



Envisioning the Future of ECM

How Enterprise Content Management
Will Evolve to Empower the Intelligent
Enterprise

Foreword

The future for enterprise content management (ECM) is rapidly coming into view, fueled by networked communities, adaptive work processes, pervasive collaboration, self-describing information sources, and the ability to leverage the enterprise intelligence embedded in a flexible content infrastructure. People can work exactly as they like, with an utterly invisible yet uncompromised set of content services, powered by transparent network connections. The content infrastructure connects across an extended enterprise to weave employees, partners, and customers into the webs of information-sharing relationships.

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The promise of an intelligent enterprise

A future driven by content management

Imagine a future in which your company's information is no longer merely an asset that supports your business. Rather, it's a driver. And you realize that your company has become a leader in your industry precisely because you've learned to use information to drive growth, revenue, relationships, and profit.

What might that look like? Imagine that your company is in the biotechnology field and you're the director of a new line of products. What's different? For one, you no longer simply manage and publish content to a website. E-mail, archaic and clumsy, has become nearly obsolete. Workflow processes are not rigidly defined and immutable. People no longer occupy static roles circumscribed by fixed job descriptions.

Instead, you leverage the tools available to you—applications like Second Life, Facebook, and IM—to communicate, collaborate, meet, learn, and adapt on a global scale. At any time anyone in the company can see what your R&D staff is working on through various online communities and the blogosphere. You co-design and test products with collaborators globally using wiki pages that have built-in intelligence and realtime reporting capabilities. Finally, your people use social media tools to bridge the gap between work and play, and build stronger relationships with customers as well as each other.

Sounds fanciful? It'll be here sooner than you think. The future for enterprise content management (ECM) is becoming clearer, and it's fueled by networked communities, adaptive work processes, pervasive collaboration, self-describing information sources, and the ability to leverage intelligence captured in a flexible content infrastructure. People can work exactly as they like, powered by networks and ubiquitous, instant access. At the same time, IT professionals use systems, applications, and services to ensure a safe, secure, and well managed content infrastructure to support this new way of working.

A business environment built on a flexible content infrastructure

Let's start our exploration of the future by envisioning how it will look to us as typical business users. In the future, we've become immersed in content, and we're leveraging it continuously for information intelligence. Text, business graphics, photos, video clips, web pages, search results, and interactive exchanges are all instantly available, and they're organized in meaningful ways. Mobility and information portability have become a natural part of our business life. Whether we're using a richly featured desktop or a mobile handheld, the devices hardly seem to matter. They simply connect to our expansive content infrastructure and intelligent systems resources. We are able to engage with our colleagues, partners, and customers as needed across our extended enterprise, regardless of location or time-zone. It's natural to work with communities of colleagues, and effortlessly share content related to common tasks and activities.

This flexible content infrastructure adapts to the ways we work. We no longer face the artificial divide between information silos managed by disparate applications. Nor do we distinguish between enterprise applications on one hand and ad hoc document collections on the other. In an era of convergence we unlock whatever content we need, when we need it, regardless of storage device, format, or application. We are able to manage any type of content, produced by any source imaginable.

We refine our solutions portfolio through continuous improvements. We restructure the flow of content by providing the human insights and analysis at the critical junctures—the environment continuously monitors our interactions, discovers patterns, and makes recommendations. Moreover, our application developers can finally keep up with the speed of business. They exploit a consistent yet ever expanding set of components and services to rapidly construct innovative content applications, delivered with only a modest investment of time and resources. As a result, our company finally has the agile and cost-effective content infrastructure to adapt to our continually changing business environment.

Linking people, processes, and information

From passive repositories to valuable resources

What are the capabilities of the content infrastructure that's driving the future for ECM? It's all a matter of how we leverage content over the network, and link people, processes, and information to build an intelligent enterprise.

We need to be able to work more efficiently, reduce our cost of operations, and also capture new opportunities through innovative business processes. We can transform the content we store in online repositories from simply being records of past activities into valuable resources that proactively drive business management, insights, and decision-making.

Managing all types of information

To begin with, we are able to manage all types of content in a consistent manner. We do not differentiate between structured and unstructured content—the tables generated by a relational database compared to the words, paragraphs, and illustrations contained within a document. When it comes to filing, organizing, and storing various kinds of content, there is no difference between plain text and rich media. We utilize a consistent set of operations that performs the right actions for each content type and that automatically understand each format's unique capabilities.

