# IBM's Intranet Offerings: Pathways to New Heights

Businesses are establishing intranets, internal corporate networks built on Web protocols, at a phenomenal rate. According to Forrester Research, 16% of the Fortune 1000 have intranets and another 50% are either in the consideration or planning stage[1]. As companies build intranets for improving internal communication, streamlining processes such as purchasing, and simplifying transaction processing, they are finding multiple sources of business value. They are reducing communication costs, increasing productivity and sales, as well as significantly improving work quality.

Intranets have enormous potential. Today businesses are only scratching the surface of a wellspring of possibilities. Intranets allow companies to reengineer processes as well as expand their business because of improved communications and greater productivity. Knight Ridder SourceOne quickly delivers documents—some rare and obscure—from internal digital and hard copy libraries, as well as from prestigious affiliated institutions around the world. Leveraging intranet technology, KR SourceOne yielded impressive gains in efficiency and customer satisfaction. Some companies such as Mason and Hanger, an engineering contracting company, are prototyping intranets for decision support systems.

Companies may be tempted to jump on the bandwagon using the fastest means possible. This tact may meet basic requirements, but it often does not take into account future network growth, the advantages gained by leveraging existing data, nor how to add new intranet-enhancing products as they become available. These considerations demand that intranets be flexible, open and integrated. And, any time a company makes information accessible to a wide group of people or extends an intranet to suppliers or vendors, it must establish appropriate security mechanisms, ranging from firewalls to access control to encryption.

IBM has been working with hundreds of customers worldwide who want to reap the rewards that intranet technology can bring. IBM has the experience along with the depth and breadth of skills to guide companies through these issues to quickly and easily get an intranet up and running. After all we've been managing and connecting complex enterprise computing environments for over two decades! IBM creates new value for your business on the Internet using a security-rich, integrated approach. Our complete line of security products and technologies enables IBM intranets to handle mission-critical data and tasks. IBM solutions are open and flexible, and IBM products can scale from the smallest departmental intranet to complex networks connecting worldwide enterprises.

This paper is a summary of IBM customer studies on business intranet uses and requirements. It describes our approach to developing intranets that enable business enhancement and growth. It covers the different uses of intranets and defines common paths that customers follow in adopting this technology. It explains IBM offerings in the intranet market. Finally, it suggests the actions customers need to take to start benefiting from the application of this wealth of internet technology.

[1] Forrester, "The Full Service Intranet", 3/96.

## Intranet Innovation: Breaking New Ground

Our research indicates that one out of every three companies is pursuing a strategy of revolutionary, as opposed to evolutionary, change. The business environment has become so competitive and customer expectations so high that it's a rare company that excels by doing business as they have always done it. The competitive nature of business has led today's customers to expect the highest quality at the lowest cost with impeccable service. Traditionally, most companies emphasized only one of the areas of quality, cost or service. To thrive today, it's imperative that they be strong in all three.

An IBM study of hundreds of senior functional and information technology executives found when companies don't take advantage of breakthrough advances, they limit their ability to keep up with their competitors who do leverage technology. This yields a business cultural imperative of change or die. Subjects of the study indicated that to get the most out of the change, it needs to be fast, at least as fast as competitors, and much deeper than cosmetic adjustments. It must be a fundamental transformation in the way a business operates to accomplish new ways to deliver value. Although change can be disruptive and inertia often makes it hard to start, those that overcome the hurdles gain a lot. Change leaders can set the standards and establish the new rules in their industry.

IBM understands the nature of this transformation not only as a supplier to businesses around the globe, but also through its own experience in the marketplace and its internal alterations in recent years. So even though IBM's business is computing and networking, we know that our customers are using technology products as tools. Customers buy our products and services as a means to achieving their business goals, as a means to increased effectiveness.

Recently, the Internet and intranets have served as the impetus to positive change and new value. They have laid the groundwork for a surge of business transformations transcending industry, geography or size. Companies are fundamentally interested in intranets for enabling, enhancing, and extending effective communications within and among organizational communities of interest. There can be mutual benefits derived from intranetworking between synergistic businesses. Intranets have also allowed companies to enter new areas in their industry and expand elements within their businesses. Internet technology employed in intranets can be the base that a business uses to reinvent their entire operation.

This volatile but fertile business environment is the backdrop for IBM's intranet strategy. Every offering serves as a means to optimize, expand, or transform new channels of business value. This translates into businesses successfully reengineering, broadening their scope, adding new areas of competence, and enhancing the way people communicate with one another. The key to achieving any of these goals is getting the right information to the people who can use it most effectively. Although businesses find, generate and maintain a lot of data, many times the people who need it can't get to it very easily. IBM intranets unleash information, make it available to authorized users, and simplify its maintenance, enhancing the way people use information and share it with others.

## Web-Enabled Business Value

In IBM's recently commissioned international study, several hundred senior functional and information technology executives were asked to share their perspectives and learning on the key business challenges they face and the role of internet and intranet technology in addressing them. The survey indicates that the leading companies are rapidly creating Web applications to address an extremely wide range of objectives: from simply improving and cost-reducing older ways of doing internal business administration, to providing the new IT systems infrastructure for global engineering projects, to creating competitive marketing advantage with whole new customer acquisition and customer servicing approaches and systems. In almost every instance, firms are finding that by using internet technologies they are able to communicate and link information—internally and externally—in ways that often were not possible before.

