Digital Asset Management Concepts

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INTRODUCTION TO DIGITAL ASSET MANAGEMENT

"DAM. Looks like something you might say if you couldn't find a photograph you needed for a front-page story. But DAM—digital asset management—is actually designed to preempt such frustrated outbursts. In an age when oodles of media, including print, images, video and audio, are stored in computers rather than file cabinets, newspapers and other groups need a way to organize, manipulate and share those media quickly and easily." (Grimes, 1998)

Dramatic changes have occurred on the corporate front in the last few years, as more and more businesses have started to conduct commerce on the Internet. New business concepts and products are being developed on a daily basis. The accent is on speed, and changes occur quickly – daily, hourly or even minute-to-minute. Two major facets of these changes are:

1. Large amounts of data are created and stored in digitized forms in organizations, and
2. New "digital products" are created.

As more and more information is created in electronic form, organizations are faced with the following problems:

- The volume of digital data has become cumbersome to manage and reuse (Sharples, 1999).
- Organizations have struggled to reduce cycle time, maintain brand consistency, and coordinate cross-media publishing as well as one-to-one marketing efforts.
- The number of digital assets that an organization may manage has exploded.
- Gistics, a California-based research firm that has studied media asset management for several years, estimates that approximately 30% of all media assets in organizations are misplaced, and then reworked or duplicated.

A 2001 Frost and Sullivan market indicator report by Subha Vivek forecasts tremendous future growth in the U.S. digital media management market (Vivek, 2001). The three market segments that will be affected represent the capture, storage and access, and distribution of digital media, respectively.

The promise of digital asset management has attracted a lot of commercial enterprises and software research laboratories, and several products have been introduced commercially in the last few years. However, due to the "newness" of the field, there is not much academic research literature in the field. A good source of academic thought in this field can be found in the online proceedings of the Annenberg DAM Conference, held at the Annenberg School of Communication, University of Southern California in 1998 (Annenberg DAM Conference, 1998).

BACKGROUND: DIGITAL ASSET MANAGEMENT (DAM) CONCEPTS

This section is adapted from our earlier paper on the subject (Subramanian & Yen, 2002).

A. Definition

A *digital asset* is any asset that exists in a digitized form, and is of intrinsic or commercial value to an organization. *Digital asset management* can be defined as a set of processes that facilitate the search, retrieval, and storage of digital assets from an archive.

B. Basic Features of DAM

The basic features of any DAM system include: storage, search and retrieval, and "thumbnail browsing" (Rosenblatt, 1998). A good DAM system will also include the ability to perform object check-in and check-out.

Other desirable features include:

- Integration of the DAM system with content creation applications on the desktop.
- Enterprise features, that is, features that are necessary for a digital media management system to be useful in a large-scale deployment at a large media company (i.e., an industrial strength, scalable database).
- The ability of a DAM system to have a user interface that can function in a cross-platform environment (e.g., the Java language from Sun Microsystems, and the development of XML technology).

- The ability to extend the functionality of the DAM system through programming interfaces.

C. What are the basic differences between DAMs and standard data management systems?

One might argue that DAMs are not much different from currently available database management systems that facilitate the search, retrieval, and storage of data. However, DAMs are different in their potential to address four key problems that pertain to the creation, storage, search and dissemination of multi-media data. According to Hilton (Hilton, 2003), those four issues are:

1. Asset mining: New and sophisticated methods for mining multidimensional, multi-media data stores, which can result in the creation of dynamic, "on-demand" digital products
2. Automation: Automated classification and retrieval systems
3. Managing intellectual property (and associated security issues)
4. Engagement: New GUIs and other data manipulation methods as well as collaboration tools

Somani, Choi and Kleewein distinguish traditional data management systems from "content management systems" that handle digital assets, communications and content such as documents, intellectual property, rich media, e-mail and Web data, and discuss the differences between the two types of systems in the following areas (Somani et al., 2002):

1. Data federation to provide in-place access to existing data
2. An expressive data model that accommodates data from very disparate sources
3. Search over metadata and data

Somani et al. then propose an architecture for integrating the two, that is, data and content management systems. A detailed discussion of the architecture is beyond the scope of this article.

DAM SYSTEM ARCHITECTURE

Figure 1 uses a three-tiered architecture of the generic DAM system architecture to show the process followed during an asset creator's session and a client's query session.

In the *asset creation flow*, the Asset Creator creates an asset, which could be in any digital format, and provides the asset and its associated information to the Asset manager. The Asset manager converts the information associated with the asset into an XML metadata format, builds the appropriate data type definitions, and passes the information and the asset to the Metadata manager. The Metadata manager manages the organization of the Metadata Store, which is a database containing meta information on the assets. Appropriate links between the metadata and the actual assets are created and maintained here. The Metadata Store contains information about the digital assets, typically in an XML DTD format. The assets are passed by the Metadata manager to the File manager, which is responsible for the check-in and check-out of the assets into and out of the Digital Asset Store, which is a combination of file systems and databases.

In the *query processing flow*, the Client asks a query. The Query processor parses the query and sends the user information as well as the parsed query to the Metadata manager, which maintains the metadata for the assets. The metadata include not only information about the asset but also information on who is allowed to access the asset. After this information is retrieved from the Metadata store, a message is sent back to the Query processor by the Metadata manager. The message passed may either be a refusal to access the asset, or an affirmation that the requested asset is being retrieved.

The metadata component acts as a store, search, retrieve and security tool, managed by the Metadata manager.

ADDITIONAL ARCHITECTURAL DETAILS

A. An Open and Distributed Architecture

The key to any digital asset management system is to create an open and distributed architecture. A well designed DAM system first should provide the ability for people to take an asset, repository or archive and be able to customize it into their environment and extend it to their existing system and other new systems. The architecture should allow for the following features:

1. Scaling
2. User Interface and Custom Interface
3. File Management and Asset Association
4. Platform Independence and Transportability

B. Representation and Identification of Digital Assets

1. Representation Issues and Addressable Unit: The three categories of digital asset representation issues are: