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Hartman Communicatie BV
De brug tussen business, gebruikers en ICT

Table of Contents

About the Initial Authors	4
Wipro.....	4
Real Story Group (formerly CMS Watch)	4
Smigiel Consulting Group.....	4
Hartman Communicatie.....	4
Acknowledgements.....	5
License Terms: Creative Commons - Attribution Share Alike	5
Executive Summary	6
Introduction and Purpose	6
About Enterprise Content Management.....	7
Measuring ECM Maturity	8
Human	9
Information.....	9
Systems.....	9
Assessing your own Level	13
Deeper Dive: Level 1 - Unmanaged	16
Introduction	16
Narrative Example.....	16
Maturity Characteristics Summary	17
Discussion.....	17
Human Dimensions	17
Information Dimensions.....	18
Systems Dimensions.....	18
Getting to the Next Level	18
Level 2 - Incipient	19
Introduction	19
Narrative Example.....	19
Maturity Characteristics Summary	20



Discussion.....	20
Human Dimensions	20
Information Dimensions.....	21
Systems Dimensions.....	21
Getting to the Next Level.....	21
Level 3 - Formative	22
Introduction	22
Narrative Example.....	22
Maturity Characteristics Summary	23
Discussion.....	23
Human Dimensions	23
Information Dimensions.....	24
Systems Dimensions.....	24
Getting to the Next Level.....	24
Level 4 – Operational	25
Introduction	25
Narrative Example.....	25
Maturity Characteristics Summary	26
Discussion.....	26
Human Dimensions	26
Information Dimensions.....	27
Systems Dimensions.....	27
Getting to the Next Level.....	27
Level 5 – Proactive.....	27
Introduction	28
Narrative Example.....	28



Maturity Characteristics Summary	28
Discussion.....	29
Human Dimensions	29
Information Dimensions.....	29
Systems Dimensions.....	30
Maintaining Level Five	30
Participating in Model Development	31
Appendix A: Glossary.....	32



About the Initial Authors

This document resulted from a collaboration among four firms: consulting firms Wipro, Smigiel Consulting Group, and Hartman Communicatie, as well as analyst company, The Real Story Group.

Wipro

Wipro Technologies (www.wipro.com) is a global services provider delivering technology-driven business solutions that meet the strategic objectives of our clients. Wipro has 55+ 'Centers of Excellence' that create solutions around specific needs of industries. Wipro delivers unmatched business value to customers through a combination of process excellence, quality frameworks and service delivery innovation. Wipro is the World's first CMMi Level 5 certified software services company and the first outside the USA to receive the IEEE Software Process Award.

Dave Smigiel, formerly of Wipro, helped direct this effort. Dave has been involved with unstructured content initiatives since the mid-1990s. During his career he has held professional positions specializing in content management, knowledge management and data management solutions with various major consulting firms. He has served clients in the automotive, airlines, utility, telecommunications, high-tech and retail industries. Dave has an MBA and holds AIIM certifications in ECM, BPM and IOA as well as the CDIA+ from CompTia.

Real Story Group (formerly CMS Watch)

The Real Story Group™ (www.realstorygroup.com) is a buyer's advocate for enterprises looking to invest in content technologies. The Real Story Group publishes independent research that helps buyers sort out suitable technology choices for their particular needs. Real Story Group research is known for its technical depth, readability, and absolute neutrality.

Smigiel Consulting Group

Smigiel Consulting Group (SCG) is a vendor-independent management and technology consulting firm focused exclusively on Enterprise Content Management and Knowledge Management. SCG combines thought leadership and strategic thinking with project execution experience. In addition to strategy and technology selection expertise, SCG provides project implementation oversight services incorporating key enablers such as organizational readiness considerations and Lean process improvement methodologies to enhance ECM adoption rates and end-user acceptance.

Hartman Communicatie

Since 1993, [Hartman Communicatie](http://www.hartmancommunicatie.com) bridges the gap between business, users and ICT. Our consultants help organisations in getting more value out of their information by developing an optimal communications and information strategy. Hartman Communicatie is vendor neutral



and publisher and organiser of several publications and events on information management, such as the annual [HartmanEVENT](#) and a [Buyer's Guide](#) of content management systems in the Benelux.

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Several outside readers contributed to this initial draft, though their contributions do not necessarily reflect their agreement with all the material that follows. These contributors include Len Asprey, Paul McTaggart, Ben Richmond, and Ganesh Vednere. The authors are grateful for their feedback.

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Executive Summary

Enterprises face ever-increasing volumes of content. The practice of Enterprise Content Management (ECM) attempts to address key concerns such as content storage; effective classification and retrieval; archiving and disposition policies; mitigating legal and compliance risk; reducing paper usage; and more.

However, enterprises looking to execute on ECM strategies face myriad human, organizational, and technology challenges. As a practical matter, enterprises cannot deal with all of these challenges concurrently. Therefore, to achieve business benefits from ECM, enterprises need to work step-by-step, following a roadmap to organize their efforts and hold the attention of program stakeholders.

The ECM Maturity Model (ECM³) elaborated here attempts to provide a structured framework for building such a roadmap, in the context of an overall strategy. The framework suggests graded levels of capabilities -- ranging from rudimentary information collection and basic control through increasingly sophisticated levels of management and integration -- finally resulting in a mature state of continuous experimentation and improvement.

- Level 1: Unmanaged
- Level 2: Incipient
- Level 3: Formative
- Level 4: Operational
- Level 5: Pro-Active

Like all maturity models, it is partly descriptive and partly prescriptive. You can apply the model to audit, assess, and explain your current state, as well as inform a roadmap for maturing your enterprise capabilities. It can help you understand where you are over- and under-investing in one dimension or another (e.g., overspending on technology and under-investing in content analysis), so you can re-balance your portfolio of capabilities. The model can also facilitate developing a common vocabulary and shared vision among ECM project stakeholders.

Individuals are invited to apply join the ECM³ “Guiding Consortium,” presently organized by the Project Leaders (representatives of Wipro, Hartman Communicatie, Smigiel Consulting Group, and The Real Story Group). Over time, the Project Leaders intend to hand off leadership of the Model to this Consortium. Please see <http://ecm3.org> for details.

Introduction and Purpose

The effective deployment of Enterprise Content Management (ECM) technologies requires planning and developing a comprehensive *strategy*. Such a strategy must deal with the varied human, information, and systems aspects of ECM.

As a practical matter, enterprises¹ cannot deal with all attendant ECM challenges concurrently. Therefore, to achieve business benefits from ECM, enterprises need to work step-by-step, following a roadmap to organize their efforts and hold the attention of program stakeholders.

The ECM Maturity Model (ECM³) elaborated here attempts to provide a structured framework for building such a roadmap. The framework suggests graded levels of capabilities -- ranging from rudimentary information collection and basic control through increasingly sophisticated levels of management and integration -- finally resulting in a mature state of continuous experimentation and improvement.

Like all maturity models, it is partly descriptive and partly prescriptive. You can apply the model to audit, assess, and explain your current state, as well as inform a roadmap for maturing your enterprise capabilities. Use this model as a guide in developing a comprehensive strategy that reduces risk and aligns with the unique characteristics of your own enterprise. The model can also facilitate developing a common vocabulary and shared vision among ECM project stakeholders.

The model is particularly oriented towards ECM Business Champions, Business Analysts, and IT Leaders. However, it should be helpful to any consultants and practitioners of ECM strategies, solutions, and tools.