***Users are adopting Internet technologies across a wide range of needs because they can create solutions that provide effective business benefits.***

| | *"Eliminate"* Class of Problem Situation | *"Create"* Business Benefits |
|---|---|---|
| **Internal Needs** | • Difficult to store/access paper-based files | • Lower operating costs<br>• Facilitated distribution<br>• Greater accessibility on demand |
| | • Cross-platform information interchange problems | • Single standard (TCP/IP)<br>• Lower conversion costs (e.g., PC to Mac) |
| | • Multi-site/cross-functional communications problems | • Standard E-mail/communications<br>• Facilitated information distribution<br>• Greater decision support/collaboration |
| | • Lack of standards for communication with suppliers/vendors/dealers/ business partners | • On demand access to information/ "self-service"<br>• Real time order/inventory tracking<br>• Training |
| | • Time delays in distribution of information to customers | • Lower cost of production/distribution<br>• Greater customer satisfaction/ "self-service" |
| | • Lack of digital, 2-way communications with customers | • Real time--customer service/feedback<br>• Lower customer service costs<br>• New service--disintermediation |
| **External Needs** | • Access or cost problems reaching new markets | • Revenue growth<br>• Expanding market to other geographies<br>• New accounts |

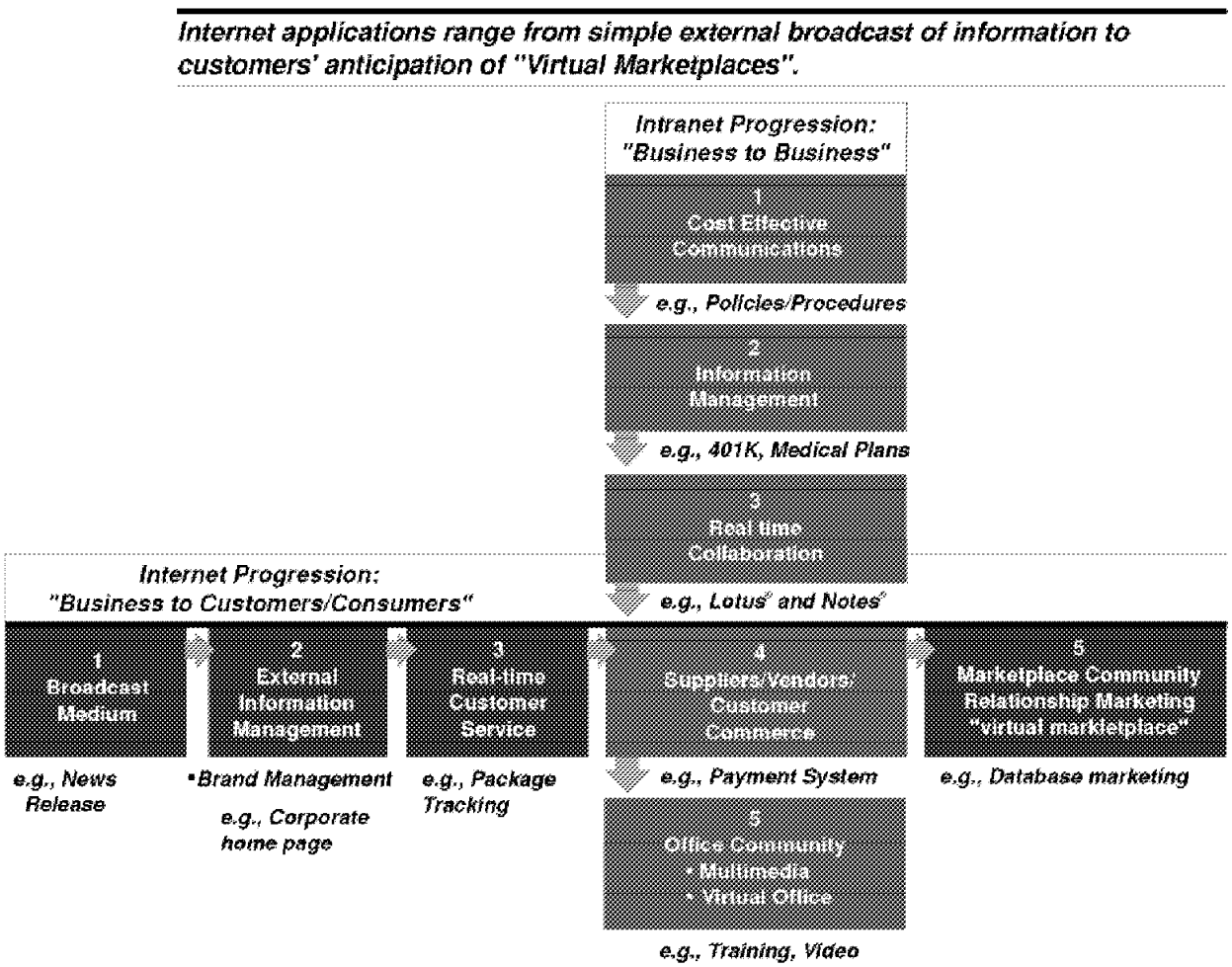
In the wide variety of internet technology-based applications surveyed across the wide range of industries, there is an interesting common pattern. The common pattern is organizations applying Web approaches to change existing business processes or deliverables from the way they were done "pre-Web" to a new or supplemental way of doing them "post-Web." They are using the Internet to create new value for their businesses in ways that were never before possible—we at IBM call this Web-enabled business value.

***A wide range of current business need solutions are evolving into Web enabled, value added, cost-efficient applications.***

| | Function | Pre-Web Applications | Post-Web Solutions |
|---|---|---|---|
| External | • PR/Communications | • News releases | • Web page |
| | • Customer service | • Customer call center/IVR | • Self-service/real time database |
| | • Marketing | • Brochures/calendars | • On demand brochure/ relationship marketing |
| | • Sales | • Presentations/price lists | • On demand sales materials |
| | • Investor Relations | • 10K, Annual Reports | • On demand reports |
| | • HR/Recruiting | • Classified ads | • On demand/interactive applications |
| Internal | • Engineering/R&D | • Publications/research | • "Broadcast" library |
| | • Finance/accounting | • Paper expense reports | • Interactive reports |
| | • Purchasing | • Purchase order entry | • Real-time vendor ordering |
| | • HR | • Employee benefits booklets | • "Broadcast" benefits information booklets |
| | • MIS | • Technical reports | • "Broadcast" reports |
| | • Corporate Management | • Publishing policy/procedures | • On demand policy/procedures |

For internal applications, these users are seeking the benefits of lower overall costs and greater productivity. For external applications, users are also achieving lower costs and greater productivity, plus they are establishing more and better communications and relationships with their customers and their suppliers.