Moreover the content itself is smart and self-describing. It encompasses granular components (or content objects) that encapsulate industry expertise, application know-how, business best practices, and compliance policies. Components are automatically tagged by an array of attributes that capture relationships among items and that often have their own semantic structure. We exploit industry-wide and company-specific taxonomies to add intelligence to these relationships. Behind the scenes and embedded into our interactive experiences, we make extensive use of XML tagging, XML-related industry standards, and several XML-based content services.

We thus personalize and contextualize content to expedite our adaptive work processes. We assemble components on-the-fly to produce new items and insights. We readily access the granular content components we need to solve business problems and to take actions in new ways.

Content services across the network

Nor is it enough to simply store content within a shared repository. We've been doing this for years and are confident that our content is secured by the underlying platform. Location-transparency, information rights management, and archiving for compliance are all aspects of operating across an extended enterprise, often encompassing multiple organizations and disparate supply chains.

When we engage with company teams around the world, we have immediate access to the information we need. Thanks to caching and virtualization technologies, network latency (when fetching content or invoking services from remote locations) is no longer a problem. We seamlessly yet systematically access and consume a wide range of web-based resources—many of which are procured on demand through software services in the cloud.

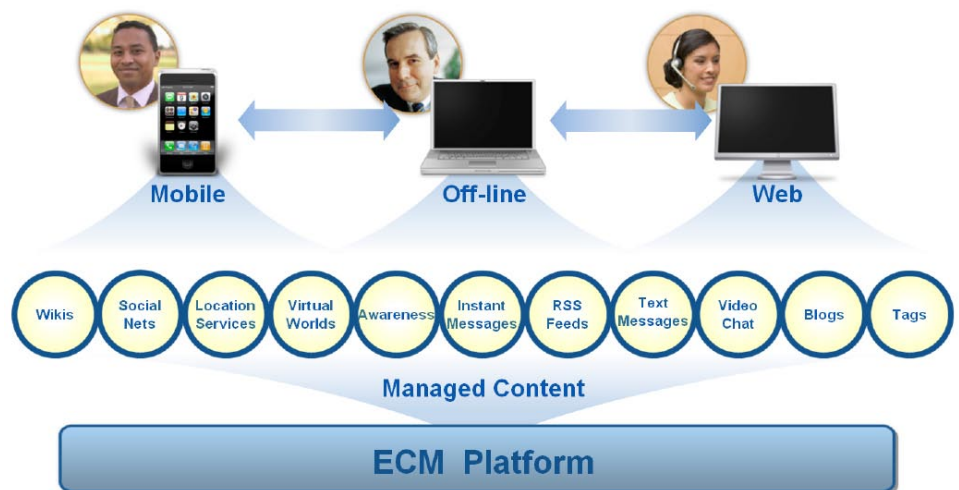
Empowering people

How we utilize these content services to empower people is changing. We are familiar with posting and accessing content within shared workspaces—protected places on the network which only team members access and where the team leader manages access rights and permissions. We are now able to harness the power of network communities through composite collaborative applications that connect seamlessly through cloud computing capabilities.

We contribute content to team discussions and exchange information among team members in many different ways. Blogs, wikis, and threaded discussions are among the modes for sharing information. Nor are we limited just to plain text and tethered desktops.

- We share photos, rich media, podcasts, complex engineering drawings, and other types of content as easily as we exchange ordinary words and phrases.
- We rely on our content-rich business applications both when using a fully-featured web browser and a light-weight mobile device

And most importantly, all of our user-generated content is stored transparently within our online environment. We do not compromise our enterprise requirements for performance, quality-of-service, security, and compliance—the managed content is cached and replicated among multiple content stores as needed.



Managed content encompasses many different types of Web 2.0 technologies, which are easily stored in a systematic fashion within an ECM platform. Mobility and information portability allow businesses to empower users to get work done whenever and wherever

Through the influence of these Web 2.0 technologies within the enterprise, we collect a rich set of knowledge resources around personalized and contextualized communities of interest. We leverage the dynamic relationships between the people and information through additional collaborative capabilities.

- Content syndication (such as RSS feeds) is a resource for automatic alerts. We subscribe to information that others publish and receive notifications about interesting new sources.
- Social networking is a part of our online experience. We link to other team members, discover what they are doing, and exploit our shared interests.
- A directory of expertise structures our ad hoc sharing. We easily identify others within our enterprise that have specialized know-how to answer questions and help us solve problems.

As a result, we turn information about people, what they know, and what they do into a powerful business resource. We support a global and distributed workforce, one that is on the move and expects to switch seamlessly between fully-featured web browsers and light weight mobile devices. Through the sensing and alerting capabilities within our content infrastructure, our composite collaborative applications get smarter and become ever more valuable for enabling us to work together effectively, to solve our business problems.

