

# Digital Asset Management

## White Paper

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Date: 22<sup>nd</sup> May 2001



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## Introduction

Digital Asset Management is the *archival, retrieval, tracking, manipulation, re-purposing, interaction with, and transaction* of all types of digital media - Text Documents, illustrations, Images, Audio, and Video files.

DAM solutions cover the process of creation, manipulation, distribution, and access/ retrieval of digital assets, as an end-to-end solution with several component workflows.

### The exponential growth of Digital Assets

As digital content in the form of text, documents, images, audio, and video files is generated each day, the infrastructure and people resources that a company employs are being stretched to accommodate and manage the huge quantum of digital assets that are created and pumped into the company's systems. The large number of *new* digital assets notwithstanding, a large volume of digital assets already exist within a company's systems that are of high value by virtue of the fact that these assets can be re-purposed and transacted, or need to be preserved for future use.

With each passing day, it is becoming apparent that a dedicated effort needs to be made to manage the process of creation, storage, archival and retrieval, workflow, publishing, distribution, and access of Digital Assets, - to monetize, reuse, and to prevent the digital assets from slipping into oblivion.

At a macro level it spells good news for infrastructure and hardware vendors because infrastructure needs to be ramped up to address this issue. As Anant Agrawal, VP and GM of the Networking and Security Business Unit at Sun Microsystems pointed out, "This planet generates a staggering amount of data. It's almost equal to 25 billion copies of The San Francisco Chronicle or 2.8 billion music CDs. If you produce that much data every year there has to be an infrastructure to manage, store and deliver that data".

The proliferation of net devices, the large amounts of assets being created for online and multi media consumption, and, the need to build

in capability for digital assets to be easily transacted online, is paving the way for the next generation of DAM solutions to evolve. As a solution practice, the concept of DAM has been around for years in the pre-press and publishing houses who have been the first proponents of this practice even before the Internet became a mainstream medium. Today, DAM solutions have evolved way beyond their earlier avatars that were dedicated to the production workflow efficiencies in pre-press, graphic arts, cataloging, and print publishing industry.

There are efficiencies to be reaped in not just streamlining the workflow of content production and processing, but also in ensuring that people find the right digital asset resources they are looking for. Re-purposing of content archives is an area that companies are streamlining in order to avoid the time consuming and costly task of re-creating the same content for different media formats, - for print, TV, web, and mobile devices. More over, there are revenue opportunities to be realized in cross selling, cross merchandising, and in giving intuitive information links to digital assets. With an efficient process to oversee the production and distribution of digital assets, organizations can - create once & publish anywhere, - thereby saving costs or generating new revenue streams.

## **Accessibility, Agility, Mobility, and Transact-ability of Assets**

Studies from Gistics Inc. and Frost & Sullivan Market Research show that organizations dealing with media files spend an average of 2.9 hours per week just managing those files. Another 3.97 hours per week is spent in file transferring. On an average, a person looks for files 2,500 times a year, and fails to find files 35 percent of the time. Companies are finally discovering that the labor costs for all this file management (or mismanagement) is worth correcting.

Asset agility is the enhancements provided for by having suitable 'tags' or asset descriptors that are as comprehensive as possible. This is described in greater detail on Page 12 under the sub-title 'Agile Content'. Mobility can be defined as how easily the asset can be transformed into different formats for rendering/ integration into other asset objects, and transact-ability is the packaging and availability on a suitable platform for it to generate revenue. Digital Asset Management takes cognizance of all the above four characteristics that are important for an Asset to possess.

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## Digital Asset Management - A Definition

**Digital asset management is a set of processes that when working together give a system, repository, and enabling workflow process for managing publishable media content such as images, illustrations, documents, audio, video and physical (non-digital) elements.** Asset repository functions include organizing, viewing, indexing, abstracting, translation, searching, browsing, archiving, purging, reviewing, revising, versioning, tracking, and auditing of files. This also includes uploading and downloading files or viewing information any-where on the net, depending on the access permissions, and automatic email notifications. The purpose is to provide easy querying, asset identification, metadata retrieval, asset conversion, and export into publishing applications. The last category in this 'supply chain' of digital assets i.e. publishing applications is generally known as Content Management Systems. There are several vendors who have well developed platform solutions that have emerged as leaders in this category.