While Internet and intranet applications tend to start differently, many of the leading users see a trend toward merging or interfacing the two. Security issues and concerns are significant, but as secure intranet applications are made accessible to the public Internet and to customers, and as external Internet Web sites are linked to internal intranets and computer applications, there will be less and less distinction between the two.




With Internet and intranet applications both using the same fundamental, open, technology standards, the leading users are planning to expand and extend their systems into new applications such as "virtual marketplaces" and "virtual offices."

## Evolution of Intranet Benefits

Most companies deploy their intranet strategies over a spectrum of time and derive additional benefits with each new phase of adoption. Each phase can profoundly affect the way a company runs its business. While we describe the phases as discrete categories, in reality there is a continuous spectrum involving multiple dimensions of intranet communications, including:

- Nature of the information—how static or dynamic;
- Nature of the exchange—one-to-one (e.g., e-mail); one-to-many (e.g., broadcast); group collaboration; business-to-business;
- Nature of the interaction—browsing, searching, interactively updating, transacting.

These different aspects of communications range from simple exchange between individuals to complex transactions between enterprises using information from multiple disparate sources—and the entire range is included under the "intranet" umbrella. IBM's portfolio of intranet solutions is organized to span this continuum of benefits to serve a wide range of customers who are at different stages of intranet adoption.

## Cost-effective communication

The first benefit customers derive from intranet adoption is more cost-effective communications, a fundamental element of business. If the means of communication are not efficient, communication can be very time consuming and therefore costly. Improving the effectiveness of its communication mechanisms can immediately yield cost savings to a company. Attaining cost-effective communications entails making information directly accessible to people who need it without overwhelming the people who don't. Intranets can mean direct access, so people can easily find the information they need without involving anyone else either for permission or direction on how to navigate through the information. At the same time, companies can keep the information protected from people not entitled to access.

From the perspective of an information supplier, an intranet can extend reach and simplify logistics. For example, it can become quite cumbersome to maintain the distribution list for a typical quarterly status report sent to a large mailing. If information changes before the next report is due, on an intranet the report can be easily updated and posted. Mistakes can quickly be fixed, perhaps without even being noticed.

Publishing information on an intranet is quite simple, especially with offerings from IBM and Lotus described next, such as Domino/Notes, Net.Data and DB2 WWW connection, VisualAge, or the IBM Internet Connection Servers. Net.Action, from Lotus, delivers a dynamic function-rich Web site that can be installed and configured in a Notes environment simply and quickly.

Information maintained in a Lotus Notes database is easily published on the Web with Domino. Domino renders Notes data in HTML format on-the-fly and serves HTML documents from the file system. Domino can also keep the information out of the hands of people who are not authorized to see it with Notes Access Control. Web site designers can easily deliver fine-tuned access control to Web sites and Web documents.

Lotus Notes has made it easier for Motorola's Semiconductor Product Sector to publish all kinds of documents on their intranet. It has been particularly useful for putting complex data models on-line. Not only is Web publishing easier, but users are finding it easy to search for the right document by just using key words.

From the perspective of someone trying to get to information, an intranet can simplify life. It's no longer necessary to ask someone for copies or to be put on a distribution list. There is also more control over what is seen. If the big picture is of interest, then that is all that is sought. However, necessary depth and details in related material can be explored very simply through hypertext links and the intranet's overall structure. Information can be accessed by computer any time. With an intranet, both internal and global information is more readily available and more reliably current. Intranets also allow recipients to respond to information quite simply either through implicit e-mail mechanisms or through forms.

Motorola employees are finding it very fast and simple to register for classes. The class registration data is maintained in a Notes repository that people can access from a Web browser. People can get class information and sign up from an internal Web site. Before this system was in place, people registered for classes over the phone.

Illinois State University's Office of Technical Services within Information Systems facilitates the University's various mainframe computing efforts. They have created an internal Web site using Net.Data, Internet Connection Secure Server, and DB2 to retrieve information stored on their mainframe. A project management application tracks activities for each I/S employee and is maintained and updated from a Web browser. An application that tracks network backup activity allows the I/S group to efficiently monitor the computer systems.

### Internal information management

Managing the information that everyone is accessing is a key factor in its effectiveness. Done correctly, it can make core business processes more efficient and change less disruptive. Information management is comprised of several elements including keeping both new and existing content current and accessible, supporting ways for users to interact with the information, and ensuring that only authorized people have the necessary access.

Intranets may introduce new chores in managing information as they grow and distribute around the organization. Presenting a consistent company image on behalf of the entire organization becomes important as distributed Web sites proliferate in an organization. Business processes may be put in place to author and forward company policies for approval prior to dissemination throughout the population. Ensuring all departments have the same updated versions of information requires synchronization across separate departmental servers, including directories and security mechanisms. Providing varying levels of information access to different audiences—engineering, marketing, suppliers, customers—is an issue. Hypertext link management replaces the more cumbersome tasks of finding, cross-referencing, and updating related paper documents and files.

Domino bridges the open standards of the Web with the power of the Notes object-oriented database, replication, security, content management and rapid application development environment. Domino provides the basic requirements for an interactive Web site, including a programmable content store, views, full text search engine, and threaded discussions. Domino's rich object store can contain any type of data/applet attached to a Web page—audio, video, text, Java applets, Active X controls, plug-ins. Domino/Notes can protect information down to the field level if necessary. Notes bi-directional replication goes beyond traditional internet mirroring algorithms, enabling the synchronization of databases on multiple servers; users in multiple locations can make changes directly against a local server, with all changes automatically synchronized.

IBM's Directory and Security Server delivers a comprehensive, easy-to-use set of industry standard services supporting distributed and secure computing. Net.Commander, from Tivoli, provides administrators with enterprise-scale capabilities for configuration, deployment and monitoring events between servers, firewalls, and databases, providing end-to-end systems management.

