

Hummingbird Enterprise™:

Fostering a 360° view of enterprise content

A Hummingbird Whitepaper



Where the future of e-Business takes flight

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This edition published February 2002

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Abstract

Today's knowledge-based economy demands that organizations provide highly functional and secure web-based enterprise information management systems. Enterprise information management systems (EIMS) are rapidly becoming an organizational necessity, and form the strategic framework of many business processes. Knowledge-driven organizations understand that information orientation, or the interaction of people, information and technology can have profound impacts on business performance, strategic initiatives, long-term viability and most profoundly innovation. Therefore, enterprise information systems are one of the most important information technology initiatives currently on any C-level executive's agenda.

Surprisingly, even in this digital age, the world still runs on paper — banks still routinely reference microfiche to check signatures — the majority of the world's scientific information is microfiche-archived in libraries — the entire U.S. healthcare system runs on paper and faxes — and most state, federal and government agencies are scrambling to implement EIMS systems. According to Gartner Group, less than fifty percent of all organizations worldwide currently have an enterprise information management, and/or document management system. Recently a Center for Disease Control and Prevention representative stated that it would be four years before a bioterrorism warning system could be implemented because most hospital emergency room reporting systems and labs were paper based. Once in place the National Electronic Disease Surveillance System will enable analysts to search and map disease reports and lab records by scanning electronic documents provided by state and local health departments.

Enterprise information management systems encompass a wide array of enabling technologies that can securely and effectively deliver vital information to anyone, anytime, anywhere, and on any device. These enabling technologies include, enterprise information portals, knowledge management, information retrieval and search, document/content management, collaborative computing, workflow/business process management and business intelligence. The market, however, is strewn with a myriad of products and is perhaps one of the most confusing and chaotic in the industry.

This paper outlines and discusses a model for making these valuable and essential solutions work together, with the goal of maximizing the benefits and return on investment in striving to transform raw information into useable intelligence — the goal of achieving a true *360° View of Enterprise Content*.

Readers will learn about key market trends and driving factors and gather a clear understanding of why the 360° model of viewing enterprise content is a valuable asset in today's dynamic business world. Additionally, readers will learn about the *building blocks* that enable the 360° model, what they can expect in terms of benefits and return on investment, and, finally, how **Hummingbird Enterprise™** accelerates the realization of this view of organizational content.

Introduction

Without question, information drives business today. It is widely accepted that information represents the dominant opportunity to generate competitive advantage. A recent Columbia University study found that investments in intangible assets generate a return on investment eight times greater than similar investments in tangible assets.¹ Consolidating this vast amount of information from a variety of departments, branches, and autonomous business units within a given region is one thing, but accomplishing it globally presents new and unique obstacles to fostering a complete enterprise view of content.

Enterprise Information Management Systems (EIMS) in the New Millennium

Robust EIMS systems require innovation and increased functionality in the following areas:

- B2E Enterprise information portal
- Information retrieval and search
- Collaboration
- Customer relationship management
- Knowledge management
- Business process management (workflow)
- Convergence of content, digital assets and document management
- Metadata management

The term document management appears somewhat antiquated today. In today's enterprise computing environment documents follow a more electronic book paradigm and are most often composed of pieces or a series of content not necessarily all text. So in effect, many organizations have hundreds or even thousand of content creators, who do not necessarily follow the author editor paradigm. The worlds of document, content and digital asset management, however, are now converging and many organizations are now creating new repositories of what is coined enterprise content. Enterprise content management includes all web-related content, documents, records, policies, procedures, video/audio files, images, and illustrations. EIMS systems of the millennium must have the capability of managing a wide range of enterprise content from creation to destruction.

The Internet and Web have evolved far beyond the original vision of its creators and has become a global area network facilitating cultural exchange, collaboration, and a new business paradigm, e-Business. In the same way e-Commerce radically changed the course of business worldwide, the Internet and Web have removed the barriers of time and place from the *business* of business. This technology inflection point has presented many significant technical and cultural challenges to organizations worldwide. The first and foremost is the organizational ability to conduct business on Internet time, and delivery of information in a secure fashion.

¹ Baruch Lev, Intangibles, Report to the Brookings Institution, December 1999.

Organizations are geographically challenged to deliver secure information and facilitate collaboration between virtual employees, businesses and suppliers in multiple states, continents and countries. The document, often considered unstructured data, is core to nearly all business processes, and web-enabling secure access to enterprise documents has become a key e-Business initiative worldwide. Leveraging web-enabled information systems by adding secure collaborative components is the next logical step in facilitating collaborative e-Commerce. Often referred to as digital workplaces, these systems focus on specific business processes and enable them to operate on Internet time, improve communication and facilitate collaboration between businesses, employees, suppliers and customers.