About Enterprise Content Management

ECM can be defined in many ways. However, for this model, we will build off AIIM's definition:

[T]he strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes.²

For the purposes of this model, we focus on the commonly understood scope of ECM as concerning principally document and records management, along with associated services and processes like imaging, workflow, and archiving, among others. The model does not directly concern itself with Web Content Management (WCM) and related, publishing-oriented disciplines, although some of the concepts below apply to those programs as well. Similarly, the model does not address data-oriented information management, such as Business Intelligence and Data Warehousing.

The business justifications for ECM are varied. Enterprises may invest in ECM to:

- Make ever-increasing volumes of unstructured content (primarily documents) more accessible
- Reduce storage requirements by consolidating single sources of content
- Share and collaborate more effectively, and allow for reuse of existing corporate content

¹ When we say "enterprise," we mean the entire organization, regardless of type (e.g., public, non-profit, commercial) or size.

² <http://www.aiim.org/what-is-ecm-enterprise-content-management.aspx>

- Meet legal and compliance requirements
- Reduce the amount of paper within the enterprise
- Provide a more standardized way of gathering and distributing information (e.g., using forms)
- Improve business processes to become more efficient
- Support business continuity requirements
- Increase value from investments in content technologies
- Communicate in a more consistent manner with all stakeholders
- Support knowledge management strategies, and
- Fulfill many other business purposes

Measuring ECM Maturity

Enterprise Content Management is broad enough to touch multiple areas within your enterprise. To be effective, ECM requires successful strategies, technologies, governance, and practices.

Consequently, there are many ways to measure ECM maturity. “Maturity” could reflect: the expansion of a content management system from department to enterprise level; the completeness of the management lifecycle for business-critical documents; organizational awareness of the business value of unstructured information management; or the volume of content under successful management; among many other dimensions.

This model breaks down possible attributes into thirteen dimensions of maturity across three categories: Human, Information, and Systems. These dimensions should apply across any enterprise regardless of industry, size, technology and business objectives, although some dimensions will surely take on greater or lesser importance under different circumstances.

Note that these categories and their individual dimensions are in arbitrary order, rather than any predetermined order of priority. Priorities for your enterprise will be industry-specific, and will emerge more clearly after assessing your level of maturity.

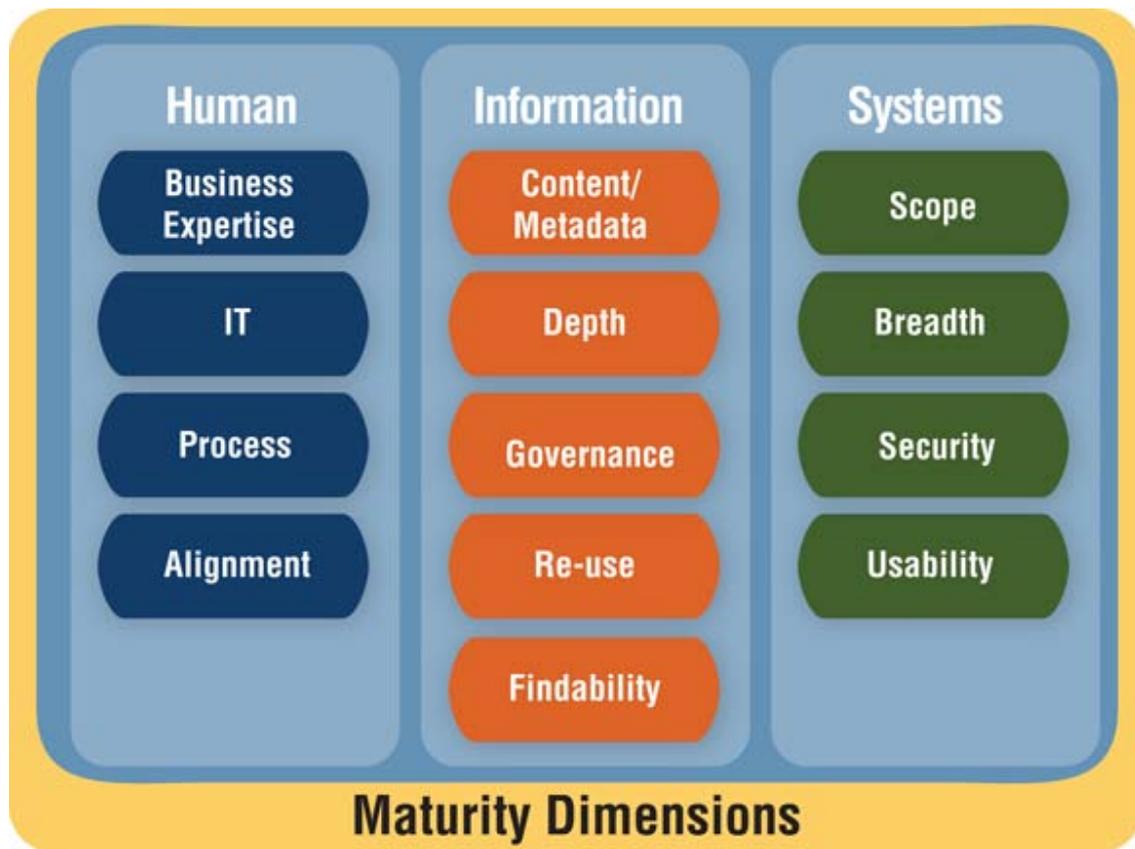


Fig. 1: There are thirteen maturity dimensions across three categories.

Human

Business Expertise - Employee and executive education and understanding of core ECM precepts

IT Expertise - Ability to properly take advantage of incumbent and new systems

Process – Extent to which enterprise has analyzed its content-oriented business processes

Alignment – Extent of effective Business – IT collaboration, understanding, and synchronization

Information

Content/Metadata – Extent to which enterprise has analyzed its content and metadata

Depth - Completeness of content lifecycle management

Governance- Extent of policies and procedures addressing information management

Re-use - Extent realization of content re-use opportunities

Findability - Ability to find the right content at the right time

Systems

Scope – Relevant range of ECM functional capabilities (DM, BPM, DAM, etc.) adopted

Breadth – Evolution from departmental to enterprise-wide management systems, where necessary

Security – Extent to which actual content access reflects enterprise entitlements

Usability -- Application fitness to purpose³

³ Reference: Steve Krug, [Don't Make Me Think](#)



An enterprise’s maturity can then be broken down into five levels that identify a readiness to realize ECM strategies and deployments.

Table 1: Maturity Levels Defined by Key Characteristics

LEVEL	STATE	CHARACTERISTICS
1	Unmanaged	The enterprise does not formally manage content. Distributed share drives and local hard disks serve as document stores, resulting in redundant data, inability to find content, and high levels of rework and end user frustration.
2	Incipient	Functional or project driven approaches emerge to managing some subsets of content. Various technologies (e.g., DM, Collaboration) and competing/redundant products are deployed, but remain poorly used and insufficiently applied.
3	Formative	The enterprise has inventoried content and put plans, policies, and procedures in place, but remains in the process of implementing them --likely over several years. Multiple projects are underway, but risk conflict and failure in the absence of a broader strategy. Notions of information lifecycle management begin to get incorporated.
4	Operational	Content is managed pervasively throughout the enterprise—albeit in diverse systems. Applicable retention schedules have been applied to all critical electronic content. The enterprise has also figured out what content <i>not</i> to manage, and has made space for social/collaborative content management as well.
5	Pro-Active	Content management functionality is available broadly as a shared service and is viewed in the context of a broader services-oriented effort. The enterprise can procure and incorporate new content technologies (such as DAM) as needed, and plug into a flexible architecture to serve the business. Solid understanding of core information management issues and key business drivers allows the enterprise to be more agile in the roll-out of new services.

