DIGITAL CONTENT MANAGEMENT SYSTEM: A CONCEPTUAL FRAMEWORK

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ABSTRACT

Digital Content Management System (DCMS) is a software system that provides preservation, organization and dissemination services for digital collections. The paper covers DCMS, its important features, process, advantages and the types of contents. Need and types of content management systems are explained along with the systems. The role of libraries, existing steps and standards in DCMS has been elaborated critically. The paper concludes that the libraries should play key role by developing expertise in the areas of XML and metadata and the Librarians should take the lead in developing content management and managing future digital libraries. In this paper, after brief introductions of digital content management system and digital rights management terms, we explore many of the business and legal imperatives that have led to content processes that are more complex from a rights perspective. Then we discuss some of the ways in which vendors of content-handling systems should integrate rights information handling into their products in order to offer more complete solutions to customers’ digital content management system and distribution problems, at lower costs and with faster, lower-risk deployments. In our developing knowledge economy, digital content management system will continue to take a central and increasingly vital role in organizational success, effectiveness, and competency.
Keywords: Digital Content Management System, Systems Analysis, Digital Rights Management, Digital Preservation, Metadata Access.

INTRODUCTION

Digital Content management system holds the promise of better organization, increased access to resources, greater organizational effectiveness...for those who dare slog through the process of setting up a Digital content management system - a task often more onerous than dealing with unorganized content. Many different types of organizations, including media companies, large corporations, government agencies, and others, have been adopting digital content management systems (DCMSs) to help them organize digital content and create content-based products for their customers, employees, and partners. DCMSs are intended to be control centers for entire content lifecycles, including content creation, management, production, and distribution, but the increasing complexities and interdependencies of these processes result in DCMSs falling short of their ideal responsibilities.

In many organizations/industries (especially my field - higher education) digital content creation is far outpacing management. The result is an almost chaotic format of resources dispersed across an organization (which is fine - as long as connections are made), without a clear understanding of information/digital assets - the building blocks of a knowledge society.

New technologies/concepts have two potential impacts: a completely new way of doing things, or an improved way of doing what is already happening. Managing content with technology falls into the latter category, but is unfortunately marketed in the former. The "new thing" is the rapid growth of digital resources...improving organization with technology is only an improvement of existing practices of libraries and information architects.

OVERVIEW OF DIGITAL CONTENT MANAGEMENT SYSTEM AND PROCESSES

The term “Digital content management system” originated in the mid-1990s, and it has several different meanings in today’s marketplace. At its most generic, a digital content management system is one that stores digital content for search, browsing, access, and retrieval by users in a workgroup or enterprise. The most prevalent types of digital content management systems are

- Digital Asset Management (DAM): systems that manage rich media assets, often including digital audio and video clips, for retrieval and repurposing in media production environments. These systems are sometimes also called Media Asset Management (MAM).

- Web Content Management (WCM): tools that provide page template design, editorial workflow, and publishing environments specifically for Web sites and other forms of Internet content delivery.

- Enterprise Content Management (ECM): systems that facilitate management of corporate documents and other types of information for use internally as well as
externally with a company’s business partners, customers, regulators, and the general public.

DIGITAL CONTENT MANAGEMENT SYSTEM

Digital Content management system is (drum roll...) the management of content (any digital item - video, audio, text, graphic, links to physical resources, etc.) to allow for contribution from varied sources with points of control to ensure quality. The contributors are often individuals without strong technical background (subject matter experts), so templates are used to create uniform and consistent documents.

Digital Content management system is a concept, process, function, and a strategy.

As a concept, it is the organizing of corporate information and making it useful (useful defined as being usable in format, time, and place needed by end user).

As a process, DCMS is a set of guidelines, templates, roles, and procedures to achieve the concept of DCMS - namely to make information more useful.

As a function, DCMS requires low-tech front-end (for non-technical users), multiple contributor environments, control points (to ensure quality), scalable, and separation of content from presentation.

As a strategy, DCMS is part of an overall knowledge management process and includes:

- Organizing information in an organization
- Knowing what information an organization owns
- Finding what information an organization has
- Maintaining (current and relevant) information of an organization.