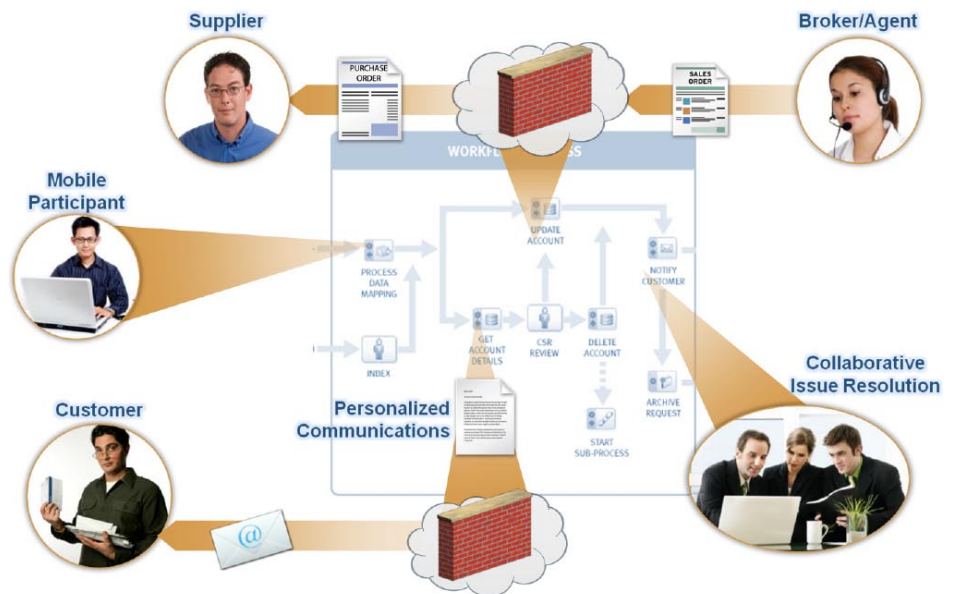
Adaptive work processes

Our firms run on repeatable business processes. We identify essential tasks and activities—such as sourcing materials for our supply chain, transforming quotes into sales and revenue, or tracking customer service incidents from reports to their resolutions. Today, we rely on controlled task management and a business process management (BPM) engine to define and execute predefined business processes. We optimize these processes for specific transactions—such as reducing time to completion, lowering operational costs, or handling increased demand. We round out a BPM offering with simulations, analytics, and reporting capabilities—all targeting our ability to expedite fixed, transactional business processes.

Yet in reality, our process management requirements are more complex than the current generation of BPM technologies allow. When competing in a dynamic market, there are new business opportunities and new ways of doing things. Change is a fact of business life—we need to be prepared. We also need to be able to manage people-based activities within the context of our business processes. Beyond simply automating transactional tasks, it's important to add the human dimension.

In the future, we anticipate adaptive work processes that deal with both structured and ad hoc tasks. We optimize activities, events, and policies for agility. Processes are assembled and disassembled on demand. We refine and adjust our process definitions as we respond to changes in our operating environment. Ad hoc tasks are as readily managed as structured ones.

We leverage the enterprise collaboration capabilities within our ECM platform to facilitate adaptive work processes. These processes can span departmental and organizational boundaries. As shown below, people-centric activities are integrated with traditional workflow tasks. These ad hoc monitoring, sensing, correlating activities trigger policy rules and responses that anticipate and react to dynamic business situations.



Our adaptive work processes link data, content, people, and tasks. We can combine flexible, ad hoc collaborative activities with traditional workflow tasks.