As you can see, each level has numerous general characteristics, but by analyzing across the thirteen individual dimensions we introduced above, enterprises can get a sense for what level they reside. Consider the following chart.

Dimension:		Level: 1) Unmanaged	2) Incipient	3) Formative	4) Operational	5) Proactive	Measurement / Monitoring and Feedback Processes
HUMAN	IT Expertise	No experience managing formal repository and workflow systems	Struggling 1.0 implementations of some systems	More advanced version 2.0+ implementations of systems, with focus on business-critical content	Managing repository and workflow systems is a core IT skill	Pro-active experimentation and learning about emerging content technologies	
	Business Expertise	Ignorance about value and role of ECM	Growing sense of awareness about lack of management services	Communication plans include updates to key stakeholders about ECM business value	Executive sponsorship of ECM as a practice; process and content analysis are core skills	Information management designated a core employee skill and part of their HR reviews	
	Process	Few or no standardized procedures around content	Basic process analysis leads to some ad-hoc workflows	Initial modeling of inter-departmental processes to prep for automation	Automated processes span systems and departments	Robust exception-handling and experimentation within framework	
	Alignment	Key business drivers are not well understood by IT strategists, resulting in ECM gaps in IT portfolio	Gaps still exist between technology and core business processes; IT-metrics not evaluated by business outcomes	IT and Business both understand their information management roles and their respective strategies are no longer developed in a vacuum	Execution of IT & Business strategies become more cohesive, but still follow push-pull model	Strategy development between IT and the Business is done in collaborative and concurrent manner with frequent reviews using proper metrics	
INFORMATION	Content/metadata	No formal inventory; no formal classification	Departmental inventories and initial content tagging	Enterprise inventory underway; controlled vocabularies (CVs) initiated	All new repositories and content types registered; global taxonomies created	Pervasive ROT elimination; Folksonomy development; Ongoing metadata reviews	
	Depth	No lifecycle management	Most content archived haphazardly; some departmental RM efforts	Development of formal electronic retention, RM, and disposition schemes	Implementation of electronic and paper-based RM across the enterprise	All content types go through formal lifecycles.	
	Governance	No policies and procedures	Scattered policies; few or no formal procedures	Development of information governance structure and codification of procedures	Policies and procedures widely disseminated; Enterprise ownership in place	Active review and adaptation; Voice of Customer key to feedback process	
	Re-use	Content routinely duplicated	Content still routinely duplicated, but staff aware of problem	Initial content analysis and structuring	Documents repurposed across systems and channels	Content components re-used across systems and channels	
	Findability	Employees spend excessive time searching using various internal search engines	Search indexes tuned and basic metadata applied	Rationalization of search technology; analysis of search logs and further tuning, leveraging CV terms	Development of specific enterprise and/or federated search applications	Search and classification become a central service, with business-driven variants	
SYSTEMS	Scope	No understanding of core content types	Some basic DM implementations with ad hoc workflow	Identification of core content types, locales; pilot projects for DAM, BPM, etc.	Business-critical information systems prioritized	Broad availability of diverse management systems	
	Breadth	No systems	Scattered departmental efforts	Initial attempts to combine or integrate systems across departments	Successful departmental initiatives have been scaled enterprise-wide	Encourage and adopt innovations from departmental levels	
	Security	No security regime in place	Dependent on individual systems	Formal projects initiated to address gaps & redundancies due to multiple solutions	Standardized policies and procedures exist and are system enabled	Security is treated as a centralized shared service	
	Usability	Lack of systems make end user usability considerations moot	Employee adoption rates measured, but dissatisfaction unanalyzed	Some initiatives use Scenario Analysis and User Persona techniques to guide design	User-centered design underpins all system designs, with formal collection of user feedback	Usability is a guiding principle in all system activity	



Assessing your own Level

Clearly it would be highly unusual for any enterprise to reside at the same level across all thirteen dimensions. However, drawing a line down the chart (indicating your capabilities for each dimension) can give you a good sense for your organization's ECM maturity.

For example, in the following scenario (see chart next page), "Enterprise ABC" has overdeveloped its ECM systems in relationship to its content analysis and understanding of core ECM concepts. Without improvements in findability and governance, further investment in infrastructure is unlikely to deliver a return on their investment.

Is Enterprise ABC at ECM Maturity Level Two or Level Three? Or neither? The answer to that specific question is less important than identifying structural immaturities and addressing them.

Moreover, you can see that you do not need to be proficient at a given across *all* categories and dimensions in order to then move on from one level to the next. The idea is to understand where you fit generally, document imbalances, and set priorities from there.

Beyond the following chart, this document continues a discussion of the five phases, which can help you understand in more detail where your enterprise stands and where you need to mature going forward.

← “Enterprise ABC” ECM Maturity Levels

Dimension:		Level: 1) Unmanaged	2) Incipient	3) Formative	4) Operational	5) Proactive
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	Usability	Lack of systems make end user usability considerations moot	Employee adoption rates measured, but dissatisfaction unanalyzed	Some initiatives use Scenario Analysis and User Persona techniques to guide design	User-centered design underpins all system designs, with formal collection of user feedback	Usability is a guiding principle in all system activity

Measurement / Monitoring and Feedback Processes

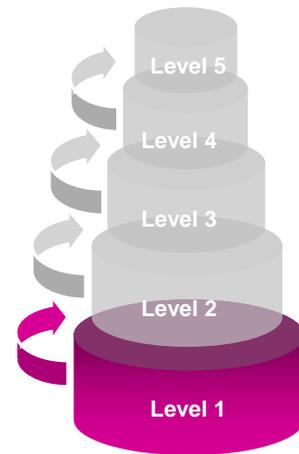




Deeper Dive: Level 1 - Unmanaged

Introduction

At this level ECM technologies are typically non-existent as are supportive policies and procedures. The lack of ECM capabilities leaves users with a high-level of frustration when faced with everyday tasks. Content is poorly understood, with basic pre-requisites such as content inventories and classification schemes not done or at best incomplete or outdated. Users typically spend significant time looking for content and often content is routinely recreated. A key reason for this situation is that business and IT stakeholders do not understand the value that ECM strategies can offer and the role that they play within sound information management architectures is not well understood.



Narrative Example

Acme Manufacturing is a mid-tier supplier of automotive parts to both the original equipment manufacturers and aftermarket suppliers. As with all companies in this sector emphasis has been on improving processes across the value chain. One area of information technology (IT) that is currently missing from Acme's IT application portfolio is tools that improve unstructured content management. Two examples of how this gap impacts productivity and efficient access to content is exhibited by the issues that Customer Service experiences when dealing with Aftermarket sales orders and contract management.

The first involves the Contracts and Terms of Sale that the firm has for approximately 200 Aftermarket customers. These documents are typically stored in binders with each customer segmented by Tabs. On a regular basis Sales personnel and Account Managers submit one or more of these documents via interoffice mail and e-mail attachments to customer service personnel to be filed as part of the customer's record in the appropriate binder. Often these documents get misfiled or not filed at all. When these documents are needed as part of a decision process to satisfy a credit request by the customer significant time is spent looking for the right content. Even if the documents are located the customer representative is never really confident that they are working with the most recent addendum and have all of the supporting documents necessary to make an informed business decision.

