Papers

Digital asset management and anti-piracy at Warner Bros. Studios

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Abstract Under Executive Vice President Darcy Antonellis, Warner Bros. Entertainment created a digital asset management (DAM) capability that was globally available, fulfilled the needs of the user community but still offered protection from piracy. Media Asset Retrieval System (MARS) is now a core part of daily operations for 18 Warner Bros. divisions around the globe.

INTRODUCTION

Beginning in 2001, Warner Bros. Technical Operations Inc. embarked on a mission to develop an enterprise digital asset management (DAM) capability. Today, their Media Asset Retrieval System (MARS) is a core part of daily operations for 18 business units around the globe, and is also a key component of Warner Bros.' worldwide anti-piracy strategy. The following discusses the studio's views on DAM, recent anti-piracy initiatives and their mutual relationship.

Warner Bros. Studios view the use of digital technologies as an opportunity to support our business growth as well as provide tools that help protect our content. MARS is one of the tools we employ to ensure that our publicity and advertising efforts are coordinated and timed to be as effective as possible

without the deflations that can be caused by illegally published content. Today, via the MARS system, many different groups are sharing materials more efficiently and securely than they ever could before. For example, a production shooting in Australia can upload unit photography and production artwork into MARS directly from the set, allowing the various domestic and international marketing groups to complete their campaigns earlier with higher quality materials. This is a significant benefit given both the compression of release windows and the increasing complexity of our campaigns. In addition, because of the enhanced security provided by MARS, it is a much safer method than shipping unprotected CDs, negatives or prints, which are handled by a whole series of people with limited

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traceability. Now with MARS, we have an efficient means of distributing advertising and publicity content globally, the ability to prevent unauthorized access and the tools to trace activity. MARS and systems like it are an important part of our overall anti-piracy strategy.

MARS — AN ENTERPRISE SERVICE

Our primary objective with MARS was to provide our client divisions with a tool to help conduct their business. However, these divisions often require distribution of assets outside of the studio early in the production process when piracy concerns are at their highest. Imagine, for example, the number of vendors who need access to images of the new Batmobile from “Batman Begins” so they can time the release of their merchandise and promotions to coincide with the release of the film. Now imagine the impact to merchandising revenues if an illicit manufacturing group was able to obtain this imagery and use it to create knock-off products in advance of our own licensees. Often, with any blockbuster theatrical release, you are not just dealing with a group of professional counterfeiters trying to access your images; there are countless “fans” on the internet who view being the first to post an image of the film’s elements as a competition with no other reward than bragging rights. So we have the need to support the business and the need to

Table 1: Volume of MARS users

MARS Users	8900+
MARS-Sourced Portals	6
MARS-Sourced Portal Users	30,000+

protect the content. That’s a difficult balance to achieve, especially when we work with a large number of outside creative vendors, a multitude of licensees for consumer products, other Time Warner businesses and many different international dubbing/subtitling houses. Further complicating the security challenges are the various portals that use MARS as a source for their assets. There is a large amount of traffic in and out of the application (see Table 1), and we need to be sure that we can monitor and control distribution without restricting the pipeline.

One of the most obvious and critical aspects of a successful DAM implementation is that it reliably fulfills the storage and distribution needs of the user community. If it doesn’t, users will (and given their mandates, they should) resort to traditional and physical practices: maintaining multiple local copies of assets, distributing via email, publishing to file transfer protocol (FTP) sites, sending hard copies etc — all of which make content security more challenging. For this reason, it is vital that the application provides efficient and secure central storage, is deployed on an enterprise environment with support, is globally accessible, provides efficient and secure distribution

Table 2: MARS uploaded rates 2002–2005*

	2002	2003	2004	2005
Average monthly uploads	17,200	14,950	14,150	32,900

*2002 and 2003 reflect large conversions

mechanisms, and allows our divisions to conduct business with their partners with a solid level of transparency.

Related to storage, our upload rates are increasing dramatically (see Table 2), both with new productions and to support conversions of existing physical archives¹.

It can be challenging to keep up with the storage needs of a large enterprise, but it's a crucial investment². We've also made significant efforts to integrate with other enterprise applications (mainly as controlled sources of information for asset classification), allowing users to establish the critical data relationships that tie their assets to division-specific project and financial structures. Finally, we run MARS as an enterprise application, meaning that it's on enterprise-class hardware³ in a secure data center with 24/7 availability, daily back-ups, monitoring and a comprehensive support infrastructure, which includes a dedicated support team from Accenture. This is a significant investment as well, but it's critical for the vitality of the application and for the effective management of enhancements, the user community, and related vendors.