Smart information

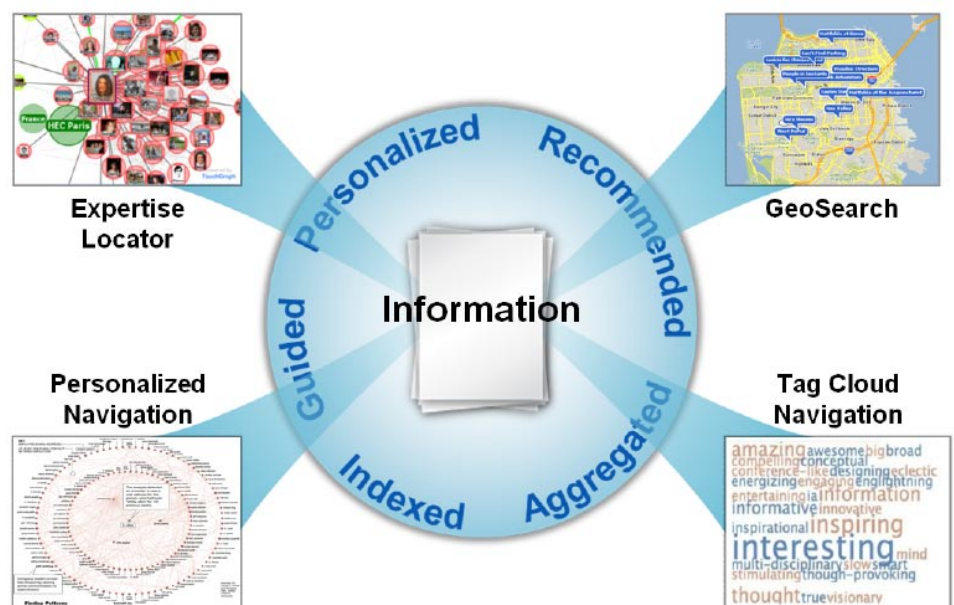
Over time we assemble very large content collections from the ebb and flow of our daily interactions. Yet all too often the valuable insights and relationships, contained in the content we meticulously store within our information infrastructure, remain hidden and hard to act upon. Easily finding the right content is difficult. Making sense of the critical facts, figures, and concepts is almost impossible. Collecting the necessary information and compiling it into the relevant form for decision making is time-consuming and labor-intensive.

With smart information delivered through innovative, content intelligence services, this need not be the case. We are no longer limited to simple search queries and response lists, where we have to assemble results in a sequential, piece meal, and time consuming fashion. Rather, we actively and dynamically mine our content collections for business results. We quickly discover patterns among essential items.

How do these content intelligence services work?

- We rely on an extensible set of analytic services to review massive volumes of text using semantic-based text extraction, advanced linguistics, and rule-based tagging.
- We utilize search and discovery services to enhance the various ways we classify content—combining multiple search indices, tag clouds, and facets—and then compile the results in an easy to navigate fashion.
- We exploit visualization services to dynamically map the results and extract important relationships, based on key concepts and business processes.

We visualize content in multiple ways, all designed to make sense among disparate sources. (See illustration for some of the alternatives.) With this faster time to understanding, we uncover new lines of inquiries and new ways to unlock the business value of our content collections.



There are many ways to organize and synthesize actionable information. Beyond the all-too-familiar lists and explorer-style folder views, we can do such things as map content by geocodes, organize tag clouds, plot personalized networks, or group by expertise location.

As a result, our content collections serve as interactive tools for inquiry and decision-making. We quickly find relevant result sets. We map relationships to identify important connections and gain new insights. We rapidly assemble content from disparate sources, often looking inside lengthy documents to find the relevant parts, and link them to related sections of other documents to create entirely new items. We can then act upon these new items, ensure that they are organized as part of a predefined content lifecycle, trigger an automatic review, or produce personalized publications. In short, smart information informs our insights, drives our actions, and facilitates our decision-making.

The flexible infrastructure for pervasive applications

Continuous evolution

Fueling our focus on people, processes, and information, we leverage a rich set of content components that encapsulate industry expertise, application know how, and best practices. Transparent to our experience as business users, we're using "mash-ups," semantic maps, and other composite Internet application technologies to drive powerful content-centric applications.

We seamlessly yet systematically access and consume a wide range of web-based resources—many of which we procure when needed through software services in the cloud and pervasive information appliances. We are no longer constrained by a predefined platform or have to make substantial up-front technology investments. We have the flexibility to connect to services as needed, pay as we go, and continually evolve the capabilities of our content infrastructure.

Services beyond the content platform

How do we develop and deploy this kind of flexible infrastructure? To begin with, application developers build upon a content platform. They exploit platform-level web services that expose the key capabilities of a content infrastructure. These web services are also readily available in the marketplace, providing increased flexibility to developers who are not restricted to a single platform vendor.

Thus application developers can rapidly develop applications that:

- Discover how remote teams organize research reports through schema services
- Analyze content stored on disparate repositories through query and search services
- Link events, activities, and policies that drive business processes through workflow services

This web services orientation is a powerful approach to application development. The content-related resources managed by the content platform are easily integrated with other web services and web-based systems to develop high-value, loosely-coupled applications that solve business problem.