Organizational Issues Challenging EIMS Managers

Organizations encounter a number of common challenges in achieving effective management of enterprise content. In order to accelerate the realization of this view, several factors that drive it must be understood:

- An enterprise requires ubiquitous access to applications, data, and content.
- Legacy and line-of-business applications must connect to users throughout the enterprise.
- Documents critical to the organizational operations must be managed to control their usage.
- The enterprise must protect the entire lifecycle of documents, as well as the systems and solutions they reside in.
- To retain and reuse knowledge, an organization must be able to find content housed in repositories throughout the enterprise and beyond.
- An enterprise must analyze the vast amounts of data that line-of-business, legacy, and custom applications generate.
- There is increasing demand and expectations of an organization to securely share content with their customers, partners, and supply chain.
- Organizations require solutions that simplify content management, publishing, and document lifecycle.

The Building Blocks for Enterprise Information Management Systems

The ways in which organizations can achieve enterprise content hinges on the ability to better organize, manage, secure, control, and present that information to various audiences within the organization as well as participants throughout the extended enterprise.

This necessitates a fluid process for managing enterprise content that includes document management, collaboration and workflow capabilities, tools that address knowledge management requirements, business intelligence applications, and a centralized framework for delivering them — namely an enterprise portal.

Integrated Document Management

Leading analyst firm Gartner, Inc. defines *integrated document management* as “Middleware services for organizing electronic documents and automating related tasks; and facilitating document distribution.” The demarcation between the traditional applications that address document processing, content management, and business process automation has blurred over recent years, seeing these solutions become a single, unified solution rather than a blend of dissimilar technologies.

The concept of *integrated* document management is characterized by several key architectural elements:

- **N-tiered and web-based** — this allows for the document management solution to be accessed by all audiences (internal and external), minimized administration, reduces total cost of ownership (TCO), and ensures a familiar interface. More importantly, given the move of virtually every business system to a web-based model, it provides for rapid and relatively straightforward integration with mission-critical systems.
- **Repository-based** — By this, it is meant that all enterprise documents are stored centrally rather than having dispersed document stores, shared folders, file systems, and network directory structures. It is critical to the overall efficiency of the document management system that content be stored, managed, and delivered by a highly secure central repository or set of *libraries*.
- **Integrated Library Services** — The critical elements of effective, robust document management must be served up by a single system. These elements include metadata management (providing essential information about each document, folder, library, such as modification date, time, author, version, and other important metadata), check-in/check-out handling, and document versioning.
- **Integrated Search and Retrieval** — Users gravitate toward search windows on Web sites, in applications, and on network files systems. It is imperative that truly integrated document management solutions provide the ability to get at and deliver meaningful result sets in a variety of formats (by keyword, date, author, relevance, and even concept). Moreover, advanced capabilities that search not only document profiles but also document content are essential. More advanced solutions offer both categorization (taxonomy) functionality as well as further contextual search capabilities, *fuzzy* search, and intuitive, or suggestive, result sets.
- **Process-Centric** — Tying formerly standalone solutions to business processes is increasingly important. Allowing for ad-hoc workflow, document routing, project management, and document lifecycle management are characteristics of true integrated document management solutions.
- **Collaboration** — While implementing collaborative solutions is a new trend among organizations, these initiatives are aimed at streamlining business processes and generating new, productivity gains. Within the scope of integrated document management, this equates to team-based, project-focused, or *document-centric* collaboration. Facilities must be provided within the framework of integrated document management to deliver the ability to collaborate around documents — with both internal and external participants. Security is a serious consideration whenever enterprise information integrity is at stake. Given this, security models are extremely important within integrated document management solutions.

- **Extensible Development Tools** — While organizations are looking to achieve as much “out-of-the-box” functionality as is possible, the need to incorporate legacy systems, custom applications, or deliver unique capabilities necessitates the inclusion of development kits within integrated document management systems. In order to provide for maximum flexibility, a comprehensive and extensible set of development tools should be included/expected.

Knowledge Management

It has been well documented that knowledge management is 90 percent culture/people and 10 percent technology. Knowledge management requires a commitment to information sharing, collaboration, as well as a top-level mandate in order to deliver on its potential. Knowledge management can be defined simply as “The process of turning information into useful knowledge.” The need to manage ever-increasing amounts of information is critical. In today’s economic climate, information and intellectual capital are key to generating new and lucrative opportunities. But what are the tools organizations need to develop a knowledge enterprise? What specific functionality should they look for in knowledge management applications? Cultural challenges aside, what do organizations really need?