PROCESS OF MANAGING DIGITAL CONTENT

- Creating - This may involve the creation of content via an authoring tool native to the DCMS, conversion of legacy content, or creation of content through regular corporate processes (and the content is then uploaded into the DCMS in its (usually) proprietary format).
- Reviewing - Content that has been created is submitted to a review process. Reviewers can accept, reject, or suggest changes.
- Editing - Improvements/alterations to content based on review, feedback, or changes in the underlying principles expressed by the unit of information.
- Organizing - Information needs to be organized in order to be accessible to end-users. Some aspects of organization:
  - Format (legacy content conversion)
  - Version control
  - Meta tagging/Indexing
  - Set live and kill dates
Publishing - Once content has been created/reviewed/edited/organized, it is then published and set "live" in a system. "Presentation" (CSS, usability, accessibility, etc.) is added at the publishing stage to create look and feel desired for the format.

Feedbacks loop - 3rd party evaluations. The initial review process will ensure content accuracy and conformity to standards. However, knowledge becomes outdated (or errors were made during the review stage), and feedback from content users can ensure knowledge "freshness". Additionally, 3rd party evaluations can offer qualitative assessments of the content itself that may not be intrinsic to the initial review process.

Searching and retrieving - This aspect of DCMS ensures that content is available when it's needed and in the desired format.

BENEFITS OF DIGITAL CONTENT MANAGEMENT SYSTEM

The ultimate goal of DCMS is to permit organizations to achieve strategic goals. As with any technology process, the tool has value only to the degree that it enables (not dominates) achievement of larger corporate missions. This list details some major value points for DCMS:

- Repurpose content for use in various formats - web page, documents, etc
- Reduce costs associated with maintenance of content/web sites
- Reduce costs associated with searching for content (or duplication of content creation)
- Access - find ability (and its implications - info when needed, avoiding duplication)
- Meet info needs of organization - when, where, how
- Relevant - content is current and meets needs of users
- Organized - content can be easily located due to an imposed organizational structure at the time of publishing
- Customized - delivering info in a manner and format required by the person for the task
- Increased responsiveness to trends, markets, etc. (and every else that comes from knowing where things are)
- Quality control (via automated workflow process)
- Collaboration and "spiraling" knowledge as contributors build on each others' work
- Permits non-technical staff to enter and publish content into a system

CONTENT INGESTION AND METADATA CREATION

The metadata creation process is the nexus for integration between rights management systems and DCMSs that satisfies business concerns such as those mentioned above. As with all other types of metadata, it is most desirable to avoid having to rely on manual input for creating rights metadata: In addition to adding undesirable overhead to business processes, relying on manual input introduces opportunities for errors and inconsistencies in metadata.
The metadata creation process is the most crucial point of integration between rights management systems and DCMSs.

The simplest way to automate the creation of rights metadata at ingestion time is to program the DCMS to use default rights metadata settings according to company policy—for example, to assume, unless otherwise specified, that the company holds copyrights on all assets. A more advanced variation on this idea is to set up the DCMS to infer rights metadata according to rules that take into account the type of content, the type of content creation/editing tool from which the asset is being ingested into the DCMS, the user doing the ingesting, or the point in a workflow routing. In cases where no automation is possible, the DCMS vendor would integrate a template-based rights editor into the ingestion process, so that a user can fill in the appropriate rights on a case-by-case basis.

Example: a magazine publisher, which stores copyright info in its DCMS, creates all text content in-house but obtains all images from freelancers or other external sources. In this case, if the user is a text editor who is ingesting text items through a text creation tool such as Quark Copy Desk, then the DCMS should infer that copyright on those items belongs to the publisher and set the rights metadata accordingly. For a photo editor who is ingesting images through Adobe Photoshop, the DCMS should prompt the editor for information about the external source of a photo.

A company can achieve even more advanced ways of automating the creation of rights metadata in a DCMS if it uses systems for tracking business rights, such as contracts with content creators and other sources of content. An example of this is shown in Figure 1.

![Figure 1: Integrating retrieval of rights metadata with ingestion of a digital image into a DCMS](image)

In the scenario of Figure 1, the magazine publisher has a system for keeping track of freelance photographers or stock image agencies; many magazine publishers have
such systems in the form of small databases on PCs. Systems for tracking freelancers sometimes also track information from the publisher’s contract with each freelancer, covering such elements as the terms under which the publisher can redistribute the images it licenses. Terms can include restrictions by time (e.g., duration or embargo date), geography (e.g., U.S. only), and medium (e.g., print only, not electronic).

