Building the Corporate Web

How To Use the Internet, Intranets, and Extranets to Get a Head Start in E-Business

(The subject of this white paper is now available as a major computer book title. See last page for details.)

by Ryan Bernard, IntraMark, Inc.

Though World-Wide Web technology is primarily used on the Internet, companies like Sun, Digital, Nortel, Eli Lilly, and Levi Strauss are finding it can provide an ideal way to deliver information and services over corporate LANs and WANs. This article examines the wide range of potential applications for these new tools and proposes developing a new kind of information system called an "intranet" which can serve as a universal, single point of access for nearly all your company's strategic information.

Introduction

The past year has seen an explosion in technologies related to the World-Wide Web. Every major business or organization in the world is now experimenting with Internet technologies in one form or another. Major software giants like Microsoft have reoriented their entire product lines around the paradigm of Internet connectivity. Hundreds of startup companies now offer tools and services to connect organizations with the Web.

Most importantly, however, many forward-looking companies are now experimenting with the use of this technology on their internal networks. But will their efforts enhance the organization's strategic goals, or will this be just another pretty (useless) set of home pages?

This paper discusses the many ways web technology can be used within large organizations to advance organization-wide strategic goals. At its heart, the true value of web technology lies not just in "putting your organization on the Internet map," but more importantly in improving communication between your organization and its employees, customers, and suppliers.

Typical Problems with Information Access

Why do we need these new tools? The following list shows the typical problems involved in authoring, processing, and delivering information within large organizations:

- Incompatible, proprietary file formats
- Expensive, non-intuitive or even non-existent viewing tools
- Frequent upgrading of publishing and viewing tools
- Massive printing budgets for documents that are under-used
- Out-of-date information locked in obsolete systems
- Difficult access to vital business information
- Redundancy and duplication of information across networks

Corporate user groups are working on solutions to these problems by developing document management and interchange standards. But it may be that many of the needed solutions are already at hand. Web technology promises to help unblock the information flow, redesign business processes, and improve productivity for all users.

"To understand the true power of this technology, you need to stop thinking about it as strictly an Internet tool and start evaluating it on its own merits. "

A Historical Perspective

When Bell invented the telephone, he never dreamed of all the potential uses for it. At its core, the telephone is a relatively simple device that allow us to transmit sound through space. What makes the telephone so useful, however, is that it is completely intuitive and requires no training: you just plug it in, dial, and connect to any other phone in the world. It is also highly adaptable to a wide range of applications such as paging, fax, and data transmission.

Internet Explorer, Netscape, and other web browsers are *like* the telephone in some ways, because they are easy to use with very little training, they facilitate communication automatically across vast networks, and they are extremely configurable.

In the past, if you wanted to retrieve electronic information, you had to:

- Find out where it was located and what format it was stored in (a task that could take hours, if not days).
- Log in to a computer.
- Start and run an application that is capable of reading the file.
- Open the file and page down to the desired information.
- View, copy, or print the information.
- Close the file and log out.

A web browser can do all this with the single click of a mouse. What's more, you can "hyperlink" from any document to any number of other documents or data files distributed across a network. But this is not all the new technology can do.

Just as the telephone turned out to have a wide array of futuristic uses, people are starting to discover the true power of web technology and find ways to put it to work.

Evaluating the Technology on Its Own Merits

The authors of the *Mosaic Handbook* (O'Reilly & Associates) aptly call that early web browser "the Swiss army knife of the Internet" because of its wide range of information retrieval capabilities. It's true web browsers like Netscape and Internet Explorer are incredibly flexible. To understand the true power of this technology, you need to stop thinking about it as strictly an Internet tool and start evaluating it on its own merits.

Make a wish list of *every feature* you might want in an online publishing and information retrieval tool, then examine what web technology has to offer. You may find most of your wish list already granted, with features like:

- Inexpensive shareware or freeware.
- Intuitive graphical user interface.
- Requires very little training (point and click on interesting topics).
- Universal browser for any file type (reads file extensions, spawns other applications, when necessary).
- Supports full color in-line graphics.
- Supports multimedia (sound, video).
- Supports hypertext links to local or remote documents.
- Ability to create hyperlinked push buttons, clickable maps.
- Supports compound documents and reusable images (the newest trend in document architecture).
- Supports SQL queries or other interactive retrieval, display, and updating of database information.
- Supports corporate-wide standards for online document design.
- Supports retrieval/display of reports generated by other applications.

"Database queries can be automated through self-explanatory menus that issue a query and produce reports at the click of a button."