“Tools” of the Trade — The essential knowledge management “tools” include:

- *Search and Retrieval*: Full-featured advanced search technologies are required to access, manage, and organize information stored in many and varied sources throughout the enterprise. Intuitive yet powerful search capabilities that enable users to look for mission-critical information and have it presented in a variety of formats to suit their particular need or preference is essential. Superior search and retrieval tools are capable of indexing and accessing information stored in a wide range of business systems, e-mail packages, document management systems, files systems and other repositories, regardless of whether the information is structured or unstructured. This capability of accessing all types of data from a single search is also referred to as *federated search*.
- *Categorization*: These tools are the lifeblood of knowledge management initiatives. They are a key building block in that they add context to content. These tools are capable of automatically generating business taxonomies (or leveraging and enriching an existing taxonomy if one exists) a comprehensive list of concepts or categories by which to organize enterprise content. Solid categorization engines develop an intuitive, precise “table of contents” that enables users to find the information they require faster by providing them with a contextual map of search results — organizing related information by similar theme or concept.
- *Crawlers and Agents*: Another key feature of knowledge management solutions is the provision of *intelligent agents* capable of pushing required information to users. Agents allow users to define criteria or alerts or changes to documents, Web site content, or new information from other sources.

Crawlers are enabling technologies that provide for Internet content and other external information sources to be included in user and agent-based searches. This can also involve *brokered* searches whereby a search and retrieval solution brokers out searches to Internet-based search engines and then organizes those results as part of its own search.

Other Key Features —

- *Document Summarization*: Providing contextual summaries of documents, offering a *preview* format of the related result. This enables readers to see the document in a minimized form with search term highlighting (capsules and paragraphs with the search term query highlighted) — especially useful for lengthy documents.
- *Multiple Language Support*: In today's global economy, the ability to search and return result sets across a variety of not only major European languages but also Asian languages is essential.
- *Multi-Platform Support*: The ability to deploy solutions across a broad range of hardware platforms is crucial. Scalability, maximizing the value of existing IT infrastructure, flexibility, and merger and acquisition accommodation are goals and benefits of multi-platform support.
- *Natural Language Processing*: Users find natural language queries to be far easier to pose than keyword searches. Advanced knowledge management tools facilitate natural language processing, allowing users to pose queries in the form of a question (AskJeeves.com, the Microsoft Office Assistant, and Hummingbird KM are examples of knowledge management tools that deliver natural language processing capabilities).
- *Application Hooks*: The ability of knowledge management tools to access and categorize enterprise business systems is critical. Hooks, or *activators*, that enable knowledge management technologies to index, categorize, retrieve, and display comprehensive, flexible result sets from packages such as Siebel, SAP, and J.D. Edwards are extremely valuable to organizations looking to ensure that the entire range of business content is available to knowledge workers conducting information-based activities.
- *Application Programming Interface (API)*: The ability of organizations to tailor knowledge management tools, including information search and retrieval and categorization tools, is essential. From an information search and retrieval perspective, this equates to enabling organizations to develop custom interfaces, leverage a variety of advanced features, and include natural language capabilities. From a categorization standpoint, API enable organizations to develop, manage, and modify business taxonomy, provide a variety of knowledge agents for users, and initiate supervised or unsupervised categorization, or a combination of the two to monitor and fine-tune the contextualization of enterprise content.

In summary, knowledge management tools are rapidly emerging as the primary means of leveraging business information. Combined with the other technologies outlined in this section, they provide one of the fundamental building blocks to creating a true *360° view of enterprise content*.

Business Intelligence

Many organizations already have some form of *business intelligence* solution in place. Standard query and reporting toolsets, data mart, and data warehouse initiatives have been a major business focus for more than a decade now. However, these solutions are often department level, regional, and overall, disjointed. The business challenge of overcoming so-called *data islands* is well documented. The real recipe for business intelligence solutions can be broken down into clear technology segments:

- **Extract Transform and Load (ETL)** — A variety of methods have been used over the years to get at enterprise structured data, select and filter desired elements, convert it into formats conducive to end-user query and analysis, and load that data into centralized data repositories (or between like or dissimilar databases and applications). The vast majority of these initiatives involved an enormous amount of custom coding in order to apply standardized business rules, data transformations, simple conversions, and other elements required in order to accomplish the goal of a unified, enterprise-wide repository.

