

A Way to KM solutions

Things to Consider When Building Knowledge Management Solutions with Microsoft Technologies



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A Way to KM Solutions

This document provides an easy-to-understand technology roadmap for building a comprehensive knowledge-management (KM) platform. It also helps identify what needs to be done along the road towards that goal.

Creating a KM roadmap presents several challenges. KM is a vague term that is not well understood from a technology and organizational viewpoint, as are related terms such as collaboration or workflow. It also seems that there is no commonly accepted functionality related to KM (with perhaps an exception in collaboration and workflow, a combination of automated information flows that includes e-mail).

With this challenge in mind, the intent of this technology roadmap is not to provide sound scientific documentation defining KM and how the effort to implement it revolutionizes the whole culture of information management inside a company. Rather it is a pragmatic approach to help understand the pieces of technology and organizational aspects that need to be put together to successfully evaluate and use KM techniques, and extend them over time. The goal is a knowledge-driven information network that will help solve many kinds of business problems effectively.

Knowledge management can be compared to the Industrial Revolution, where the work shifted from hand-centric labor to machine-centric processes leading to an explosive rise in production and new technologies. In the same way, KM drives the shift from the manual generation of information (paperwork, which is still common today) to complete electronic processing (with the ability to effectively use and apply information). This KM revolution leads to faster rates of producing knowledge assets, and new technologies for adapting knowledge faster.

The first step along the KM road should be to think about the business's goals and usage of such a system. This defines how a specific business area can take early advantage of better information management, and get long-term benefits from a KM-enabled infrastructure.

Examples of Business Scenarios Enriched with KM Services

1. Product Design and Development

- Consulting Services
- Review Documents in R&D
- Approval mechanism of technical specs in Engineering

2. Customer and Issue Management

- Online Product Support and Services
- Information Retrieval Services

3. Business Planning

- Accounting
- Analysis of marketing parameters
- Strategy planning

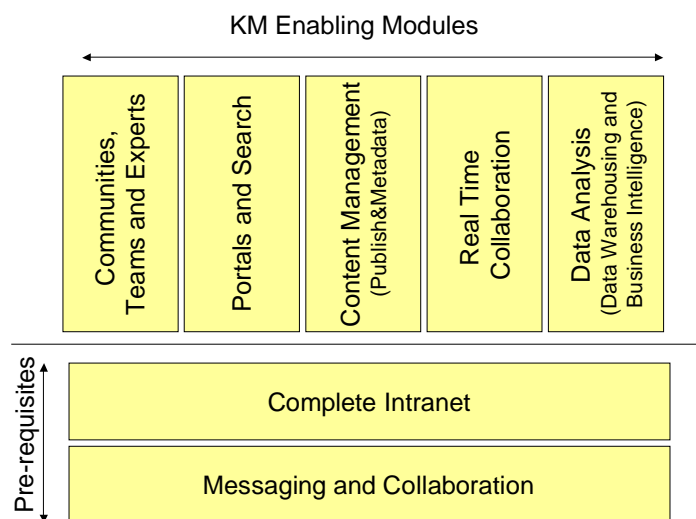
4. People Development

- Recruit experts with high knowledge in their field of expertise
- Motivate people with career options and responsibilities
- Retain the high standard of knowledge

The KM Evolution

For each business problem in an enterprise, knowledge management evolves through choosing the right competencies dependent on what needs to be solved. Each competency has its own characteristic based on organizational processes and technologies. This document describes each of the Competencies or Modules, and defines the organizational requirements and technologies that need to be implemented to enable an infrastructure with KM services.

Figure 1: The Modules of a KM Evolution



The two prerequisite technologies that are the foundation for all KM systems build an infrastructure that supports the efficient transport, structure, access, and collaborative management of electronic data.

The remaining KM-Enabling Modules extend that basic infrastructure to a sophisticated KM system that includes services like Content Management, variations of Information Delivery, and Data Analysis. Automated services such as Data Tracking and Workflow processes are also included as part of the Community and Team competencies.

The implementation of the KM-Enabling Modules has a true plug-and-play character. Although some of the modules profit from the implementation of a previous module, they can be chosen in any order related to the specific business case that needs to be accomplished. For example Real-Time Collaboration services, such as video conferencing, can be easily included on top of the prerequisite technologies, but are enhanced by the Meta data services provided in the Content Management Module.

Microsoft's KM Platform

The KM platform's components enable great KM systems to be supported across all the KM-Enabling Modules. The KM platform provides a typical, but extended, three-layered architecture that allows the building of flexible, powerful, and scaleable KM solutions (see Figure 2).

The Desktop Services layer consists of familiar productivity tools, and integrates tightly with the Application or Knowledge Services layer that provides important KM services such as collaboration, document management, and search and deliver functionality, and components for Tracking, Workflow, and the Analysis of data.

The System layer is a foundation that includes administration, security, and directory for managing the KM platform. All KM services run on the System layer and benefit from the integrated communication services that connect with external solutions, platforms, and partners.

The Development layer allows the Platform services to be optimally customized to a specific KM solution. The Platform provides the components to start the out-of-the box building of a KM system; the Platform's flexibility comes into play with the Development layer.

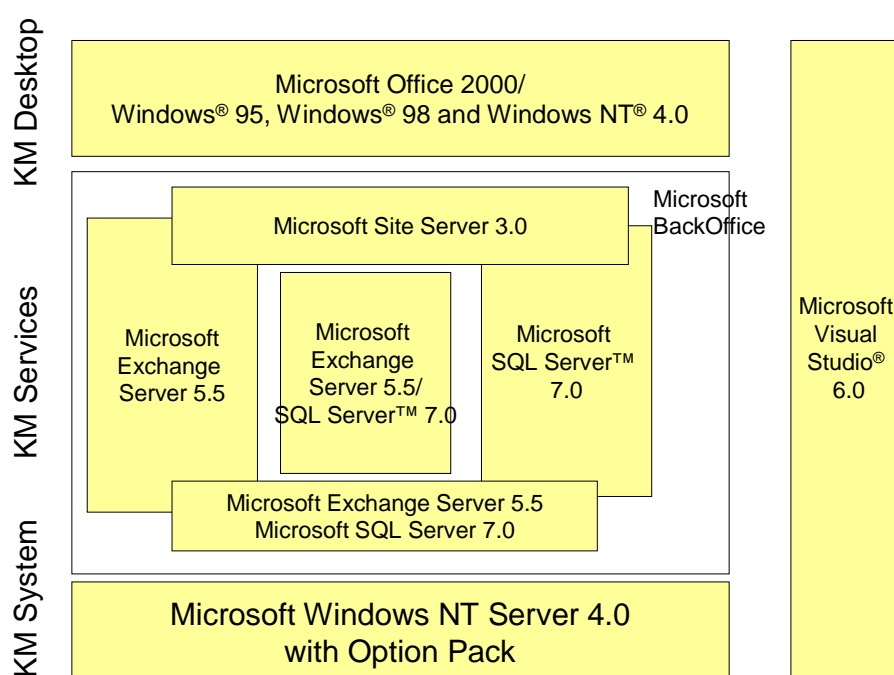
Figure 2: Possible Layers of a Knowledge Management Platform



Microsoft's Current KM Platform

Microsoft's current KM Platform is the Microsoft BackOffice® Family that provides the services to build the KM prerequisites (messaging and collaboration, and complete intranet) and to extend them to KM solutions by implementing all KM-Enabling Modules (Content Management, Communities and Teams, Portals and Search, Data Analysis, and Real-Time Collaboration). Besides these services, Microsoft BackOffice provides interfaces for connecting and integrating with legacy information or knowledge sources (for example, RDMS systems, SNA data-sources, or KM-enabling technologies like Lotus Notes or Lotus Domino).

Figure 3: Microsoft's KM Platform Architecture Today

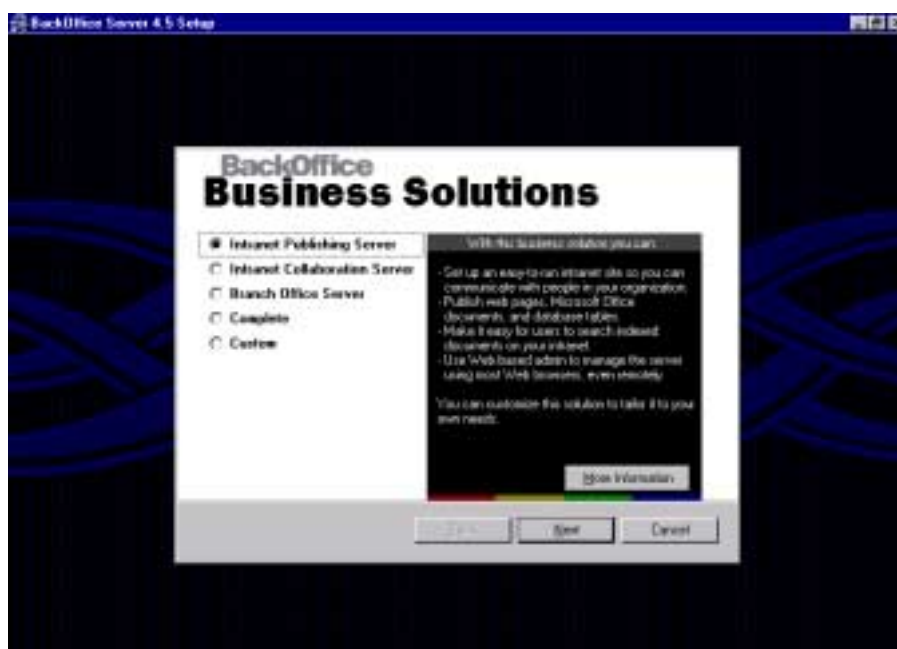


One of the great advantages of the Microsoft BackOffice platform is the ability to run BackOffice services either on a single PC server, or on multiple servers without a major change to services or security aspects. This provides a platform that is scalable without the need for changes in the solutions that run on top of Microsoft BackOffice.

This ability is especially relevant to those departmental server solutions where Lotus Notes and Lotus Domino provide a common groupware platform. There, Microsoft BackOffice builds the alternative or extends the departmental groupware functionalities with its integrated and scaleable KM services. This makes it easy to set up departmental solutions with the Microsoft BackOffice platform, and extend or connect them later to enterprise-integrated solutions.