The second example involves Aftermarket orders and order inquiries that are faxed into Customer Service. The faxes are manually stored by various indexes by each of 4 customer service teams. Subsequent queries by the customer require that the service representative deal with a significant amount of paper when researching customer complaints making addressing the customer's questions a lengthy and labor intensive task.

Maturity Characteristics Summary

Table 2: Critical Characteristics Mapped to Core Dimensions for Level 1

HUMAN	IT Expertise	No experience managing formal repository and workflow systems
	Business Expertise	Ignorance about value and role of ECM
	Process	Few or no standardized procedures around content
	Alignment	Key business drivers are not well understood by IT strategists, resulting in ECM gaps in IT portfolio
INFORMATION	Content/metadata	No formal inventory; no formal classification
	Depth	No lifecycle management
	Governance	No policies and procedures
	Re-use	Content routinely duplicated
	Findability	Employees spend excessive time searching using various internal search engines
SYSTEMS	Scope	No understanding of core content types
	Breadth	No systems
	Security	No security regime in place
	Usability	Lack of systems make end user usability considerations moot

Discussion

Human Dimensions

The ECM environment is characterized by a high level of frustration. Typically content ownership is not established and knowledge of where content exists is limited to individuals or small groups. The lack of defined processes aligned with content management functionality prevents the business stakeholder from efficiently and effectively responding to critical situations such as regulatory requests, legal discovery, or catastrophic events, as well as everyday business tasks. Without automated workflows, work processes are wholly dependent on individuals to process content and remain aware of where bottlenecks and barriers to successful and timely process execution exist.

Culturally and organizationally there exists apathy towards sound information management practices coupled with weak or insufficient executive sponsorship and commitment. Business and IT stakeholders both lack an appreciation for the role of ECM and the value that ECM enabling technologies can add to the firm's portfolio of business solutions. From an IT

perspective key business drivers are not well understood resulting in missed opportunity to apply ECM strategies in support of the critical business drivers.

Information Dimensions

The lack of an inventory and classification scheme structuring content with an associated set of metadata contributes significantly to users' inability to easily find and reuse content. Although there may be an attempt at structuring content using file folders, the lack of metadata management results in many different versions of existing content increasing the risk of using out-dated and inaccurate information to formulate critical business decisions. In addition due to the lack of ECM tools, basic library services such as check in/check out and version control do not exist, intensifying the problem of maintaining accurate and current information. In this environment share drives overflow with redundant, outdated and trivial (ROT) content making the task of finding content labor intensive and highly frustrating. This frustrating experience in time motivates many users to recreate content further increasing the volume of ROT content in the environment.

Systems Dimensions

Without ECM capable systems the organization's ability to implement content management and workflow solutions is quite limited. The more overwhelmed start using their e-mail to store and manage business records. This practice adds additional challenges as it further limits other individuals access to this information and presents significant work to decipher what to keep and what to purge when employees move on to other opportunities.

Getting to the Next Level

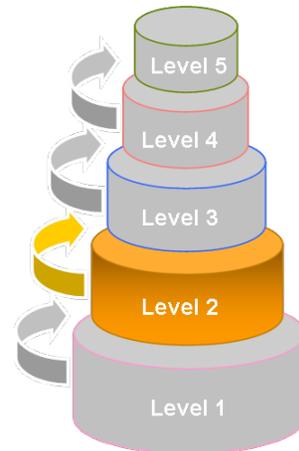
The key activities that should be considered by organizations at Level 1 are the following:

- Develop an ECM strategy that is part of the organization's overall information management strategy
- Establish executive level ownership for delivering on the strategy
- Initiate several ECM core foundational tasks such as developing content inventories, classification schemes, and metadata models
- Develop a cross functional team made up of business and IT stakeholders to identify technology to support aligned business and IT drivers with respect to content management
- Conduct an initial content inventory

Level 2 - Incipient

Introduction

Many of the Level 1 characteristics also exist in a Level 2 environment. What distinguishes Level 1 from Level 2 organizations is the existence of struggling ECM 1.0 implementations with departmental and work group success at best. Key business drivers are still not adequately supported with significant gaps common between technology roadmaps and business strategies. In an attempt to bridge these gaps business process owners augment technology capabilities by leveraging and enabling tribal knowledge. Years of being thrust into situations have made certain individuals indispensable to achieving business objectives and responding to questions posed by business scenarios.



Narrative Example

Feel Good Inc. is a large pharmaceutical firm that has over the last decade implemented a number of ECM technologies – both internally developed and commercially purchased in the market place. Research and Development (R&D) is one area of the business that has had a customized ECM software package deployed for several years. Over this time significant custom code has been developed to accommodate basic workflows and metadata tagging of content developed as part of the R&D process. Although investment in enhancements for storage and search has been ongoing R&D personnel have not fully accepted this tool and argue its use is inefficient resulting in lost productivity. A number of departments will not use the tool as it does not support the indexing terms that they need for finding and retrieving content. Although there is a growing sense of frustration in the user community over this lack of content management functionality, the lack of a global governance and strategy forum makes it difficult to mobilize the key stakeholders to affect change.

Maturity Characteristics Summary

Table 3: Critical Characteristics Mapped to Core Dimensions for Level 2

HUMAN	IT Expertise	Struggling 1.0 implementations of selected systems
	Business Expertise	Growing sense of awareness over lack of management services
	Process	Basic process analysis leads to some ad-hoc workflows
	Alignment	Gaps still exist between technology capabilities, information architectures and core business processes; IT-metrics not evaluated by business outcomes
INFORMATION	Content/metadata	Departmental inventories and initial content tagging
	Depth	Most content archived haphazardly; some departmental RM efforts
	Governance	Scattered policies; few or no formal procedures
	Re-use	Content still routinely duplicated, but staff aware of problem
	Findability	Search indexes tuned and basic metadata applied
SYSTEMS	Scope	Some basic DM implementations with ad hoc workflow
	Breadth	Scattered departmental efforts
	Security	Dependent on individual systems
	Usability	Employee adoption rates measured, but dissatisfaction unanalyzed

Discussion

Human Dimensions

As personnel struggle with immature ECM implementations many users leverage the firm's tribal knowledge or relationships with the right person to complete tasks. Culturally and organizationally the key individuals' peers hold the "Go To" people in high regard and applaud their ability to get the job done. Although reliance on these individuals is necessary in the short term to continue operating, the enterprise does itself a disservice by not identifying methods and strategies for decoupling process dependency from individuals. Also the key individuals currently viewed as critical to content access processes oftentimes are reluctant to actively participate in activities designed to improve and change the current methods of information access. This reluctance further impedes progress towards improving the overall ECM capability.

Gaps between IT and Business strategy alignment are still rather large with any metrics being questionable as they typically are not evaluated by actual business results and outcomes.

Although some focus has been placed on process analysis, automated work flows are insufficient to truly impact overall process efficiencies.

Information Dimensions

Although some work has been completed developing information architectures, they are not developed from an inter-departmental or enterprise view resulting in reduced applicability for a number of users across various functional groups. Although search functionality is available, providing some benefit, the misaligned information architectures too often make it difficult to find the proper content in a reasonable timeframe. Informal policies and procedures are developed inconsistently and address local work groups rather than establishing global guidance and direction. The lack of global governance makes it difficult for a results oriented dialogue to occur between the users and the technologists to address tactical and strategic strategies for overcoming the existing shortcomings.