IBM is further developing its Web Object Manager (WOM) technology, used in the Olympics, for the stage when an enterprise is ready to enable highly interactive, core business processes on the Web. WOM provides a comprehensive set of features to deliver a state-of-the-art, Olympic tested solution that provides support for scalable, transaction-oriented application development and delivery. WOM enables customers to use the Internet as a business tool for global access, achieve better integration with existing business applications and networks, and exploit the Internet for commerce. WOM meets the challenge of heavy volume and multiple source sites, enabling security-enhanced transactions and providing interactive, personalized content.

## Real-time collaboration

Enhanced, timely information exchange within the organization is another benefit of intranet adoption. As people from various organizations, functions and geographic locations increasingly work together, the need for real-time collaboration becomes increasingly important. Teams need to share information, review and edit documents, incorporate feedback, as well as reuse and consolidate prior work efforts. Intranets that enable collaboration to occur without paper or copies of files can save hours and even days in a project schedule. Collaboration also breeds further invention while preventing repetition of mistakes.

Electronic collaboration eliminates many hurdles such as distance between co-workers, multiple versions and paper copies of information, and the need to integrate different work efforts. Collaboration without a unifying communications infrastructure like an intranet is like doing any task without the right tools—it is extremely difficult and has the potential to become completely overwhelming. Project participants or an administrator would need to spend a great deal of time managing the logistics of the data—ensuring that the people have access to current material as well as figuring out how to gather and incorporate input.

Domino combines the power of a groupware management system with the universal information access capability of an intranet. By doing so it multiplies the benefits of either of those tools used separately. This powerful combination provides thin, pervasive clients that easily communicate with each other through numerous means such as shared documents, databases and spreadsheets, online discussions and e-mail. Furthermore, the standardization that an intranet brings greatly simplifies system management tasks and makes it easy to switch between internal and external communications.

Companies such as Coopers & Lybrand plan to use Domino to build security-rich, interactive workflow applications for the Web. A key advantage is that Domino extends the power of Notes to Web browsers. Notes has been and will continue to be a critical element of all levels of Web applications at Coopers & Lybrand, including publishing, interactive and complex Web applications.

Students and professors at Wake Forest University are finding out how the collaborative capabilities of Notes can completely change the dynamics of the classroom. Students can submit research topics to their teachers using Notes, making it easier for professors to respond quickly and completely. Notes also facilitates student collaboration on projects. Professors then see how well students cooperate and help each other by electronically viewing the comments students make on their classmates' papers.

## The Extended Intranet: Electronic connections to suppliers and partners

Companies are finding that, by extending their intranets beyond their immediate boundaries, they are able to communicate more directly and efficiently with the communities with whom they do business. Establishing electronic connections to suppliers and partners can result in key savings in time and money in communicating inventory levels, tracking orders, announcing new products, and providing ongoing support. Intranets are being used in a range of application areas to leverage access to existing information and extend a company's reach to employees, partners, suppliers, and customers.

As companies progress in their methods of interaction, more sophisticated intranetworking can result in increased responsiveness and shortened order fulfillment time to customers. Suppliers track inventory levels directly, reduce delays in order fulfillment, and save costs of maintaining inventory. More companies are developing this form of intimate exchange, where the electronic capability actually drives the process.

Chrysler's Supplier Parts Information Network (SPIN) is an enterprise extension of applications and data out to their suppliers, including both analysis of supplier performance and a parts quality system to track bad parts issuances. Between the browser and the server, the data is encrypted so observers can't peek at the information. The applications use CICS transactions on the mainframe to restrict the user to authorized data. Chrysler expects to reduce the time in dealing with suppliers and increase the quality of the communication.

In a Notes environment, several products enable access and use of existing data for sophisticated information exchange:

- **LotusScript** is a cross-platform, embedded, object-oriented, structured programming language, a superset of the easy-to-learn and use BASIC language;
- **LotusScript: Data Object** supports Notes clients and servers to access and update any ODBC-compatible relational database;
- **Oracle LotusScript Extension (LSX)** supports reading and writing Oracle databases using Oracle's native SQL;
- **MQSeries Link for Lotus Notes** provides the link to transaction-based systems, allowing integration of business processes across Notes and transaction systems;
- **Lotus NotesPump** provides a high-performance, enterprise-scalable data exchange infrastructure to allow organizations to leverage the data in both Notes and relational databases providing replication and synchronization.

VisualAge for Smalltalk supports rapidly building interactive intranet applications that can interoperate with Lotus Notes data and applications. This powerful development tool enables application developers to build intranet applications that leverage their existing investments in IBM and third party data transaction systems with Lotus Notes, utilizing a wide choice of middleware such as MQSeries, CICS, or TCP/IP.

Demanding corporations around the world already use the industry-leading products that form the foundation for the IBM Software Servers. These companies can make a smooth transition to intranet computing while retaining their equity in existing IBM systems. And because much of the world's corporate data is already resident on IBM systems, the IBM Software Servers are highly attractive, offering reliability, integration, scalability, growth paths, simplicity, and open-systems flexibility. The Servers are used with gateway programs to make existing applications and data immediately available to Internet users, without application changes or programming. Net.Data builds on the data access with DB2 WWW Connection, delivering ODBC connectivity to heterogeneous data, both IBM and non-IBM sources, such as Oracle, Sybase, and Informix. Net.Data enables applications written in C++, Java, Perl, and REXX.

IBM's World Purchasing Service offering is a cross-industry, networked service for electronic purchasing that complements reengineering of the buying and selling process, and includes catalog enabling tools for Notes and the Internet, catalog management and distribution services, content hosting, and transaction processing. This service combines the controls and economies of centralized purchasing with the freedom and responsiveness of decentralized purchasing.

