# Managing Converging Content in Organizations

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## INTRODUCTION

Content management is essential for organizational work. It has been defined as "a variety of tools and methods that are used together to collect, process, and deliver content of diverse types" (McIntosh, 2000, p. 1). Content management originates from document management. In fact, a great deal of contemporary content management system functionality has evolved from document management systems.

*Documents* are identifiable units of content, flexibly structured for human comprehension (Murphy, 2001; Salminen, 2003). They have traditionally been considered as containers for organizational content. *Document management* considers the creation, manipulation, use, publishing, archiving, and disposal of documents as well as the continuous development and design of these activities in organizational domains. In different domains, the requirements for document management differ accordingly. For example, manufacturing companies possess a bulk of technical drawings to be managed, and in e-government organizations, the document content may act as a normative reference that needs to be frozen and archived for long periods of time (Honkaranta, Salminen, & Peltola, 2005). Therefore document management in e-government is commonly split into two types: document management focusing on document production and the records management considering document repository management.

Research on document management in organizations has been carried out focusing on a multitude of issues, including document standardization (Salminen, 2003), document metadata (Murphy, 1998), document and information retrieval (Blair, 2002), the social role of documents for organizational groups (Murphy, 2001), as well as document engineering (Glushko & McGrath, 2005).

The wide selection of content management systems available has evolved mainly from document management systems (Medina, Meyers, Bragg, & Klima, 2002). They combine into single systems various functionalities developed separately in domains such as library sciences, text databases, information retrieval, and engineering databases. The essential features of document management systems cover:

- Library services and version management
- Management of user roles and access rights
- Text retrieval based on metadata and full-text search
- Support for document life-cycle and related workflows
- Management of *metadata*, as information about documents
- Multi-channel publishing for a multitude of devices and print

A survey on content management systems revealed that many of the systems still have a monolithic and closed architecture and their ability to adopt proprietary encodings is scarce (Paganelli & Pettenati, 2005). Contemporary content management systems' support for access management and for customizing workflows for integrating content into organizational processes may be modest. For example, the popular Microsoft SharePoint Server (http://www.microsoft.com/sharepoint/default.mspx) only assigns access rights to folders, not to individual files or units within the files. Content management software may include limited functionality for the design and management of an organization's Web site. The applicability of the document management approach and the systems for content management have been limited due to an orientation towards using documents as the only unit for managing content. As a consequence of this approach, long documents are difficult to browse through, portions of document content are difficult to reuse in other documents, and long documents are inconvenient for Web delivery (Honkaranta et al., 2005). At least two recent approaches on content management which aim at complementing these weaknesses can be identified. These are Web content management and the use of structured documents in the form of XML.

## BACKGROUND

The Web Content Management (WCM) approach focuses on Web content publishing. A great deal of research efforts (e.g., McIntosh, 2000; Boiko, 2002; Murugesan & Ginige,

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2005) are targeted specifically on Web content management. One focus in the approach is the reuse of content blocks, enforced either by an extensive use of metadata (Boiko, 2002) or by adopting a single-sourcing approach and XML (Rockley, Kostur, & Manning, 2003). The underlying approaches and the conceptual base used can be traced back to electronic publishing (e.g., Boiko, 2002; Rockley, Kostur & et al., 2003) and to database-oriented approaches (e.g., McIntosh, 2000). Technology-driven development and the growing adoption of open source software, such as Plone (http://plone.org/foundation/) and eZPublish (http://ez.no/products/ez_publish) are also characteristic to the Web content management approach. Therefore many researchers like Murugesan and Ginige (2005) call for more disciplined and more method-based development and maintenance for WCM and Web application development.

The conceptual base for the novel approach is inconsistent and immature (Grossniklaus & Norrie, 2002). The content life-cycle may involve different phases which are dealt with concepts and terms that are not yet stabilized. There are also differences in the content workflow. For example, according to McIntosh (2000, p.1), a content life-cycle consists of three main phases; 1) content assembly, 2) content production, and 3) content delivery. However, Boiko (2002) utilizes concepts such as content acquisition, aggregation and metatorial processing. The lack of a concise conceptual base may hinder requirements elicitation and cause communicational breakdowns between system analysts and the people in an organization.

The WCM approach focuses on managing the content delivered on the Web, while the content management approach manages the content right after its creation regardless of its (possibly multiple different) publishing channels. The Web may be just one additional channel for publication from the content management system perspective. Therefore the organization whose Web site is primarily meant for delivering textual and multimedia content rather than as an application interface should not only consider content management on the Web, but content management as a whole. Yet the Web as a delivery channel—just as any other—sets unique requirements for content presentation and organization. While document-based content management typically considers the content as an object to be presented via reader or editor software resembling a paper print, the WCM approach considers content units as a portion of Web site multi-frame layout. For defining content combinations and their positioning on the Web site, the WCM systems utilize *templates* containing placeholders for content units to be inserted.

*Structured documents,* such as XML (Bray et al., 2006), separate the content, its logical structure and visual layout from each other within documents by using markup delimiters. The logical structure is described by a schema such as a *document type definition* (DTD) or a *XML schema*. A schema defines the markup vocabulary and the structure for a class of XML documents. A great deal of contemporary research and utilization of XML for organizational content management has focused on the data-oriented use of XML, such as developing service-oriented architectures (SOAs), Web services, and markup languages for data exchange, such as HL7 for e-Health. For content management in organizations the structured documents provide means for document and data interoperability and unified and simplified maintenance procedures, and a standard format for data exchange between organizations. Although the tradition of structured documents is long, contemporary research on using XML (not XHTML) as a format for organizational content has remained scarce except for the field of electronic publishing (Fahrenholz-Mann, 1999) and utilization of XML in e-government (Salminen, 2005). Some other pieces of research on XML documents consider, for example, document type schema design (Jauhiainen & Honkaranta, 2006; Maler & El Andaloussi, 1996).

The benefits of using structured documents and related technologies have lately been recognized and adopted by both content management and WCM approaches, although the use of XML poses multiple challenges. There are systems and tools for managing XML documents as files or within databases. However, the support for XML in content management systems is varying or under development. Albeit many interoperability problems in systems and in service integration have been solved with XML, the hot topic is how to take advantage of the enhanced XML and custom schema support for document interoperability in new office software using XML as its native document format, such as Open Office (http://www.openoffice.org/) and Microsoft Office 2007 (http://msdn.microsoft.com/ office/understanding/xmloffice/tools/default.aspx). In addition, developers lack knowledge about research findings and practical experience on adaptations and implementations of domain-specific XML and related technologies in real-life organizations. This forms a novel and essential line of research for organizational content management.

## CONVERGENCE OF CONTENT TYPES AND ORGANIZATIONAL WORK

We may identify at least two kinds of convergence taking place in organizational content management. First, the management of content is deeply intertwined with organizational work. Second, content as we know it is becoming exceedingly complex as it converges with different logical and physical entities to be managed.

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