New Microsoft BackOffice features to be added in the near future will speed up the process of generating departmental or branch office solutions, because new scenario-based setups of the Microsoft BackOffice Family will make it unnecessary to know how the several BackOffice services interact together. With the setup of the Microsoft BackOffice suite, a solution is built that fits a specific requirement. This solution can be put to work right away, or it can be further customized for specific needs with the Microsoft Development Tools.

Figure 4: Setting Up Microsoft BackOffice



Three scenarios can be generated out-of-the-box and used as a starter for departmental applications:

1. Intranet Publishing Server

Provide a complete intranet site as a departmental solution that enables communication among workers, publish documents in Customizable Document Libraries, create Team Workspaces, run full-text Search against the documents, or build an intranet directory.

2. Intranet Collaboration Server

Extends the Intranet Publishing Server with further collaborative functionalities like threaded discussions and team and events calendar. Also enables enterprise-wide collaboration.

3. Branch Office Server

Connects the Microsoft BackOffice Server to a corporate network and enables central administration and intranet/Internet access for its network client.

KM's Basic Conditions

KM should help turning experiences and information into results.

This is the starting point for all the technology modules that finally lead into a comprehensive KM system that handles all the knowledge assets of an organization. It will also help to focus the process of thinking about where knowledge assets come from, and how information and processes can be shared and reused in an extending KM system.

Information from a Theoretical Point of View

Since humans use only part of the brain for thinking, and IT efforts have failed for several years to build computer systems that can come close to the power of this wonderful gift, its most likely that useful knowledge assets are generated by people themselves.

This is the first problem with KM. The effort of building a KM system begins with trying to catch as much neuron and synaptic fireworks as possible from this biological thinking machine the brain. That not only implies the first change in the organizational culture of a company, it also gives the first conditions for a successful KM system.

Basic Conditions for Success of a KM System

People are prepared to work with technology and to document their work.

KM systems support an easy way of creating, storing, and retrieving people's work.

The success of a KM system depends on the culture of a company supporting the efforts of the people to produce information that can be used to improve the business. Empowered staff producing high-value content will have more use and benefit from a KM system than people in companies that don't support sharing of information and ideas in an open fashion. This benefit is greater for those companies that have expensive human resources, or that operate in industries dependent on sharing and reusing information. The chances of finding a KM system (or candidates for a potential one) are extremely high in:

- Companies with huge R&D efforts (computer industry)
- Companies with big engineering departments (manufacturers)
- Companies that rely on documentation (pharmaceuticals, medical)
- Consulting companies, software engineering companies, ISVs
- Accounting and consulting firms

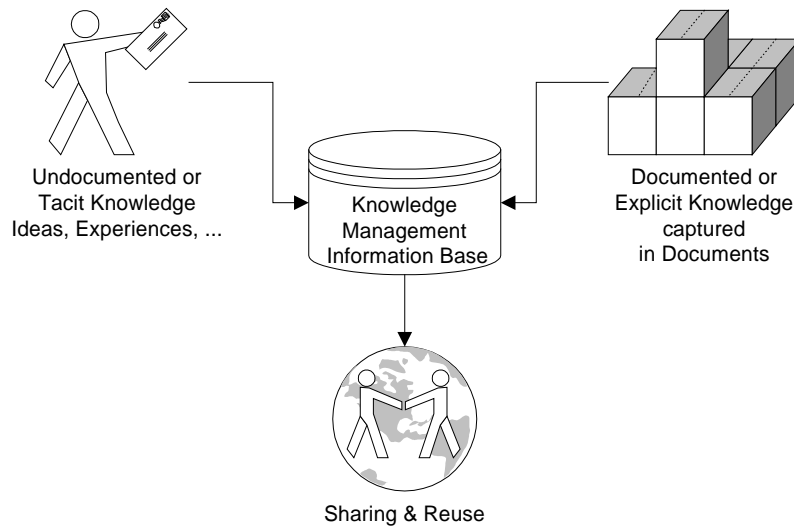
Messaging and Collaboration

From the introduction above, it is clear that infrastructure IT systems intended to support KM efforts need to also support the capturing of undocumented information (human thoughts), the sharing of ideas and documents, and the efficient finding of this information (fast and more important accurate). This is the foundation of an IT system that helps to handle information and transfer it into knowledge.

Another characteristic of an IT system that supports KM efforts is the existence of a set of common tools used and well known by all users of the IT system (sometimes referred as knowledge workers). Whatever tool is used to provide an entry point to this IT system, either presents the information, or controls all interaction with it. It therefore needs to be capable of handling all the information that is part of the working environment of the knowledge worker. In the best case, only one tool or application should exist for this interface.

This entry point to all information and applications in a KM system is also called a "Portal Service". If the same environment supports also the creation of content, it's called the KM desktop. Web Browsers with its possibilities to present all kind of information in a rich way and combine the easy-to-use are ideal candidates for such functionality.

Portal Services are covered within the Portal and Search Module. This section focuses on the parts of content creation, sharing, and collaboration of the future KM desktop.

Figure 5: Information Sharing**Goal:**

A basic collaborative KM system must support the Sharing and Reuse of information with a basic set of collaborative information techniques.

To support especially the requirement of capturing the undocumented knowledge, the Messaging and Collaboration services are a perfect tool. If writing e-mail, sending Documents, or participating in Discussions are easy tasks for knowledge workers, the motivation to act with KM in mind is much higher than in infrastructures that don't support this or that make it hard to use Collaborative features. In a well-designed collaborative environment, this knowledge flow can be easily captured in e-mail, Document and Discussion Databases, and included in the KM system for later reuse.

Technology Requirements

KM Desktop Services

- Easy-to-use, productivity suites integrated in all other desktop services
- Comfortable e-mail systems that support collaborative services such as shared calendars, tasks, contacts, and team-based discussions
- Web browser for browsing and presenting the documents to the user
- Simple search functionalities like OS integrated file search services or application integrated search services (e-mail, discussions)

KM Application Services

- Collaboration services with a multi-purpose database for capturing the collaborative data
- Web services for providing the access layer to documented knowledge
- Indexing services for full-text search of documents

KM Operating System (OS) Services

- Well-organized central-storage locations like file, Web servers, and document databases

Microsoft Integration in a Collaborative Environment

Figure 9 shows the three KM Platform layers—system, services, and desktop—configured for a collaborative environment. An overview of the functions of each component follows below:

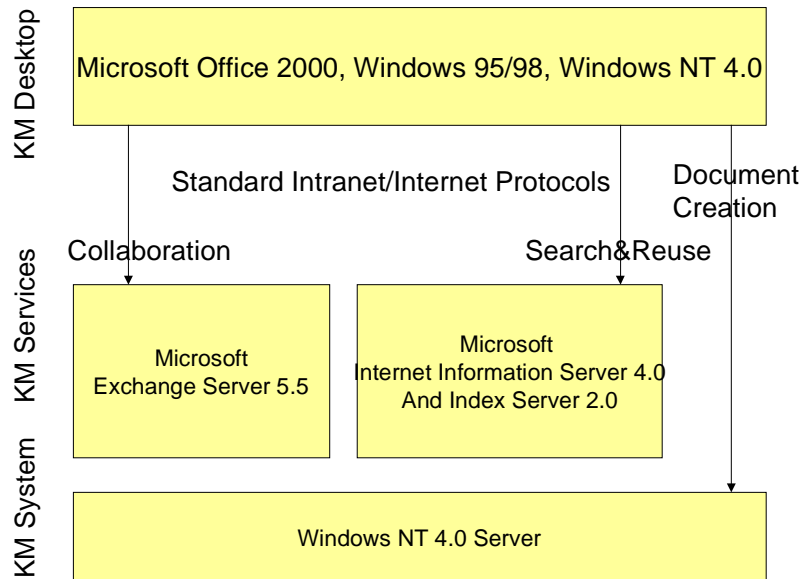


Figure 6: Integration in a Collaborative KM Environment

- **Microsoft Office and Microsoft Outlook®** build the basic front-end for the end-users of the KM system for creating, capturing, and organizing their information sources for effective working. For KM services, Microsoft Windows and Microsoft Office provide basic search services for documents, while the Microsoft Outlook Search Services find e-mail and discussion thread-related information.
- **Microsoft Internet Explorer** provides easy access and browsing for all kind of information. Internet Explorer integrates with Microsoft Office and also allows access to all Microsoft Office documents.
- **Microsoft Windows NT Server** stores documents in its Secure File Server.
- **Microsoft Exchange Server** adds e-mail, collaboration, discussion, and document-management features.
- **Microsoft Internet Information Server (IIS) with Microsoft Index Server** provides basic search and access of documents in file systems over standard Internet protocols.

Collaboration: Services and Technology Requirements

The technology enablers in this module are sophisticated e-mail and Web services. Both services must be extensible and customizable to work with the index services in Microsoft Index Server (for full text search) or discussion services in Microsoft Exchange and Office 2000 (for threaded or inline discussions). Equally important are the interfaces with the desktop productivity suite to deliver the collaborative scenario. Figure 10 shows the requirements for the different services, and how Microsoft products and technologies map into them.

Figure 7: Feature Requirements of Collaborative KM Solutions and Microsoft Technologies

	Knowledge Creation and Collaboration (Rich e-mail, Shared Calendar, Tasks, Contacts, Journals)	Basic Knowledge Find Services	Knowledge Storage
Office 2000	E-mail, Send or Store Rich Office Documents (Access Data Pages, etc.). Share common Contacts and team Calendars. Activity Tracking in Journals.	Exchange Database Search (Threaded Discussions, E-mail) with Outlook 2000. Possibility to save regular searches in Exchange Public Folder for later reuse	E-mail and Posts to Exchange Database (Exchange Public Folders) for later reuse Save to Central File Server Location
Windows 95/98/ Windows NT Workstation	Access to heterogeneous Knowledge Documents with integrated Microsoft Internet Explorer	File based Document Search. Possibility to save regular searches on KM desktop or include links to those in Web pages	
Windows NT Server		Microsoft Index Server for Full Text Search of Documents on File Servers	Secure File Server Services and Microsoft Internet Information Server for accessing the stored documents over standard Internet Protocols
Exchange Server	Access to Knowledge Documents with Standard Internet Protocols like IMAP/NNTP/HTTP or via MAPI (Microsoft Outlook Client)	Rich Views (Grouping, Sorting, Filter) on Exchange Public Folders	Multi Purpose Database for Storing E-mail, News-Posts, Office Documents

Scenario and Technology Recommendations

Use the Web Technologies to Access Information

One goal of a KM system is to build a single interface for its users, where as much information as possible is accessible. To achieve that single interface, use Web technologies, especially HTTP/HTML based access/browsing and presentation of the information. This will give the most flexibility when accessing data from the KM desktop.