DAM workflow includes the structured movement of documents or media across an organization for the purpose of performing activities in a collaborative process that includes cataloging, development, evaluation, sign-off, and archiving. Workflow management functions include definition, coordination and tracking project status, assigned tasks, versions, overall cost, completion date and deliverables. It may include generation and management of job tickets for different applications in order to communicate detailed job specifications.

Since its early days in pre-press and publishing houses, DAM has now emerged as a practical mainstream technology — not stuff for early adopters. Projects can be targeted to solve real-world problems and deliver substantial benefits in well-understood areas of the multi format, multi use publishing operation. Efficient Management of the various forms of digital assets also includes managing the *rights* of content authors. These applications are categorized as Digital Rights Management (DRM) solutions.

We may classify the need for DAM solutions into two broad categories:

**Category 1:** Companies whose main business is Content - Like Media companies/ print and publishing companies, content owners who wish to have efficient internal workflow processes, and, in addition offer enhanced services to their viewers for monetizing their existing content.

**Category 2:** Companies who generate content that is used for, and, as part of their other day-to-day products/ business activities. Examples of such companies are finance, Insurance, Medical etc.

In the Case of Category 1, asset authoring, creation, and versioning workflow process are of prime importance and will likely be more evolved as compared to a Category 2 DAM solution that may emphasize on the Asset transaction workflow.

Examples of digital assets in the first category are: video archives of sports events, news, entertainment videos, music videos, photographs, video education instruction aids and so on.

Examples of the second category of Digital Assets are: Billing Statements, engineering drawings, Insurance claim forms that are filled in by hand, Loan applications, self help maintenance videos, etc... Companies that manufacture or distribute thousands of SKU's, and have frequent and regular product introductions or substitutions, or, employ sophisticated targeted merchandising strategies present a challenging opportunity in managing the complexity of their processes and digital assets.

The abbreviations DAM, MAM, DMM, and ECM are used in different contexts, depending on the intermediate point in the asset delivery value chain that the solution is targeted at, and depending on the Industry vertical. The most common interpretations are as below.

## **ECM (Enterprise Content Management)**

Generally deals with Documents/ Text that is generated within an enterprise. ECM is used where documents are scanned and their digitized images stored for long term archiving. The many products branded under Document Management Systems or Enterprise DMS are covered under ECM. Typically they range from document creating tools, document scanners (imaging), software collaboration tools that manage these scanned images, document editing and sharing tools, versioning, indexing, etc. The ECM terminology is more prevalent in the second Category described above. A large

number of players exist in this space, and the products are fairly evolved.

## **DAM (Digital Asset Management)**

Generally implies the management of assets that are created in Image form, like graphics, scanned document layouts, photographs, etc. But can be construed to be a superset of ECM, by virtue of the fact that it also includes one more content type - video. DAM abbreviation is used in the first category described above. Taking the example of a magazine publisher, Content Management solutions will address the process of page making, layout templates, and assembly of multiple sections/ pages within the magazine/ website, whereas DAM initiatives/ solutions take up the management of the various components of what goes into these pages: - content objects like images/ photographs and their descriptors, text section header, graphics, diagrams, etc.

## **MAM (Media Asset Management)**

Generally covers the assets like video, images, photographs, etc. that are used by the Media industry. The MAM term is used in the first category described above, to imply Media Assets specifically, as compared to the more general 'digital' assets.

Digital Asset Management systems are intended to help companies' *reuse* and *re-purpose* existing text, photos, images, and video in such a way that it will:

- ✍✍ Enable mapping of relationships between the various media assets
- ✍✍ Enable many different users of the various departments of an organization to have access to a personalized interaction with a particular asset.
- ✍✍ Enable many different members of an organization to manipulate a particular asset sequentially as part of a single or many workflow processes (as is the case with media companies),

DAM solutions are a necessity for any sector/ company where a large volume of ever growing list of Images, Video, Audio, and Text are necessary to be archived, manipulated and re-purposed,

*And/ Or,*

The assets need to be accessed by a large number of widely dispersed users.