Software solutions now eliminate the lion's share of custom code, administration, and total cost of ownership typically associated with ETL projects. Today's ETL solutions provide organizations with a straightforward, highly efficient, secure means to extract appropriate data from virtually any source, apply required business rules and other data transformations, and load and replenish target data stores. Good ETL solutions provide:

- *Standards-based, Procedural Scripting*: Facilities for developing necessary transformations and defining business rules (some solutions provide a point-and-click environment for developing transformations — eliminating much of the custom code and development work).
- *Central Repository*: To facilitate reuse of transformations and business rules in future data integration initiatives, a central repository is required. This eliminates the redundancy and *reinventing the wheel* required by legacy ETL tools and point-to-point data integration solution. Transformations and business rules stored centrally allow organizations to reapply them to any enterprise data they want made available to knowledge workers.
- *Metadata Management*: The ability to access and work with enterprise metadata (literally, information about data) is included in some advanced ETL solutions.
- *Broad Source/Target Capabilities*: Good ETL solutions offer a complete range of data sources and targets. Solutions should not only enable ETL between leading databases — Oracle, Sybase, Microsoft SQL Server, UDB, etc. — but also enterprise systems such as Siebel, NCR Teradata, and SAP R/3. This capability is often provided *natively* as opposed to requiring an effective, but inefficient online database connectivity (ODBC) connection.
- *Audit Trail and Validity Check*: Advanced ETL solutions provide administrators with complete audit trail, logging, and even *validity check*, or the ability to have the system track and ensure that the syntax is correct before it applies transformations. Other performance and integrity monitoring facilities, such as commitment control, rollback, etc., are also available in leading solutions.
- **Reporting and Analysis** — Reporting and analysis packages are the graphical interface and workspace that organizations provide knowledge workers with in order to simplify and maximize the effectiveness of the decision making process. Rather than unleashing decision makers on raw, often incomprehensibly formatted, data, organizations deploy query, reporting and analysis software to provide a visualization of the data. Widely available, reporting and analysis solutions should offer organizations:

- *Scalability*: The ability to have a good number of users concurrently accessing the system without sacrificing performance.
- *Flexible Reporting Formats*: Preconfigured, or scheduled *canned* reports, interactive reports, management focused reports, and online analytical processing (OLAP) should all be provided for. Additionally, reports and query activity should be conducted in a web-based environment; and reports should be publishable in a variety of formats, including PDF, exported to standard productivity tools, and even pushed out to PDA and other devices.

Above all, organizations should ensure that the solution is both extensible and sustainable. In other words, business intelligence initiatives should be *future-proof*. Another consideration lies in the viability of the solution in terms of application integration — can the solution be linked to existing and new business systems? Again, the emerging trend is in maximizing the value of existing systems and information. If organizations do not already have a sound business intelligence practice in place, they will surely benefit from the superior decision making facilities, centralized data access, and other benefits that ETL and reporting and analysis provide.

Enterprise Information Portal

Today's business climate is characterized by velocity and change. Organizations are moving fast to deploy business solutions that maximize the value of enterprise information. They are looking for ways to increase competitiveness, restructure business processes, simplify information access, and better understand their data.

As organizations move forward with their e-Business initiatives, it is imperative that they not only consider the integrity, scalability, and openness of the solution, but also the ability to leverage existing IT infrastructure investments within the new model. Being able to seamlessly integrate mission critical legacy applications, enterprise business packages, customer relationship management solutions, custom applications, and other vital systems, without extensive programming and architecture changes, is of real benefit.

A good deal of the promise of enterprise information portals has yet to be realized due to a combination of technology limitations associated with many portal offerings and the lack of process-focused implementations. That is, many organizations undertake portal initiatives without clearly outlining expected returns, functional goals, tangible benefits, or methods of measurement. In fact, a recent Forrester research report indicates that more than 30 percent of organizations with portal pilots or production deployments “Don't track/measure return at all,” and an additional 50 percent “Didn't know,” or had limited measurement considerations. Over the coming years, this will change. Portal deployments *must* be tied to tangible return, measurable productivity and efficiency process streamlining, and a proven ability to generate and sustain revenue opportunities.

Similar to the caveats of knowledge management — that cultural issues must be addressed in addition to the provision of technology enablers — enterprise portals demand a fundamental change in the way stakeholders conduct business. Not to say that this has to be an overly painful exercise — in fact one of the advantages of deploying enterprise portals lies in the improved and simplified user experience they generate — but simply that training, focus group survey, and stakeholder input must be sought throughout the portal deployment to ensure that the various audiences ‘get what they want’.

Cultural and process issues aside, there are still fundamental elements that organizations should expect in a portal offering. These include:

- **Sound Security Model** — Above all true enterprise portals — those that include internal and external audiences, information sharing, and extended enterprise functionality (e.g. customer facing portals and B2B portals) — must ensure the integrity of enterprise content. Organizations should demand that portal offerings deliver the benefit of single sign-on (access to all applications and information on a per-user security profile via one password), user authentication (based on existing security profile — LDAP, NDS, ADS, NTLM and other industry-standard security models), data encryption, and other security functions that protect the integrity of applications and information. Ideally this should be provided natively, without requiring a third-party security product for the sake of lowering administration and decreasing deployment efforts.
- **Built-in Collaboration** — Collaboration is a rapidly growing market segment. The market has seen the introduction of collaboration tools of all stripes — both asynchronous tools and synchronous *real-time* tools. However, the trend is clearly moving away from deploying these solutions as means of communication and toward deploying collaborative solutions seamlessly tied to business processes and aimed at generating efficiencies, reducing costs, and accelerating mission-critical projects.