- Supports online forms, data entry, and interactive communications.
- Supports integration with e-mail applications, including list servers.
- Integrates with newsgroups, forums.
- Supports automatic execution of batch files, scripts, or commands.
- Supports automatic execution of full-blown applications written in Visual Basic, C, C++, or Java.
- Capable of spawning remote (telnet or 3270) sessions and running remote applications for local display.
- Supports automatic download of any remote computer file.
- Supports user authentication and encryption schemes.
- Supports a variety of search engines with rank-ordered, clickable, auto-hyperlinked search results.
- Supports central or decentralized document management philosophies.
- Allows enterprise-wide distribution of online document publishing.
- Supports on-demand printing of online documents.
- Supports cut-and-paste from online documents to other applications.
- Supports usage tracking/analysis.
- Non-proprietary, platform-independent, open document architecture based on ISO standards.
- Client-server architecture for optimum system performance.
- Saves disk storage by requiring only one copy of a file or image to exist organization-wide.
- Displays appropriately on any resolution monitor (user adjusts fonts locally for easy viewing).
- Works on standalone computers, LANs, WANs, or global networks (any network using TCP/IP).
- Configurable as an embedded front-end browser for CD ROM apps.
- Cross-platform compatible (PC, Mac, Sun, SGI, DEC, HP, IBM).
- Available as a built-in component on most current desktop platforms.

As this list shows, what may have looked like a simple tool really holds a considerable amount of power for information delivery and user/provider interaction.

Web Technology in a Nutshell

Web technology centers around a client-server application originally developed by the National Center for Supercomputing Applications (NCSA) at University of Illinois and taken to its full potential by companies like Microsoft and Netscape (now part of America Online). The breakthrough application was a freeware product called *Mosaic*, which was the original model for products such as Netscape Navigator and Microsoft Internet Explorer.

The breakthrough nature of web technology was due to several factors:

- **Cross-platform connectivity** - browsers on UNIX, Mac, or PC platforms can all access the same core information.
- **Global access** - you can request documents from servers located anywhere on a global TCP/IP network like the Internet, or a private one like a LAN or WAN.
- **Ease of use** - files are served at a click of a button through a simple hypertext link. A web is a series of interlinked hypertext documents.

"A new employee might click through an online orientation seminar, including a multimedia presentation on company operations, then take an online quiz, with the results automatically graded and forwarded to the employee's file in Human Resources."

- **Flexibility** - Web clients can access many different server types (Web, Usenet, gopher, ftp, etc.) and can recognize any file type (via file extension). WWW servers provide flexible interface to other apps, including online databases.
- **Open systems** - any software that follows the published protocols can be used as a browser or editor.

At first, web technology was used primarily on the Internet to link together a global web of business and technical documents. Increasingly, however, businesses are finding ways to use this technology other TCP/IP networks, including private ones.

Visionary Corporate Applications

If you have done much browsing on the World-Wide Web, you already understand how easy it is to retrieve a wide range of information over public networks. The following scenarios suggest some of the potential uses for use of web applications in a corporate environment:

Management Systems

- A vice president in Cleveland clicks a menu on her computer screen and views daily progress reports from sales managers nationwide.
- Database queries are automated through self-explanatory menus that issue a query and produce reports at the click of a button.
- Computer reports normally printed on paper are distributed online by printing them to an ASCII or HTML file, or by publishing on-the-fly from the original data source.
- Project assignments are posted within an online information system for collaborative viewing by work groups.
- Team goals and measurement charts are put online for corporate-wide access.
- Historical meeting minutes of various standing committees or process improvement teams are put online for review by all interested employees.

Collaborative Workgroups/ Interdepartmental Communication

- Planners, designers, engineers, or marketing people collaborate interactively in designing or reengineering a product – posting ideas, sketches, and other material online for group access.
- A programmer views a list of toolkit components used to design software. Component libraries and docs are downloaded automatically.
- Each department in a company has a "home page" that employees can browse to learn about department mission, staff bios, current projects, and contacts.

Online Reference

- Workers in a factory use a browser to rapidly locate and view up-to-date ISO9000 work instructions, MSDS, or maintenance procedures
- Sales reps in the field use a menu system to view the latest product pricing, promotions, discounts, and rebates, or to read more details on specific customers, suppliers, or company policies.
- Employees can view benefit programs or company policies and procedures online.

Interactive Communication

- A company automatically distributes a survey to employees, customers, or suppliers nationwide, gathers the results automatically, and stores them in a database for analysis.

"Companies no longer can justify the cost of printing all their business and technical information without any guarantee that users are actually reading it."

- Announcement of the company picnic is put online; people use the system to sign up for the volleyball tournament, cook teams, etc.
- Information on United Way program goals and progress is put online, and employees can send in their pledges by filling in an online form.