### The "Virtual Office"

As intranets grow in sophistication, companies benefit from being more responsive and adaptable to the needs of their employees and their organization. In the fast pace of current environments, companies must be able to react quickly, often with dynamic organizational structures. A virtual office is not a physical place; rather it's an environment that facilitates working by removing the boundaries of space and time. Expanding the functionality of the virtual office to include multimedia capabilities via an intranet expands the horizon of the worker even further. The worker is not isolated from his colleagues by physical boundaries. Multimedia-enabled computing brings long-distance interaction one step closer to the effectiveness of in-person interaction.

The concept of the virtual office is not limited to the business environment. Georgia Governor Zell Miller funded a project run by Augusta Technical Institute (ATI) to provide education to residents in rural areas of Georgia. They worked with IBM to develop "Distance Learning," a network that allows an instructor to present multimedia classroom presentations to students at unstaffed rural satellite locations. ATI further enhanced this network by using IBM's Person to Person (P2P) collaborative computing application across local LANs as well as the Internet.

Using IBM's consulting services is an excellent way to mold technology to help a company adapt to the needs of its employees. Not only can IBM consulting teams integrate IBM products with other vendor's products, but they have access to the innovations that continually emerge from IBM Research.

## Applications — The Driving Force for Intranets

The focus of the IBM intranet strategy is enabling applications, empowering businesses to make effective changes that wield significant and positive business value. IBM is focusing on the key application areas of:

- Electronic commerce;
- Collaboration; and
- Content management.

The latter two directly pertain to intranets, and both indirectly support the effectiveness of the first. Our view of electronic commerce encompasses key needs ranging from:

- Marketing, advertising, and promotion;
- Sales processes requiring intelligent catalogues,
- Order tracking;
- Secure payment methods;
- Ensuring customer satisfaction; and
- Enabling efficient electronic customer self-service.

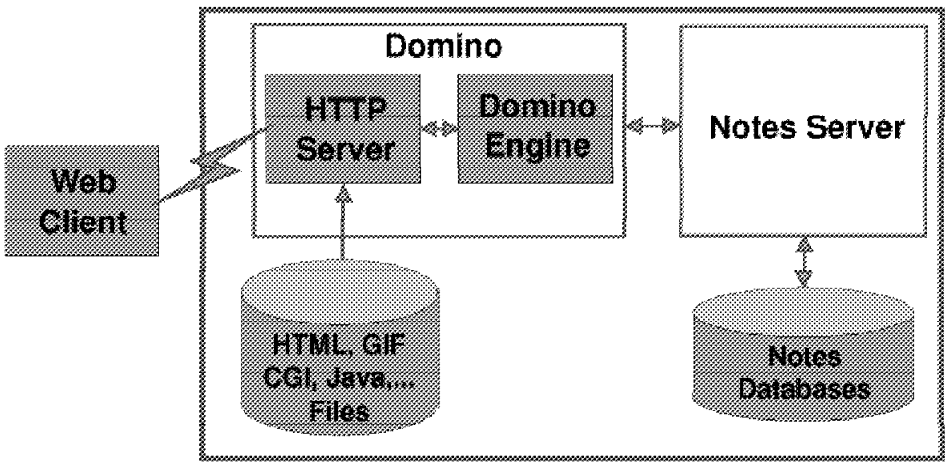
IBM's collaboration direction is to build applications that enhance the way people work together, enabling cross-enterprise, cross-platform, secure communications and information sharing, and improving means for employee self-service. Our content management offerings facilitate distribution, repurposing existing information, and protection of intellectual property. We are constantly building our inventory in these arenas, taking advantage of new improved technologies, such as video streaming, as they reach commercialization levels. With applications as the linchpin we categorize our current and future offerings into:

- Enabling applications; and
- Leveraging existing content and applications through enterprise integration.

### Application Enablers — Platforms and Tools

Application enablers include the infrastructure that allows applications to run effectively and to be built easily. Domino bridges the gap between the open networking environment of internet standards and protocols with the powerful facilities of Notes. Domino is new technology which transforms the Notes server into a dynamic, interactive Web application server. It enables any browser to tap the power of Notes/Domino to collaborate in an interactive manner with content-rich applications. With Domino, you can develop and deploy a broad range of Web-based business applications from simple publishing of press releases and policy manuals to collaborative applications which help employees work on a project to interactive applications such as sales force automation. Domino/Notes offers:

- Rapid and easy Web site construction and maintenance;
- Rich set of development tools for creating dynamic and interactive applications;
- Unparalleled security management;
- Enterprise systems integration;
- Remote Web site management featuring replication for automatic server synchronization.




Lotus Notes is the leading groupware and messaging system. Applying years of experience to Domino enables Domino to serve that role extremely well in the intranet environment. This means that companies can integrate their e-mail systems into Domino using either native Notes e-mail, browser-based e-mail, or third party e-mail. Furthermore, its groupware capability acts as an excellent facilitator for collaboration.

Notes has always been an outstanding platform for application development. Lotus Notes release 4 has the ability to convert documents to HTML. Domino expands that capability to include a set of frameworks that enable a company to build and maintain an interactive intranet site quickly and easily. One of those application frameworks is Net.Action, a tool for quickly building integrated interactive Web sites. Your Web site can be built in an afternoon if you are already using Notes.

In an intranet environment, more people creating and accessing data requires better information management. Domino/Notes supports major data management functions including replication, link management, directory services and network management. Similarly, as more people access data from more locations, the need for adequate security increases. Domino/Notes has a broad range of security facilities from controlling access to authentication to encryption, incorporating industry standards for security such as Secure Sockets Layer (SSL) for encryption of transmitted data.

The services provided by the IBM Internet Connection Server are integrated today with Domino and will subsequently be integrated into other IBM Software Servers. Today, the IBM Internet Connection Secure Servers are also separately orderable.