Organizations should look to portal offerings that include out-of-the-box collaboration functionality to facilitate team-based, project oriented collaboration activity, with a security framework to protect data integrity and provide for controlled external participation, cross-application functionality to provide streamlined collaborative activity, task management, auditing, and other fundamental collaborative capabilities.
- **Search and Categorization** — A parallel to knowledge management — which is natural given that one of the primary goals of portal deployments is to initiate better information access and management. It is imperative that portal solutions provide native information search and retrieval and comprehensive categorization technologies. With portals promising users a streamlined, intuitive experience, it is critical that search and categorization functionality deliver precise, meaningful result sets in a variety of formats conducive to the facilitation of *speed to knowledge* for users.
- **Application Integration** — As organizations strive to maximize their current investment in IT infrastructure, streamline system integration processes, and share data and information beyond internal audiences, they are looking to enterprise portals to facilitate rapid and cost effective solutions. Organizations should expect an effective, comprehensive plug-in architecture that enables to bolt-in existing and future applications seamlessly. Many portal solutions offer plug-ins to industry standard applications and business systems as well as information sources, the Internet, and other information stores. Organizations should also ensure that a development kit is available to create custom plug-ins that extend beyond those made available by portal vendors. Advanced portal solutions offer what is called *application collaboration* that enables individual business applications to carry out cross-application tasks via a portal-based menu. For example, a user can publish a sales report created in a reporting solution to a document management system, check it into a collaborative project folder, or route the document for review and

approval — all from a drop-down menu, avoiding the need to work across various applications to carry out separate tasks.

- **Customization** — It goes without saying that portal solutions should be customizable to suit corporate standards, look and feel, or interface design goals. Further to the overall look and feel of the portal, there must be facilities that enable individual users to tailor their portal workspace to suit individual role, requirement, or preference.
- **Openness and Scalability** — True enterprise portals are deployable across both UNIX and Windows platforms, can integrate systems from desktop to mainframe, and are accessible from not only desktop and laptop stations, but also by a variety of devices, including mobile phones and PDA. Additionally, while many portal implementations start small (20 to 100 users), the goal is ultimately to deliver true enterprise class deployment. Organizations should ensure that the portal is capable of growing — accommodating the tens of thousands of possible users.
- **Advanced Capabilities** — Some portals offer a wide range of advanced features. Among the more interesting of these include:
 - *Messaging*: The ability of having intelligent agents notify users (based on administrator, group, or individual criteria) of such things as content change, new content, task timelines, system messages, or other alerts.
 - *Surveys*: The ability to initiate ad hoc surveys is well suited to project management, collaboration, and other situations that may involve and benefit from quick poll feedback.
 - *Publishing Features*: Many portal deployments have a goal of information sharing and knowledge management. Some portals offer the ability to publish content from the portal workspace to user communities, portal pages, messaging systems, or directly to portal users and groups.
 - *Intuitive Page Creation*: A drag and drop model that allows users to build their own portal pages for personal, group, or enterprise use is often desirable and generates the benefits of not only improved user experience, but also those of facilitating streamlined knowledge sharing and fostering best practice replication.

As with any emerging technology, portals are a dynamic, rapidly evolving entity. Not only are enterprise portal deployments within organizations ever changing, but also the technology itself evolves daily. What is critical is that the fundamentals are in place — in ensuring that a sound framework to build on is provided. No portal will deliver 100 percent feature/functionality out-of-the-box, but if the standard elements of security, application integration, scalability, and the other key feature/functions outlined above are present, then organizations will have a highly-adaptable foundation on which to build their portal solution.

The 360° View of Enterprise Content: The Future Landscape of Information Access and Management

To maximize competitive advantage, accelerate speed to knowledge, entrench collaboration and information sharing on an organization-wide basis, fully exploit process-streamlining opportunity, and increase customer relationship efforts, organizations need a more robust framework. What organizations should aim for is not only the deployment of best-in-class information management solutions, but developing an environment in which these solutions truly work together.

Below, Figure 1 illustrates the idea of what is called the 360° Model of Enterprise Content, or an illustration depicting a complete view of all the functionality and processes required to completely leverage the value of organizational information.



