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Cywilko, Paul G. ***Best Practices and Recommendations for the Implementation of Digital Asset Management Systems***

Abstract

Digital asset management (DAM) solutions are quickly becoming a standard within the television broadcast industry. They can increase efficiency, reduce costs, and even transform companies and their workflows entirely when organizations choose to adapt to the technology and fully embrace the benefits the system can provide. Yet, many DAM projects do not meet their objectives and experience failure. To overcome these failures, this study has formulated ten best practices that can be address common issues associated with implementation through an in-depth review of literature relevant to DAM implementations. These best practices for the successful DAM implementation revolve around four key phases of implementation: planning, installation, usage, and organizational culture. While each of these phases present their own challenges, the largest challenge is often the culture of an organization and the failure of organizations to fully adopt the technology and the benefits it can provide. These best practices have been applied to an upcoming implementation at Mountain States Television (MST) and provides specific product and vendor recommendations guided by these best practices to ensure the greatest degree of success.

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Chapter I: Introduction

With nearly all of the television broadcast industry engaged in digital video production, there is an ever-increasing necessity for the effective and efficient management of digital video content and related digital assets. Across the industry, millions of hours of video content fill servers and hundreds of thousands of labor hours are expended in managing that content (i.e. file storage, file naming, file structure organization, file manipulation, file circulation, file removal). To aid those laborers, many digital assets management (DAM) systems have been developed to mitigate the expanding cost of data management through the automation of many tasks that were traditionally done manually. DAM systems work to organize, catalogue, maintain, and make accessible the massive amounts of data and video content that exist within digital media working environments.

While most larger, nationally-distributed broadcast corporations already have DAM systems in operation, many smaller local television broadcast companies have yet to integrate the technology into their organizations. Many of the larger cable and broadcast networks have spent the past decade or more digitizing their content—transferring their tape-based media into file-based media—creating a vast amount of data that required accurate cataloging, unique organizing strategies, and automated management. Conversely, many of the smaller broadcasting companies around the nation do not have the same kinds of needs or resources to convert the media type of their content libraries. However, as time and technology progress, many of these smaller broadcast companies are finding themselves with an ever-increasing number of media files and only time-consuming manual strategies in place to manage them.

One such company, Mountain States Television (a pseudonym), is encountering these sorts of time-consuming file management issues and has begun to set aside funding for a DAM

solution. In conjunction, MST has laid out initiatives to progress into a purely file-based environment, away from legacy formats (i.e. digital tape). With this, the company is increasingly in need of a system to process, organize, and manage all of its digital media assets. While staff is lean, and resources are limited, the need for the automation of the time-consuming file management tasks is greater than ever. In order for the organization to remain competitive and increase its efficiency, it must develop a digital asset management solution that automates many of the file management tasks that are currently being done manually. Automating these tasks will free employees to conduct more pertinent work, prevent them from spending inordinate amounts of time managing their media, and add value to the organization through increased productivity.

Purpose of the Study

The purpose of this study is to review the literature pertaining to the implementation of DAM systems, examine DAM implementation case studies, and formulate a series of best practices for DAM implementations. I will then apply those principles in an evaluation of MST's unique situation as it relates to each best practice. The evaluation will result in detailed and specific recommendations for MST to consider in its implementation of a DAM system. Moreover, this study can serve as a guide or starting point for other organizations interested in pursuing DAM implementations and aid them in setting themselves up for success.

Chapter II: Literature Review

The articles examined for this literature review survey the recent history of DAM technologies, the current understanding and conceptualization of DAM strategies, the theoretical applications and implications of DAM solutions, and the benefits and dangers associated with the adoption and implementation of DAM systems. Reviewing this literature will aid in the creation and formulation of a set of best practices for the implementation of DAM systems and inform the specific recommendations that will be 32made to MST as they look to adopt the technology.

A Recent History of DAM Technology

In delving into the world of DAM technologies, it is important to first explore the modern landscape of the technology to develop a more complete understanding of where it is situated in both academia and the business world. In 2010, a commissioned International Data Corporation report projected that digital information worldwide would grow to an estimated 35 trillion gigabytes by 2020—roughly 44 times larger than it was in 2009 (International Data Corporation, 2010). This spike in size of the digital universe was attributed to the global conversion of media to digital as "all major forms of media—voice, TV, radio, print—complete the journey from analog to digital" (International Data Corporation, 2010). With this massive amount of data, organizations from all areas of enterprise, from medical institutions to military operations to (especially) media organizations, have found themselves facing fiscal challenges in storing, retrieving, and disseminating their digital information (Humphrey, Tollefson, & Kriet, 2010; Lamont, 2011; Marks, 2006; Schopflin, 2015; Slawsky, 2010).

It is from these mounting challenges that DAM solutions—DAM technologies that are implemented as computer systems to remedy issues associated with media content management—have become not only essential, but extremely valuable (Marks, 2006). With the

growing surplus of rich media files, effective DAM solutions have become a best business practice and a key component of enterprise content management strategies (Marks, 2006). According to Research and Markets, the DAM market is projected to grow to an estimated $5.36 billion by 2020 (Lamont, 2016). As the prevalence of strategic DAM implementations continues to grow, so does the need for qualified DAM professionals—those who specialize in the technology and its application (Slawsky, 2010). While many individuals learn the profession on the job or informally through conferences, webinars, podcasts, or blogs, there has been an increasing number of programs and courses emerging in schools of higher education (Slawsky, 2010). Many higher education institutions across the globe, including Columbia University, Zhejiang University, Rochester Institute of Technology, Birmingham City University, Simmons College, and Kings College London, have developed curricula within their varying programs to formalize DAM training and provide students the "technological skills demanded by the international information economy" (Slawsky, 2010, p. 350).

DAM strategies have grown from more rudimentary content management approaches, such as software-driven database applications and file shares, into comprehensive end-to-end management systems that handle files from their conception until archive (Careless, 2010; Lamont, 2016). Until recently, DAM systems often lacked workflows that were robust enough to carry content from creation to distribution, had limitations in managing metadata, and did not have the ability to handle video proficiently (Lamont, 2016). Additionally, the cost of DAM hardware, software, system maintenance, and IT staff represented a substantial cost making a sufficient return on investment difficult (Marks, 2006). Presently, however, the convergence of multiple technological and market trends has produced an increasing demand for DAM technologies hence decreasing costs and widening the availability of DAM solutions (Lamont,

2016; Moon, 2008). DAM technologies have matured and become highly effective through improvements in functionality, options for cloud-based solutions, seamless interfacing with existing applications, and the incorporation of new capabilities such as geolocation and artificial intelligence (Careless, 2010; Lamont, 2016; Lamont, 2017).