**According to GISTICS, a market research firm, DAM solutions area will be a \$3.2 billion market by 2001. A more conservative forecast by Frost & Sullivan, based in Mountain View, California, anticipates digital asset management system sales of \$1.5 billion by 2002. (2000)**

*GISTICS, Inc. says production employees can save an average of 36 hours per year by using a digital asset management system to organize their jobs and processes, and their employers can realize return on investment (ROI) of between eight and 14 times over a three-year period.*

## DAM - High Potential Industry Sectors

The various sectors that use/ have the potential to use DAM are:

- ✍✍ Media
  - ✍✍ Print and Publishing companies
  - ✍✍ TV companies/ Movie Production Studios
  - ✍✍ Media conglomerates with multi format/ channel interfaces
- ✍✍ Finance & Insurance
- ✍✍ Legal
- ✍✍ Healthcare
  - ✍✍ Medical Imaging
  - ✍✍ Other (Pharmacy - formulas, equations, patient history)
- ✍✍ Arts & Culture (Paintings, Architectures, Museums, performing arts)
- ✍✍ Universities & Education institutions
- ✍✍ Archeology
- ✍✍ Maps
- ✍✍ Basic sciences like Chemistry, Physics, and Biology
- ✍✍ Astronomy, Oceanography, Metrology

Most sectors listed above use DAM systems in some form or the other either using proprietary tools/ technologies from vendors that offer specialized/ niche or generic benefits.

With the evolution of the Internet and its underlying anywhere, anytime, customizable, 'open standards' philosophy, there is a huge potential in:

- ✍✍ Designing and deploying the next generation of DAM solutions, and
- ✍✍ Re-architecting existing installations of DAM systems to scale up and enhance their flexibility, functionality, interactivity and ease of use

Many corporates in category 2 as described earlier may have been able to make do with a 'web-enabled' installation of an ECM product. This is generally the case where,

- ✍✍ The main functionality required is mostly that of Web publishing, and archival/ retrieval
- ✍✍ The volume of 'documents' is not too large
- ✍✍ The access to archives is by a few select people at few locations, and
- ✍✍ The asset workflow is fairly simple

In the case of enterprises, where

- ✍✍ The volume of 'assets is quite large
- ✍✍ The assets may need to be retrieved sequentially by the various departments as part of a complex workflow
- ✍✍ Geographically distributed offices need to interact with a common set of archives,

Then, an enterprise architecture approach to the implementation of DAM is necessitated *in order to eliminate the redundant data flow, and extra maintenance costs*. This approach centralizes the DAM repository operations. This 'shared services' approach will enable interoperability between various business units and eliminates disparate imaging systems that are perhaps being separately maintained by individual departments.