- Use Internet Information Server and HTTP as the primary application level protocol to hide the document store (file system).
- Use Index Server for full text search of the documents stored on file servers. Customize Index Server to search different document partitions to reflect the scope of the company's information.
- Use Internet Explorer as an information broker.

Use the E-mail Client and Integrate with the Productivity Suite

The e-mail client with collaborative features like calendaring, task management, and discussion threads is one of the first applications with which users familiarize themselves. Integrate the productivity suite into this application to build a single interface for accessing collaborative information and creating documents.

- Train the users to utilize the Microsoft Outlook messaging and collaboration client out-of-the box integration into the Microsoft Office suite as primary entry point for collaborative data and corporate document manipulations

Use the Collaboration Server as Knowledge Assets Storage

With the usage of rich, productivity suite integrated e-mail services among knowledge workers the databases on collaboration servers are an important knowledge source.

- Build a business-related strategy for deploying Microsoft Exchange Public Folders to store discussions and collaborative documents. Enable key Public Folders for e-mail to enhance the support the knowledge assets capturing out of Office 2000.

Complete Intranet

This core module of knowledge management is supported by a well-organized information network that provides access to all the relevant data needed to get a job done or drives decision-making. These decisions must be taken fast enough to get a competitive advantage. A collaborative environment needs to be extended if it is to meet these requirements because it is still too hard for its users to access accurate information, gather all the relevant information, and find hints to other knowledge sources.

Goal:

A Complete intranet KM system should enable people to find the right information or sources for helping solve problems or drive decisions.

Enhancing the Collaborative Collaborative Environment

From an organizational perspective there must be a role established that knows:

- Which organizational group or team needs what kind of knowledge.
- Where information inside and outside a company is located.
- How to group and link information together.

From an infrastructure perspective services are needed that support:

- The core characteristics of Intranets, such as presenting related information in the form of pointers and links to Web resources.
- Creating and accessing knowledge assets over standard Internet protocols
- Presenting the right information (groups) to the right people.

The new KM role of a knowledge architect (KA) is introduced during the transition to a complete intranet.

The role of the KA is to own the technical and political overview of the information infrastructure of the organization. This role negotiates between groups and handles overlapping competencies and border issues so as to optimize the information gathering process. The primary task is to survey what's needed to build a successful information network (one that achieves an optimized process for problem solving, driving decisions and finally getting competitive advantage). There can be several knowledge architects that divide the responsibilities for the information services in an organization. In that case there may exist another role, the chief knowledge officer (CKO) that is responsible for coordinating the KAs.

Technologies for an Intranet

- Uniform Resource Locator (URL) technologies to hyperlink-related information together to an information web.
- Directory Services that store information about people roles and responsibilities in the organization.
- File servers extended with Web servers to access the Documents over Standard Internet Protocols.
- Home pages on the Web servers for each specific business problems to present groups of related knowledge assets.

Complete Intranet with Microsoft Technologies

- **Microsoft FrontPage®** for building and managing Webs, especially to link the information together to the pointer network and to create Web server home pages.
- **Microsoft Office 2000 Web Folders and Server extensions** to enable the storing and accessing of Office2000 Documents on Web servers through HTTP/WebDAV.
- **Microsoft Internet Information Server with Active Server Pages (ASP)** to access roles and responsibility data in directory services.
- **Microsoft Exchange Server** for a global corporate directory service with information about roles and responsibilities.
- **Microsoft Visual Studio** for development of easy access to directory data, enabling the finding of people and including this information within Web server home pages.

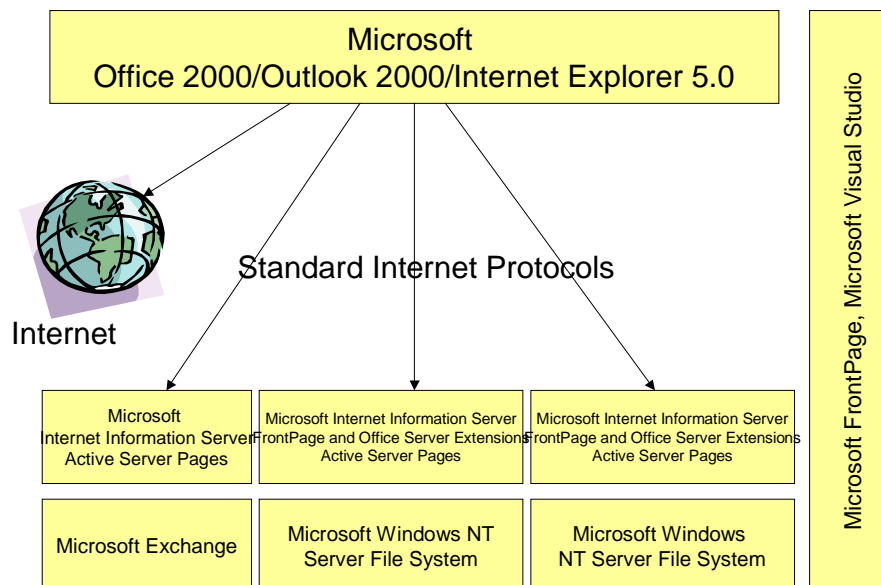
Integrating KM Services in an Intranet

The main difference in technologies over the collaborative environment is the need to define how the documents should be grouped, and linking them together into the Information Web. Microsoft FrontPage is the tool for creating and managing the Web groups (Sub Webs) and hyperlinking.

The integration of data from data stores and structures other than file-based documents is more complex than creating and managing the Web with standard HTML and URL technologies. The Microsoft FrontPage Web site creation and management tool delivers some support for developing ASPs and integrating data access, but Microsoft Visual InterDev® Web development system, as part of Microsoft Visual Studio, allows more flexibility. The application services of both Microsoft Windows NT Server and IIS, especially ASPs and COM technology, allow the use of most common data sources over the Information Web.

Microsoft Exchange data access components for these services already exists and makes it easy to access dates in Exchange Public Folders or the Exchange Directory Service.

Figure 8: Complete Intranet



Scenario and Technology Recommendations

Extend the Document Locations on File Servers with Standard Internet Technologies like Web Services

This will make every knowledge asset stored on these servers accessible from standard Web browsers (through the use of HTTP) and will streamline the variety of access methods making it easier for the knowledge workers.

- Use Microsoft Office 2000 Web Folders and Server extensions. This will enable the knowledge workers to store all Office Documents direct on the Web Servers.

Hint: An interesting effect of the Microsoft Office 2000 Server Extension is that it enable discussion threads and inline discussions on Office Documents stored in the Web Folders. This is an additional functionality for KM in pinning additional information like comments or suggestions to Documents.

Build Home Pages for Related Information and Information Groups

HTML pages that include links to all knowledge sources, not only documents, but also links to people, or external links to Internet Pages. This will supply the knowledge workers a one-stop access to those related knowledge assets.

- Use Microsoft FrontPage 2000 for HTML pages creation. FrontPage has a variety of collaborative abilities with Office 2000 and Microsoft Exchange Data to make it easy to include heterogeneous links.

Extend the Messaging Directory with Information about Roles and Responsibilities

This will enable you to search the corporate address book for knowledge contacts.

- Use Exchange Server, start using the Exchange Directory Service extensively to build your corporate directory, and include basic information about people skills in it.
- Use Microsoft Internet Information Server and ASP technologies to make these data available from intranet pages.

Use Integrated Development Environments for Creating, Managing and Developing the KM Intranet

Use FrontPage 2000 and Visual InterDev 6.0 to develop the HTML and ASP pages. Specifically, the use of Design Time Controls (DTCs), like the Exchange DTC, helps to integrate dynamic data (in this case to enable access to Exchange Public Folder data in ASP pages).

Use features like Templates and Themes to build a consistent look and feel for all the Web pages.

Use the Active Directory Service Interface (ADSI) to access the Microsoft Exchange Directory. ADSI is the Microsoft strategic API for accessing Directory data. This is recommended over native Lightweight Directory Access Protocol (LDAP) APIs.

Communities, Teams, and Experts

The two pre-requisite technologies of KM puts all collaboration and Document-based knowledge sources together and enables the knowledge worker to browse through informational objects based on knowledge groups. Communities, Teams, and Experts add the next level of sharing knowledge and turning it to results.

Teams differ from communities in that teams are task driven, and communities are interest driven. Usually a team works closely together (a workgroup) on the same tasks and goals. In many cases the information produced by a team is closely held within the team until it has reached a level of completeness where it can be shared, for example in a review, with a broader audience. Communities are mostly driven by interests in the same area and are more loosely coupled (for example by subscriptions). The information shared by a community is closer at the final release. Communities are especially useful for building knowledge to higher levels, often by getting successive levels of input from a wide audience.

This KM-Enabling Module supports knowledge workers to join communities by subscribing themselves to subject matter sources. The building of communities and teams is characteristic of this Module, whether they are driven by the information in the KM system, are administered by a KM Architect, or service themselves.

The role of an Expert is to qualify and filter information. Often an Expert is related to a limited set of subjects (in most cases nobody can be an expert in everything). Those Subject Matter Experts (SMEs) can be defined in two ways: either as an organizational function (defined by the KA) or as very knowledgeable people who become well-known experts in their team or organization and assume the status of an SME for contributing high quality information or for reviewing it.

The SME is an important role for a KM-related Information Web or intranet. In traditional intranet solutions, there is little control over who can store or upload information into the intranet. This is not a bad thing, and is desired in order to build an extensive information repository. But to maximize the usefulness of the intranet, the information should be filtered (“is this really useful information”), classified (“which type or category of information”), and grouped together (“which information correlates”). This process is part of the responsibility of the SME.