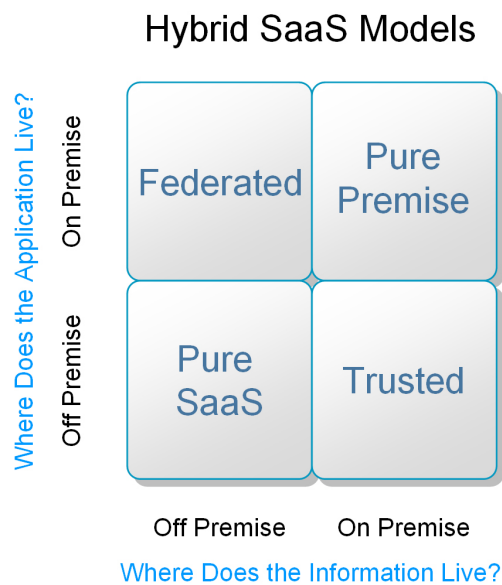
Web services also ensure interoperability with third-party content repositories. Using predefined web services, people and applications can access, query, and retrieve content from repositories maintained by disparate systems in a standardized fashion, thus overcoming the information stovepipes of separate content environments.

With a web services approach to application development, lengthy projects are but a memory. Application developers can exploit the power of the web while continuing to manage content securely and in a company compliant manner. Across our flexible content infrastructure, there's single-point policy management coupled with every-point policy enforcement.

Flexible SaaS

Looking to the future for the intelligent enterprise, we are no longer limited to a predefined application deployment typology where we must install and maintain our content platform as an enterprise application, running within our corporate data center. We have options beyond making an up-front investment in a content platform. We have the flexibility to access content-related services only as needed.

Software services are widely available in the network cloud, and we can access ECM capabilities through a software-as-a-service (SaaS) deployment typology. We can share resources and reduce operating costs—our SaaS-deployed content platform supports multi-tenancy, as well as metering for charge backs. As a centrally managed resource, it is always-on, and always available—and yet operated by a trusted party elsewhere in the network cloud.



The SaaS model gives organizations the flexibility to determine how and where they store information and run application resources.

Moreover, a flexible SaaS deployment, one that is optimized for content is not an all or nothing proposition. We tailor this deployment to meet our business needs and also ensure instantaneous access when working with very large files. With smart caching, we minimize the effects of network latency—we intelligently stage, store, and forward content across multiple network resources within our SaaS environment. We have the flexibility of determining how and where we store and run both our information and application resources. We optimize this SaaS deployment to collect and securely manage content—either on premise or off—and deliver that information to where it needs to go.

There are four alternatives for flexible SaaS—pure SaaS, pure premise, federated, and trusted.

- **Pure SaaS:** Applications and their supporting content reside in a hosted environment or somewhere in the cloud.
- **Pure premise:** Applications and content reside in an organization’s data center but leverage a service-oriented architecture and components that integrate with on-premise enterprise applications.
- **Federated:** Content is entrusted to off-premise storage but is accessed securely through customer-managed applications.
- **Trusted:** Sensitive content is maintained under the organization’s control but can be accessed by hosted or cloud-resident applications and authorized individuals.

Through these SaaS options, we can match application deployment to the topology that best meets our business needs and that reduces our operational costs. We can simply connect to information resources— including applications, solution components, or content collections—to perform specialized activities that generate real business value. With flexible SaaS, we can achieve the benefits of software delivered through the cloud as a service, while also maintaining the security and high availability of content essential for our enterprise operations.

Smart information + flexible infrastructure = The intelligent enterprise

What then are the consequences of smart information and a flexible infrastructure? The content resources and services we need to do our work are instantly available, ubiquitous, accessible when we need them, and cost-effective. The management resources and services our IT staff needs to support our distributed work environment are easy to establish, deploy, and monitor. Our business processes and systems become proactive and far reaching. Our Web 2.0 capabilities transform how we work within our business locations and when on the road.

To be sure, we still maintain the boundaries of our enterprise environment, but in a sensible fashion. Security and compliance remain important concerns when doing business over the network. Yet these boundaries no longer constrain us. Rather they actually guide and liberate our use of content across all aspects of our work environment.

Whether we are seeking answers to simple questions, analyzing complex situations, or gaining insights for making important decisions, we have rapid access to the information we need at these critical junctures. Whether we are working on a simple task, collaborating with colleagues elsewhere over the network, or enmeshed in a business process, we can readily track and manage content across our extended enterprise.

As a result, we can proactively anticipate business transitions and trends, as well as build critical relationships with partners and customers. We rely on smart information to inform our actions, manage our work activities, and help us to make effective decisions. With smart information accessible over the network, we can effectively sense and respond to changing business events. When we are immersed in the smart information we need to do our jobs, we create radically new methods for doing business across the intelligent enterprise.

Are you ready to build the intelligent enterprise?



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