Over the past decade, DAM technology has been constantly evolving. DAM technology has been implemented in various industries at various stages of its growth, from infancy to adolescence. While many of these DAM implementations have experienced success in meeting their objectives, there are many that have not. In his article *Planning for Effective Digital Asset Management,* Sawyer (2006) highlights several common issues related to DAM implementations that are based in both the theoretical and practical applications of the technology. Theoretically, Sawyer (2006) points to a most common misunderstanding of DAM systems as simply advanced storage tools, or replacements for existing content storage systems, rather than dynamic media management solutions that can enable new workflows and address existing problems across an entire organization as well as evolve to address future issues (Sawyer, 2006). Practically, there can be any number of snares that may cause DAM solutions to not hit their marks and they can range from improper project requirements and system capability shortcomings to insufficient metadata and poor system governance and maintenance (Sawyer, 2006).

Theoretical and Practical Application

As Sawyer (2006) writes, “The road to digital asset management is paved with good intentions. However, most DAM projects never realize their full potential” (p. 38). Schopflin (2015) asks, “Why would organisations embark on such projects if their full benefits cannot be realised?” (p. 318) It is this notion, the realization of a DAM system’s full potential or its full effectivity, is what commonly constitutes the *success* of a DAM project (Sawyer, 2006;

Schopflin, 2015). Success can be synonymous with the project meeting its objectives or providing the implementer an adequate return on investment (Sawyer, 2006; Marks, 2006). Success for a DAM project can be qualified as "content that is catalogued in a meaningful way, available in a timely fashion, and accessible in a useful manner and available in a usable format" (Sawyer, 2006, p. 38), or as Shopfiln (2015) illustrates, content that is of good quality, acquired efficiently, stored purposefully to facilitate staff, accessible to all in need, identifiable, flexible for multiple purposes, and accountably managed. More than this, content commerce organizations see this success as the automation of common, mundane, manual processes and the cessation of re-creating assets that simply cannot be found (Bates, 2007). As the road to success can be rocky, many authors have highlighted issues that commonly present themselves as well as a number of strategies to circumvent them. As the adoption of DAM technologies is typically a linear process and issues and solutions can be found in four general phases: planning, installation, usage, and organizational culture.

Planning. The literature suggests that the planning involved when undertaking a DAM project is the most crucial step in the process of DAM implementation. When planning for a DAM implementation, the largest concern is also the most fundamental concern—the vision of the project. The vision for the project must be holistic and be understood as not simply as a product purchase, but a fundamental change to "the way you work with content, and this may extend throughout your organization" (Sawyer, 2006, p. 38). What is clear is that in order for the DAM solution to reach its full potential and maximize the value provided by the DAM system, the approach to the solution must address the needs of the entire enterprise (Sawyer, 2006). The DAM system must be understood as only a tool within a greater holistic DAM strategy (Schopflin, 2015). As every department within an enterprise (marketing, programming, legal)

deals with digital information, an effective DAM solution must incorporate all information at the enterprise level, for if different DAM solutions are integrated at different areas within the enterprise, what results is "islands of content," (Sawyer, 2006, p. 40) or rather, siloed information and workflows (Schopflin, 2015)—the antithesis of sound DAM strategy.

It is from this incomplete vision that the requirements for the DAM system are often insufficiently defined in the design phase of the project or poorly managed as the project progresses. The initial requirements of the DAM system—definitions of what the system will actually *do* to solve the perceived problems—can be inadequate as a result of discrepancies in communication and understanding between the project's stakeholders, the system designers, and the end-users (Bates, 2007; Sawyer, 2006). As all of these players have their own levels of understanding and competing interests in content management, it is pertinent that adequate time be taken to identify every requirement and work to fully understand them (Sawyer, 2006). Managing these requirements is also essential because requirements can change and as they do they can "become clouded by misinterpretation, poor recall, assumptions and new priorities" (Bates, 2007, p. 173). Change is also a necessity as the project's success cannot hinge solely on the "stakeholder's ability to accurately communicate requirements and the analyst's ability to capture them at the outset of the project" (Bates, 2007, p. 174). With poorly managed requirements, the end result is often "exactly what we asked for but not what we need" (Sawyer, 2006, p. 40). It is pertinent to have a strategy in place to record and properly manage the changing requirements to be able to identify which requirements may conflict with one another and to better understand the how the changes will impact the DAM system now and down the road (Sawyer, 2006). Down the road is also a key aspect when defining requirements, as creating forward-thinking requirements lends itself to maximizing the lifespan of the DAM system. One

way to do this is to consider preclusion—a capability the system does not have because it was not considered at design time—and focus on not only what the system can do but it *cannot* do (Sawyer, 2006).

As with any project, it is often defined by its project management style. Traditional, linear project management approaches, such as 'waterfall' techniques where there are a series of sequential steps from conception to delivery, are often a cause of failure with DAM projects as they do not have the flexibility to accommodate changes to the initial planning of the project (Bates, 2007). As Slawsky (2010) notes, "no two DAM implementations are the same" (p. 353) and because of this, Bates (2007) suggest that agile project management methods are a "good fit because DAM solutions are inherently about supporting the user and the way they work with rich media" (p. 176). Unlike most traditional project management methods, agile project management utilizes accelerated methods in the rapid development of a series of end-product iterations (Nicholas & Steyn, 2012). Agile methodology is regularly employed when product development must begin as quickly as possible to remain competitive in a rapidly changing economic environment (Collins, 2014). The focus of agile methodology is the quick delivery of intermediate project results in a series of iterations (Stettina & Hörz, 2015). With each successive iteration, client or customer feedback is gathered and integrated into the following iteration—accelerating the customer feedback loop and enhancing the value of each subsequent iteration (Collins, 2014). Additionally, an agile approach can be beneficial in that the product is usable or operational in a short period of time and, if the project is terminated, the customer is still left with usable results (Nicholas & Steyn, 2012). The primary benefit of using an agile project methodology is the ability for the project to remain extremely flexible in uncertain conditions (Cobb, 2011). It is this flexibility that allows the greatest measure of success to be achieved as it

allows for the kind of constant change necessary for the continual modification of requirements to find lasting solutions.