Communities, Teams, and Experts are also used for the controlled process of putting information into the KM system. Filtering, qualification, approval, or more complex workflow processes for documents and other electronic data need to be established. In a KM system these processes are not strictly based on traditional organizational roles (manager, reviewer, approver, author, and so forth) but more on Subject Matter Experts. This can add a great level of dynamic and flexibility to the KM system and the automated processes.

One example, especially for the SME-based case, is to add some dynamic to the system through the possibility that knowledge workers, which obtained a certain expert status in their subject, can subscribe themselves as SME’s (for example after passing an online knowledge tests) and get included into the review or even approval processes.

Together with the Collaborative Pre Course that enabled the infrastructure with e-mail services, this Module empower the knowledge worker to get information fast and in a proactive way from a KM system right to the KM desktop. The e-mail system notifies groups of people with corresponding skills and interests about new knowledge assets and delivers the information that they need.

Requirements: Communities, Teams, and Experts

- Directory and Membership Services that support the building of Communities through grouping people together into expert teams working on the same set of information, or having the same needs and interests in specific information.
- Forum services to create Workspaces for Communities and Teams that contain all interest-related data.
- Self-subscription services to specific matters of interest for dependent information delivery and subscribing.
- Services to assign specific roles to knowledge workers of the KM system.
- Workflow services for automating processes based on roles and SMEs.
- Tracking services that follow team contacts and team activities.
- Monitor services that enable SMEs to filter information.
- Dynamic E-mail Distribution List services for automated subscription services.
- E-mail services for automating notification, routing, and simple workflow services.
- Organization Databases integration like People Skills and HR databases for enhancing Community, Team and Experts information, and Search this information.
- Home pages on Web Servers for each Community, Team, or Expert to speed up the access to knowledge sources.

Communities, Teams, and Experts with Microsoft KM Technologies

- **Microsoft Office 2000 Server Extensions** for departmental notification services based on subscriptions to office documents on Web servers (in Web Folders).
- **Microsoft Outlook 2000 and Microsoft Exchange Server** for Team Activity Tracking.
- **Microsoft Exchange Server** for team based directory services, building forums and workspaces, assigning roles, notification delivery through e-mail, and collaborative workflow services (interpersonal and team based workflow intensive—for example, approval services).
- **Microsoft Exchange Server or Microsoft SQL Server™** as a database with information about people skills (in order to locate the relevant SMEs).
- **Microsoft Internet Information Services with Active Server Pages (ASP)** to access people-skills databases.
- **Microsoft Visual Studio** for development of easy access to directory, forums, and people skills data, enabling the finding of people who are experts in a specific subject.
- **Microsoft Site Server Membership Services, Microsoft Site Server Knowledge Manager and Microsoft Site Server Search, Microsoft Site Server Direct Mailer** for building communities, subscribing to knowledge briefs, and notification.

Scenario and Technology Recommendations

Build Forums for Communities. Allow for the flexibility to add Forums dynamically on demand. Use moderated Forums to allow for filtering and control of content by SMEs.

- Build Microsoft Exchange 5.5 and Public Folders for Forums and assign moderators to the Public Folders.
- Use Microsoft Exchange Outlook Web Access for Accessing Forums over HTTP or build Forum Webs with Microsoft Visual InterDev 6.0, the Microsoft Exchange DTC and CDO to access Forum data in Exchange Public Folders
- Use the Exchange Directory and ASP pages build a subscribing mechanism to Forums. Build notification services based on Exchange Distribution Lists for each Forum. In subscribing for notifications an Exchange Contact is generated and added to the Forums Distribution List.
- Use Microsoft Site Server 3.0 Search to provide Full Text Search on the Forums.

Optional:

A different concept is building Communities based on Microsoft Site Server 3.0 Knowledge Manager and Shared Briefs. Each Shared Brief is a collection of Knowledge Assets based on Microsoft Site Server 3.0 Search Catalogs. The Knowledge Briefs are defined by giving roles to specific people (SMEs). Microsoft Site Server 3.0 Membership Directory is used to build communities. Together with Microsoft Site Server Direct Mailer and Internet Information Server SMTP Service notification services are built for each Community.

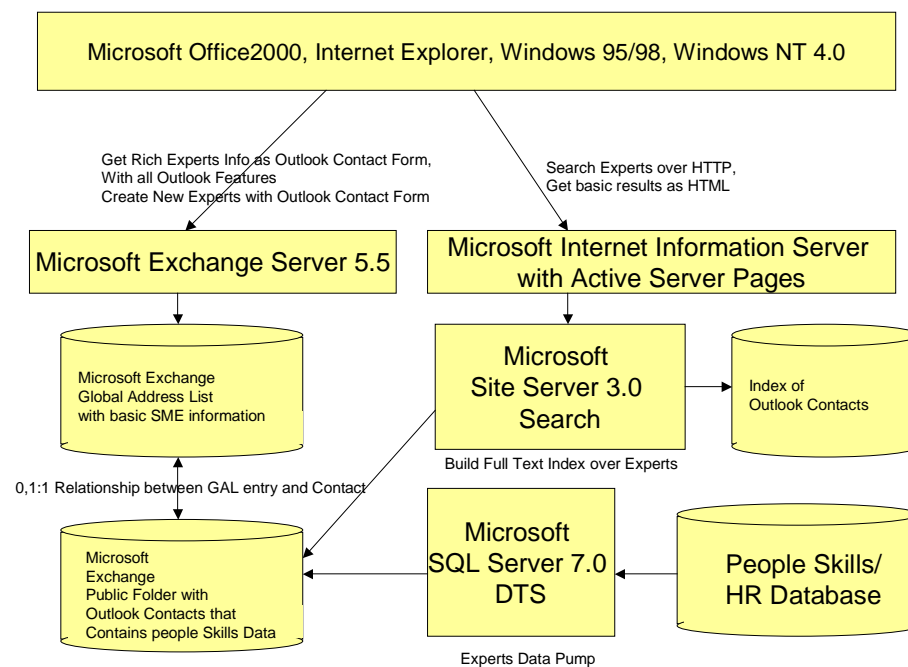
Build Teams and Team Workspaces. Assign Roles to Team Members to manage the Workspace and its Knowledge Assets.

- Test if an Outlook Team Folder Application Template exists that match the needs of the Team Workspace.
- Use Microsoft Exchange Public Folders for Team Workspaces. Use Exchange Distribution Lists for defining Teams. Add Roles to Members in the Distribution Lists on the Exchange Public Folder.
- Define a useful Public Folder Team structure with subfolders like Team-Tasks/Calendar/Contacts and create Views on Exchange Public Folder to get important data first.
- Use Outlook 2000 Public Folder Homepages for each Team Workspace to link knowledge assets like people and applications for the team with contents in Exchange Public Folders (for example, display the SMEs for the Team matters on the Public Folder Home page).
- Use rich Controls like the Outlook 2000 View Control in the folder home pages to display Team data like Calendars and Tasks.
- Use Outlook 2000 Activity Tracking to track Team activities like shared contacts.

Extend directory information from the e-mail system with people skills/HR information.

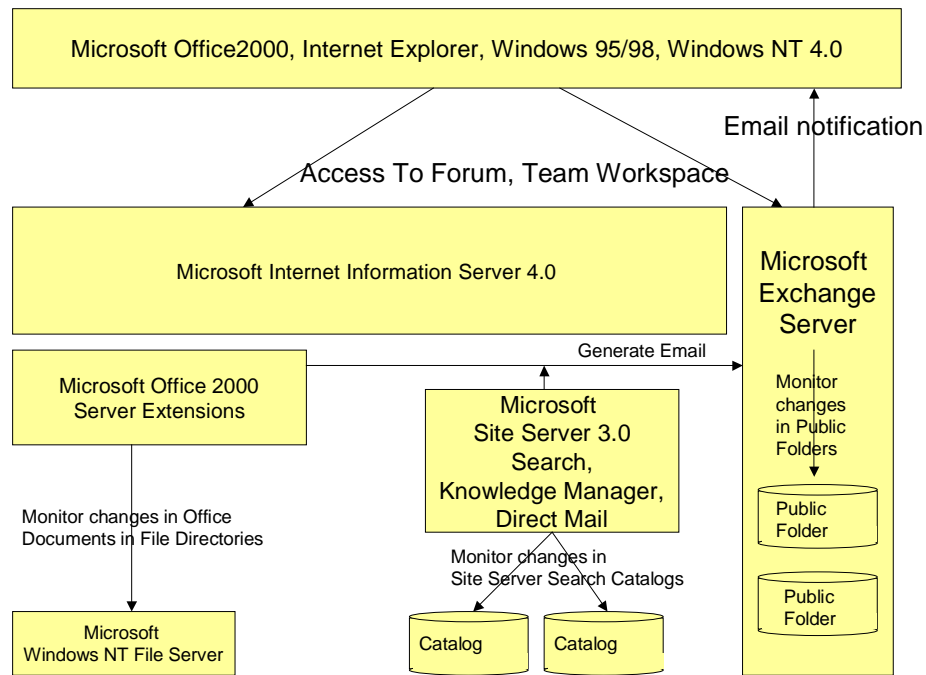
- Use Microsoft Exchange Server, starting to use the Exchange Directory Service extensively to extend the corporate directory with basic information about Subject Matter Experts (SME).
- Extend this information with People Skills data in Exchange Public Folders or if strong relationship exists in these data use a HR database in Microsoft SQL Server.
- Use the SQL Server Data Transformation Services to consolidate existing People Skills and HR Information from relational databases in Microsoft Exchange Public Folders or in Microsoft SQL Server databases to create a single access point for the KM system.
- Make this information searchable with Microsoft Site Server Search (either in Microsoft Exchange Public Folders or in Microsoft SQL Server).

Figure 9: Implementing Experts with Microsoft Exchange and Outlook



Build Notification and Routing Services on the e-mail system. The Messaging directory can be used to define roles for approval and simple workflow processes. Integrate Community information in the workflow processes (reviewing and approving of documents).