Figure 01: The 360° model — Information — and knowledge-based solutions working together to transform an enterprise

Each element of the *wheel* depicted has specific information — and knowledge-based solutions that enable them. If you picture the *wheel* dissected, this represents how most IT infrastructures have evolved. That is, the modern organization has deployed solutions over time that address each element in turn. However, to foster a complete view of enterprise content and streamline the way in which it is managed, the standalone solutions, or *elements of the wheel*, must be enhanced or replaced with solutions that allow for seamless interoperation with all information-based applications.

The section on *The Building Blocks of Leveraging Enterprise Information* covers most of the technology and solutions that facilitate the 360° Model:

Access

Essentially Access is provided by the user interface, presentation layer, query tools and other elements used to interact with business systems, repositories, and other users. The goal is to provide a consistent user interface across various applications, either through an enterprise portal or by leveraging a common solution-set. Providing an intuitive, familiar experience for the user eliminates many of the obstacles encountered by having to familiarize and train on various systems.

Connect

Reports indicate that a large percentage of enterprise structured data — as much as 80 percent in Fortune 500 organizations — resides in legacy data systems — mainframes, midrange systems, and UNIX data stores. By extension, connectivity to this data is essential to generating the 360° view of enterprise content. Solutions must be in place to ensure that mission-critical legacy data is made available and presented to users for inclusion in their knowledge-based tasks.

Manage

With the amount of unstructured information (documents, e-mail, images, multimedia, etc.) generated by today's organizations, industrial-strength document management is one of the most strategic investments to be made. To reemphasize, fundamental features of integrated document management are a centralized repository, security, versioning, search, collaboration, and a flexibly deployed architecture (*n*-tiered).

Protect

A common security framework is required for several reasons. Not only does it perform the absolutely critical role of sentry of information and application integrity, but also facilitates simplified user access in providing single sign-on, and streamlining profile maintenance by avoiding the need to manage multiple security directories for administrators and remembering multiple passwords and ids for users.

Find

The information on search and retrieval and knowledge management outline the solutions required to deliver the *Find* element of the 360° model. Advanced search tools and comprehensive categorization technologies are required. Ultimately though, in generating the 360° view of enterprise content, search and categorization solutions must interoperate (delivering search and categorization functionality via a common interface) and deliver true unified search capabilities (access to structured and unstructured, internal and external sources).

Analyze

The section on business intelligence covers the solution components of the *Analyze wheel* element. Solutions capable of getting at information, transforming it into query and analysis conducive formats, and loading and replenishing data stores and applications — namely ETL tools — coupled with reporting and analysis tools are required to satisfy this element of the 360° model. Again, the existence of these solutions in the enterprise is not sufficient.

Rather, they must interoperate with the solutions that deliver functionality to satisfy the other *wheel* elements. For example, ETL solutions must be able to get at, extract, modify, and load data *between* all enterprise systems. Similarly, reporting and analysis solutions must be able to incorporate information from *all* systems in user query and analysis activity.

Share

Collaboration tools provide the means to meet the *Share* element requirements of the 360° model. As noted in the enterprise portal and integrated document sections earlier, however, this does not equate to collaboration tools deployed solely as means of communication. Rather, collaboration functionality — both asynchronous (e-mail, discussion boards, groupware, calendaring, etc.) and synchronous (application sharing, whiteboarding, chat, etc.) must be tied to business processes and embedded within information — and knowledge-based solutions. Some collaboration solutions available today readily interoperate with ERP, CRM, and other business solutions to maximize the effectiveness, efficiency, and opportunity for team-based, project oriented collaborative tasks.

Publish

A combination of solutions that offer users the ability to publish documents, reports, and other content is required to address this critical element. Within enterprise portals it means the ability to publish documents, pages, and other information. With respect to integrated document management, *publish* means the ability to not only check-in new documents, but also speaks to lifecycle management, workflow, routing, and other components of managing unstructured data. The most important factor is ensuring that users are able to publish content from whatever application they are working in to wherever it needs to be. In other words, a universal publishing facility that spans the entire range of information- and knowledge-based solution is required.

It is important to keep in mind that fostering a 360° view of enterprise content involves not only the interoperation of technologies and business solutions, but also the commitment of users to supporting it. In fact, users (whether internal or extended enterprise) can be considered the hub of the *wheel* diagram. Even if the ideal technology infrastructure is in place to facilitate the 360° model, it means nothing without users. Fortunately, the 360° model benefits both organizations *and* users. It not only generates concrete business value (bottom line return, reduced cost of ownership, etc.), but also drastically changes the efficiency and manner in which users access, manage, work with, and leverage enterprise content — for the better. Indeed, and unlike many technology solutions touted in the past — the model that fosters a true, 360° View of Enterprise Content adheres to the maxim “If you build it they will come.” Staff, suppliers, business partners, and, perhaps most importantly, customers will all see the way they search for, get at, analyze, share, and understand business content revolutionized.