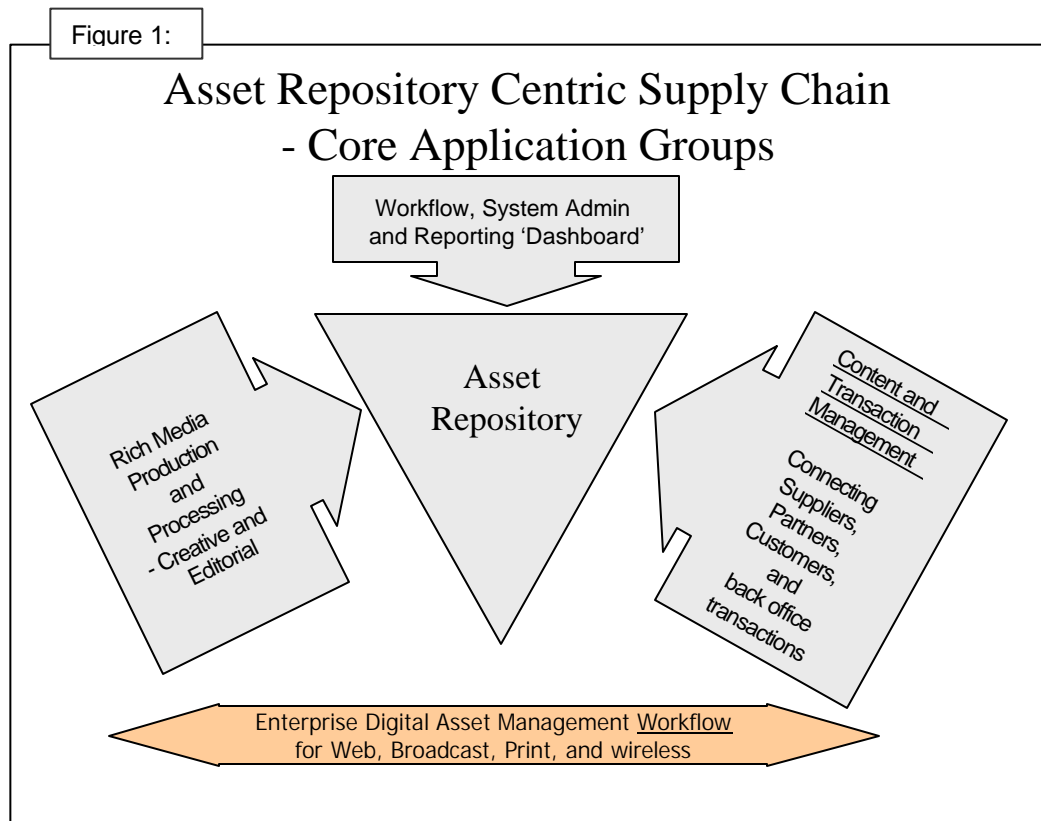
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## Asset Centric Approach

The ease of manipulation, tracking, and management of digital assets is dictated by how the DAM solution is structured.

By taking an 'Asset Centric' approach, in which the Asset Repository 'Pool' is the core of the solution, all the supply chain workflows can be configured as either drawing out of this pool or systematically adding more/ new assets to this pool.

This is represented at a broad level by the Schematic in **Figure 1** below. A DAM supply chain may be considered to consist of the following components:



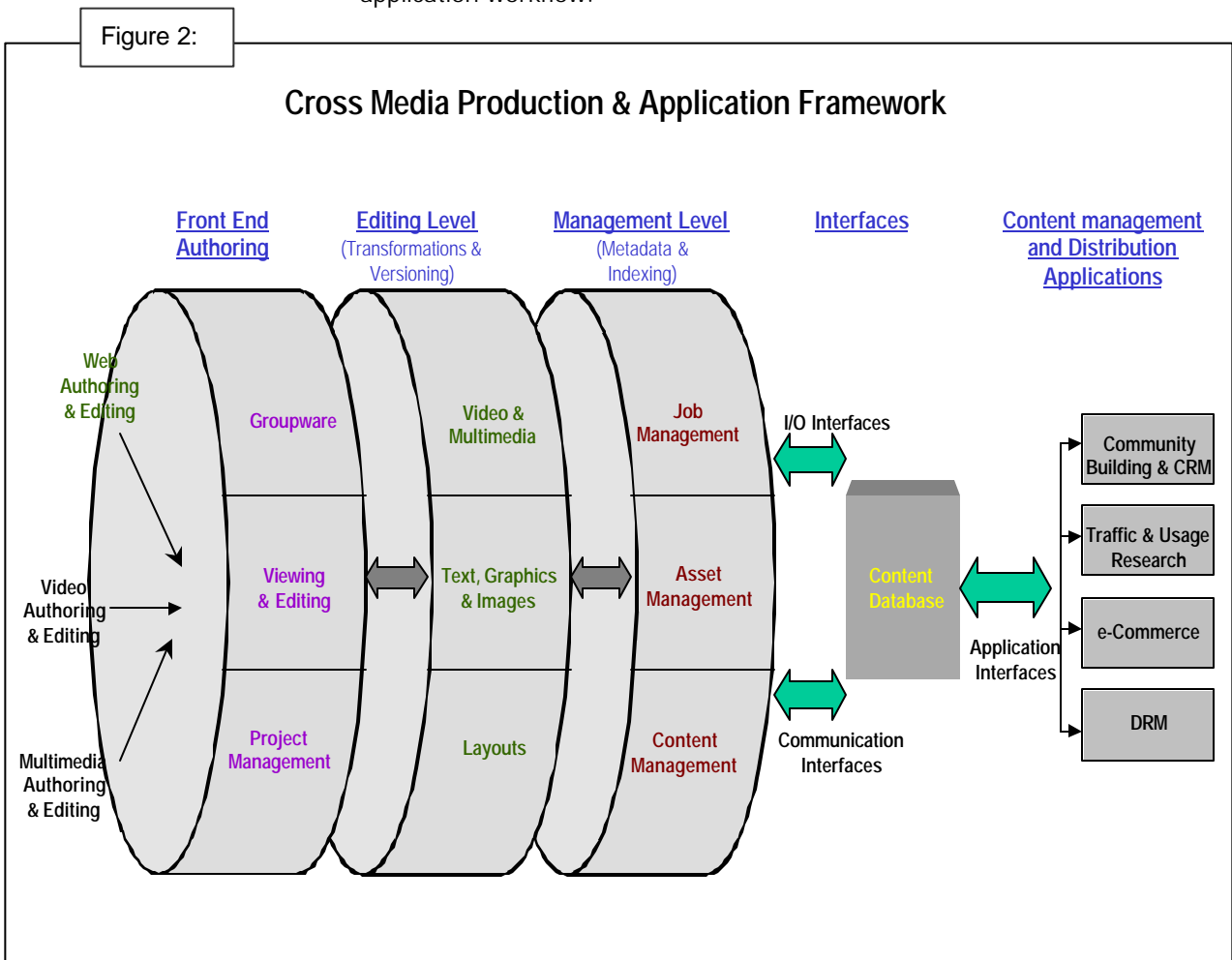
Each of the four component modules has workflow application sub-components within themselves that interface with one another.

The production and processing module that 'inputs' assets into the repository needs to consider separate workflow sub-components for each media type because each media file type warrants customized treatment. Once the assets are created along with their metadata, they are deposited in the asset repository. Metadata enables the assets to perform functions in conjunction with certain applications. The asset repository manages the assets with metadata.

The content and transaction management module makes the assets available, 'Publishes' the assets, and makes them searchable. It enables content syndication and transaction activities. Digital Rights Management is one such 'bundle' of activities.

The fourth module - system admin and reporting 'Dashboard' is to monitor and oversee the system, track usage, track asset royalties to authors, and exercise control over operations.

Let us examine the first component module - production processing - encompassing the various media format types. Below, shown in **Figure 2** is a schematic of the cross media asset production and application workflow.



The functionality that a DAM system is required to provide is vastly different for different media types (simply because each media type has to be processed in a different way). The functional requirements, the logical workflows and the use cases are different.