Figure 10: Notification Services with Microsoft Technologies



Technology:

- Use Microsoft Exchange Server as the e-mail engine for notifications.
- Use Microsoft Exchange Server Event Scripting and Routing services for approval services. Especially the Microsoft Exchange Event Scripting technology allows great flexibility to include membership information in the automation processes.

Portals and Search

Almost everybody knows Portal Services like Yahoo!, Lycos, Excite, or MSN™ where consumer oriented services allows for easy information shopping. Those Portals categorize personal interests in groups like “News”, “Sports”, “Economy”, “Education”, “Science”, “Entertainment”, and so forth, and allow for easy browsing within those groups in building a logical hierarchy of subgroups or forums (See Communities, Teams, and Experts for forums). Not only the browsing but also Search services support the consumer in the odyssey to gain knowledge out of the biggest information store on earth (the Internet). Another huge benefit of these Consumer Portals is the high customization provided for its visitors. Objects of interest can be included and a fix placed in a personalized Portal, allowing for immediately access when revisiting the portal site.

This technique applied to business-oriented goals is one of the key KM-enabling modules following the same idea of the consumer-oriented portals in the corporate world. Business Portals provide information to knowledge workers within the company, and also to external suppliers and customers, with instantly task-relevant information objects. Goal of such a portal is the transparent enterprise, hiding the complexity to access knowledge over the enterprise information stores with legacy applications.

Examples of Business Portal Information Objects

- Important Corporate and Team links
- Team Applications links
- Incoming Mail Notification and Headers
- Personal Tasks
- Corporate Search
- Integration of Business Intelligence Data

From the examples, some direct organizational tasks can be derived. Teams in the enterprise need these definitions in order to locate information from inside or outside the company that allows them to successfully include links to that information into the portal. The kinds of structured data in Management Information Systems (MIS) and/or Enterprise Resource Planning (ERP) needs to be in the business portal as well as information on how this data has been made accessible and useful (or intelligent) when presented for analyzing.

This Module defines also the creation of Catalogs that build groups of related information based on business needs over structured and unstructured enterprise information (KM information base) to allow for full-text search against the partitioned data. An extension to the Catalogs is the definition of Searches against these Catalogs by SMEs (see Communities, Teams, and Experts) and make these search definitions available.

In order to define the Catalogs for an organization, there has to be a very good understanding of the business and its processes. At this stage, the Knowledge Architect needs the support from the different divisions, business units, and departments that understand how their information is organized and is related to their business goals, tasks, and needs.

Technical Requirements: Portals and Search

- Personalization Systems that allow customizations of the Business Portal.
- Web Browsers with personalization systems have the ability to include Desktop Services like e-mail, Collaboration Data, or Business Intelligence Tools for accessing and rich presentations of MIS/ERP data.
- Web Site Development Suites for building and maintaining the Business Portal pages and sites.
- Catalog and Search services that integrate all kind of information sources (for example, file and Web servers, databases, and document management systems) and crawl-external resources like partner and suppliers sites or the Internet.
- Services to build a Virtual single storage that combines all catalogs for knowledge retrieval.
- Notification Services that react on changes in Catalogs and integrates with the e-mail system.
- Database replication and transformation services that help pull information from different data sources into the search system.

Optional:

Another way to achieve proactive knowledge delivery in Portals is through channel technology. The concept of KM channels is comparable to cable TV channels. The knowledge worker can subscribe to a channel (or get an automatic subscription based on the interest group he belongs to – see Communities, Teams, and Experts) that is implemented within an area on the KM portal. This area is updated each time the channel-related information changes in the KM system.

Further development of this technology is questionable, which may dissuade some users from channel technology. To determine if your KM solution should include channels, you may consider putting the channel technology through a user-acceptance test phase.

Microsoft KM Components for Portals and Search

- **Microsoft Site Server 3.0 Personalization Services**
for personalizing the KM Portal.
- **Microsoft Site Server 3.0 Search**
to build catalogs that contain a document index, and to integrate data sources like file and Web servers, Microsoft Exchange Stores, databases, and information captured by crawling Internet sites, for a full text retrieval system.
- **Microsoft Site Server 3.0 Knowledge Manager**
to build Shared Knowledge Briefs (Searches against Site Server 3.0 Catalogs) and make them accessible on the KM Portal.
- **Microsoft Exchange Server 5.5**
for e-mail notification services.
- **Microsoft Office 2000 Web Components and Outlook 2000 View Control**
for building rich Portal Services presenting dynamic data.
- **Microsoft Internet Explorer 5.0 and Dynamic HTML (DHTML)**
to build sophisticated portal interfaces in hosting rich controls and interactions with the knowledge workers.
- **Microsoft FrontPage 2000 and Visual InterDev 6.0**
to develop and maintain rich portals with components and customize Search based on catalogs.
- **Microsoft SQL Server 7.0 with Data Transformation Services (DTS)**
for building a central repository for information related to specific business tasks.

Optional:

- **Microsoft Site Server 3.0 Push**
for implementing KM channels.

Recommendations: Catalog and Search Technologies

Figure 11: Example of a KM Search System with Microsoft Technologies

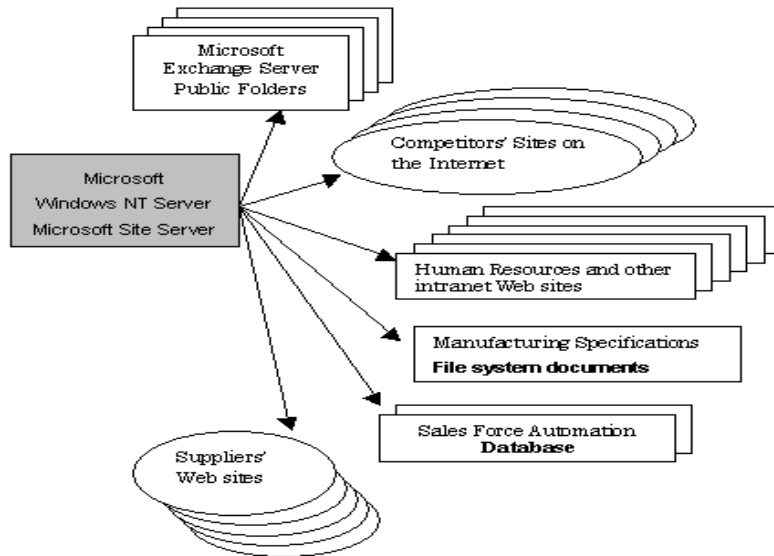
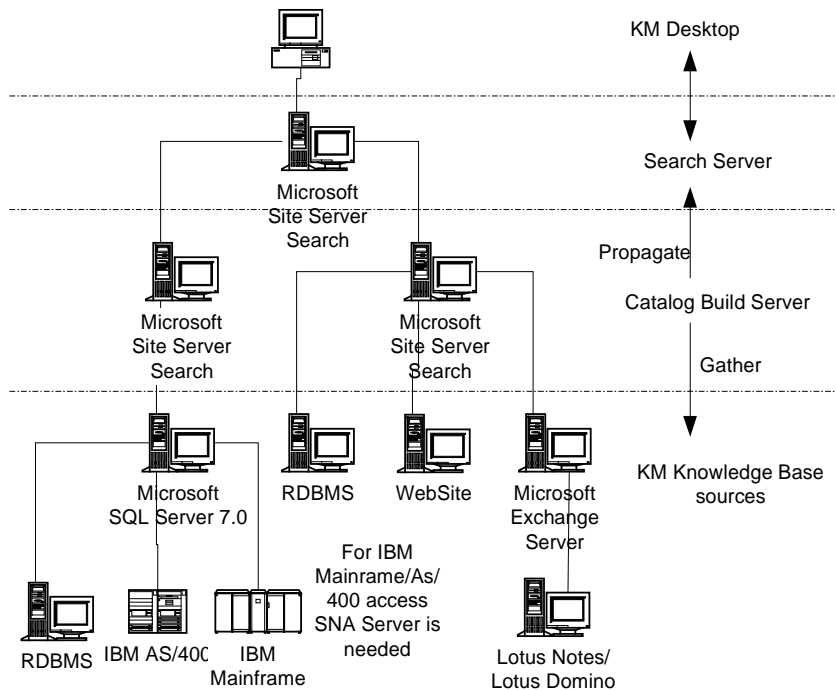


Figure 12: Integrating Information Sources into the KM Knowledge Base



An important quality of a KM-enabled search system is that it allows an integrated search of all information sources, but the results are collated and sorted together. A good practice is to build a central Search server that is responsible for delivering the results to the KM system users who get their information (catalogs) from Catalog Building servers. Only these Catalog Building Servers gather the information from the KM knowledge base sources, build the catalogs, and propagate these to the Search servers.

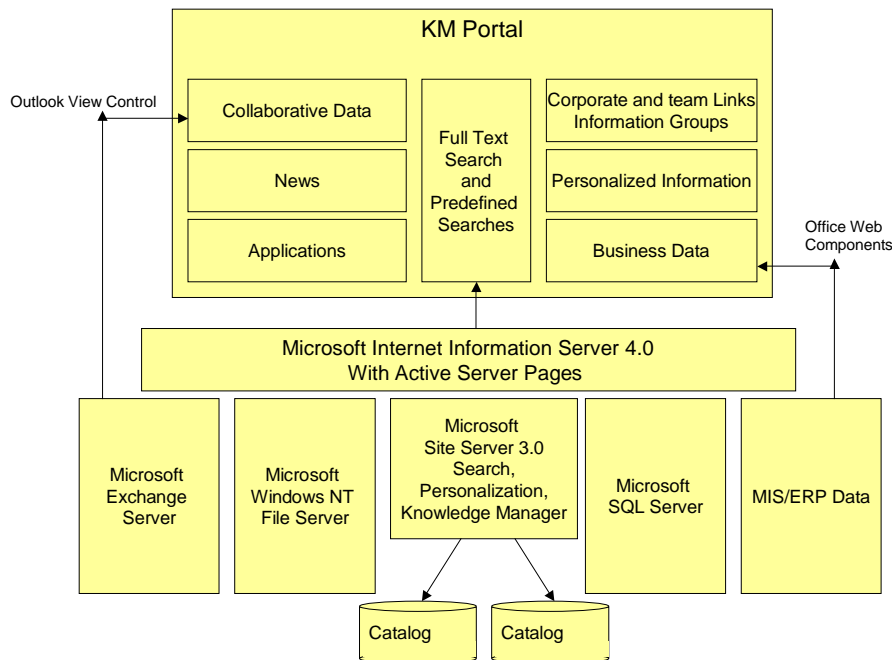
For more information on the Search Scenario, see also the Microsoft TechNet article: "Implementing Search in the Enterprise—Large and Small"

Define each Content Catalog well. This will increase usability of the Search functionality in the KM system.

