

# Integrative Document and Content Management Solutions

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## INTRODUCTION

Developments in office automation, which provided multiple end-user authoring applications at the computer desktop, heralded a rapid growth in the production of digital documents and introduced the requirement to manage capture and organization of digital documents, including images. The process of capturing digital documents in managed repositories included metadata to support access and retrieval subsequent to document production (D'Alleyrand, 1989; Ricks, Swafford & Gow, 1992).

The imperatives of documentary support for workflow in enterprises, along with widespread adoption of Web-oriented software on intranets and the Internet World Wide Web (WWW), has given rise to systems that manage the creation, access, routing, and storage of documents, in a more seamless manner for Web presentation. These content management systems are progressively employing document management features such as metadata creation, version control, and renditions (Megill & Schantz, 1999; Wiggins, 2000), along with features for management of content production such as authoring and authorization for internal distribution and publishing (Addey et al., 2002; Boiko, 2002; Hackos, 2002; Nakano, 2002).

If business applications are designed taking into account document and Web content management as integral constructs of enterprise information architecture, then the context of these solutions may be an integrative document and content management (IDCM) model (Asprey & Middleton, 2003). As the name implies, the IDCM model aspires to combine the features of a document management system with the functionality of Web content management. An integrative business and technology framework manages designated documents and their content throughout the continuum of their existence and supports record-keeping requirements.

The IDCM model supports system capabilities for managing digital and physical documents, e-mail, engineering and technical drawings, document images, multimedia, and Web content. These systems may be deployed

individually to address a specific requirement. However, due to the volume and varied formats of important documents held in digital format, these systems are often deployed collectively based on a strategic IDCM approach for better managing information assets. An organizational approach to IDCM supports enterprise knowledge strategies by providing the capability to capture, search, and retrieve documented information.

## SCOPE

IDCM depends upon effective integration of organizational systems that together are used for managing both digital and physical document types. The scope of this management is across all stages of document lifecycles. It includes provision for distribution of the document content over intranets and the Internet.

Features of enabling IDCM technologies are described in the following section. The technologies may be differentiated into those with core capabilities and supporting technologies.

Core capabilities are: document management; e-mail management; drawing management; document imaging; Web content management; enterprise report management; and workflow. Supporting technologies include: Web services; database management systems; digital signatures; portals; universal interfaces; and network management.

Significant issues that need to be addressed with respect to IDCM solutions include the provision of seamless functionality that may be employed across different capabilities so that currency, integrity, and authority are managed effectively. These in turn must be complemented by user interfaces that provide stylistic consistency and that are augmented by metadata that enhances retrieval capabilities through the supporting technologies.

The following section itemizes the types of features that are required.

## SYSTEM FEATURES—CORE TECHNOLOGIES

### Document Management

An encompassing approach to document management sees documents within a framework that supports integrity, security, authority, and audit, and that are being managed so that effective descriptions of them are used to support access, presentation, and disposal (Bielawski & Boyle, 1997; Wilkinson et al., 1998). In this context document management applications implement management controls over digital and physical documents. The general capabilities of a document management application are:

- *Document production and capture*—interface with common office productivity software.
- *Classification*—support business classification schemes (e.g., folder structures, document properties).
- *Metadata*—capture of properties that describe document.
- *Check-in/checkout*—maintain document integrity during editing.
- *Version control*—increment versions of document to support integrity.
- *Complex relationships*—manage links and embedded content within digital documents.
- *Security*—implement user/group access permission rights over documents.
- *Document lifecycles*—manage the transition of document states through pre-defined lifecycles.
- *Integrated workflow* to automate review and approvals; controlled distribution of documents.
- *Search and information retrieval*—search metadata or text within documents, or both.
- *Viewing*—view documents in native application or using integrated viewer.

These should be associated with recordkeeping features such as disposal scheduling and archiving.

### E-MAIL MANAGEMENT

The growth in e-mail has brought a high demand for solutions that allow enterprises to manage e-mails that have value to the business. The IDCM model offers two types of capabilities:

- *Direct capture*—These applications are often referred to as e-mail archiving applications.

- *End-user capture*—These capabilities are typically offered as a module within document management systems.

Direct capture or archiving facilities intercept incoming and outgoing e-mail. They operate by taking a copy of incoming and outgoing messages that are managed by the e-mail messaging system, and use customized business rules to extract e-mail that may not have a business context. Unwanted e-mail such as spam, or that received from news lists or information bulletins, can be eliminated.

These systems may feature auto-categorization based on metadata such as that contained in e-mail message headers, and possibly also within attachments. Categorization can also occur using the content and context of e-mail by applying techniques such as learning by example from previously processed e-mail. These types of solutions might be valuable for capturing statistical information differentiated by the types of requests made by customers. For example, statistics can aid call centers to monitor turnaround timeframes for responding to e-mail requests, or undertake trend analysis.

Search options include the capabilities to search messages and text attachments. Depending on the capabilities of the system, searches might be invoked from an e-mail client, desktop client application, or Web browser.

Some systems are able to apply rules defined in disposal authorities so that e-mails are purged from the system within a legal framework. In some cases, different retention schedules can be applied to specific categories of e-mail.

End-user capture facilities are adopted by some enterprises to save relevant sent and received e-mails that evidence business transactions into an e-mail management repository, such as a document management system, leaving it up to the user to identify e-mails that need to be saved according to organizational guidelines.

The document management system would need then to integrate effectively with the existing enterprise e-mail client software. This capability would enable end-users to save e-mails and/or attachments to the managed repository, automatically derive metadata from the header of e-mail messages, add custom metadata, and store the e-mail and attachment/s (where appropriate) as a digital record.

### DRAWING MANAGEMENT

Many systems for registering or managing drawings have been developed independently of more generic approaches to document management. They may include information systems that enable users to register or index physical drawings in a database, along with generation of transmittals for issue of new documents, and management of the

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