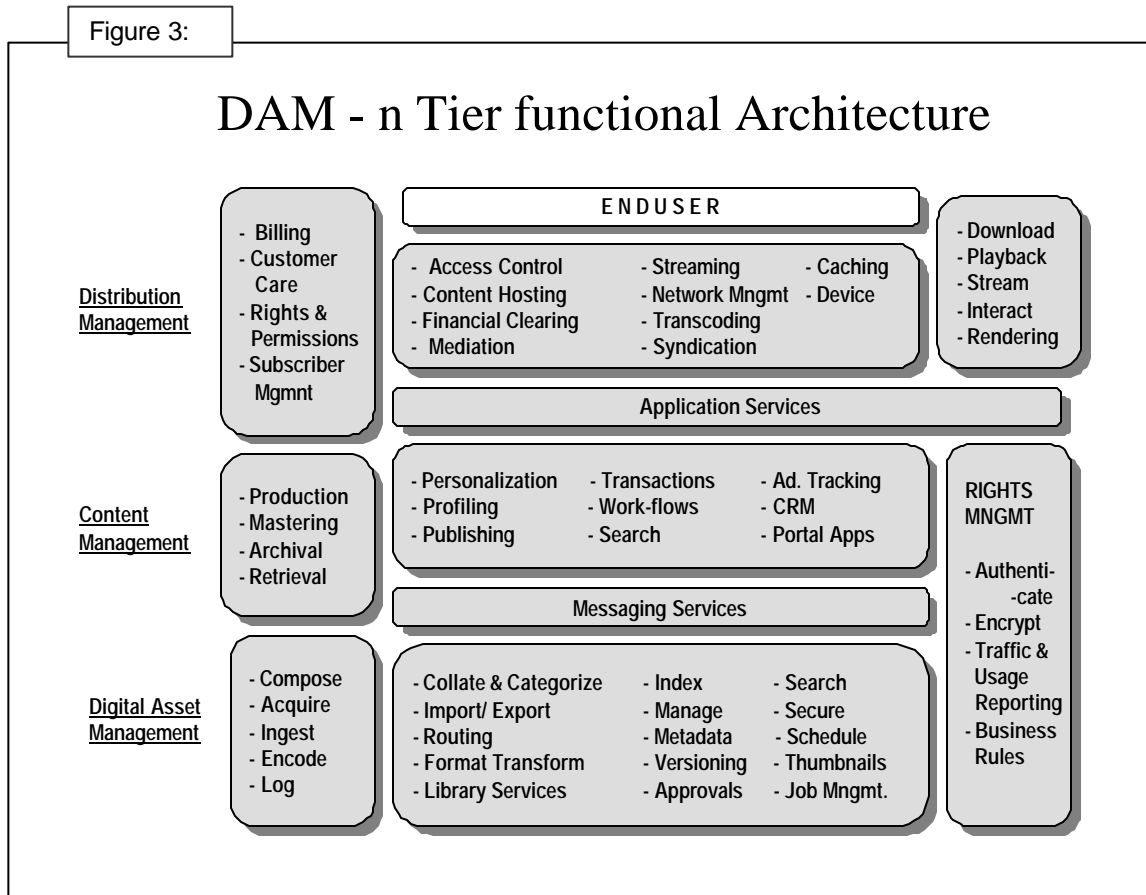
## Agile Content (Content with Metadata)

Digital Assets are managed by making them '*Agile*'. i.e. by associating various types of *metadata* that can be individually manipulated.

Metadata is the definition or description of data. The term metadata refers not only to the set of definitions of the data but also to its formats, processing, transformations, and routing from producer to consumer. Metadata is a set of standard field names, descriptions, and usage developed over time to include all data elements shared across different application services. Metadata-driven data architecture relies on a common data model stored in a metadata repository accessible to all applications and tools that need to reconcile internal data to the external data environment.

Each of the different application components of a DAM system maintains separate internal views of common data. The metadata-driven architecture allows these separate internal views by supporting common definitions of that shared data. New applications can be integrated without significant changes to existing ones because of the shared understanding of the common data. Metadata-driven data architecture also simplifies usage and audit tracking.

**Figure 3** below shows all the four component modules have been integrated into one single functional framework. The bottom tier (Digital Asset Management) is what has been described in figure 2 earlier.



## Types of DAM

Today, dozens of DAM system vendors have evolved and customized their product features on the basis of the end users need. Since every end user company's workflow is different, the many DAM products on offer have been tailored for book and magazine publishing, catalog publishing, graphic arts companies, design studios, broadcast media, marketing, internet publishing, pre-press and printing industries and others. While some products may be highly specialized, others offer generic features and may be customizable. The three variants that have emerged are:

**Single User/ Desktop model:** Provides limited functionality and low priced

✍ ✍ **Workgroup Level** (Multi user): This is a client server model, and many solutions to fit niche markets exist (video, audio, text, pre-press etc)

✍ ✍ **Multi-user Enterprise Level:** Targeted at multiple department, comprehensive, feature packed, and scalable.