- Too many catalogs will make it difficult to find related knowledge assets later (disjoint result sets). Too few catalogs will result in too generalized content, and make it hard to get an exact result set.
- Building a central data repository (consolidate databases) is preferable to maintaining multiple catalogs in the Search topology. This will simplify the KM search infrastructure and management.
- Include collaboration Data in Microsoft Exchange Public Folders (for example, Bulletin Boards, Forums, and Discussion Databases) and MIS/ERP data in the Catalogs.
- Use Microsoft Lotus Notes Application Connector to replicate Lotus Notes/Lotus Domino databases and applications in Exchange Public Folders and applications. The Application Connector provides bi-directional replication, which allows the sharing of discussion and other databases. The information in the Public Folders can then be indexed and searched with Microsoft Site Server Search.
- Use Microsoft SQL Server Data Transformation Services (DTS) to consolidate MIS/ERP data and legacy databases that need to be included in the virtual storage of the KM system.

Recommendations: Portals

Figure 13: Integrating Information Sources into the KM Portals



Use the E-Mail Client as the KM Portal

As the e-mail client is the focus of information sharing and is typically one of the first applications a knowledge worker uses in the daily business, use it for hosting the portal pages.

- Use the Microsoft Outlook 2000 “Outlook Today” feature for the portal service and integration with personal productivity data. The Outlook 2000 View Control provides great flexibility in integrating collaborative data into the Outlook Today Portal page.
- Make the Microsoft Outlook 2000 “Outlook Today” feature the start page for all users, to guide them to the appropriate knowledge assets depending on their business unit, information, needs, and interests.

Include Business Intelligence Data in the KM Portal

Speeding up the decision process as one goal of KM in places important Business Intelligence (BI) data on the portal and allows for dynamically viewing of decision-making data.

- Use Microsoft Office 2000 Web Components like the Microsoft Excel 2000 PivotTable™ Component or Microsoft Access 2000 Data Access Pages to put BI data on the KM portal.

Make the KM Portal Customizable

This will allow the knowledge workers to optimize the organization of their KM desktop, thereby applying the knowledge resources they need most and getting results.

- Use Microsoft Site Server 3.0 Personalization System and its Active User Object to make the KM portal customizable. Use Microsoft SQL Server 7.0 for the Personalization Directory.
- Use the Personalization DTC in Microsoft Visual InterDev 6.0 to support the development of customizable portals.

Content Management

Portals and Search addresses the problem of searching knowledge using all information sources in the enterprise: structured and unstructured internal information objects like office documents, collaborative data, MIS and ERP systems, experts, and information from outside sources such as partners, suppliers, and competitors. External sources, and in particular the Internet, provide a tremendous potential for knowledge if the criteria for including such information are well chosen. All the pools of information sources that are part of, and accessible to, the KM system combine to build the KM information base.

This Module handles how knowledge assets get into the KM information base. To handle this new complexity of the KM information base and help the knowledge workers to stay focused on solving business problems (without disappearing in technology), a sophisticated KM taxonomy needs to be built based on Metadata. It also needs to publish information in the knowledge base, for example categories and attributes. The KM information base must then be made accessible through operations driven by the Metadata complex.

In the publishing process several things should be considered concerning the KM taxonomy. Although metadata-tagging documents is important for the quality of content in the stage of document publishing, it is a burden for people to submit information if tagging the metadata is a complex or time-consuming process. One of the basic conditions mentioned at the beginning of this roadmap was that a KM system must encourage users to submit information. Positive aspects for promoting this condition are the building of well-focused Communities (see Communities, Teams, and Experts), so users feel part of and respected in a concentrated team and don't lose their inclination or motivation to submit. Building huge submission and posting systems where users don't get recognized or rewarded will discourage them from providing their knowledge, which therefore prevents the company from evolving a culture for knowledge management.

Content Management: Required Metadata-based Operations

- Listing and browsing
- Sorting
- Grouping
- Filtering
- Searching
- Publishing of information to the KM information base

Finding the right Metadata—an essential for successful information management—is a challenging process for the KA as:

- Too much Metadata will add high complexity to the system, lowering the overall effectiveness, as it becomes difficult to search, browse, and publish accurately.
- Too few Metadata will lead only to rough partitions that bring about fuzzy information results.

As discussed earlier, the publishing process of new knowledge information is critical for maximizing the quality and usefulness of the KM information base. The knowledge workers need an easy process to classify knowledge assets based on the defined Metadata. SMEs (see Communities, Teams, and Experts) can be leveraged to support this quality securing process and are of great importance to this Module. Their task is the final classification, filtering, and approval of the published knowledge assets. One solution is to provide pre-tagging features for all users in a review and approval and also process additional tags that are supplemented by the SMEs.

Many of the functionalities required for this Module are implemented today in Document Management Systems. Most of these integrate into Microsoft BackOffice® and should be taken in consideration when building Content management solutions.

In the Microsoft environment there are several options for implementing Content Management Stores, which are essentially partitions of related information, especially for documents. In the Microsoft Site Server 3.0 scenario, Content Stores are implemented with the Microsoft Windows NT Server file system.

Document Content Stores

- Microsoft Windows NT File System
- Microsoft Exchange
- Microsoft SQL Server

Using the available technologies, the following KM functionalities can be implemented as shown in Figure 16, which also summarizes the criteria used when deciding on the appropriate content store for a specific solution.

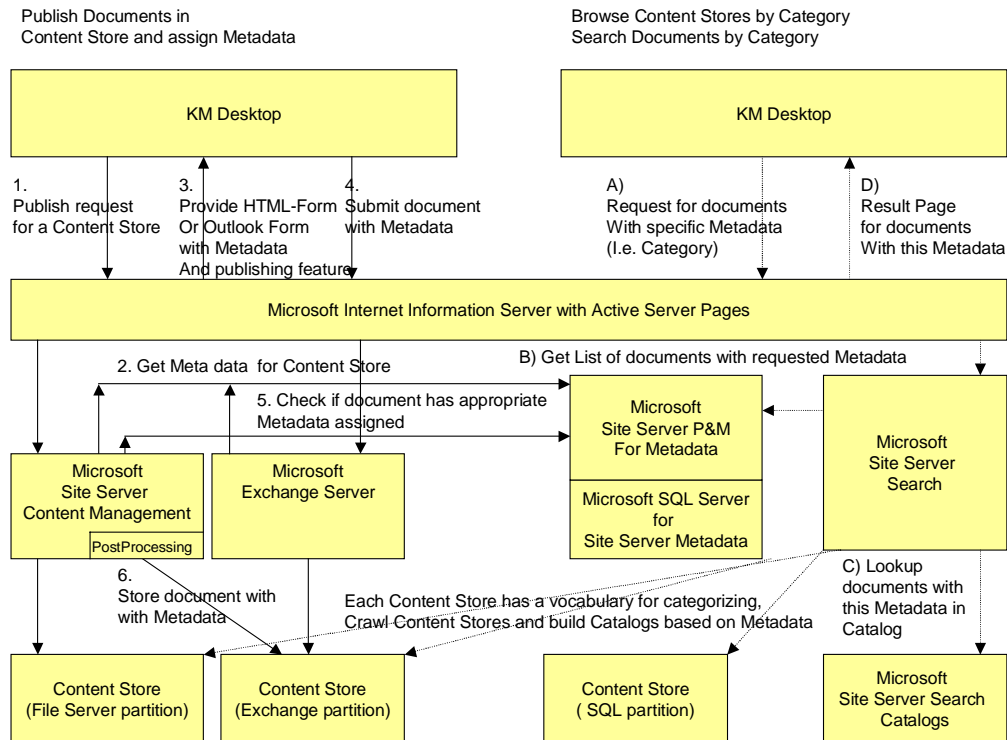
Figure 14: Microsoft Content Store Technologies

	Publishing based on Metadata	Rich Views based Metadata	Subscription and Notification Services	Approval and Workflow Processes	Check In/Check Out Mechanism	Versioning Mechanism
File System with Site Server 3.0	Strong	Weak	Medium	Weak	None	None
	Site Server Content management	Site Server P&M and Knowledge Manager	Site Server Knowledge Manager	Site Server Content management	NA	NA
Exchange Server 5.5	Strong	Awesome	Strong	Medium	Medium	Weak
	Outlook or HTML Forms	Build in views, sorting, grouping, filtering	Out-Of-The box features like Public Folder rules. List server functionalities. Or Integration with Site Server Search and Knowledge Manager	Collaborative Workflow processes Out-Of-The box Moderated Folders. Development: Event Scripting for Approval Services. Routing Objects for role based Workflow	Possible without big development work 3 rd party solutions	Possible, but development necessary 3 rd party solutions
SQL Server7.0	Weak	Strong	Strong	Awesome	Medium	Weak
	To Develop: Application for implementing Hybrid Model (Metadata in SQL Server and Documents in File System) 3 rd Party solutions	To Develop: Dependent on Database design and Application development 3 rd Party solutions	To Develop: Stored Procedures and Exchange integration for Notification services Application for Subscriptions based on SQL tables Or Integration with Site Server Search and Knowledge Manager	To Develop: Great for transaction oriented work item processing. Most flexible for organizational related workflow solutions, but need intensive development work 3 rd Party solutions	To Develop: Application Development 3 rd Party solutions	To Develop: 3 rd Party solutions

For more information about how to manage the documents see the white paper, "The Microsoft Infrastructure for Document Systems" on Microsoft document management site <http://www.microsoft.com/industry/docman/> (exact address: <http://www.microsoft.com/industry/docman/developers/whitepapers/whitepaper.stm>)

Integrating Metadata into the Microsoft Scenario

Figure 15: Building a KM Vocabulary Based on Categories and Attributes



All Metadata is defined in the Site Server Personalization Directory. In order to establish a publishing process, Content Stores are defined in Site Server, and then the created metadata is assigned to a specific Content Store.