Systems Dimensions

At Level 2, technology as well as repositories typically exist but the content is stored inefficiently with the lack of standard metadata and controlled vocabularies presenting significant hurdles to finding and leveraging the content. These implementations tend to be version 1.0 deployments with basic support for ad-hoc processes that involve documents. Adoption rates are not very high with success often being measured on departmental or workgroup findings versus cross functional areas of the firm.

Often technology becomes the focus at this level rather than being viewed as an enabler to the overall process in support of a more effective and efficient value chain. With respect to usability, existing implementations tend to treat knowledge workers as robotic actors, rather than players in often sophisticated processes.

Getting to the Next Level

The key activities that should be considered by organizations at Level 2 are the following:

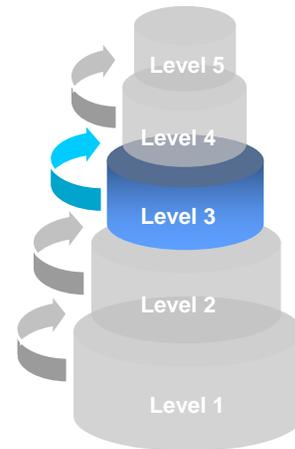
- Rationalize existing tools and technologies and develop a shared vision across the key stakeholders to craft a “To Be” ECM framework
- Identify methods and strategies for decoupling process success from being dependent on key individuals
- Analyze IT and Business Alignment strategies to identify why gaps exist between deployed ECM capabilities and business needs
- Analyze business processes to determine where ECM can add value
- Development ECM system metrics that evaluate impact in terms of business objectives in addition to traditional IT measures such as availability and performance

- Provide high level training to end users on the use and benefits of information management
- Rationalize any taxonomies and classification schemes that exist in to a coherent business aligned information architecture with a corresponding metadata model
- Conduct usability audits of existing systems

Level 3 - Formative

Introduction

At the Formative stage the enterprise is starting to realize benefits of second generation ECM implementations. Although some standards and process automation exists, individuals are still central to success of the process. Capabilities are focused around managing business-critical documents with processes that cross the functional areas of the value chain being modeled and analyzed for improvement opportunities. As a result of targeted communication plans some of the key stakeholders in the enterprise understand the cost-benefits of ECM business solutions.



Narrative Example

Suresh is a senior manager in a large IT group of a large multi-national consumer products firm. His main area of responsibility is the ECM portfolio of technologies that are available to the business divisions. Currently he is preparing for a presentation to other senior leaders from both the business units and IT regarding the roadmap recommendation for maintaining, sustaining and integrating the ECM infrastructure to other enterprise applications. His involvement with other decision makers in the firm in strategic planning sessions is relatively recent as in the past he would typically develop his plans on his own and pursue their approval through his management chain. Often times this process resulted in new technology procurements and upgrades negatively impacting business users. Being involved in this more collaborative and holistic planning process he becomes confident that the mistakes of the past will not be repeated.

Maturity Characteristics Summary

Table 4: Critical Characteristics Mapped to Core Dimensions for Level 3

HUMAN	IT Expertise	More advanced version 2.0+ implementations of systems, with focus on business-critical documents
	Business Expertise	Communication plans include updates to key stakeholders about ECM business value
	Process	Initial modeling of inter-departmental processes to prep for automation
	Alignment	IT and Business both understand their Information Management roles and their respective strategies are no longer developed in a vacuum
INFORMATION	Content/Metadata	Enterprise inventory underway; controlled vocabularies initiated
	Depth	Development of formal electronic retention, RM, and disposition schemes
	Governance	Development of governance structure and codification of procedures
	Re-use	Initial content analysis and structuring
	Findability	Rationalization of search technology; analysis of search logs and further tuning
SYSTEMS	Scope	Identification of core content types, locales; pilot projects for DAM, BPM, etc.
	Breadth	Initial attempts to combine or integrate systems across departments
	Security	Formal projects initiated to address gaps & redundancies due to multiple solutions
	Usability	Some initiatives use User Persona and Scenario Analysis techniques to guide designs

Discussion

Human Dimensions

As the enterprise moves from 1.0 to 2.0+ ECM functionality the enterprise is developing ECM competencies both in the technical and business domains. An area of emphasis beginning to develop is the analysis of inter-departmental processes and how applied ECM capability can improve efficiencies and effectiveness. This process view is different from Level 2 in that any process work done in the “Incipient” stage is solely within a functional area or workgroup.

Improvement has also been made in the manner that IT and Business strategic plans are developed. Although gaps still exist in their alignment the strategies are no longer developed separately. Structured and frequent communications highlighting ECM successes and

contributions to the overall business objectives are starting to be the norm. Because of these formal updates a number of the key stakeholders are beginning to advocate increased use of enabling ECM technologies.

Information Dimensions

Activities addressing gaps across multiple inventories and incomplete metadata models are common at this level. Key information architecture elements such as controlled vocabularies are being investigated as a means to improve system benefits and end user satisfaction levels. Complementing this is work addressing Search engine performance and optimization.

Realizing that overall governance is lacking and key to long-term sustainability, efforts are undertaken to develop an overarching governance structure and formalize policies and procedures by documenting and communicating them to the community of ECM stakeholders.

From a content lifecycle perspective efforts are formalized around retention and record management strategies with traditional Records Managers being formally solicited to become part of the ECM stakeholder community if not already involved.

Systems Dimensions

The Level 3 enterprise aspires to increase the breadth of ECM capabilities by looking for opportunities to combine small pockets of ECM users and technologies to form a larger point of presence. This strategy results in benefits due to economies of scale for support purposes and provides a foundation for ECM community forums. In this evolution to enterprise-wide management solutions the enterprise also begins to look at best fit capabilities when looking to address specific business requirements such as managing digital assets, paper-based information and critical processes.

To address usability gaps with existing tools and to minimize these gaps when launching new ECM-based solutions Scenario Analysis and User Persona techniques are being incorporated in the Definition and Design phases of ECM projects. Using these techniques, technologists and business leads can identify early on in the project lifecycle elements of the end user application interface that may not be optimized or complete in support of the business process being transacted.

Getting to the Next Level

The key activities that should be considered by organizations at Level 3 are the following:

- Accelerate initiatives targeted at raising the awareness of the benefits of enterprise-level governance
- Solicit active participation in governance activities from key stakeholders such as Records Managers, Business, Legal, Operations, Marketing/Sales, and IT
- Continue to focus on moving the process of developing and executing on IT and Business strategies to a true collaborative model

- Conduct detailed training for end users on creation, use, maintenance and disposition of information
- Fine tune ECM system metrics to assure measurements reflect business objectives (e.g. operational efficiencies, increased quality, increased revenue)
- Continue emphasizing value of inter-departmental process analysis necessary to develop best fit ECM-based business solutions across significant segments of the firm's value chain

Level 4 – Operational

Introduction

At this level, the enterprise as a whole is more sensitized to the importance of ECM. It views ECM as something that can help improve its processes and make them more effective. As a result, there is business sponsorship of ECM at the executive level as well as recognized business owners at the operational level.

There is a considerable improvement in automating content-specific processes and workflows and an increased focus on managing Records. All content types are appropriately registered and have well defined taxonomy, thus separating content from presentation. This ensures that content can be repurposed across different channels. This approach to standardization is applied to a prioritized set of critical business applications.



Narrative Example

Joe Engineer is the Director at a Public Water Utility in an ever growing part of the country. Due to this increased growth and ever increasing local and federal regulations the work load on Joe's team is increasing at an alarming rate. Recently Joe incorporated document management and scanning technology into his key business processes. These technologies are part of the standard business solution offerings within the IT systems portfolio. As a result of this decision his team is experiencing reduced process time for managing the documentation (e.g. plans, permits, Letters of Acceptance, Citizen Correspondence, Compliance Reports) required to run and maintain his operations. The process of capturing hard copy documentation received from external stakeholders and linking it to the proper project stored in a common repository through intelligent scanning capture technologies has significantly reduced his team's efforts.