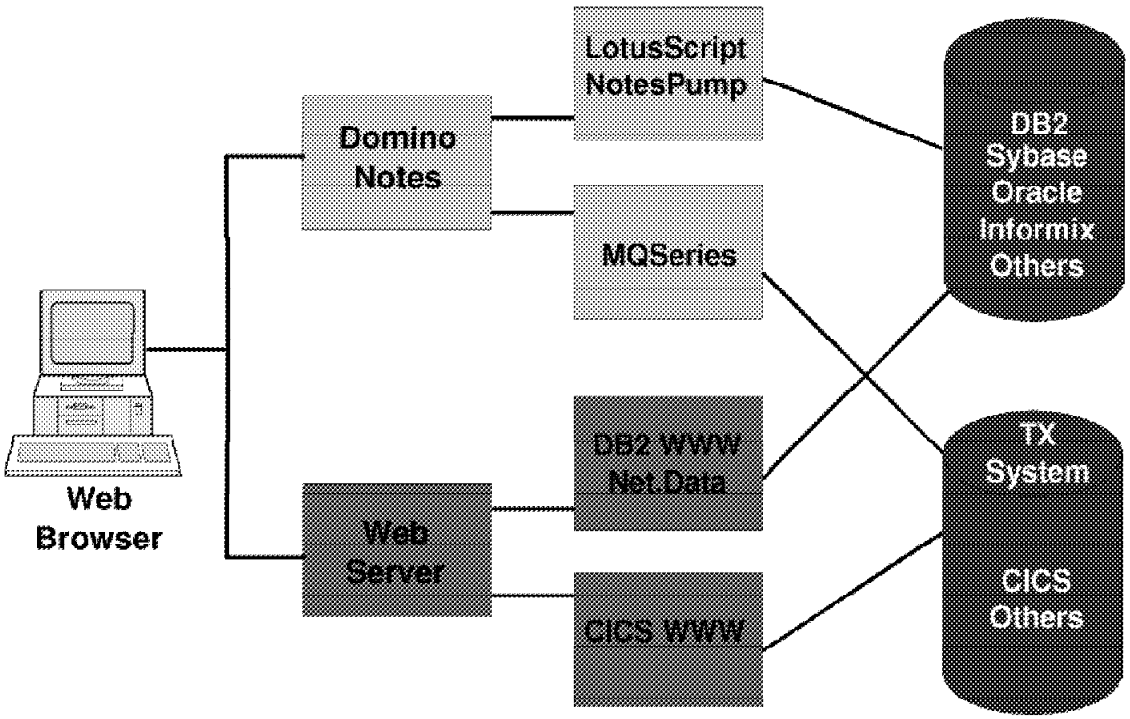
IBM has a variety of innovative application offerings in the area of content development and management, from IBM's own laboratories and from alliances with leading edge business partners. Query by Image Content is a natural language engine that searches for information based on image data. In addition to our application product offerings, IBM has a variety of application services. IBMInfoSage, for example, is a service that delivers customized news and information to subscribers twice each business day based on their individual profile.

The IBM strategy for Java is based on a three-tier programming model. The first tier is the thin client, which is focused on presentation logic and user interface. It is completely driven from the server—no application-specific code is installed on the user machine. This significantly reduces the cost of installation and maintenance. The second tier server contains the business logic. The third tier is the database, transaction system, and/or legacy applications. Separating the business logic from the data makes it faster to change the application to reflect business changes, such as a corporate reorganization.

IBM plans to introduce a complete set of Java application development tools and servers that will allow application developers to easily build, deploy and manage three-tier client/server applications. The cornerstone of IBM's Java tool box strategy for professional developers will be IBM's VisualAge for Java product. This product, which is currently under development, is intended to provide Java developers a rich, integrated visual development environment and a set of pre-built components. This development environment will enable Java developers to rapidly build multitier, platform-independent Java applications.

### Enterprise Integration — Enabling Existing Content

When considering the role of intranets to facilitate fundamental change, perhaps their most important capability is providing easy access to existing information. IBM's strategy addresses this need through enterprise integration offerings. Lotus and IBM have key enabling products and technologies to enable the use of information contained in previous investments in existing IT infrastructure. There are two paths that customers can take to access their existing information.




The first of these is Domino/Notes which can be the conduit for transporting transaction-based and relational database information into collaborative and workflow applications. Lotus and its partners provide a series of LotusScript Extensions (LSXs). For example, the MQSeries LSX runs on all Notes client and server platforms and connects via MQSeries to over 18 different back-end systems. Customers can combine browser-based processing with Domino/Notes servers to provide complete, interactive Web applications.

The second approach is to use a Web server with gateways to existing relational database and transaction-based information. IBM provides a number of gateways with our Internet Connection Servers to access CICS, IMS, and DB2 applications and information. CGI gateways are included as part of bonus packs for OS/390 and AIX. These support open industry standards, rather than proprietary architectures and protocols, to enable you to connect the multivendor systems within your business and extend your reach to environments outside your company's boundaries.

IBM's Net.Data, CICS WWW, and MQ WWW provide the direct access between data and the Web. Net.Data leverages existing data, and provides an integrated environment for developing new Web applications as well as redeploying client/server business applications to the Web. Net.Data builds on the strength of DB2 WWW Connection. Not only can you access data in DB2, but with ODBC support you can access data in many other databases such as Oracle, Sybase, Informix, and Microsoft—giving you the ability to access relational data wherever it resides. Net.Data, which can be used with any Web server, can significantly improve processing time for first-generation "dataweb" applications, and allows the Web application developer to build new-generation processes that deliver even faster performance in internet-to-database transactions. Net.Data applications will also be able to exploit the latest browser technology.

A customer with both relational databases and collaborative workflow applications with Notes has the best of both worlds. With middleware tools such as NotesPump and LotusScript, information from back-end systems can be integrated into Notes. The power of Notes combined with the richness of information sources can be used in the development of robust Web applications.

The IBM Software Servers are integrated, cross-platform products that also help businesses meet their need to share information between companies, business partners, and customers who are using diverse network architectures and protocols, operating environments, platforms, and applications. IBM Software Servers can be used in various combinations to transform database and transaction data into Web-browsable information.