Hummingbird Enterprise™: Transforming Information into Intelligence

The Hummingbird Enterprise Mission

The foundation of Hummingbird Enterprise rests on the conviction that management of intellectual assets and data requires integrated and fluid processes that encompass the entire range of knowledge-intensive tasks that drive business. Regardless of location or format — be it structured or unstructured — relevant accurate information must be readily and consistently available to those who need it — anytime, anywhere, and on any device.

Hummingbird Enterprise: Defined

Hummingbird Enterprise delivers on its mission by providing a business-critical suite of Enterprise Information Management System (EIMS) components enabling organizations to provide employees, partners, customers and suppliers with the ability to easily access, find, analyze, manage, and collaborate on enterprise content across a wide variety of formats, languages, and platforms.



Figure 02: Hummingbird Enterprise offers everything organizations need to manage the entire lifecycle of their business content.

Hummingbird Enterprise Components:

Hummingbird Portal™ — A web-based workspace that ties applications and information together to complete the 360° view of enterprise content.

Hummingbird DM™ — Enterprise-class integrated document management system that transforms document-based electronic information into knowledge assets, providing a strong foundation for collaborative and content management solutions.

Hummingbird RM™ — A standards-compliant records management solution that creates an organized, secure environment to manage the complete lifecycle of knowledge assets from creation to destruction.

Hummingbird KM™ — A collection of powerful technologies that deliver robust search, categorization, and information retrieval capabilities that provide knowledge workers with the fastest, most precise access to the collective enterprise content and expertise.

Hummingbird Collaboration™ — A document/project-based collaborative environment that increases the effectiveness of continuous collaborative activities between employees, customers, partners, suppliers and other participants.

Hummingbird BI™ — A complete reporting and analysis package that allows users to pose questions about critical data and then communicate findings with meaningful, actionable reports. Integrated and highly scalable, it allows an enterprise to access and analyze data from ERP and CRM solutions, data marts and data warehouses, legacy systems, and custom design data repositories.

Hummingbird ETL™ — A powerful data integration solution that extracts, transforms, and loads (ETL) data between applications, databases, data stores, data marts, and data warehouses. It enables organizations to achieve timely and accurate data exchange so that critical structured data is available to knowledge workers in formats appropriate for query and analysis activity.

Hummingbird Enterprise is a comprehensive integrated solution that provides organizations with a 360° view of enterprise content. Hummingbird Enterprise:

- Delivers a consistent user experience regardless of specific application,
- Is deployable on both UNIX and Microsoft Windows systems,
- Integrates seamlessly with not only its own components but industry-standard solutions as well,
- Interoperates with core components and other applications to provide seamless cross-application functionality.

Hummingbird Enterprise: Design Goals

Persistent User Experience

As IT infrastructures evolve, users are typically presented with changes in the way they use technology. Individuals struggle with having to discover how to carry out tasks with new interfaces and different applications. Additionally, figuring out how applications work together — or if they work together at all — adds to the challenge. Most solutions force users to work across applications by switching between those applications — initiating separate sessions to carry out related tasks.

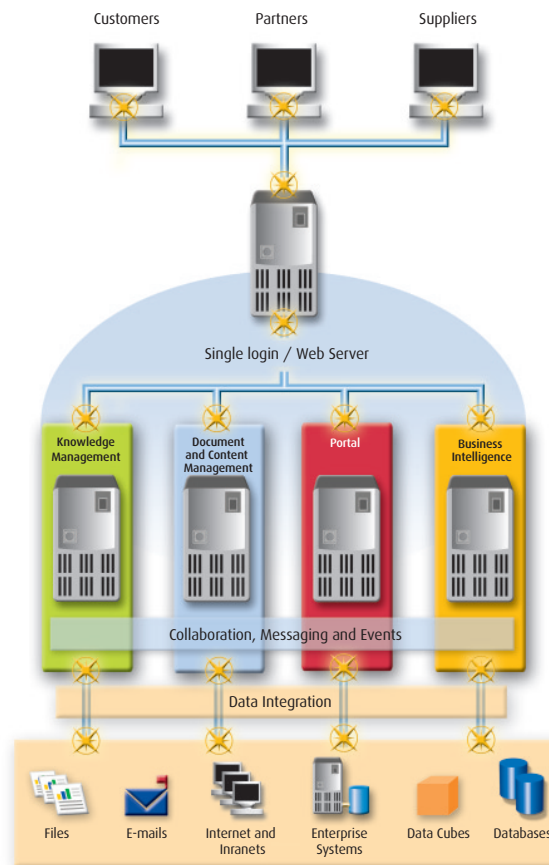


Figure 03: Electronic content in all forms must be effectively managed in order for enterprises to fully leverage its business value. Each data form has its own set of management tools and accompanying challenges. Hummingbird Enterprise enables a unified approach to managing and leveraging this content.