Automating this capture process and introducing inter-departmental workflows is streamlining his process throughput and reducing the time his engineers spend on filing and retrieving hard copy documentation. Due to a sound metadata model utilizing controlled vocabularies

searching, finding and retrieving critical documents to address daily operational issues is no longer a painful process. At the executive team level the ability to find business-critical information through an easy to use Search form has greatly improved their capacity for being proactive in addressing constituents concerns.

Maturity Characteristics Summary

Table 5: Critical Characteristics Mapped to Core Dimensions for Level 4

HUMAN	IT Expertise	Managing repository and workflow systems is a core IT skill
	Business Expertise	Executive sponsorship of ECM as a practice; process and content analysis are core skills
	Process	Automated processes span systems and departments
	Alignment	Execution of IT & Business strategies become more cohesive, but still follow push-pull model
INFORMATION	Content/Metadata	All new repositories and content types registered; global taxonomies created for critical content types
	Depth	Implementation of electronic and paper-based RM across the enterprise
	Governance	Policies and procedures widely disseminated; Enterprise ownership in place
	Re-use	Documents repurposed across systems and channels
	Findability	Development of specific enterprise and/or federated search applications
SYSTEMS	Scope	Business-critical information systems prioritized
	Breadth	Successful departmental initiatives have been scaled enterprise-wide
	Security	Standardized policies and procedures exist and are system enabled
	Usability	User-centered design underpins all system designs, with formal collection of user feedback

Discussion

Human Dimensions

Both IT and Business understand the importance of ECM as a core discipline. Executive sponsorship for ECM exists as well as a good understanding of ECM practices, processes and content analysis within both IT and Business. Repeatable tasks have been automated and this automation spans multiple initiatives across departments and systems. Although significant improvement has been made in concurrent development of the Business and IT strategies there

are still some execution missteps that occur resulting in one or the other enterprise at times pulling the other along to maintain alignment.

Information Dimensions

There is a unified taxonomy that has been defined for most critical content types at a global level. Any new repository or content type that is required by the business is registered within the ECM architecture with appropriate metadata. A key catalyst and enabler for this Level's capabilities are well defined processes that are understood, standardized and followed.

A well defined process for content analysis ensures that there is reduced duplication of content. Content can be repurposed and reused across multiple systems and channels. There is an enterprise wide search application that can index content from multiple applications or there is a federated mechanism that exposes content from multiple applications and systems to users in a unified way.

The discipline also covers Records Management within the ambit of ECM (if required).

Systems Dimensions

The processes and procedures are applied to a broad set of prioritized business critical applications and lessons learned from successful departmental initiatives are scaled up to enterprise level. This ensures that at a minimum critical business applications are supported by the ECM in a disciplined way.

Security and Usability principles are also well defined and well understood. So there are procedures in place for implementing well thought out and uniform security processes, along with proven user-centric design techniques.

Getting to the Next Level

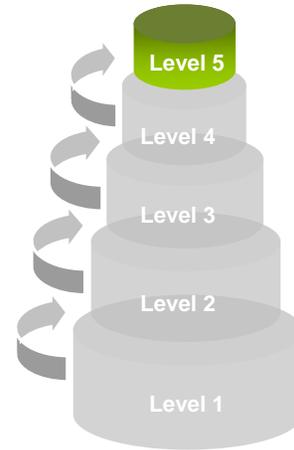
The key activities that should be considered by organizations at Level 4 are the following:

- Continue to evaluate IT and Business strategy development and execution to reduce unwanted execution missteps
- Integrate the ECM strategy into an enterprise-wide Knowledge Management strategy to take advantage of synergies between knowledge management and content management
- Continue to evaluate ECM system metrics to maintain alignment with changing business drivers
- And finally, the ECM system needs to be thought of in the context of shared services architecture to fully utilize the benefits

Level 5 – Proactive

Introduction

The Enterprise has a holistic view and strategy around Enterprise Content Management. Typically, this means that ECM is considered as a shared service with all aspects of ECM – Document Management, E-mail, and Records Management – addressed by the strategy. This also allows enterprises to address future demands and plug newer content technologies within the same framework. Information Management is considered a core area. There are well defined processes and ways of scientifically managing and measuring the impact. As a result, the outcome is often predictable and repeatable. Importantly the effectiveness and efficiencies resulting from this can be measured.



Narrative Example

Johan is the CIO at a leading Insurance provider with businesses around the globe. His group runs a center of excellence (CoE) for providing services to different business units and as part of their competencies, they offer ECM services to their clients. Various services – Document Management, Records Management, et. al. have been integrated within an overall Services Oriented Architecture in a shared services mode and clients are charged based on usage. The Center of Excellence has multiple dimensions and helped the company in achieving significant productivity and efficiency gains:

- *Economies of scale and critical mass have resulted in reduced costs*
- *Effective knowledge management and sharing of resources has enabled them to retain niche skills and scale up much faster*
- *A well defined governance model makes them more responsive to evolving business demands*
- *Usage of standard tools and technologies has brought about much needed consolidation and associated benefits. This also prevents inorganic growth of similar technologies and allows them to experiment with newer trends in a more controlled way*
- *The ability to measure and track different metrics helps them in further improvements*

Maturity Characteristics Summary

Table 6: Critical Characteristics Mapped to Core Dimensions for Level 5

HUMAN	IT Expertise	Pro-active experimentation and learning about emerging content technologies
	Business Expertise	Information management designated a core skill and part of HR reviews
	Process	Robust exception-handling and experimentation within framework
	Alignment	Strategy development between IT and the Business is done in collaborative and

		concurrent manner with frequent reviews using proper metrics
INFORMATION	Content/metadata	Ongoing ROT elimination; Folksonomy development; Ongoing metadata reviews
	Depth	All content types go through formal lifecycles.
	Governance	Active review and adaptation; Voice of Customer key to feedback process
	Re-use	Content components re-used across systems and channels
	Findability	Search and classification become a central service, with business-driven variants
SYSTEMS	Scope	Broad availability of diverse management systems
	Breadth	Encourage and adopt innovations from departmental levels
	Security	Security is treated as a centralized shared service
	Usability	Usability is a guiding principle in all system activity

Discussion

Human Dimensions

At this level, there are significant improvements to the “*Human*” dimension and as a result, people are generally quite comfortable dealing with content technologies and associated processes. They find it easy to experiment with existing and newer technologies. In fact since Information Management is a core discipline, there is a perfect collaboration between IT and Business.

Information Dimensions

There is high usage of Taxonomies and Folksonomies to enrich content and its usage. People religiously follow rules and processes defined to tag content. This also helps in ensuring that search along with classification is much improved.

All the stages of content lifecycle are well-defined with appropriate automation and business rules. All critical content types have such formal lifecycles defined for them.

Being a shared service also means that the Organization has in place an appropriate Governance Structure and central sponsorship. As a result of these formal oversight functions, continuous improvement to the ECM environment is a focus and planned enhancements are the norm.

There is strict separation between content and presentation that leads to high content repurposing. Content is further componentized and each component managed independently. This ensures less duplication of content.

Retention policies are applied to appropriate content in accordance with business and regulatory needs.