It is beneficial to integrate such rights databases with DCMSs so that, as Figure 1 shows, rights information associated with the content sources can go into the DCMS as rights metadata at ingestion time.

**Distribution**

The simplest way to set up multiple content feeds is via file transfer protocol (FTP). A given content provider can have many different FTP feeds, each of which includes a different subset of the company’s content; the ultimate example of this would be a news wire service, which has many different service levels for its subscribers. In this case, information about distribution partners can be linked with rights metadata from product catalog-type systems, which describe different levels of content offerings, to automate the process of putting the appropriate content in various FTP directories for distribution partners to pick up. The ICE protocol provides ways of automating this process and describing rights and licensing terms, though without providing a persistent protection mechanism.

*Example:* In the magazine publishing example above, rights restrictions on images that derive from contracts with outside content sources result in rights metadata, stored in the DCMS, which in turn governs distribution process so that each customer or distribution partner only sees the content to which they are entitled.

As Figure 2 shows, the magazine publisher from Figure 1 might have a Web publishing system that takes content automatically from the DCMS and uses it to maintain the magazine’s Web site. The Web publishing system would not use any images with rights metadata set to exclude online distribution.
A digital content management system (DCMS) is a combination of tools used to achieve objectives of DCMS. Often, content management system is viewed as content for the web (digital content used for Inter-Intra-extranet). This is a significant use currently, but as organizations (like libraries and education institutions) begin to use DCMS, the system can also be used to point to physical resources (though only having a link to a resource does eliminate one selling feature of a DCMS - content when needed).

"Most digital content management system providers and experts can agree on at least a basic definition of a web DCMS: at a minimum, a web content management system should be able to separate content from presentation, and in so doing should allow the non-technical creators of content to manipulate a web site's content directly."

"A DCMS is a tool that enables a variety of (centralised) technical and (de-centralised) non technical staff to create, edit, manage and finally publish a variety of content (such as text, graphics, video etc), whilst being constrained by a centralised set of rules, process and workflows that ensure a coherent, validated website appearance."

"A digital content management system provides Web site operators with tools to automatically enforce versioning and change control, maintain hyperlinks and site maps, and schedule publication of content. It also allows content providers to submit text and graphics without knowing HTML, while enforcing a consistent look and feel across.
Features of DCMS

Each DCMS will have different features and functionality. Some common features are:

- Versioning to allow revisiting of previous content and to detail development process
- Template-based publishing for consistent look and feel
- File "check-in" and "check-out" to avoid accidental over-writing
- Workflow process
- Roles-based
- Repository for storage and access for various needs
- Metadata features
- Content scheduling to ensure content is current.

Digital Content Conversion

Proprietary content formats can be inhibitive as organizations need to present content in various ways. Content conversion is a significant aspect of effective management. By creating content and presentation separately, usability of each piece of content increases (i.e. for multiple formats).

"Most existing content is trapped in a proprietary format that binds the content to a particular viewer and editor. To be liquid, content needs to be free from its proprietary format and thus, free from its proprietary editors and viewers. Converting legacy content to XML makes the content liquid and therefore, easy to reuse in different contexts destined for a variety of display formats.

"Corporations have a tremendous amount of information assets that exist today as individual files in directories...Because of its unstructured nature, it has been difficult to leverage this information and to reduce both the cost and complexity of managing this information...By converting existing documents and new documents into XML, and organizations can achieve significant savings of both time and money.

CONCLUSION

We have described the increasing complexity of digital content processes in various types of business environments, ranging from media companies to large corporations to government institutions. We have shown how persistent content protection and management of rights information are increasingly crucial to ensuring that business processes comply with contractual and regulatory demands, facilitate the implementation of new digital content-based business models, and protect valued corporate digital content both within the enterprise and with business partners. We have also discussed various ways in which vendors of DCMSs and other digital content-processing systems should integrate rights information, persistent protection schemes, and other rights processing components into their products. We noted that incorporating support for a standard Rights Expression Language goes a long way towards making such integration less costly, time-consuming, and risky by giving all components a common understanding of rights semantics as well as a common syntax for expressing them.
Ever since network-based distribution of digital content became a reality, content owners have been searching - mostly in vain - for cost-effective digital content management and distribution solutions that are truly integrated, enable them to pursue new business models and keep up with the latest technology, and ensure that content rights are respected for both legal and economic reasons. Standard Rights Expression Languages will help make this search finally come to a successful end.

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