Installation. Agile project management methodologies align themselves with what many authors describe as *modeling*—the process of physically testing various implementation options within a workplace to validate or modify its usability. Corrections to the solutions can be made early in the process saving time and money and prevents the revision of months of work—keeping the project from incurring significant costs or jeopardizing the project timeline (Bates, 2007). Beyond broadcast solutions, many organizations have found modeling approaches effective, including military contractors who consider it "a good first step for business process improvement because you can understand the processes better and communicate about them" and it "provides a means to do simulations and compare different workflows" (Lamont, 2011, p. 7). The modeling process allows for the experimentations of a given solution within an actual working environment which allows for a comparison between "as is" and "to be" processes and, moreover, allows for the forward-thinking testing of "what if" scenarios that are outside of an organization's current workflows (Sawyer, 2006, p. 41). This kind of modeling allows the user to test the adaptability of the product to see how well it can change to new and different workflows (Sawyer, 2006) that will inevitably present themselves in the future as "products, features, technologies, standards and organization needs constantly evolve" (Slawsky, 2010, p.350).

As the modeling phase progresses and the final selection draws near, Sawyer (2006) suggest performing a detailed gap analysis prior to final selection "to identify where the gaps lie between your requirements and the capabilities of the product" (p. 42). Doing this will allow you to assess the degree of negative impact those gaps will cause and either work to rectify those discrepancies, adjust your requirements in an acceptable manner, or reject the system if the

critical gaps cannot be closed or your requirements become too compromised. As the system is integrated, Sawyer (2006) recommends that you look beyond just the capabilities of the product and carefully examine the integration capabilities, or rather the underlying architecture of the software and hardware. While many DAM vendors claim that their systems have open architectures that can be easily integrated into any network environment and work correctly and indefinitely, there are always technical problems. Sawyer (2006) suggests that involving the organization's IT department or contracting an independent specialist to verify the system's stability, reliability, and that the system was integrated using a service-oriented architecture (SOA) integration approach.

Usage. When actually using the DAM system, it must be understood that an organization's approach to metadata and metadata strategy is critical in ensuring the success of the system (Sawyer, 2006). Metadata—the descriptive information attached to the files—is essentially the life blood of a DAM system as it gives the files a means to be found within the storage system for re-use. Many DAM systems experience failures because of inconsistent or incomplete metadata entry (Schopflin, 2015; Slawsky, 2010) which eventually results in a database that is virtually useless. As McGovern (2013) writes "Metadata is the lynchpin of the whole system. The usefulness of the DAMS depends on the users' ability to find assets easily" (p. 250). As metadata is the most important aspect of a DAM system's functionality, it is imperative to either adopt a standardized metadata taxonomy, such as Dublin Core (Slawsky, 2010) or MPEG-7 (Sawyer, 2006), or develop a comprehensive custom metadata schema depending on what is most fitting for the DAM application. As McGovern (2013) details in her article *Digital Asset Management: Where to Start,* a comprehensive metadata schema can include descriptive information (what is in the content), structural information (how the asset

relates to other assets or resources), administrative information (rights), and technical information (pixel dimension, etc.), all of which utilize standardized taxonomies or were developed from library science techniques to produce a custom solution that fit the business. Deviating from standardized metadata or scientific approaches, such as using free text or synonyms, will likely prove inadequate after years of additions and can jeopardize the integrity of the database (Schopflin, 2015). It is important to make a selection that best suits the needs of organization moving forward, as metadata strategy will have a lasting impact into the future (Sawyer, 2006) in terms of the ways in which the assets can be used and how. While it can be difficult to anticipate what challenges the future may bring, it can be useful to apply information management principles, grounded in Information Technology and Library and Information Science disciplines, to better inform metadata strategy and aid in the ensure the success of the implementation (Schopflin, 2015).

Just as important as strong approaches to metadata are strong governance and ownership strategies. In order to keep the system operating at its full potential, it is necessary that responsibility for the system be clearly and deliberately defined and assigned (Sawyer, 2006; Schopflin, 2015). The development of standard operating practices and oversight of the system is required to not only ensure proper metadata entry, but to lay the groundwork for storage policies (what is and what is not allowed to be stored on it) and verify the functionality and accuracy of automated tasks. A large part of ownership and governance includes stewardship—taking the system into the future through upkeep, updating, and repairs. This requires the acknowledgment of the long-term and a commitment to the financial requirements associated with maintaining the system. While the upfront costs can be obvious, many companies often overlook ongoing and

future costs of the system including: hardware/software maintenance, vendor support, storage expansion, and personnel training (Sawyer, 2006).

Organizational culture. What Sawyer (2006) mentions briefly in his article, and perhaps the most common cause of DAM failure, is that the "failure to plan for and manage the organizational impact of changed business processes can lead to resistance to follow the new processes, compromising the quality, integrity, or usability of the content in the DAM system" (p. 41). Resistance to change is purely a cultural issue that can occur within an organization and as Slawsky (2010) notes that "organizations' cultures, missions and structures can have a strong impact on adoption, implementation, and on selection of a DAM vendor" (p. 353).

Schopflin (2015), in her article *Information Management Approaches to Digital Asset Management: A Case Study in Success and Failure*, illustrates how an unnamed medium-sized commercial broadcaster (perhaps similar to MST) experienced failure with a DAM project not because of the capability of the technology, but because of the organization's culture and resistance to adoption. Schopflin (2015) describes a DAM implementation centered around a digital archive—a large footage-sales operation—from which the broadcast production department could pull footage from and, more importantly, add to. However, the afterlife of the department's output was not a priority and they participated minimally in its use, preferring to continue to use their own independent systems. The department provided very little or inaccurate information (metadata) about their products to the cataloging personnel who ingested them into the DAM system, causing "immeasurable inefficiencies across the organisation" (Schopflin, 2015, p. 317) as the catalogers had to research from scratch what the production staff had already known in a culture where it was "frowned upon for archive staff to approach creative staff directly" (p. 315). Emails for the information went unanswered and it was eventually forgotten

and lost resulting in an impotent/inaccurate media database that was relatively unusable for the intent of resale and long-term re-use of the products. The organization made a considerable investment in a DAM system that did not function properly only because the content creators refused to adapt their workflows and actually use the system. Schopflin (2015) highlights that the reasons for failure were not inherent to the DAM system:

> Rather, the problems were cultural. The content creators were more important in the organizational hierarchy than the archive and could not be forced to use a production system designed for long-term retrieval in mind. The flow of information from creative to archive staff was stymied by internal customs and siloed working. (p. 317)

Schopflin (2015) also notes that this can happen at all levels of enterprise maturity, not just smaller, perhaps, poorly-run organizations, and draws attention to one of the highest profile cases of DAM failure at the BBC where their Digital Media Initiative (DMI) Project was scrapped after spending £98.4 million in just a few short years. Schopflin (2015), noting that the DMI had laid out the pre-requisites for success which primarily included the change of business practices and instead focused on reporting tech risks rather than the DMI's ability those change business practices, says that "the project failed to address the cultural change that would have been necessary to mandate the use of the production system" (p.317) and "would have required the adoption of a new cultural outlook among programme makers, which nobody was confident could be delivered" (p. 318). Schopflin's (2015) case study and BBC example demonstrate "the reluctance of organisations to tackle cultural problems and difficulty of challenging hierarchies and divisions between departments" and that it is often "seen as too hard to embed this type of essential change into practice" (p. 318). While there is a history of organizations being "half hearted in their attempts to instil a culture of information sharing and responsibility among all

staff," there "can be much to be learned from organisations that do succeed" (Schopflin, 2015, p.318).

One such organization is Swedish Television (SVT), where Krantz (2006) details SVT's DAM implementation is his case study, *Getting Into DAM Activities and Experiences of Digitizing News Broadcast Production*. As one of the first broadcasters in the world to implement a DAM system for news production and archives (Krantz, 2006), SVT faced a very unique challenge and was able to overcome it by acknowledging the necessity of a complete change in workflow. SVT, a public service company based on the BBC license fee model, was one of only a handful of terrestrial broadcast channels in the country and was barred from generating funds from advertising (Krantz, 2006)—essentially living on a fixed government income. Unable to grow or, potentially, sustain, SVT had to increase efficiencies and reduce costs if they wanted to move into the future. Unlike many companies that pursue DAM technologies, SVT had no delusions about the undertaking and understood that the intent of the implementation was aimed at not only creating new efficiencies, but reducing staff. Krantz (2006) details this reality:

> The secret is that with the new systems, you can change the organization and the workflows. But then you also have to change the way you think. And this is the hardest part from top to bottom. Everybody in a company wants to do what is best for the company. Although sometimes other interests, closer to oneself, will dominate. (p. 139)

SVT knew that resistance would be found at every level. Automating tasks reduces employees, fewer employees means less administration staff, fewer staff means reduced costs. Facing the challenges from users, unions, bureaucracies, and even politicians, SVT understood that the DAM system had to achieve their objectives: better storytelling, faster workflow, control over

the creative process, system stability, fewer staff, fewer investments, and increased output (Krantz, 2006). As theses objective suggest, this was not simply a technology purchase, but a transformation of the organization itself. The DAM system offered a whole new production workflow that had to be fully embraced in order for it to be highly efficient. In other words, the organization had to adapt to the technology to fully utilize it, rather than the technology adapting to the organization as it was—a common pitfall found with many organizations that attempt to utilize DAM systems.

Initially setting out with a goal of a complete their return on investment in five years, the DAM system investment returned in four—saving the company more than 10% per year (Krantz, 2006). More than this, the company could have generated a 20% savings, but instead invested half of the return into new production to increase their output (Krantz, 2006). While often faced with the question, “Why change something that works?” (Krantz, 2006, p. 140) and the statement “It will never work,” (p. 142) SVT worked diligently to help the crews feel motivated and confident in the system by discussing changes prior to implementation and giving them direct experience with the workflows as they rolled out. Other motivational strategies, as Schopflin (2015) suggests, can include offering simple workflow adaptations that make it easy for staff to share their day-to-day work to promote acceptance.

Chapter III: Best Practices

Drawing from the literature review, I have composed ten best practices that should be taken into consideration as MST moves toward DAM implementation. Generally speaking, these best practices can aid any company that finds itself beginning to burgeon in the digital realm and wanton of DAM technologies to increase efficiencies and get the most out of their investments. These best practices are listed below in the same linear fashion as the literature review, much like distillations of the key points that commonly occur sequentially as an organization begins a DAM undertaking. If applied, these best practices can help circumvent common failures through highlighting important considerations and suggesting strategies that can be employed to set a DAM project up for success.

Planning

The first best practice is *holistic vision.* To achieve the full value of a DAM solution, broaden the scope of the project to benefit the entire enterprise. Assess information and content needs across the organization, not just within specific departments. Be sure to fully define the role the DAM system will play within the organization and exactly how it will meet your objectives. Review your DAM strategy within the broader context of the entire organization and ensure that it aligns strategically with your overall company vision prior to selecting a solution.

The second best practice is *accurate requirements*. Work very closely with DAM system stakeholders, system designers, and system end users to accurately determine and define system requirements. Ensure all identified requirements are recorded, documented, and maintained properly within requirements management software applications or other means. Carefully review solution design not just for capabilities, but limitations to avoid preclusion. Consciously include or exclude design features with an eye toward future use.

The third best practice is *agile project management/modeling*. When planning for the DAM system project, use an agile project methodology that will allow you to modify the system requirements to meet your needs as the system is being developed. Model your current processes within the design and experiment with potential future production models. Consider how adaptable the solution is to these various models and gauge its ability to handle change and the unexpected.

Installation

The fourth best practice is *gap analysis*. Perform a detailed gap analysis to identify discrepancies between your requirements and the DAM system's capabilities. Assess the degree of negative impact those gaps will cause and either work to rectify those discrepancies or adjust your requirements in an acceptable manner. Be prepared to reject the system if the critical gaps cannot be closed or your requirements become too compromised.

The fifth best practice is *integration examination*. Understand that there will always be technical problems, so involve your company's IT department or contract a specialist to ensure a successful integration. If possible, purchase a system that either has a service-oriented architecture (SOA) or can be SOA-enabled. Ensure that your IT staff has sufficient technical skills for the system and examines the actual mechanics of the integration, not just the functionality of the system. You'd hate for the entire system to fail because of simple software updates or changes.

Usage

The sixth best practice is *standardized metadata.* Metadata is the key to making your assets accessible for use and directly correlates to the usability and success of the DAM system. Adopt an industry standard metadata taxonomy, such as Dublin Core or MPEG-7, to facilitate

content searching and ensure the long-term integrity of your database. It is critical that the metadata approach be fitting, standardized, comprehensive, and uniform throughout the organization. Be sure that the standardized cataloguing language you select has the provisions necessary to accommodate future workflow change to help your assets remain viable for the longest possible amount of time.

The seventh best practice is *ownership, governance & maintenance.* Typically, IT departments manage the technical and operational aspects of the system, but governance policies must be put in place to control what types of content are to be stored on the system, how long those contents will be retained, what metadata is required for various contents types, and so on. It is imperative that not only governance policies be put in place to keep the system running efficiently, but assigning authority to an individual or entity to enforce those policies and own the responsibilities of the overall management of the system.

The eight best practice is *long-term financial requirements.* When engaging in a large DAM project, all eyes are on the initial price tag and many forget to consider the ongoing costs associated with the system. It is essential that you budget for future hardware/software maintenance, upgrades, and expansions, as well as vendor support to keep the system fully operational. Additionally, it is important to budget for staff training on how to use and maintain the system.

Organizational Culture

The ninth best practice is *workflow implications*. Utilizing a DAM system, and getting the most benefit from it, means that an organization must utilize the new workflows the technology can enable. This means that the day-to-day work that many staff regularly undertake will change. More than this, it can also mean a reduction in staff. DAM systems, when integrated

with a holistic approach, can transform the workflows of an entire enterprise, increasing efficiencies from end-to-end, and offer a substantial return on investment if properly used.

The tenth best practice is *motivation and adoption*. While it may be difficult to motivate staff to alter their long held working traditions and habits, involving them in the implementation process and including them throughout the integration can increase their confidence in the system and allow them to participate early in the process. This experience is essential not only to help staff truly adopt the system, but to garner the end-user feedback that is critical to a successful DAM design. You can also ease staff into the new system by implementing simple workflows that make it easy for staff to contribute and participate on a daily basis.

These ten best practices listed above have presented themselves through my research as key to a successful DAM implementation. While some of these practices are more vital than others, they can all work in conjunction to aid an organization in getting the most benefit from their DAM investments. Each of these practices will be considered, evaluated and incorporated into the specific recommendations for MST. Also, when technically applicable, they will be directly applied to the specific recommendations as they relate to the available technology.

Chapter IV: Methodology

With the literature review completed and the best practices for DAM implementation derived from it, I will now begin moving toward specific recommendations for MST's DAM implementation. The process will begin with conducting a needs assessment to determine the requirements of the DAM system. The needs assessment will consist of two parts: 1) a series of informal interviews/meetings with end-users, associated staff, and all project stakeholders to document the *general* DAM needs and DAM desires of the organization now and in the future and 2) an examination of the general and unique workflows the organization undertakes to determine *technical* DAM needs of the organization.

To assess the general DAM needs of the organization, I will conduct a series of informal interviews (conversations) with the potential end-users of the DAM system from every department across the organization to collect general information about the types of challenges they face with data management and their thoughts on what sorts of solutions they would like to see. As the DAM solution must be part of a larger enterprise-wide asset management strategy, or holistic vision, it is imperative that conversations be held with all reaches of the organization to develop a solution that benefits the organization as a whole. Additionally, I am intentionally beginning these conversations at the end-user level, or rather, with a grassroots approach in the intent of ascertaining more authentic and genuine information pertaining to the true issues facing the workers and seeking their opinions about pragmatic solutions as the DAM solution must first work at the ground level. From there, I will conduct a series of meetings with supervisorial, administrative, and executive level staff to get their take on the issues and potential solutions and synthesize the information into a list of general requirements that will suit the company wholly.

The technical needs assessment will examine all of MST's workflows and focus on the key areas where a DAM solution is applicable and would be beneficial. The key areas of focus include the following: functional users, content volume, storage architecture, baseband ingest, file-based ingest, workflow integration points, archival, and hosting and remote access. These key areas of focus have been generalized from not only the relevant areas of MST's workflows, but also from the common and prevalent practices across the media and television broadcast industry. Moreover, these key areas of focus are generally what all DAM systems are designed to interplay with and must be examined prior to any consideration or selection of a DAM system.

Once these key needs have been assessed and the requirements formulated, I will conduct a product review to identify the available products on the market that are able to satisfy these requirements and are within MST financial stipulations of a solution costing no more than $200k. I will then compile my findings and compare the solutions against one another to verify that the available products meet the requirements. From this, I will arrive at a specific product recommendation that will be cross examined with the applicable best practices and confirmed. Confirming the specific recommendation will allow MST to generate and release their RFP/RFQ. I will gather the responses to the request and create comparison table and provide a specific vendor recommendation that is informed by the relevant best practices and financial requirements.

Chapter V: Specific Recommendations

As the methodology describes, the specific recommendations regarding the product and vendor will be the result of a few different processes. The needs assessment, focusing on both general and technical aspects, will aid in generating the system requirements. The system requirements will determine which products are viable options. The viable product options will be examined to see how well they align with the applicable best practices and to make the specific product recommendation. Upon this recommendation, RFP responses will be gathered and examined in the same fashion—how well they corelate with the described best practices to inform the specific vendor recommendation. Also considering the formulated best practices, I will conclude with final thoughts on the cultural and organizational challenges that MST may face if these recommendations taken.

Needs Assessment

After facilitating several meetings with MST's potential end-users and conducting a series of informal interviews with MST's leadership associated with the project, I have complied a list of general requirements that need to be met in order to satisfy the needs of the organization. The following general *(G)* requirements have been found:

- G1. Eliminate repetitive and time-consuming tasks.
- G2. Re-use and re-purpose assets across platforms.
- G3. Enable easy search and retrieval of assets.
- G4. Manage not only video assets, but all digital assets.
- G5. Simple means of ingest.
- G6. Simple means of content export/transport.
- G7. Automated transcoding and increase transcode speeds.

- G8. Ability to show proxy clips to clients for review or sales.
- G9. Enable a painless migration to new facility within two years.

In addition to these general requirements that have been ascertained through conversations with all stakeholders involved, I have conducted a more in-depth examination of MST's physical workflows to assess the needs of the organization to determine the technical requirements of the system. This examination focused on several key areas commonly associated with DAM implementations, the calculations of which are essential in determining the technical *(T)* requirements of the system, both now and in the future with anticipated expansion and growth, and are listed below:

- T1. Functional Users
- T2. Content Volume
- T3. Storage Architecture
- T4. Baseband Ingest
- T5. File-based Ingest
- T6a. Workflow Integration Points (Actual)
- T6b. Workflow Integration Points (Desired)
- T7. Archival
- T8. Hosting and Remote Access

The findings of the examination are listed in the following tables and display the technical and physical information associated with each technical requirement, and a short description of how the data is relevant to the specific recommendations.