Systems Dimensions

ECM is considered as a shared service with all aspects of ECM – Document Management, E-mail and Records Management – addressed by the strategy. The enterprise has defined an Enterprise Architecture and realizes that the ECM is a core component of the overall technology landscape. What this means is that ECM aligns with and complements other components that define the enterprise’s technology landscape – Enterprise Resource Planning, Supply Chain Management, Product Lifecycle Management, Customer Relationship Management, Portal, and so on. There are well-defined frameworks and tools for integrating ECM with the rest of the architectural blocks and in that sense the ECM is yet another service in the overall context. The information framework is adaptable and flexible enough to support new information types, media and delivery channels.

This is typically achieved by having an overall Service Oriented Architecture (SOA) and exposing Content Applications and Processes as services. The result is that all of the processes and functionality like workflows, library services as well as content are exposed through services that can be utilized by other applications. Similarly these other applications also expose their functionality as a service which can then be consumed by the ECM. This ensures that there is minimal duplication of functionality, data and content. Security and Usability also become important components and hence play a big role. Because of the fact that there are multiple applications and components, there is dedicated focus to ensure security principles are followed. Similarly, to ensure seamless user experience across all these applications, there are well defined processes for ensuring all aspects of Usability.

Each department or Line of Business (LoB) subscribes to this shared service model and there is a two way flow of knowledge – lessons learned from departmental implementations are channeled back in to the central service model allowing other departments to leverage and benefit validated best practices and internal successes.

Maintaining Level Five

Now that the Organization is at the highest maturity level, it is important to continually improve and maintain this status. So there are steps needed to ensure that metrics are regularly collected for all the aspects and are used as a feedback mechanism to make further improvements. Effort is also made to continuously evolve, optimize and improve processes to increase effectiveness and efficiencies. Additionally as new stakeholders look to participate in leveraging the ECM shared infrastructure to support their business drivers they are incorporated in to the ECM community and begin to participate in the established feedback and governance forums.

Participating in Model Development

You can follow the development of this model -- and download the latest version -- via the ECM³ team blog at www.ecm3.org.

As of Model Version 1.0, Wipro, Smigiel Consulting Group, The Real Story Group, and Hartman Communicatie serve as Project Leaders for ECM³. Project Leaders will initially approve all modifications to the core framework.

Individuals are invited to apply join the ECM³ "Guiding Consortium," presently organized by the Project Leaders. Over time, the Project Leaders intend to hand off leadership of the Model to this Consortium. To remain active, Consortium members must commit to regular discussions and contributions to the model, as well as participate in at least one in-person meeting per year.

To apply to join the Guiding Consortium, visit www.ecm3.org.

Appendix A: Glossary

AIIM Formerly the Association for Information and Image Management, now just AIIM. Originally formed to provide education, professional development and standards for microfilm and electronic image processing, its scope has expanded to represent the enterprise content management (ECM) industry. It is an ANSI/ISO accredited standards development enterprise.

ANSI American National Standards Institute. Private US Agency that coordinates the development and maintenance of various industry standards.

API Application Programming Interface – the specific method prescribed by a program by which a programmer can make requests of it.

Application Server A server program that houses the business logic for an application. Application servers, or “app servers” execute the operations necessary to complete transactions and other interactions between end users and a business’s back-end databases and applications. Application servers provide functionality such as clustering, database access classes, transaction processing, and messaging. For tiered applications, best practice calls for separating out this application processing from the actual dishing-up of Web pages, which is done by a Web server operating in front of the app server.

Archive An archive is a collection of computer files that have been packaged together for backup, to transport to some other location, for saving away from the computer so that more hard disk storage can be made available, or for some other purpose. An archive can include a simple list of files or files organized under a directory or catalog structure (depending on how a particular program supports archiving).

ARMA The Association of Records Managers and Administrators.

Business Process Management (BPM) A mix of process management/workflow with application integration technology.

Categorization Organizing documents, and other content into logical groupings, based on their contents.

Certifications The issue of a formal statement confirming the results of an evaluation, and that the evaluation criteria used were correctly applied.

Classification Classification is a method of assigning retention/disposition rules to records. Similar to the Declare function, this can be a completely manual process or process-driven, depending on the particular implementation. As a minimum, the user can be presented with a list of allowable file codes from a drop-down list (manual classification). Ideally, the desktop

process/application can automate classification by triggering a file code selection from a property or characteristic of the process/application.

CMIS Content Management Interoperability Services – A specification for utilizing web services and Web 2.0 interfaces to enable interoperability of content management repositories from different vendors.

COLD Computer Output to Laser Disk – term often used interchangeably with ERM.

Compound Document A document that may contain components from other documents and information sources.

Controlled Vocabularies An organized list of words, phrases, or some other set employed to identify and retrieve documents. A collection of preferred terms that are used to assist in more precise retrieval of content. Controlled vocabulary terms can be used for populating attribute values during indexing, building labeling systems, and creating style guides and database schema. One type of a controlled vocabulary is a thesaurus.

Corpus A complete collection of objects.

Digital Asset Management (DAM) The purpose of DAM is to enable enterprises to organize and repurpose media assets to streamline costs and enhance revenues. DAM systems are especially suited to managing multimedia content, and tend to offer hooks into specialized desktop media authoring systems.

DCMI Dublin Core Metadata Initiative – is an enterprise that has a mission to promote the adoption of interoperable metadata standards and developing specialized metadata vocabularies for describing resources that enable more intelligent information discovery systems. A core set of agreed-upon metadata fields is known as “the Dublin Core.”

Declare Designate that a particular document is a corporate record.

Digital Asset Management (DAM) The purpose of DAM is to enable enterprises to organize and repurpose media assets to streamline costs and enhance revenues. DAM systems are especially suited to managing multimedia content, and tend to offer hooks into specialized desktop media authoring systems.

Disposition Refers to what is done with records when a record is no longer needed for current business. Disposition possibilities include transferring records, destroying temporary records at an approved time, or transferring records of continuing value to Archives when they have been deemed worthy of preservation.

Document A written paper, recording, photograph, computer file, or other item that bears the original, official, or legal form of something and can be used to furnish evidence or information.

Document Management Software that controls and organizes documents throughout an enterprise. Incorporates document and content capture, workflow, document repositories, COLD/ERM and output systems, and information retrieval systems.

Document Repository Site where source documents or other content objects are stored.

DoD 5015.2 United States Department of Defense (DoD), Design Criteria Standard for Electronic Records Management Software Applications.

ECM Enterprise Content Management. A generic industry term for software products that manage unstructured data, for example documents, images, files, and Web content.

EDM (EDMS) Electronic Document Management (System). A traditional and still commonly used term used to describe ECM systems (though usually those with a focus on Imaging, Document Management, and Workflow).

ERM Electronic Reports Management. A technology that ingests print stream data, stores and indexes this information, then makes it available in report form on demand to end users.

Federated Records Management Allows organizations to enforce records retention rules across multiple disparate repositories.

File Plans A common classification scheme for the entire enterprise. The file plan is typically a hierarchical set of subjects or business activities. Each node or subject file is annotated with a unique code called a file code. A given file code thus refers to a specific subject file within the file plan. Each subject file has an official retention rule (when/why/how to delete) assigned to it. Each record must be assigned a file code that matches the appropriate subject file within the file plan. This way, documents of like subject are all assigned the appropriate retention rule.

Folksonomy A folksonomy is a user-generated set of tags or categories; essentially, the social-software trend's answer to the taxonomy. Folksonomic tagging is intended to make a body of content easier to search, discover, and navigate over time. Folksonomy functionality is not inherent to most ECM Suites; folksonomies tend to arise in Web-based communities where special provisions are made on the website for users to create and use tags.