Hummingbird Enterprise delivers a consistent user experience between components. All elements of Hummingbird Enterprise share:

- Similar interface look and feel — colors, fonts, location of functional elements
- Matching graphical representation of functions (save, “send,” check-in/check-out, etc.)
- Similar activities and cross-application functions carried out via identical methods

Unified Repository

Electronic content in all forms — images, documents, e-mail, web-based information, database tables, transactional systems, ERP, etc.— must be efficiently and effectively managed in order for enterprises to fully leverage its business value. Each data form has its own set of management tools and accompanying challenges. Hummingbird Enterprise enables a unified approach to repositories:

- Hummingbird Portal, Hummingbird DM, and Hummingbird Collaboration share the same repository,
- Hummingbird KM integrates third-party document repositories, e-mail systems, Web sites, and databases into a unified access system based on categories of business information.

Common Platforms

An enterprise requires that the technology used to solve business needs fits in with their overall computing platform strategy. Those strategies can be complex, involving multiple platforms that fit into different business unit standards or accommodating merger and acquisition activity. The range of available platforms is broad, covering strategic vendors, operating systems, databases, and interfaces.

Hummingbird Enterprise is deployable on a variety of leading platforms, scalable from departmental to large-scale enterprise implementations. From a platform perspective, Hummingbird Enterprise offers:

- Microsoft Windows deployment for small/midsize organizations and departmental deployment,
- IBM and Sun platform support for enterprise-class scalability requirements. Currently, Hummingbird Portal, Hummingbird BI, Hummingbird KM, and Hummingbird Collaboration support UNIX with plans to extend support across the entire Hummingbird Enterprise solution spectrum,
- Hummingbird BI, and Hummingbird ETL are capable of accessing and exchanging data housed on a myriad of databases and platforms, from desktop to mainframe.

Lastly, organizations are looking to lower the cost of integrating enterprise applications and eliminating so-called “data islands.” Hummingbird sees Web Services evolving to address this challenge. Looking forward, Web Services will prove to be a critical tool in integrating Hummingbird Enterprise with customers’ strategic business solutions.

Single User Definition

Business applications have to define users, and how they interact and access systems. Each application can have its own mechanism to define users (password and network identification) and such elements as security permissions, access rights, and so forth. This creates both an administrative burden and a user annoyance in having to maintain multiple sets of credentials.

Hummingbird Enterprise uses Common Authentication Protocol (CAP) to authenticate users against popular systems — regardless if they are based on Novell, Microsoft, UNIX, or mainframe security models. In the future, Hummingbird Enterprise will evolve to a single description of a user throughout the solution.

Summary

In striving to build momentum and competitive advantage, organizations are looking to leverage their knowledge assets to generate new opportunities. Rather than attempt to build a patchwork solution, and to comply with organizational retrenchment necessitated by a harsh and dynamic economic climate, organizations are leveraging existing investments in information technology and endeavoring to build a 360° view of enterprise content. If successful, organizations will realize tangible, significant, and rapid returns, including:

- **Enhanced productivity** — via customizable workspaces, interoperable solutions, increased collaborative capabilities, and other characteristics associated with the 360° model
- **Streamlined business processes** — via collaboration, knowledge sharing, best practices replication, communities, and other knowledge management features of a 360° model
- Fully **secured** information management
- **Accelerated time to knowledge** provided by an integrated model for accessing, analyzing, sharing, managing, and organizing information
- **Cost savings** — a lower total cost of ownership provided by an integrated solution set, rapid deployment time, streamlined application integration, and decreased administration
- **Improved efficiencies** — the 360° model helps eliminate redundancy of knowledge-based work, drastically reduces time involved with finding information by ensuring true *federated* search and retrieval.

As organizations channel efforts toward attaining this 360° view of enterprise content, Hummingbird Enterprise represents a framework for accelerating the process. Hummingbird Enterprise offers organizations a rapidly deployable solution for maximizing the value of organizational knowledge assets – linking people to the information, applications, resources, and collaborators required to fully leverage all available content. From its highly secure, customizable portal component, to its business intelligence, knowledge management, document management, collaboration, publishing, and records management components, Hummingbird Enterprise offers organizations everything they need to turn information into intelligence.

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WP-01-00-EN-0018.02/02
Printed in Canada.