While out of the box products may suffice for department level implementations, when it comes to enterprise wide multi department, multi location, cross functional implementation, it may perhaps be apt to architect a customized solution.

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## DAM Strategy Considerations

To sum up the issues discussed so far that will ensure scalability of your DAM solution, building your DAM architecture around a Central Asset Repository that is accessible to authorized users is the first design principle that we need to examine.

The term 'authorized users' can be taken in a broader context to include trusted partners, group companies, and content syndicates. The DAM solution can be designed to have an Extranet interface for this. In this case, the DRM application portfolio has to be robust to address the royalty and copyright issues of the respective in-house content owners. DRM applications vary from encryption of the assets, watermarking of assets, and access control, and tracking of rights enforcement.

**The goal of a Digital Asset Management solution is the Creation of an In-house Media Exchange Environment that is Secure and Accountable.**

From an asset production viewpoint, *Automated Workflow* to enhance the production efficiencies of creative, editing, and other functional departments, around the Central Asset Repository is the next important criterion.

Once Assets are capable of being 'Managed' with the employment of appropriate Meta-data, and indexing tools, asset delivery/ access either through downloadable files (web publishing), or streaming audio and video/ ITV application platforms have to be integrated into your DAM infrastructure. This is to enable your customers interact with, and transact for your assets via e-Commerce.

With an eye on ROI, your internal business processes and workflows have to be *Optimized for Profitability*. There is no point in automating every workflow or digitizing, meta-tagging and indexing every Content Object available. An asset by definition is something of value. The degree of 'Agility' of an asset too needs to be examined as part of the Optimization/ ROI analysis.

*A DAM system must enable Content providers to add value by adding context, quality and usability to content objects.* The four main activities involved namely a) Content creation, b) Processing, c) Archival & Retrieval, and d) Content distribution/ access by end users must be enabled to deliver content tailored to the customer and his context, preferences, and intended use.

A DAM solution should make it possible to store large archives with precise classification and categorization of their contents so they can be managed more easily.

A DAM system provides selective retrieval of any particular data. This is made possible if all data that is to be stored is broken down to units that can be parameterized individually. Then, large archives become manageable.

In addition, taking into consideration that such a system will have many users, a DAM system should be able to create a user-personalized view that is always up-to-date and can be tailored towards the user's preferences. Two facets are to be considered: The business process/ transaction workflow that is determined by the desired end user 'control' functions (interactivity) requirements, and, the technology considerations that enable the content to be 'controlled'.

DAM systems typically enable all the above functionality by making the digital asset repository as the 'center' of all workflows.

## **Comprehensive media support**

The next generation DAM Strategy requires significant up front planning by a corporation to create assets that can be assembled and reassembled multiple times for different outputs and different media.

## **Content-base Vs. Database**

The Digital Asset Management system breaks down the content objects that are to be managed into "components" that allows for

more parameters, and greater detailing of the content objects. This makes it possible to do any transaction in a much more precise and refined way, to a particular part of the content object. At the same time, DAM takes into consideration that it may be more appropriate to have certain assets as integrated entities. Unnecessary 'componentization' of assets may not find use in the organization, and will perhaps be a burden on the system.

The system should be able to handle all of the data types. This is important since assets are made up of a mixture of relational and non-relational components, (e.g. XML objects, SKU tables, specifications, images, partial page layouts, etc.). To address this need, a database specifically designed to support the objects used in publishing is the database of choice.

## **Comprehensive process support**

The system should be able to perform various functions and processes for contributing, collaborating on and controlling content. Cross media workflow is the need of the hour.

The ability to share, author, revise, combine, re-purpose, proof, and/or customize their product information in an efficient and centralized way. A DAM system user must be able to do cross-referencing related content.