Training

- A medical student studies a training lesson that includes a moving picture of a fetal ultrasound scan and the sound of the child's abnormally beating heart.
- A new employee clicks through an online orientation seminar, including a multimedia presentation on the company. An online quiz is completed, with the results automatically graded and forwarded to the employee's electronic file in Human Resources.

Customer Support

- A help desk operator views a centralized menu that provides direct, single-point, clickable online access to all of the company's printed documentation.
- A customer service rep views detailed customer and supplier information while on the phone, retrieves invoices or POs from an imaging database, and views quick reference guides or written procedures for specialized orders – all through a single menu.
- An authorized customer uses an Internet or dial-up connection for a "virtual visit" to a company. After entering an account number and password, the visitor browses through a pre-designed pathway to visit various departments, view exhibits, obtain sales materials, view online catalogs, view video presentations, and order products at the click of a button.
- A company presents a "virtual trade show" with actual booths and exhibits that exist only on the web—or an "online version" of a real trade show.

Some companies are already using Internet technologies to implement similar applications. At the rate information is being converted to web delivery, it's only a matter of time before most business communication and transactions will be delivered online through this type of system.

The Internal Web (Intranet)

When you look at the sheer volume of information stored by corporations today – including reams of printed information like computer documentation, procedures, specifications, and reference documents – you quickly see the argument for taking information online. Users no longer have time to wade through a shelf full of manuals to find some obscure tidbit of information. And companies can no longer justify the cost of printing all this information without any guarantee that users are actually reading it. Then there is the problem of keeping all that printed information up-to-date.

Many companies are already using *intranets* to deliver information to internal users. The term *intranet* refers to the fact that the web (or other Internet applications) are being run completely *on the inside* of a private network, often without a direct connection to the Internet. There are a number of information resources and transactions that are potential candidates for an intranet.

Documents

Every corporation has reams of business information that it must distribute to internal employees or external customers and suppliers. The

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following list provides examples of the types of documents that companies traditionally distribute:

- Policy and procedure manuals
- Quality manuals
- ISO 9000 work instructions
- Employee benefits programs
- Orientation materials
- Software user guides
- Hardware manuals
- Quick reference guides
- Online help
- Style guides and other standards
- Training manuals and tutorials
- Seminars
- Company newsletters and announcements
- Scheduling information
- Maps and schematic drawings
- Computer reports
- Customer data
- Sales and marketing literature
- Specifications
- Price lists
- Product catalogs
- Press releases

The new technology gives us a way to put all of these documents online for instant access by authorized users.

Electronic Resources

Companies also have a number of electronic resources stored on computer that are traditionally distributed by transportable media or by copying across network nodes. These may include:

- Test data
- Customer data
- Spreadsheet templates
- Documentation templates
- Software applications and utilities
- Programmer toolkit components

In the past, many of these resources may have been hidden away in rarely accessed cavities of the network. Using appropriate web applications, you can catalog these resources online for user review and automatically distribute them – through a single mouse-click – across a network to any authorized user who requests them.

Interactive Communication

Finally, there are various kinds of two-way communication within a corporation that can be facilitated by web technologies. These include:

- Surveys and feedback
- Program notification and enrollment
- Progress inquiries and reporting
- Memo distribution, comment, and reply
- Spontaneous data entry and data collection
- Interactive database queries
- Product promotion and ordering

Web browsers give us a way to communicate with employees, customers, or suppliers, present information, capture feedback, and process the feedback automatically through databases or scripting mechanisms. It also supports spontaneous user searches of information archives or databases.

"Consider that we now employ rooms full of programmers to extract information from old legacy systems and present it to users in understandable ways. Now consider that in a matter of minutes, someone using a simple text editor can create a customized menu and link it directly to nearly any type of data source that channels its output to ASCII or HTML files."

The External Web (Internet)

The external web provides a way for organizations to communicate with external customers and suppliers. The following types of information may be included:

Sales and Marketing Data

Currently, marketing is the main focus for commercial web sites on the Internet. This includes:

- Product brochures.
- Online electronic catalogs.
- Product specs and manuals.
- Product promotions and discounts.
- Real-time product pricing.
- Frequently asked questions and answers.
- Ordering information, or online ordering and billing.
- Interactive registration.
- List of dealers or sales contacts.
- Multimedia demos.

Parallel sets of information could be provided for each product, so that a customer interested in the XYZ Widget could get a sales brochure, a complete set of specifications, FAQs, manual, and so forth.