Microsoft Site Server 3.0 can automatically create HTML Forms with Metadata list boxes for uploading documents to Content Store and can also include the Metadata in the publishing process. These HTML Forms can be customized with Microsoft FrontPage 2000 or Microsoft Visual InterDev 6.0. Microsoft Site Server 3.0 supports the creation of Content Stores for the Windows NT file system only.

Through the use of Microsoft Exchange as a Content Store, Outlook Forms or HTML Forms can be created with MAPI-properties as Metadata and the document can then be treated as an attachment to the Form. The Exchange Mesa DB Lookup Control can be used to dynamically populate metadata properties on Outlook Forms.

This scenario can also use the Post-Processing feature of Microsoft Site Server 3.0 Publish to create an Outlook Form out of an ASP page with CDO, assign all Metadata as MAPI properties, and attach the published document to that Outlook Form.

Analyzing Your KM Information Base

One of the challenges of a KM system is to understand how the users of the KM system interact with the KM information base. The regular analyzing of usage and content to ensure that the KM system fulfills its purpose and is up to date is essential for the success of a KM system. Unused or useless documents or other information (for example, based on value scores from readers) should be removed by garbage collection services from the KM information base.

Content that is not valuable to users needs to be identified, and important content that has great value can be presented in content hit lists on the KM portal site, or distributed through notification services in e-mail.

An interesting extension is the creation of a hit list that is person-related. With a specific document, important people (people who are known to be SMEs) that have read this document are displayed. Linked to every listed SME is another list that consist of additional documents those SMEs have read to become experts.

A second variation is the possibility for everybody to review and submit comments (or vote how valuable this information was for them) to documents. This list can be shown to an extension of the list of professionals (well-known SMEs) who made comments (for example "what other people think about that document").

Microsoft Site Server Analysis is the tool within the Microsoft Site Server that supports this task. It has several tools to analyze the usage of the KM site, including who visits the KM system, where the users go, how long they stay, and so forth. Additionally, Site Server's analysis tools find broken links or outdated content. Microsoft Site Server has also a voting component that can be used for implementing rating systems in the KM system.

Scenario and Technology Recommendations

Define each Content Class and its associated Metadata well.

This will increase usability of the Publishing and Search functionality of your KM system.

- Too many content classes will lead to publishing documents under different content stores even when they are related, and make it difficult to find them later (disjoint result sets). Too few content classes will result in too generalized content, and make it hard to get an exact result set.
- The more precisely the Metadata is defined, the easier it is to find information based on different criteria. This is especially important as a subject matter expert might search and browse for the same data using different keywords from a beginner.

Define a publishing strategy for documents and integrate it into the KM system.

Ensure that, during the publishing process, users can tag the documents on publishing process according to the defined Metadata.

- If Documents reside in Microsoft Exchange Server Public Folders, create Outlook or HTML Forms and treat the document as attachment. Think of storing the metadata in Special Public Folders and the usage of the Mesa DB Lookup Control to populate the metadata properties in the forms.
- If Documents reside in File System-based content stores use Microsoft Site Server Content Management features. Use Microsoft Site Server 3.0 P&M as a Metadata directory and Microsoft SQL Server 7.0 as the storage for the Metadata. Use Microsoft Site Server Publishing Services and Knowledge Manager for creating publishing Forms and Post Processes for documents.

Use XML as Markup Language

for assigning Metadata to describe and deliver rich, structured data to the KM information base and applications.

- **Microsoft Office 2000, FrontPage, Visual InterDev and XML Notepad**
to create XML-based documents and data, or extend existing documents with XML tags.
- **Microsoft Internet Explorer 5.0 and XML parser**
to process XML-based data.
- **Microsoft Site Server 3.0 Tag Tool**
to apply tags to HTML documents to categorize them. Site Server Search will use these tags to gather and catalog these documents.

Integrate Analyze Services in the KM system

This helps to keep useful data in the KM information base. Use this data also to personalize the KM portal sites.

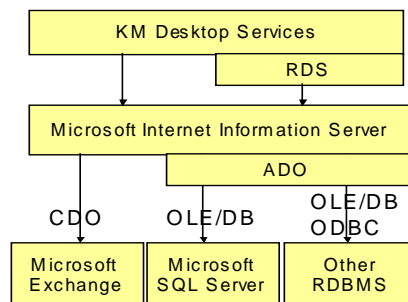
- **Microsoft Site Server 3.0 Analysis**
for analyzing both the usage and content of the KM system.
- **Microsoft Site Server 3.0 Voting Components**
to track the quality of the KM information

Integrate Knowledge in Line of Business Data (LOB)

to maximize information completeness of the Content Stores in the KM system.

- Microsoft SQL Server 7.0 with Data Transformation Services (DTS) for building a consolidated content store of legacy databases (see Portals and Search).
- If it is not practicable to consolidate data using RDMS systems, use Microsoft Data Access Components and intranet technologies to integrate these dynamic data sources.
- ActiveX[®] Data Objects (ADO) as a programming interface for consistent, high-performance access to data. ADO is the single data interface for 1-to-n-tier client/server and Web-based data-driven solution development.
- Prefer OLE DB as a data access provider to RDMS and legacy databases.
- Use Remote Data Services (RDS) as client-side services to develop data-centric applications within ActiveX-enabled browsers. RDS brings the advantages of client-side caching of data results, updateable data, and support for data-aware ActiveX controls.
- Use Collaborative Data Objects (CDO) for access to Microsoft Exchange Folders and for e-mail functionality. Choose CDO over the Messaging API (MAPI) whenever possible, as this is the strategic API for accessing Microsoft Exchange data.

Figure 16: Microsoft Data Access Technologies



For more information about Microsoft Universal Data Access strategy see <http://www.microsoft.com/data>

Real-Time Collaboration

In Stage One, the knowledge on a specific subject is often not in documented form, and is therefore lost to the organization. Scenario Five shows some ways of getting the lost knowledge back into a state where an IT system can manage it. This especially focuses on areas where computers can be used to exchange thoughts, documents, and other aids for capturing this tacit knowledge for the KM information base.

The process of capturing tacit knowledge can start with the introduction of simple computer-based chat services. Regular meetings arranged with expert groups to talk about specific topics can be extended with these services, well known from the Internet and enriched by building automatic transcripts for the chat sessions. Transcripts can be easily enriched with the corporate KM Metadata and stored in the KM information base for later search and retrieval.

More complex services like video conferencing follow the same concept. The video stream is recorded on video equipment and later transferred to the KM system. Descriptions and Metadata are either merged with this video stream, or can be parallel-stored on a file or database. For cultures where such virtual meetings are common, an event database is typically built where upcoming and past meetings are stored, together with event titles and descriptions. They are listed or searchable by subject matter (or, of course, by using the Metadata), and a hyperlink is provided so that users may join a virtual meeting. If the meeting takes place in the future, integration into the e-mail system ensures that this event is marked in the calendar, and on the event date a reminder automatically guides the participant to the virtual meeting. After the event or meeting, on-demand services will make that knowledge available, by providing the recorded video out of the KM information base to the KM desktop.

When integrating this technology into the automated KM services scenario, notifications are sent automatically to the appropriate knowledge workers to remind them of an interesting meeting or event. The appropriate URLs can also be listed on the KM portal.

An interesting hybrid of both technologies above (chat and video services) is the integration of presentation techniques. In that case, an online presentation that consists of slides is sent over the network. The audience receives the video, audio, and slides of the presentation on the KM desktop. The chat service is integrated as a separate area on the KM desktop, and enables the audience to type questions during the meeting into the chat area. These questions are transferred to the presenter or a person controlling the online presentation. On receiving the questions, the presenter can answer them during or at the end of the event. All three sources — the slides as a document, the chat as a transcript document, and the audio and video as a stream — are linked together and stored in the KM system.

The same technologies not only make virtual events available for the KM information base, but also real events like conferences. Each session on a conference can be recorded and then be made available for all employees in the events system on the corporate net. Another solution is to produce CDs of the sessions and distribute them to all subsidiaries or make them orderable for interested employees.

Real-Time Collaboration KM also provides support for sharing the creating process, making it possible for knowledge workers separated by distance to share a single virtual working space and work together on the creation of documents. This includes not only the sharing of the creation process using the productivity suite, but also white board functionalities. This kind of technology is also called screen sharing.

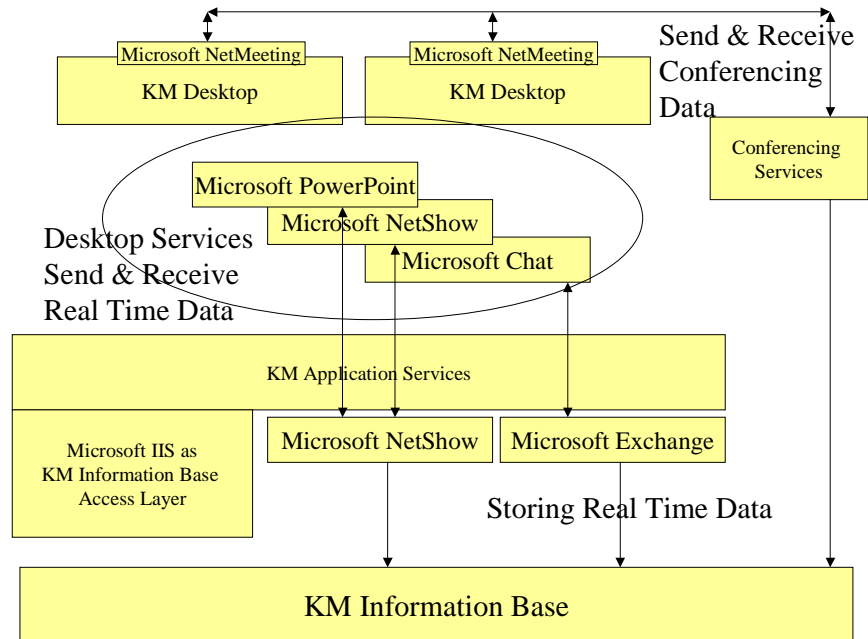
KM Technologies for Real Time and Multimedia Content

- Chat services with transcript functionality for distance discussions.
- Video conferencing for virtual meetings.
- Screen Sharing services for sharing of the document creation process, virtual white boards, and application sharing.
- Streaming media services for recording virtual meetings and video (meeting) on demand services.
- Event and meeting databases for organizing the virtual event center.