Table 1

T1. Functional Users

Function	Average Number of Users (Now)	Average Number of Users (Desired with Expansion)
Browsing (cataloging/ logging)	23	50
Editing	12	25
Remote Access	10	20
Workflow Management	5	10
Full System Use (Admin.)	3	6

User counts must be verified to ensure the selected system can handle not only the current average, but also the desired user loads in the future anticipated with growth.

Table 2

T2. Content Volume

Description	Average Number (Now)	Average Number (Desired)
Hours of Material Ingested Daily	15	40
Hours of Material Output Daily	120	168
Material Duration	30 minutes	4 hours

The volume of material (content) flowing through the system must be measured and any system selected must be able to be scaled to handle the desired volumes anticipated with growth.

Table 3

T3. Storage Architecture

Description	Type
Number of Broadcast Storage Servers	1 Air + 8 Archive
Active Storage Tiers and Capacity (TB)	On-Air (14)
	Nearline (104)
	NAS (100)
	Offline (160)
Inactive Storage Tiers and Capacity (hours)	Programming Tape Library (50,000)
	Production Tape Library (2250)
Active Media Processing Drives	36 (12 SSD)
3rd Party Storage Management Systems	Harmonic Omneon/MediaGrid
	Crispin Asset Base
	Microsoft Windows
	Myers ProTrack

The number of storage locations, as well as the amount of storage must be calculated to ensure that the selected system can manage the current asset architecture.

Table 4

T4. Baseband Ingest

Description	Type
Video Servers	5 HD Server Ports
	2 SD Server Ports
Number of Ingest Channels	1 Manual Ingest
	3 Satellite Record
	2 KiPros
Number of VTRs	2 HD
	11 SD
Router Control Needed (Y/N)?	Y
Number of Ingest Workstations	1

The number of baseband (video feed) inputs must be tallied in order to select a system that is capable of handling ingest from these sources.

Table 5

T5. File-based Ingest

Description	Type
Content Type (Average Daily Volume)	Interstitials (3 hours)
	Programs (7 hours)
	Production (1)
Primary File Types/Formats	MXF OP1a, H.264, MP4, ProRes, MOV, DV, HDV
Amount of Content Procured in Primary Format (%)	Internal (100%)
	External (10%)
Transcoding Need?	90% of externally received files.
Typical Delivery Methods	NRT, FTP, High Tail, Physical Drives

The volume of ingested file-based media, the common file types, and the transcoding needs must be accounted for when selecting a system.

Table 6

T6a. Workflow Integration Points (Actual)

Type	System(s) Used
Personnel/Equipment Scheduling	N/A
Ingest System	Harmonic, Crispin
Editing System	Adobe Premiere Pro
Post Production System	Adobe Creative Cloud
Captioning (Source)	Adobe Premiere Pro (External/File Received)
Subtitling (Source)	Adobe Creative Cloud (Internal/Manual)
Program/Rights Management	ProTrack
Sales/Traffic/Ad Scheduling	ProTrack
Master Control Automation (Channels)	Crispin (5)
Playout Server	Omneon
Graphics System	IconMaster
Audio Processing	N/A
Transcoding (Method)	Harmonic Carbon Coder (Manual) Adobe Media Encoder (Manual)
WAN Acceleration	Aspera
Teleprompter/Scripting	RundownCreator
General Business Reporting and Other	Windows 7

The possible integration points with the system must be outlined and the selected system must be able to integrate with as many possible other systems already in use at MST.

Table 7

T6b. Workflow Integration Points (Desired)

Task	Task Type
Auto QC	Video and Audio Level Limiting/Verification
Content Delivery to Baseband	Signal Transmission and Recording
Content Delivery to CMS	Transcode/Transport/Publish/CC
Content Delivery to Social Media	Transcode/Transport/Publish/CC
Content Delivery to Other Destinations	Transcode/Transport/Publish/CC

In addition to the existing potential system integration points, there are many manual workflows that are desired to be integrated into the selected system.

Table 8

T7. Archival

Description	Type
Archive System Used for Broadcast Content	Crispin
Archive System Used for Production Content	None /Manual
Hours of Content Archived Daily	5
Hours of Content Retrieved Daily	Weekdays: 3 Hours Saturdays: 21 Hours Sundays: 10 Hours

The selected system must be capable of quick and easy retrieval of voluminous content from archive servers. Note the increased retrieval required on weekends for broadcast content and the entirely manual process for production content.

Table 9

T8. Hosting and Remote Access

Description	Type
Hosting Preference (Local or Remote)	Local
Services from Virtual Machines	None Yet (Potentially Desired)
Services Accessed Remotely (via thin client)	Any/All DAM functions
Services Accessed Remotely (via mobile client)	Any DAM functions, primarily proxy viewing
Cloud Storage Utilization	None Yet (Potentially Desired)

The selected system must be able to meet the following hosting preferences and remote access needs, as well as have the capability to meet the potential future desires.

Product Review

Upon assessing the needs of MST and determining their DAM system requirements, I have conducted a product review to locate the DAM systems that are presently available within the marketplace, that can likely satisfy the majority of MST's requirements, and that are within MST's budget. Through the development and determination of the requirements, a large need for improved and automated transcoding capability has emerged. This need of transcoding—the process of altering or changing media formats and converting and versioning content—is not the primary function of most traditional DAM systems and will require an additional transcoding engine that operates in tandem with the DAM system. The DAM solution, then, will consist of two parts, a transcoding component and a DAM component. Market research for the transcoding component—commonly referred to as a media processing platform or a transcode farm—is

compiled below and consists of solutions that can satisfy MST's unique requirements and have availability within MST's financial constraints. Figure 1 indicates which applicable requirements are satisfied with an '*X'* while the unsatisfied requirements are left blank.