To effectively meet the compressed timeframes, a content providers' employees, partners, and contractors must be able to submit, check status, review, proof, and control their content and associated publishing events from remote locations. This makes it necessary for the content repository to be Web accessible with a web savvy workflow.

In addition, the system should be designed such that it is able to re-classify or re-categorize the content objects or rework/ edit the Meta-data without reprocessing of the content objects.

## **Security**

A DAM system should be secure. Since such a system will be continuously connected to the network/ Internet, no one should penetrate the system from outside. In addition the system should address DRM issues like rights and permissions, usage tracking, and trusted versioning.

Digital asset management over the internet today requires DRM technologies for:

- ✍✍ - Asserting intellectual property rights;
- ✍✍ - Managing the intellectual property value chain;
- ✍✍ - Verifying the source of the assets (authentication);
- ✍✍ - Secure distribution of digital assets to end users;
- ✍✍ - Effective distribution of digital assets to end users.

## Metadata Issues

Digital media management relies on the use of descriptive information about media objects, or metadata. Good metadata permit quick search, and extensive reuse. If the metadata are inadequate, the file languishes unused and unusable. The natural language processing elements of the search software that is ultimately going to sift through metadata has to be understood. Efficient hierarchical relationships have to be established between metadata.

Meta-data should address:

- ✍✍ Relationships between the various assets
- ✍✍ Relationship between the various assets and the end user target audience: The information, functionality/ interactivity, the form, and processes involved.
- ✍✍ Relationships between the various assets and the process administrator: The ability to manipulate content objects, and the process of manipulation.

## End user Experience

*The Goal of a good DAM solution is to achieve a contextual, personalized, event-centric, and interactive end user experience.*

Most productivity enhancing solutions deployed are with an emphasis on how to optimize the workflow process that is under consideration. An evolved approach to Digital Asset Management takes these enhancements one-step further by taking a user centric perspective right in the very first step - the analysis/ strategy definition phase. Taking the process efficiency enhancement as a given, this approach strives to enhance the end user experience to the ultimate target audience of the assets, and the user experience of the workflow/ process administrators.

It may be more apt to call our solution a "Digital Media Experience Delivery Management" Solution, as compared to the more conventional terminology of DAM/ MAM/ DMM. Rather than forcing your requirements into pre-defined models, your DAM partner must strive to unlock the power within your existing systems, processes, and more importantly your people, to enable and empower your employees (workflow administrators), customers/ end-users.

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## In Conclusion

DAM is the digital supply-chain management solution that an information-intensive company cannot afford to ignore. While this document is not intended to be a comprehensive resource to all the various issues important in your DAM strategy, we have elucidated some of the key issues relevant.

Many specific issues and variables exist within each company's workflows, which need to be mapped out in comprehensive detail for an appropriate DAM strategy to evolve. With the support and sponsorship of the top management, incorporation of DAM in your business strategy is an imperative.

In assessing your DAM strategy, multiple perspectives have to be scrutinized, most notably a) Workflow centric, b) Repository centric, c) Asset/ content object centric, and c) End-user centric, to ensure that flexibility is built into the solution to address multi-faceted issues.

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## Cognizant Services in DAM

Cognizant has a team dedicated to the DAM space. This team is continuously scouring the DAM space to understand and evaluate the many vendors, and solution functionality on offer, and to benefit our clients with the most evolved concepts in DAM. Cognizant's Digital Media Solutions Center can design and deploy a state of the art DAM solution to maximize your ROI.

In architecting DAM Solutions, Cognizant takes the following steps:

- ✍ Strategy/ Blueprint Definition
- ✍ Requirements analysis and ROI
- ✍ Asset Workflow/ Process Design
- ✍ Functional and Technical architecture
- ✍ Design of the Meta-data schema - in conformance with the concerned industry Metadata Standards body
- ✍ Technology Architecture and Application Development
- ✍ Post implementation Application Maintenance Services
- ✍ Ongoing encoding and Meta-data management services

Detailed service offerings and the rigorous Process and Methodology that is employed in an engagement are discussed in a separate service-offering document.