Integrating Microsoft Technologies in Real-Time KM Solutions

- **Microsoft Exchange Server Chat Services**
for chat services and transcripts.
- **Microsoft PowerPoint®**
for presentation broadcasts.
- **Microsoft NetMeeting®**
for video conferencing, document, and application services and whiteboard functionality.
- **Microsoft Windows Media Player**
for accessing all kind of audio and video streams.
- **Microsoft NetShow™ Server and NetShow Content Editing Tools**
for recording, broad- and multicasting of online events, and tools for tagging the content with Metadata for linking it to the KM information base.
- **Microsoft Outlook 2000**
for integration with the NetMeeting conferencing software and Microsoft NetShow Services.
- **Microsoft SQL Server**
for building the events database.

Figure 17: Microsoft Technologies in Real-Time Collaboration KM Systems



For more information about Streaming Media Services see the “NetShow Services Server Planning and Deployment Guide” on the Microsoft Web site.
<http://www.microsoft.com/ntserver/mediaserv/deployment/planning/deployguides.asp>

For more information about Conferencing Services see the Microsoft NetMeeting home page.
<http://www.microsoft.com/netmeeting>

Summary: Enterprise Knowledge Management

Based on the KM-Enabling Modules described in this document, a KM system can be defined as a special kind of an IT system that includes services for

- Collaborating
- Storing
- Organizing
- Distributing
- Retrieving

The right information for/to the right people, using familiar business tools.

The challenge for an enterprise company is to build upon these services a comprehensive KM infrastructure that can be managed so that it continues to reflect the needs of the enterprise. It includes the ability to make information and services accessible from all organizations, divisions, business units, and departments in that company. Chief Knowledge Officers or Knowledge Architects have a major role to play in the way KM is built, located, and related.

Enterprise KM Challenges

- **Complete Integration of Knowledge**
How Knowledge is built, located, and related to maximize the spectrum of the KM system (make knowledge and services from all units within the enterprise accessible)
- **Technical Integration**
Where are the infrastructures that need to be included into the enterprise KM system
- **Central Manageability**
What technologies are used for KM in the enterprise and where are the connection or integration points to make the KM system manageable for a central IT

Building an Enterprise KM System

After the identification of the KM services that need to be implemented to improve specific business processes, the technology necessary to support these goals is evaluated.

This can be a complex procedure and a summary of system or infrastructure requirements, measured against the services the KM system should provide, and will help to scope the project appropriately. Figures 2 and 3 show one example of how to develop such a summary by looking at the evolving technology and KM services from two principle perspectives:

- Graph of evolving technology and KM over time.**
 This can be built from a feature list that provides functionalities that need to be added over time to improve the services of a KM system.
- Graph of technology and its effectiveness.**
 This will show at a high level how a specific technology that will be added to the KM system will improve its effectiveness for its users.

The two graphs help to determine what level of technology and infrastructure need to be implemented, and the outcomes to be expected from this approach.

Figure 18: Graph of Evolving Technology and KM Over Time

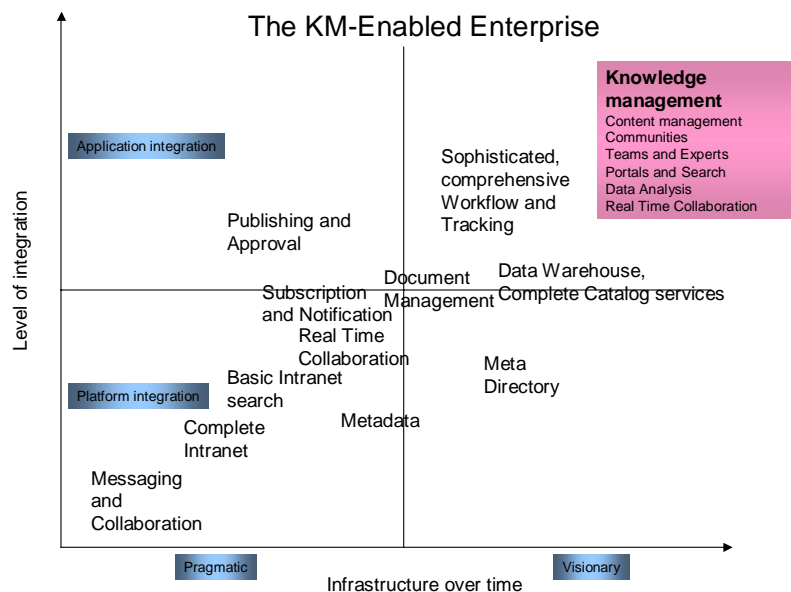
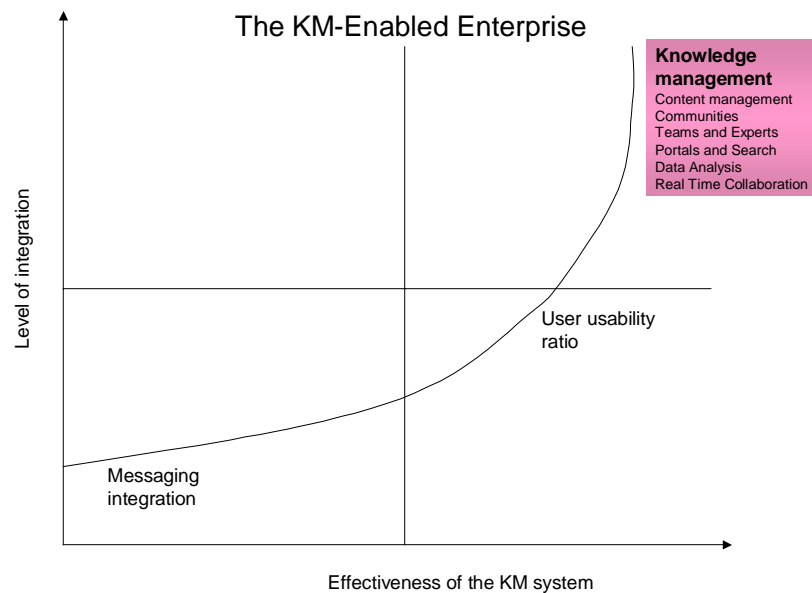


Figure 19: Graph of Technology and its Effectiveness



One way to tackle the enterprise KM challenge is a bottom-up approach with building intranets or departmental solutions. In this approach small pilots are built that implement some functionalities of the KM-Enabling Modules. These pilots should be locally controlled and should include the information needs of a specific department that's not widely scattered throughout the enterprise, to keep the pilots of manageable size.

With the start of the pilots, the big picture should never be lost when combining all KM or information fragments together into one enterprise KM system. Choose the right technologies and vendors that are able to deliver a both sophisticated solution in itself, and also able to deliver the interfaces and scalability an organization needs to bind its existing and new information infrastructure and services together.

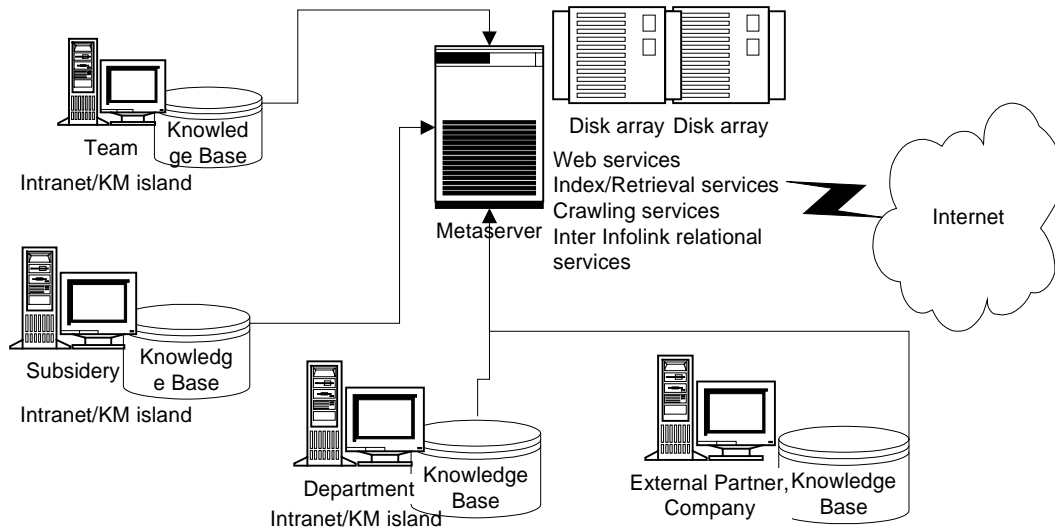
After the successful deployment of the KM pilots, the implementation of the central junction point of all KM pieces should be started as a proof of concept. This central KM hub must succeed in integrating the just-built pilot systems. It is the first step in extending the information infrastructure to a centralized controllable KM system.

An enterprise KM system builds on the back end an equivalent to the KM portal for the user. As the KM portal concentrates all information that is of value to a specific knowledge worker, the central KM backbone will concentrate all information that is of value to the whole enterprise. After all KM islands are built and integrated this will be the entry point for all enterprise-related information. In terms of KM, this central KM hub or KM backbone is also called a "Metaserver".

Scenario Recommendations

- Start small, think big
- Proof of concept
- Educate users and partners to live KM

Figure 20: Enterprise KM system System Architecture



Requirements for an Enterprise KM System

- A CKO or Knowledge Architect who is responsible for the political, strategic, and technical implementation of KM in the enterprise.
- Culture for technology usage is set up (Electronic Publishing, Collaboration, Virtual meetings, and so forth).
- All KM Islands are well connected (intranets or departmental solutions).
- Collaborative processes are established (Workflow, Approval, Information tracking).
- Enterprise KM Information Base is multi-hyperlinked.
- Processes are running to keep the Enterprise KM Information Base healthy.

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- Microsoft NetShow Provides Key Intranet Solutions.
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