Manufacturer	Hardware	Software	G1	G2	G5	G6	G7	G8	G9	T2	T4	T5	T6a	T6b	T8
AWS Elemental	Elemental Server	Conductor	X	X	X	X	X	X	X	X	X				X
Dalet	AmberFin	AmberFin Dark	X	X	X	X	X	X	X	X	X	X			X
Sorenson	Squeeze Server 4	Squeeze Pro Desktop	X	X	X	X	X	X	X	X	X	X		X	X
Telestream	Lightspeed K80	Vantage	X	X	X	X	X	X	X	X	X	X	X	X	X

Figure 1. Transcoding products listed by manufacturer, hardware, and software configurations and which relevant system requirements they meet.

As indicated by Figure 1, the Telestream Vantage media processing platform is the clearly best available transcode engine on the market that can meet all of MST's requirements and falls within their budget. As this transcoding component is critical to MST's objectives, the DAM component be compatible with the Telestream Vantage. From this additional requirement, I have compiled a list of DAM systems from reputable organizations that are compatible with the Telestream Vantage and, again, reviewed their capabilities against MST's applicable requirements in Figure 2.

Manufacturer	DAM System	G1	G2	G3	G4	G5	G8	G9	T1	T2	T3	T4	T5	T6a	T6b	T7	T8
Apace	PostMAM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Levels Beyond	Reach Engine	X	X	X	X	X	X	X	X	X	X		X		X	X	X
OpenText	Media Management	X	X	X	X	X	X	X	X	X	X		X		X	X	X
Tedial	Evolution	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X

Figure 2. DAM products listed by manufacturer and system and which relevant system requirements they meet.

Of the DAM systems reviewed that are compatible with the Telestream Vantage transcoding engine and available within MST's budget, the Apace PostMAM system contains all of the capabilities that MST requires and desires. Coupling the two of these components will

result in a DAM solution that meets all of MST's requirements, comes from well-known and widely-used manufacturers, while also coming in at a cost beneath the budget constraint. However, to confirm this specific recommendation, I will review it through the lens of the best practices I have formulated above. Each best practice that is directly applicable to the recommendation is discussed below.

For *holistic vision*, this specific recommendation is an enterprise-wide solution designed to benefit an entire organization and reach all staff involved in working with digital information and files. This system is fully scalable—able to grow with the company into the future—and made to fit within a larger overall company vision and strategy for managing and monetizing assets and data.

For *accurate requirements*, every effort has been made to ensure that the requirements developed for the system are accurate and useful now and in the future. All stakeholders, from end-users to senior management have been engaged for input and feedback in developing both general and technical requirements. All company processes and workflows have been examined for existing integration points as well as possible future integration points with special attention to possible preclusions. Additionally, this document will serve as record for the initial requirements that can be input into a requirements management system as the project progresses. The system requirements have been exhaustively compared against the recommendation's capabilities to confirm its validity.

For *standardized metadata*, the system recommendation is capable of utilizing any number of standardized metadata approaches as well as customized approaches for more comprehensive metadata schemas. Whichever metadata standard the organization chooses to adopt, it can be supplemented with forward-looking metadata strategies at any time to ensure the

usefulness and longevity of the database. Additionally, the Apace PostMAM system natively supports MST's primary file format (MXF OP1a) metadata standard which will provide immediate and automatic technical metadata integration upon adoption.

For *long-term financial requirements*, this specific recommendation includes vendor support as a yearly service contract that can be fully anticipated and easily budgeted for annually. These costs include hardware and software maintenance and upgrade consultation. The scalability of the system is designed incrementally and can be expanded at designated costs that are also easily anticipated. The personnel and staff training hours will need to be calculated upon selection and budgeted down the line as staff expands or changes.

Upon reviewing the best practices that are directly applicable to the specific system recommendation, I can confirm that the Telestream Vantage media processing platform coupled with the Apace PostMAM digital asset management system fits within the appropriate guidelines that the literature suggest will set the project up for the greatest likelihood of success. As this recommendation has been confirmed, MST will compose and release their request for proposal/quote. The responses to the request will be received and processed by senior management and finance and will select the finalists for consideration.

Vendor Review

Of the responses received from the RFP/RFQ, MST has selected three final vendors for consideration. As any organization desires, MST would prefer to receive the highest value at the lowest possible cost. The vendors and their respective quotes are listed below for all of the necessary items for each of the components. I have compiled all of the information for both of the components below and for the sake of anonymity, and the integrity of the study, the vendors are listed in Figure 3 with generic vendor numbers.

Item Identification #	Item Type	Quantity	Vendor 1 Cost	Vendor 2 Cost	Vendor 3 Cost
V-XCPROCONN-SW	Software	1	$ 20,975.00	$ 18,240.00	$ 19,975.00
V-ANLZ-SW	Software	1	$ 8,975.00	$ 7,805.00	$ 8,500.00
V-SOCMED	Module	1	$ 7,500.00	$ 6,522.00	$ 7,500.00
V-PORTAL	Module	1	$ 2,500.00	$ 2,175.00	$ -
V-TTFLIP-SW	Software	1	$ 9,975.00	$ 9,070.00	$ 9,975.00
V-CAMERA-SW	Software	1	$ 3,000.00	$ 2,610.00	$ 3,000.00
V-MANAGE-SW	Software	1	$ 3,975.00	$ 3,457.00	$ 3,500.00
V-LS-K80SSD-NA-SVR	Hardware	1	$ 38,900.00	$ 35,940.00	$ 36,900.00
V-SILVER-MS00	Software Support (1 YR)	1	$ 8,535.00	$ 8,439.00	$ 7,867.50
V-LS-SILVER	Harware Support (1 YR)	1	$ 1,800.00	$ 1,800.00	$ 1,800.00
V-LS-ADV-EXP00	Replacement Support	1	$ 1,750.00	$ 1,715.00	$ 1,750.00
CK-PST-BASE	Module	1	$ 7,950.00	$ 7,950.00	$ 7,950.00
VAMP	Software	1	$ 2,500.00	$ 2,500.00	$ 2,500.00
CK-SILVER-MS00	Software Support (1 YR)	1	$ 1,192.00	$ 1,192.00	$ 1,192.50
COMMISSIONING	Installation (Days)	3	$ 5,250.00	$ 5,250.00	$ -
DISCOUNTS					$ (1,000.00)
Subtotal for Telestream-Vantage Media Processing Platform:			*$ 124,777.00*	*$ 114,665.00*	*$ 111,410.00*
V50-4U96TS-DB	Hardware	1	$ 31,995.00	$ 29,875.00	$ 30,000.00
SP-HD4000	Hardware	2	$ 1,570.00	$ 1,570.00	$ 1,570.00
PM3+/PRO-4LIC-DB	Software	1	$ 30,000.00	$ 30,000.00	$ 30,000.00
PM-ADOBE-PNL-DB	Module	1	$ 5,000.00	$ 5,000.00	$ 5,000.00
AP-PRXY-EDIT-DB	Module	1	$ 5,000.00	$ 5,000.00	$ 5,000.00
FINDER-4U-DB	Module	1	$ 5,000.00	$ 5,000.00	$ 5,000.00
COMMISSIONING	Installation (Days)	2	$ 4,000.00	$ 4,000.00	$ -
Subtotal for Apace PostMAM Digital Asset Management System:			*$ 82,565.00*	*$ 80,445.00*	*$ 76,570.00*
Grand Total for MST's DAM Solution:			**$ 207,342.00**	**$ 195,110.00**	**$ 187,980.00**

Figure 3. DAM solution components listed by item identification number, item type, quantity, and cost from each vendor.

