standalone department-based applications cobbled together with various office software packages. These informal, idiosyncratic systems had become an embedded feature of the organization over its 25-year history. Finally, the organization was pushed to a point of decision because these homegrown methods had become cumbersome and unwieldy. Using spreadsheets and other general office systems adapted to the specialized work only supported individual departments without considering the value to the overall organization. Having to reconcile these standalone operations left them constantly playing catch-up to meet daily deadlines, leaving little time to take advantage of emerging opportunities.

THE GENESIS FOR MEDIA FABRIC MANAGEMENT IN PROGRAMMING

The genesis of the MFM system at BET started with an interest in establishing a new system for programming in early 2005. A key driver was the way different groups within programming carried out different tasks – finance, payments, and amortization. Difficulties in sharing information between these groups multiplied as each group added detailed information in different ways. For example, notes added to a spreadsheet about amortization required some consultation before the impact on finance could be made explicit. As challenging as this was for existing staff experienced with these methods, introducing newcomers to this idiosyncratic style was monumental. With the programming library set to expand significantly, the added overhead of this inherently inefficient system was no longer acceptable.

To address this, BroadView began implementing its core MFM-ready solution to knit together the different aspects of the programming department in early 2006. With the success of the installation, BET now seeks to extend the new Media Fabric Management paradigm across the enterprise to unify production, master control, and the digital library under the same common interface.

BET's goals are to reduce the number of active applications utilized to accomplish the core business functions of the organization. In addition, the aim is to enable interactions between applications to allow for data sharing, reduce duplicate data entry and provide for significant efficiency and workflow gains. Then, with the total asset management that MFM architecture provides, the whole focus of the organization can shift.

Instead of scrambling to maintain the existing operation, BET becomes a forward-looking enterprise able to effectively implement an aggressive program of marketing across multiple platforms. Ultimately, the relationships it will be able to develop and leverage with its audience will serve as a model for the new micro-media industry.

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G. Davenport, B. Barry, A. Kelliher & P. Nemirovsky, "Media fabric – a process-oriented approach to media creation and exchange". MIT Media Labe, BT Technology Journal, Vol. 22 No 4, October 2004.