ICR Intelligent Character Recognition. A form of OCR that includes the electronic intelligence to place captured document characters into a relevant context.

IDCM Integrative Document and Content Management. Another term for ECM generally much less used, but common in some parts of the World.

Index List containing data and/or metadata indicating the identity and location of a given file or document.

ISO ISO, founded in 1947, is a worldwide federation of national standards bodies from some 100 countries, one from each country. Among the standards it fosters is Open Systems

Interconnection (OSI), a universal reference model for communication protocols. Many countries have national standards organizations such as the American National Standards Institute (ANSI) that participate in and contribute to ISO standards making.

ISO 15489 Defines what a records management program should look like and provides best practice for how to develop and maintain a records management program.

Keyword Search Search which compares an inputted word against an index and returns matching results.

Localization Localization refers to the process of adapting a software product or service for different languages, countries, or cultures. In addition language considerations, such as support for foreign character sets, localization may require adaptations for currency, time zone, national holidays, cultural assumptions and sensitivities, dialect, color scheme, and general design conventions.

Meta Tag An HTML command located within the header of a website that displays additional or referential data not present on the page itself.

Metadata A definition or description of data, often described as data about data. For example, the data of a newspaper story is the headline and the story, whereas the metadata describes who wrote it, when and where it was published, and what section of the newspaper it appears in. Metadata can help us determine who content is for and where, how, and when it should appear. For documents online, important metadata elements include its author, title, date of publication, and subject area.

MoReq Model Requirements for the Management of Electronic Records. A generic functional specification for systems designed to manage electronic records.

OASIS Organization for the Advancement of Structured Information Standards - is a not-for-profit consortium that drives the development, convergence and adoption of open standards for the global information society.

OCR Optical Character Recognition. Technology that recognizes alphanumeric characters in fixed form (for example on a scanned paper document), captures and digitizes them.

ODMA Open Document Management API. An open industry standard that enables desktop applications to interface with a document management system (DMS). ODMA simplifies cross-platform and cross-application file communication by standardizing access to document management through an API. ODMA allows multiple applications to access the same DMS without the need for a hard-coded link between the application and the DMS.

Official Records A record that is legally recognized and has the judicially enforceable quality so that it can establish the information on it as fact. In many cases, it can be the original document.

PDF/A A joint activity between NPES (The Association for Suppliers of Printing, Publishing and Converting Technologies), and AIIM International to develop an International standard that defines the use of the Portable Document Format (PDF) for archiving and preserving documents.

RDBMS Relational Database Management System. A collection of programs that allows you to create, store, modify, and administer a relational database. An RDBMS stores data in related tables, and information can be extracted from the database through structured query language (SQL) statements. Because the data in a relational system is spread across tables, rather than housed in a flat file, the same database can be viewed in many different ways. Almost all complex databases today use an RDBMS, including most business databases.

RDIMS A Canadian Federal Government shared system initiative addressing information management problems. A set of tightly integrated commercial-off-the-shelf software products make up the RDIMS solution. RDIMS integrates records management, document management, imaging, optical character recognition, full-text indexing search and retrieval, workflow, an online document viewer, and reporting capabilities.

Records Any documentary material, regardless of physical form or characteristic, made or received by an enterprise in pursuance of law or in connection with the transaction of business and used by that enterprise or its successor as evidence of activities or because of informational value.

Records Management A professional discipline that is primarily concerned with the management of document-based information systems. The application of systematic and scientific controls to recorded information required in the operation of an organization's business. The systematic control of all organizational records during the various stages of their life cycle: from their creation or receipt, through their processing, distribution, maintenance and use, to their ultimate disposition. The purpose of records management is to promote economies and efficiencies in record keeping, to assure that useless records are systematically destroyed while valuable information is protected and maintained in a manner that facilitates its access and use.

Records Retention Policy A plan for the management of records listing types of records and how long they should be kept; the purpose is to provide continuing authority to dispose of or transfer records.

Repository Part of a Document or Content Management System; specific functionality to control the check-in/out of material, version control, and look-up against defined attributes.

REST Representational State Transfer. Software architecture for distributed Internet systems. Specifically, it is an alternative to Web Services and SOAP for integrating services and repositories without requiring messaging or cookies.

Retention Period The period of time during which records must be retained in a certain location or form. A retention period may be stated in terms of months or years, and is sometimes expressed as contingent upon the occurrence of an event.

Retention Schedules Records retention schedules are lists and descriptions of public records. They include information about how long each type of records should be kept (retention period) and what should happen to it at the end of that period (disposition).

RIA Rich Internet Application. A term for Web applications that have the functionality and features of traditional desktop applications. Typically, the applications transfer necessary functions to the client (in this case, the Web browser), which enables the avoidance of a page having to refresh every time a new piece of information is needed. While RIAs run in a Web browser, they don't usually require software installation.

RM Records Management.

ROT Refers to "Redundant, Outdated, Trivial" content – in short, content that should be eliminated after a thorough audit.

SOA Service Oriented Architecture. A collection of services that connect with each other to perform a function or activity. This provides more independence of the human interface portion of an application from the actual data processing activity itself.

SOAP Simple Object Access Protocol. The predominant standard protocol in the Web Services family. It is an XML construct that allows applications to be invoked remotely and deliver information back to the calling service.

Structured Data Data that can be represented according to specific descriptive parameters, e.g., rows and columns in a relational database, or hierarchical nodes in an XML document or fragment.

Taxonomy In science, taxonomy allows people to precisely identify any organism by its kingdom, phylum, class, order, family, genus, and species. Taxonomy, as it relates to content management, does the same job. It describes a classification structure for content. This structure, typically highly regimented, impacts the data model, directory structure, and file naming conventions for a given implementation of a content management system. In more complex scenarios, taxonomies are often multi-faceted, meaning multiple hierarchies or categorization trees may be used to classify content. This allows users to find content via more than one path or hierarchy (as an example, one might find information about red rock crabs via a biology facet under animals / invertebrates / crustaceans, while another might find one via a geography facet under world / land / Australasia). Taxonomy can also be language-oriented, as in specifications for subsets of XML, such as ebXML.

Thesaurus A collection of words in a cross-reference system that refers to multiple taxonomies and provides a kind of meta-classification, thereby facilitating document retrieval.

Unstructured Information Information that is without document or data structure (i.e., cannot be effectively decomposed into constituent elements or chunks for atomic storage and management).

VERS Victorian Electronic Records Strategy. An Australian-developed framework of standards, guidance, training, consultancy and implementation projects, which is centered around the goal of reliably and authentically archiving electronic records.

Vital Records Records that contain unique or irreplaceable information and require special protection, such as articles of incorporation, annual reports and shareholder records

WCM Web Content Management.

Web Services A set of standards to support application interoperability over the HTTP protocol.

Workflow Automation of business processes, in whole or in part, where documents, information, or tasks are passed from one participant to another for action, according to a set of rules. A business process is a logically related set of workflows, work steps, and tasks that provides a product or service to customers.

XML eXtensible Markup Language. An established standard, based on the Standard Generalized Markup Language, designed to facilitate document construction from standard data items. XML is also used as a generic data exchange mechanism. Since XML describes the underlying information and its structure, content can be separated from look-and-feel. This overcomes a severe limitation of formatted word processing or HTML documents, which merely describe content presentation for a particular set compliant applications (like Web browsers).