As indicated by Figure 3, Vendor 2 and Vendor 3 have been able to quote prices that fall below the financial constraint threshold of $200k. As Vendor 1 was unable to meet this constraint, it will not be selected as the recommended vendor. Vendor 3, presenting the greatest desire to win the contract through offering one free module and the free installation of both components, will be the recommended vendor as they represent the highest value at the lowest cost and adhere to the best practices as described below.

For *agile project management/modeling,* MST has conveyed their desire for the ability to shift or change the system requirements as the system is being integrated in order to ensure that the system is meeting their objectives. The vendor will work with MST to accommodate these contingencies and their associated costs during integration. During the five-day installation period, the vendor will model all of the current processes and verify their effectiveness/efficiency as well as model experimental workflows that could potentially be used.

For *gap analysis*, upon installation MST will conduct a detailed gap analysis to identify any gaps or discrepancies that exist between the system's capabilities and MST's requirements. Similar to the modeling process, the vendor will work with MST to rectify the discrepancies. If the discrepancies cannot be resolved, MST will assess the level of impact they cause and determine if they are acceptable. If unacceptable, MST will renegotiate terms with the vendor.

For *integration examination*, as the integration is completed MST will task their IT department with examining the installation to confirm its integrity and stability. Any additional training the IT staff may require will be made available by the vendor during installation. The DAM solution does have a service oriented architecture which will allow the IT department to troubleshoot many of the issues independently or with assistance from the vendor as made available with the support contracts.

For *ownership, governance & maintenance*, when the DAM system is fully operational MST will designate a staff member or members to draft standard operating procedures for the system for company adherence as well as training materials for new and existing employees. These policies will help in the governance of the system and aid in maintaining operational efficiency. Moreover, the designated *owner(s)* of the system will be given the authority to suggest corrective action against misuse of the system to protect the investment of the company.

System maintenance will be conducted regularly by both the IT department and the vendor as made available by the support contracts.

For long-term financial requirements, the first year of service and support are clearly priced (as represented in the vendor quote) and available for annual continuation at comparable rates in the foreseeable future, making service and support costs easily anticipatable. If the future rates are found to be unreasonable or incomparable, MST can always search for more competitive rates from other service and support contractors. Similarly, expansion costs are designed to be incremental and have relatively standard market rates where competitive pricing can be found. Also, as aforementioned, training materials will be supplied and MST will budget for personnel training as required.

In reviewing the best practices that are relevant to the specific vendor recommendation, I have determined that Vendor 3 has met the criteria for the recommendation through their ability to satisfy MST's unique integration and maintenance needs as well as meeting MST's financial requirements. Measured against the formulated best practices, this recommendation will, again, set the DAM project up with the greatest likelihood of success as suggested by the relevant literature. What success MST may find beyond taking the vendor and product recommendations will remain in their own hands as they must fully understand the implications of a successful DAM system and strive to motivate their employees toward system adoption.

Conclusion

With the Telestream-Vantage media processing platform coupled with Apace PostMAM digital asset management system and Vendor 3 comprising the set of recommendations I have made to MST as their DAM solution, MST may yet face a larger challenge than selecting a highly complex product and appropriate seller. As the literature relevant to DAM

implementations suggest, the largest challenge if often the organization itself. While every effort can be made to attempt to make the best product choice and find the best vendor, these efforts can be wasted if the organization does not fully embrace the changes that the solution can offer. As the two final best practices (*Workflow Implications* and *Motivation and Adoption*) I have formulated point out, MST must acknowledge and understand the full implications the system will have on their workflows and face the challenges of employees truly adopting the technology.

If MST intends to get the greatest return on their investment, they must understand that the work they do will itself change. The daily tasks that MST entire enterprise regularly conducts will alter to utilize the system as a conduit for greater efficiency. This efficiency increases exponentially as more effort is invested into the system as it will provide every employee with fast and easy access to all of MST's assets—everything the employee might need to conduct a task, immediately at their fingertips. It is often said that 'knowing is half the battle' and knowing that the company is not simply purchasing a product, but transforming the organization and the way it conducts business will be essential to MST's success in this endeavor.

It is no simple task to instantly overhaul the workflows of an entire enterprise and transform an organization. Years and years of working traditions and habits are not easily unmade, and many employees resist significant or extreme change. However, the very essence of what makes DAM solutions work to the highest degree is participation. MST must find the means to get employees to actively engage with the system and contribute to its (and their) success. MST must involve as many employees as possible (or as feasible) in the integration process to demonstrate just how the system can help them do their jobs more easily and to generate positive outlooks surrounding the system. For those that cannot directly participate with

the implementation, MST should consider constructing simple workflows that allow those employees to contribute easily and allow them to slowly adopt to the system while encouraging them to engage more. MST should also keep an open ear to employee feedback and adjust the system in positive ways that better suit the users—making it their own.

Whichever route MST decides to take to get the most out of their system, whether it be through greater understanding of what the system means for the company or through the discovery of new and different ways to maximize their employees' engagement with the system, the best practices and recommendations created within this document will undoubtedly aid them in their endeavor and inform their decision making. More than this, the content of this document can aid any organization seeking DAM implementation strategies, whether they are primarily media companies or otherwise. The best practices formulated in this document can be applied to DAM implementations at any level or scale and can help organizations anticipate the associated challenges and avoid the common pitfalls. Ultimately, I hope that these best practices can serve as a starting point for organizations to create their own valuable insights about the process and continue to expand the discussion as every dimension of our world becomes increasingly digital.

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