To enable rapid development for the intranet, IBM currently offers a suite of Application Development tools under the VisualAge brand. The first product within this brand that has been intranet-enabled is VisualAge for Smalltalk. VisualAge for Smalltalk now has a set of Web and Notes parts that enable developers to rapidly visually assemble interactive Web CGI server applications that can access data that reside in a wide variety of data stores. With native and ODBC support these data sources include DB2, IMS, Notes, Oracle, Sybase, Informix, and SQL/Server. With the "in the box" Lotus Notes parts, developers can not only access Lotus Notes data but also utilize Lotus Notes' mail capabilities and forms-based applications to build the next generation of intranet applications. These capabilities will be added to other members of the VisualAge family such as VisualAge C++ and VisualAge Generator in the near future.

Another key aspect of IBM's intranet strategy is IBM professional and consulting services. The services encompass a wide range of activities including:

- Consulting services to formulate and plan your intranet strategy;
- Smooth Start turnkey packages for all IBM Internet servers;
- Initial Web site design;
- Intranet seminars and education; and
- Integration services for IBM and other intranet vendor products.

IBM also offers specialized security services, including:

- Security assessment;
- Infiltration testing; and
- Emergency response;

to protect your company's information against unauthorized use and corruption.

Overall, IBM's strategy is to provide reliable, flexible, innovative intranet products and services to support the full range of business environments in the fulfillment of their goals. It is now easier than ever to get the appropriate IBM intranet solution. Our offerings are available through multiple channels, including the IBM sales force, IBM and Lotus business partners, and IBM resellers.

## The IBM Road Map

In *Alice in Wonderland,* Alice asks "Would you tell me, please, which way I ought to go from here?" To which the Cheshire Cat responds, "That depends a good deal on where you want to get to."

What you choose to do next depends on two parameters unique to your situation and environment:

- Where you are now, and
- Where you want to take your company in the future.

If you're just getting started, trying to get a handle on what intranets are all about, and assess your own readiness for this environment, check out our intranet readiness tool on the Web at http://www.csc.ibm.com/journey/intrared/index.html. This tool was designed as a self-service aid to assist in identifying key considerations when embarking on intranets and evaluating critical success factors.

IBM offers regularly scheduled seminars for basic information about the Internet, called *Building a Business Solution on the Internet.* IBM also offers an Internet workshop, *Building an Internet Business Strategy,* in a customized 2-day collaborative session to help you assess your current situation and requirements given your existing infrastructure and firewall needs; this session helps you develop alternatives and recommendations for security, migration, and expansion.

If you already have IBM systems installed, it's straightforward to get started by using the Internet Connection Servers available for all platforms. "Transforming our AS/400 into a Web server was a breeze—it took less time than installing a browser on our PCs," according to Ken Klausen, Senior Systems Programmer at South Dakota-based Black Hills Corporation, which operates Black Hills Power & Light.

IBM's Smooth Start services also offer turnkey packages for IBM and other Internet servers, along with planning assistance, installation, and initial Web page creation. Page design services are also provided through IBM's Multimedia Center and through IBM partners in our Web Affiliate program.

Domino provides extended functionality for a Web site; Notes users can download Domino from the Lotus site at http://domino.lotus.com. With the Lotus Net.Action solution, your Web site can be installed and configured simply and quickly, and will streamline the creation, design, and content management of your intranet sites. Lotus Business Partners offer additional services to design and install Notes on an intranet, develop and convert Notes databases for intranet publishing, and provide standard as well as tailored Notes training.

IBM offers consulting services to help you assess the best way to leverage and deploy internet technology to meet your business goals. These consultants can help you formulate and plan your intranet strategy. Security assessment services include a "health check" for your company, with identification of security exposures and risks. Infiltration testing services assess how vulnerable your systems are to electronic break-in, while IBM's Internet Emergency Response Service provides swift, expert response to limit and fix potential damage after an electronic break-in occurs.

Many companies today are redesigning their human resource systems to provide faster and more accurate information to their employees on issues including benefits, jobs, financial results, and training in the form of employee self-service. IBM's HR Access product provides enterprise-wide HR information access to serve this constituency, enabling the global organization to manage a world wide employee population with a single solution integrated with Lotus Notes.

There are a variety of ways to integrate your enterprise information, depending on your current investment and environment. Lotus and IBM products make it easier for organizations to effectively access and integrate information from transaction-based and relational database systems, using Net.Data, MQSeries Link for Lotus Notes, Lotus Script data access, NotesPump, and VisualAge. IBM's Net.Data is state-of-the-art software that Web-enables existing data and provides an integrated environment for developing new Web applications. Net.Data accesses DB2 natively, and can access Oracle, Sybase, Informix, and Microsoft data through ODBC.

With the modular IBM Software Servers, you can build a high-function, reliable environment for e-mail, messaging, decision support, groupware, transaction processing and other vital functions in today's business environment. ISSC, a wholly owned IBM subsidiary, provides a complement of services to enable database information for publishing and viewing on an intranet, configuration and upgrade installation, and help desk support.

If your IT infrastructure is composed of multiple vendors, or even a single vendor who is not IBM, IBM's integration services can bring together your heterogeneous environment to leverage your intranet to the fullest. At the Electric Power Research Institute (EPRI), a research consortia responsible for delivering technology for environmentally sound generation, delivery and use of electricity, ISSC was selected to provide the systems development and integration on the Web. ISSC provided application development, systems integration, a help desk, server hosting, and the network. ISSC integrated Netscape's Publishing System, Sun processors, Netscape server software, Oracle databases and a Verity text engine.

IBM's Global Services can fully outsource your intranet operations, maintaining your systems and help desk, and responding to emergencies. IBM's Global Network provides basic intranet network connection and access, as well as a business-to-business Notes service.

## Considering All the Issues

Intranets provide the technical means to implement far-reaching, effective change in a business. They allow people greater access to the information that will let them do their jobs better. Along with the benefits of enhanced access lie some risks. Increasing the number of people who touch important data or systems adds vulnerability to an information technology infrastructure if precautions are not taken to protect it. Integrating security mechanisms into an intranet minimizes exposure to misuse of corporate data and ensures overall system integrity.