Customer Support

Customer support should have a prominent role in an external web site. Here is a short checklist of options:

- Contact information.
- Release notes and upgrade notices.
- Online warranty registration and information.
- Online literature request forms.
- Troubleshooting and maintenance procedures.
- Frequently asked questions.
- Viewable/printable product manuals.
- Online problem-reporting and evaluation surveys.
- Customer complaint forms.
- Accessory catalogs and online ordering forms.

Access can be provided to all customers or limited to registered customers only.

Supplier/Dealer/Sales Support

A web site can help suppliers, dealers, or field reps stay in touch with company operations. It also can provide an excellent way to link customers directly to supplier information. The following list shows the types of information you may include:

- Contact information.
- Details on VAR/dealer programs, special promotions, discounts, etc.
- Pass-through links to supplier web pages, industry web pages, conferences or other sites
- Product release notes and upgrade notices.
- Market surveys and focus group studies.
- Competitive cross-referencing.
- Wholesale pricing.
- Downloadable and printable product literature.
- Downloadable canned presentations.
- Product troubleshooting and maintenance procedures.
- Interactive problem-report forms or request for service.
- Complaint and feedback forms.

Password protection may be desired, but you can also set up a separate set

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of supplier pages on a web server with its own unique URL address that only suppliers would know about.

E-Commerce

Much web development now centers on taking the entire sales and marketing process online. Online catalogs are an important first step, but traditional businesses that truly want to become futuristic *e-businesses* will need to reorient their entire transactional model toward the Internet.

Using Web Technology to Achieve the Paperless Office

When you start thinking about the wide variety of documents and transactions that can now be brought online, you start to realize how we finally may have within our sights a long-lost goal: *the paperless office.*

Achievable Goals

Web technology can help us achieve:

- Drastic reduction in cost of office supplies, printing, and copying.
- Drastic reduction in the amount of file and shelf space required.
- Improved productivity through quicker access to info resources.
- Better control of redundant or out-dated information through single-point storage and access.

Redesigned Process

The main way to accomplish these goals is to redesign the processes through which information is created, distributed, and updated. This process redesign should take into the account the long-term cost benefits of investing in better networking tools, versus continued investment in old methods of producing and distributing information, including:

- Copying machines.
- Printing and bindery contractors or in-house printing/binding shops.
- In-house mail room services.
- Mail and express mail budgets.
- Computer programming budgets.
- Redundant hard drive storage.
- Laser printer paper and toner costs.

Without doubt, this technology can help get information to the user faster and cheaper with less work involved. To understand the cost savings, consider that we now employ *rooms* full of analysts and programmers to extract information from old legacy systems and present it to users in understandable ways. Now consider that, in a matter of minutes, a person with minimal knowledge of HTML can create a customized menu and link it directly to nearly any type of data source that can channel its output into ASCII or HTML files.

A well-designed intranet will work this way: it will make all information easily available to all its users through a central menuing system that can be customized for each department. Search engines are also used for rapid access to information.

The Persistence of Paper in a Paperless Office

Web is easily used in an office environment where most people are sitting in front of computers anyway. But the so-called "paperless office" will never be completely without paper. Many people will prefer reading things on paper, or may want to print a copy for more leisurely study at a location where computers are not available. Most web browsers already support spontaneous file capture or on-demand printing of information on local or networked printers. Thus, to take documentation as an example:

"Future advances in network technology will make it imperative for companies to do business on the Internet. Despite the size or level of in-house expertise, there are ways to put any organization on the Internet map."

- The company quits sending out printed copies of manuals and other paper documents (since many people never even open them).
- Instead, the online version is kept up-to-date for simultaneous access by all company users through a web browser.
- Search engines can make the online manual easier to use, by allowing users to enter a search keyword and view a clickable list of results.
- Those who really want to "read a manual" or obtain other printed documents will be able to print their own or order a professionally printed copy through an online form.

Professional printing could occur on demand on a Docutech or other high-quality networked laser reproduction device either in-house or remotely through a service bureau. Even with the added cost of third-party printing and shipping, this method should still be massively cheaper than indiscriminate printing and distribution of materials.

Using Web Technology to Unify the Organization

Large organizations with far-flung operations may find that internal uses of web technology result in a proliferation of servers and access points. Companies like Sun Microsystems have hundreds of web servers installed throughout their organizations. This is probably desirable, since it is unlikely a central department could (or should) control all the information that goes into a web. At the same time, if everyone "does their own thing," the resulting web will be a hodgepodge of information with great variation in style, quantity, and substance.