From the beginning we focused on making MARS globally accessible. This carried with it significant security concerns from both a technical and process standpoint. Technically we overcame a number of challenges with the web-based infrastructure — hardening the system to resist unauthorized users, while at the same time optimizing performance for remote locations. Procedurally, we needed to make sure we had effective controls over the user community, but also flexibility for divisions to add users

without having to go through unnecessary bureaucratic steps. User management is a serious challenge with a system like MARS and is as much a part of anti-piracy as any of the technology safeguards. Usable tools, well-defined processes, comprehensive training and regular reviews are critical.

MARS was created as a service for Warner Bros. — an investment in an enterprise asset management service that benefits our diverse businesses. Our challenge is to ensure that our business unit's changing needs continue to be met.

SECURE DISTRIBUTION ENABLES THE SERVICE

With an enterprise-grade, globally accessible solution, we also focused on efficient and secure distribution channels, which for MARS meant mechanisms for download. Some of the required capabilities in this area are native to most DAM platforms, eg transaction logging⁴. MARS logs nearly all transactions performed on a particular asset, from upload, to previewing images and downloading. This traceability is a key component. It's also important to remember that the value of the transaction data depends on the effective management of the user-base. Other technological aspects of the secure download mechanisms include secure protocols, direct single-transaction connections to the desktop and digital watermarking.

Our digital watermarking capability applies watermarks to assets both at preview and upon download. This is a significant augmentation to MARS security since it protects the assets after

download with traceable links back to the original source. With MARS, Warner Bros. has implemented both deterrent (visible) and forensic (invisible) watermarks. As previously stated, our business now requires the distribution of assets to a wider range of parties earlier in the production process than ever before and given the timelines, the risks are greater. Forensic watermarks allow us to trace an asset back to when and who downloaded it if the asset makes an unauthorized appearance. The visible watermarks support the business requirements by providing a strong deterrent against unauthorized use — sensitive images can be released as needed to support the timelines. Images are released as “not for use,” but can serve the product development cycle of a licensed product, or are used for placement in developing an advertising campaign. Images are provided at a lower resolution and are visibly marked with the user name, date and time of the download. As discussed above, the MARS database tracks detailed user activity and is able to definitively tie the asset back to the download. The bottom line is that users are much more likely to use and guard the content appropriately if it is obviously traceable. There are many technical aspects of this solution that made the implementation a challenge, but it’s important to consider that with a library of assets that are managed by the user community, it’s the users who have the control over uploads and metadata, so process is as important as technology⁵. Anti-piracy is the responsibility of everyone in the organization. To the extent that tools can be provided to support that goal, the burden of company-wide diligence is easier.

KEEPING PACE WITH TECHNOLOGIES

Another consideration that we take seriously is the continuous enhancement of digital editing and manipulation tools. Each new technology, or enhancement brings new possibilities to compromise watermarking. We are fortunate that our user community plays an active role in Warner Bros.’ anti-piracy efforts. Our visible watermarks have been designed to require destruction of the image for removal, but to ensure this level of security requires regular testing. With MARS’ broad user base, we have a deep pool of talent and expertise to draw from.

Overall, we’ve learned that the more we seek to understand the individual needs of each business unit, the more we can provide an environment that supports their requirements and helps meet their goals. The benefits to the organization are greatly increased sharing, speed and security. That’s a win on all fronts. Still, the environment is evolving. Our user community and requirements are growing rapidly with the need to constantly audit and adjust our policies and processes. The breadth of assets stored in the MARS system and the system itself continue to expand in complexity. Add to this the fact that watermarking technology is nascent and prone to circumvention and the need for continuous development becomes clear.

THE MARS MISSION

Warner Bros. is not using MARS for broadcast content or finished film products, but we now store scripts, unit and episodic photography, special-shoot and gallery photography, reference photography, pre-production artwork,

digital press kit materials, low-resolution trailers, location photos, and a multitude of other sensitive assets. Each different format carries with it a unique set of security challenges. The mission of the system and its development team is clear; to continually adapt its function to support changing business requirements in a close to transparent fashion and to continually improve security at a level appropriate to defend against ever-advancing technological threats.

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References

- 1 Among our library of over 6,500 film and television titles are all the MGM films made before 1968. Along with those titles, we inherited a huge library of press materials and images that date back to the 1930s and are valuable not only as sales tools for their continued distribution, but as historical documents. And all these need to be digitized and catalogued as well.
- 2 Managed storage provides 22 terabytes (TB) of online and 1.3 petabytes (PB) of near-line capacity.
- 3 The MARS enterprise architecture spans 19 servers in a clustered environment, including production, staging, test and development environments.
- 4 The volume statistics provided in this paper are derived from the MARS transaction logs.
- 5 Business unit process owners are responsible for the management of content and the usage by those who they allow access. To support this structure, the business units participate in the MARS community via regular, formal meetings and communications.