A secure intranet solution implies seamless and consistent security function integrated between desktop clients, application servers, and distributed networks. It should include policies and procedures, the ability to monitor and enforce them as well as robust software security tools that work well together and do not leave any gaps in protection. The following are the basic functions necessary for broad security coverage:

- **Anti-virus software** protects your systems from disruptive to destructive viruses by detecting, verifying and removing viruses.
- **Authentication software** validates that information that appears to have been originated and sent by you actually was.
- **Access control software** allows varying degrees of access and different granularities of access to applications and data.
- **Secure transmission mechanisms** like encryption impede outside parties from eavesdropping or changing data sent over a network.
- **Repudiation software** prevents people who have bought merchandise or services over the network from claiming they never ordered what they received.
- **Disaster recovery** entails both software and procedures that assist recovery from loss of data in your systems.

Intranets that extend beyond organizational or company boundaries, may require integration among various security systems. IBM worked with British Oxygen Company (BOC) to develop security integration for a controlled access Web site where established customers reorder gas. One customer needed the site to integrate with their Kerberos security so that the site could access customer account codes for different projects. Other customers using this site were able to use the secure aspects of the IBM Internet Connection Secure Server. The same site also needed to integrate with American Express' security systems, since the orders were charged on American Express procurement cards.

Since intranets give more people the opportunity to access information, they can cause companies to grow their dependence on computer technology. This increased dependence requires that appropriate backup and emergency recovery measures be in place. IBM offers emergency response services as well as services to plan backup and security processes and procedures.

The more reliant a business is on its intranet, the more reliable and available the system must be. IBM comprehensively tests all hardware and software products to ensure the systems are there when you need them. The system also must be able to grow as the business grows. Scalability is often a critical feature that IBM has embedded into its product families. One Lotus Notes server can handle up to 1000 clients. The IBM Software Servers scale from PC-based systems to enterprise systems, and run on a variety of platforms including OS/2 Warp, AIX, and NT. One of the major precepts of IBM's WOM technology is scalability, as evidenced most recently by the Olympics servers.

Similarly, a business' application requirements may also change. Therefore the intranet must be flexible and easy to update and maintain. IBM VisualAge's and Lotus Notes' development capabilities and systems management features satisfy this criteria very well. The IBM Software Servers' modular architecture makes this product family well-suited to adapt to new requirements as they appear. Furthermore, IBM's continued development and support of object technology enhances all our product areas, specifically those that will be WOM-based.

Costs are another important intranet implementation consideration. Beyond the list prices for hardware and software components lie less obvious costs of administration, maintenance, and additional development. Despite competitor claims to the contrary, recent consultant studies have shown the efficiencies of Notes installations for typical and popular intranet usage in both dollars spent and implementation time required. Often alternative solutions require each aspect of the intranet to be independently developed.

Intranets create virtual enterprises that work best if they embody the following attributes:

- **Security:** the ability for entire organizations to come together for maximum synergy without jeopardizing proprietary data or compromising system integrity.
- **Reach:** The ability to easily connect with a single employee, a group of contractors, other vendors, and even millions of customers.
- **Flexibility:** The freedom to merge on either a permanent or ad hoc basis with anyone, anywhere, anytime—regardless of hardware or software differences.
- **Transparency:** The ability to interact with external or remote systems seamlessly and without regard for data location, underlying hardware or software.
- **Scalability:** The ability to handle up to the most demanding enterprise-level computing and transaction rates across disparate systems.

IBM and its partners are best able to meet all these requirements with a wide range of products and service offerings, years of enterprise experience, and the strategy and technology to lead the way.

## IBM's Commitment: Enabling A Peak Intranet Experience

IBM's direction is to help customers easily accomplish their business goals through strategic internal corporate networks. Our strategy is to help customers develop intranets with next-generation technology and by leveraging the investments they have made in people, systems, and applications.

Domino/Notes offers all the functionality of next-generation intranets today. IBM Software Servers, supporting open industry standards, enable you to connect the multivendor systems within your business and extend your reach outside your company's boundaries. Net.Data enables you to access multi-vendor relational data interactively from your Web pages. IBM SecureWay offerings help you protect your valuable assets. And IBM service offerings span the complete range of customer needs, from setting up departmental intranets from ground zero to integrating complex networks connecting worldwide enterprises, depending on where you are and where you want to go.

Although it may not be the first comparison that comes to mind, implementing an intranet for a business is analogous to trekking through the Himalayas. People who have accomplished either endeavor have much to say about their experiences. Volumes of information written on both subjects have captured the world's imagination. Yet, to the uninitiated the prospects of trekking the Himalayas or implementing an intranet may still seem daunting. Many still feel the need to further study the terrain and map out an approach. Despite the momentum of the movement towards intranets, companies need to carefully plan their implementations keeping a long-term view in mind.

People exploring the Himalayas come from all over the world. The world view and previous experiences of the visitors are all very different. There are many starting points and paths from which people can reach the same summit or peak. Just as the Himalayas have numerous peaks and summits to visit, each bringing a new and different experience, intranet implementations can take on various forms depending on the goals of the implementation.

A final analogous element between trekking the Himalayas and implementing an intranet is the absolute necessity of having an experienced and trusted guide. Despite how easy people may make it sound or how prepared people feel they are, trekkers are venturing into unknown territory and possibly facing harsh elements. Only the foolhardy would venture forth with an inexperienced guide. A qualified guide is one who has been to the destination before and can determine the right path given the starting point, the abilities of the team, and the target goals. The best guide provides the confidence, direction, and security that can only be gained from extensive, and sometimes even harsh, experience.

**Find out more about IBM and intranets on the WWW at**
**http://www.internet.ibm.com/offerings/ncpintra.htm**

**—let IBM be your intranet guide to Web-enabled business value.**

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