A well-designed intranet can provide an excellent way to unify the far-flung operations of a company and increase the ease, frequency, and quality of inter-departmental communication. To promote organization-wide goals, a central group of internal or external consultants should be appointed to:

- Promote the use of web technology within the organization.
- Train employees in how to use the technology.
- Develop templates and style guides that help promote a more consistent interface and level of quality.
- Evaluate and critique the contribution of different departments to the overall web.
- Advise departments on innovative ways to apply web technology to specific applications.
- Provide the technical expertise where needed to develop interactive forms and database interfaces.
- Keep track of changes in the web, possibly by certifying web sites and providing a check-in/check-out mechanism that automatically provides a record of all changes.
- Create higher level menus that provide a centralized path for accessing all web resources.
- Assist in managing the overall web, including link analysis and reporting.

An internal consulting group set up to perform these tasks can help promote organization goals without creating a centralized web bureaucracy.

Prerequisites for Adopting the New Technology

Ideally, any company wanting to use the new technology should have a number of components already in place. Those that already have them will have a significant head start:

"Some companies are looking at the idea of developing virtual private networks that use the Internet, but cater exclusively to certain industries, suppliers, or customers."

- An existing network supporting TCP/IP and client-server technology.
- A user base and customer already somewhat familiar with the World Wide Web.
- Easy access to computers. If not a computer at every desk, at least a dedicated "kiosk" set up in large employee work areas.
- Appropriate software, including web clients and at least one server, along with ancillary "viewer" software, as appropriate. The needed software can be prepackaged for easy installation on user terminals.
- Web applications developed to assist the business in bringing its mission-critical applications to the new web-connected audience.

While these requirements might have posed a problem only a few years ago, most major corporations now have most of these elements already in place. Keep in mind that these requirements are for internal networks only. Making a system available for Internet access involves additional requirements, including secure servers, firewalls, and more.

Internet and Other Access Options for External Webs

Even those businesses with security concerns will increasingly find it enticing to "go public" on the Internet, simply because the global network infrastructure holds so much promise as a medium for commercial transactions.

Future advances in network technology will make it even more imperative for companies to do business over the Internet. Companies that are already online will have a significant head start on the competition.

The strategy for developing an Internet site depends on the level of in-house expertise and equipment available. Despite a company's size or in-house expertise, there are ways to put any organization on the Internet map, as explained below.

Third-Party Servers

This solution is ideal for organizations that do not have the physical connections or the appropriate in-house expertise to support an Internet site. Company information can be placed on a server maintained off-site by a third-party operation with the appropriate equipment and expertise. .

On-Site Server

A company that has the equipment and necessary in-house network expertise may want to set up its own server for long-term cost savings. A third-party company can be hired to set up such a server and train local staff, or a third-party off-site server can be purchased and brought on-site as a company matures into the technology. An on-site server does not need to be connected to the LAN if there are security concerns. With appropriate precautions (firewalls, gateways, etc.), an on-site server can be hooked to the LAN to provide full two-way interaction between organization staff and Internet users.

Private Internets

Some companies are looking at the idea of developing *virtual private networks* or even real private networks (extended and interlinked WANs) that cater specifically to certain industries or supplier-customer environments. Companies like Digital Equipment Corporation are introducing techniques that will make it possible to directly and securely connect internal web servers to external clients.

"The speed at which this new technology is being conceived and brought online is astounding."

Onward to the Future

Over the coming year, expect to see continuing developments in web technology

Tools are improving constantly, so that now it is possible to create web pages, forms, and database access without ever directly coding HTML or CGI scripts. New programming tools like Java and JavaScript will make web-delivered applications more efficient than the old CGI standards.

Internet technology is now appearing as a built-in feature of most major desktop computing environments. Major developments in network technology, especially fiber optics, will work to increase bandwidth and make remote multimedia applications more feasible.

The speed at which this new technology is being conceived and brought online is astounding. New developments are occurring almost daily. Before long, we will all be plying the Information Superhighway, whether on the Internet or within our own private domains.

About the Author

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http://www.intramark.com/

This information can also be delivered as an on-site seminar or via extended training sessions to your staff. For details, contact the author through any of the methods above.

About the Book

The information in this white paper is available as a 400-page soft cover book, The Corporate Intranet, Second Edition (1998) *from John Wiley & Sons, New York. The book explains hows and whys of intranet and Internet development, making a clear case for its business value and explaining the technical issues, in language anyone can understand.*

The book includes extensive case studies showing how several leading edge companies have designed and built their own intranets, and the lessons learned in the process.

The book can be ordered online from Amazon.com, by going first to the IntraMark site:

http://www.intramark.com/news/book_fr.htm

Courseware Available

If you already have an intranet planned or under development, and need training for employees, IntraMark develops courseware for users, managers, authors, and webmasters. For details, see:

http://www.intramark.com/courseware