

# Corporate Portal Framework for Transforming Content Chaos on Intranets

Atul Aneja, IT Strategy & Technology, Intel Corp.  
Chia Rowan, IT Marketing, Intel Corp.  
Brian Brooksby, IT Marketing, Intel Corp.

Index words: corporate portal, enterprise portal, intranet, personalization, categorization, taxonomy, search engine, information overload, repository, architecture, framework, profiles, knowledge management, content management, metadata, XML

## ABSTRACT

In this paper, we describe a strategy for managing information overload on corporate Intranets. We define a corporate portal and describe the framework and components that are essential to providing the capability to organize content using categorization; to provide a Web-based interface to information; to personalize the portal, allowing employees to tailor information for their individual requirements; to search multiple repositories such as e-mail, file and data stores, and the World Wide Web; and to access different sources of information through a universal client interface.

## INTRODUCTION

In the last few years, information technology and the Internet have exponentially increased the amount of information that Intel employees must process every day. Information is delivered at an astonishing pace and from a dizzying array of sources such as e-mail, news, documents, reports, articles, digital files, video and audio files, and transactional data. Yet, it is difficult to take advantage of this wealth of information because it is buried in separate, often disconnected and disorganized repositories. In addition, the volume of data leads to information overload for our employees.

Herbert Simon, an economist, describes information overload as follows:

What information consumes is rather obvious: it consumes the attention of its recipients. Hence, a wealth of information creates a poverty of attention and a need to allocate that attention effectively among the

overabundance of information sources that might consume it.

We must confront the problem of information overload at many different levels, using a combination of approaches. A corporate portal will help transform some of the chaos existing today on Intel's Intranet.

## INFORMATION OVERLOAD

E-mail is a key cause of information overload at Intel. But it isn't e-mail alone that creates this problem. We have more than one million URLs on our Intranet, with more than 100 new Web sites introduced every month. Much of this information is stored in a disorganized fashion resulting in some business decisions being based on incomplete or out-of-date information.

The following is a short list of key issues that make it difficult to access information in a timely manner:

- Information is scattered throughout Intel in personal documents, e-mails, transcripts of discussions, etc.
- Finding relevant, accurate information is time-consuming, difficult (if not impossible), and often requires searching multiple systems.
- Information is accessed through different methods such as Web browsers, e-mail clients, and applications.

These combined issues result in the loss of productive time spent searching for information, the increased likelihood of making decisions based on incomplete and inaccurate data, and the failure to effectively respond to important messages and information. Our research on these issues suggests a corporate portal (sometimes referred to as an enterprise portal) as a potential solution.

## THE CORPORATE PORTAL CONCEPT

Corporate portals are a relatively new business concept. A corporate portal is an Intranet site that is similar in design to popular Internet sites such as My Yahoo\*. It offers a single point of access for the pooling, interaction, and distribution of organizational information [4]. This browser-based system provides universal access to business-related information in the same way that an Internet portal acts as a gateway to the wealth of content on the Web [1]. A corporate portal enables a company to provide users with a single gateway to the personalized information they need to make informed business decisions [1]. Thus, a corporate portal can increase employee productivity by addressing many of the issues described in the previous section [1,2,3,4].

Figure 1 shows the corporate portal adoption rate based on a Delphi Group survey of Fortune 500 companies [4]. About 35% of these companies have implemented a corporate portal and another 30% are in the pilot/experimental stage of development.

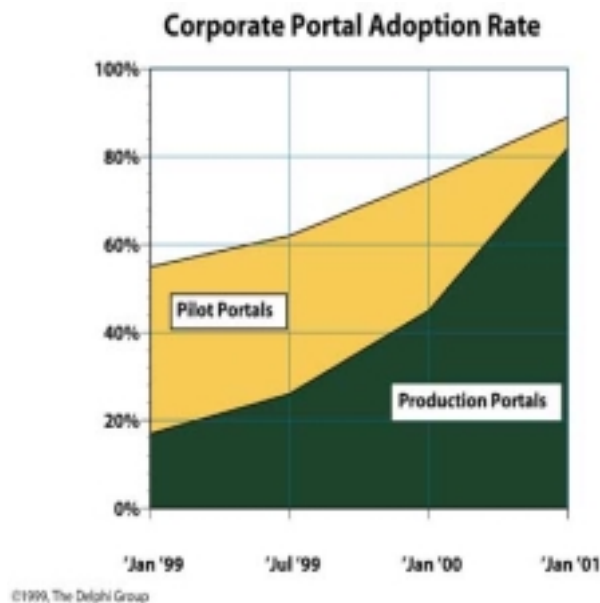


Figure 1: Corporate portal adoption rate

## CORPORATE PORTAL STRATEGY

The key steps to Intel's corporate portal strategy include the following:

- Identify the content that is or will be available, and identify where this content resides.

\* Other brands and names are the property of their respective owners.

- Leverage existing systems, resources, and repositories.
- Include both structured and unstructured information.
- Organize content into categories that can be browsed and searched.
- Integrate search functionality across multiple information repositories.
- Build a platform for publishing and subscribing to content.
- Deliver personalized content and services to users based on their preferences and roles.
- Develop the corporate portal in phases.
- Create online "communities" to connect people and enable collaborative work.
- Develop an extensible architecture that allows for extended functionality.
- Sustain a collaborative portal by "institutionalizing" it within daily business operations and weaving it into long-term strategies.
- Purchase an integrated portal product rather than building custom portal functionality.

## Business Benefits

The main benefit of a corporate portal is the increased employee productivity that results from the following improvements:

- organized and structured information, which is easier to navigate
- quick access to relevant personalized news, information, services, applications, and documents
- a highly interactive and personalized interface that provides targeted information based on employees' roles and preferences
- enhanced search capabilities that reduce the amount of time necessary to find sought after information
- filtered, targeted, and categorized information so users receive just what they need

## CORPORATE PORTAL FRAMEWORK AND CAPABILITIES

After an extensive R&D project the team identified an appropriate set of capabilities and infrastructure elements for a corporate portal (see Figure 2).

(Due to the breadth of corporate portal functional possibilities, focusing on the key requirements is critical.

This framework could be adapted to fit different business requirements.)

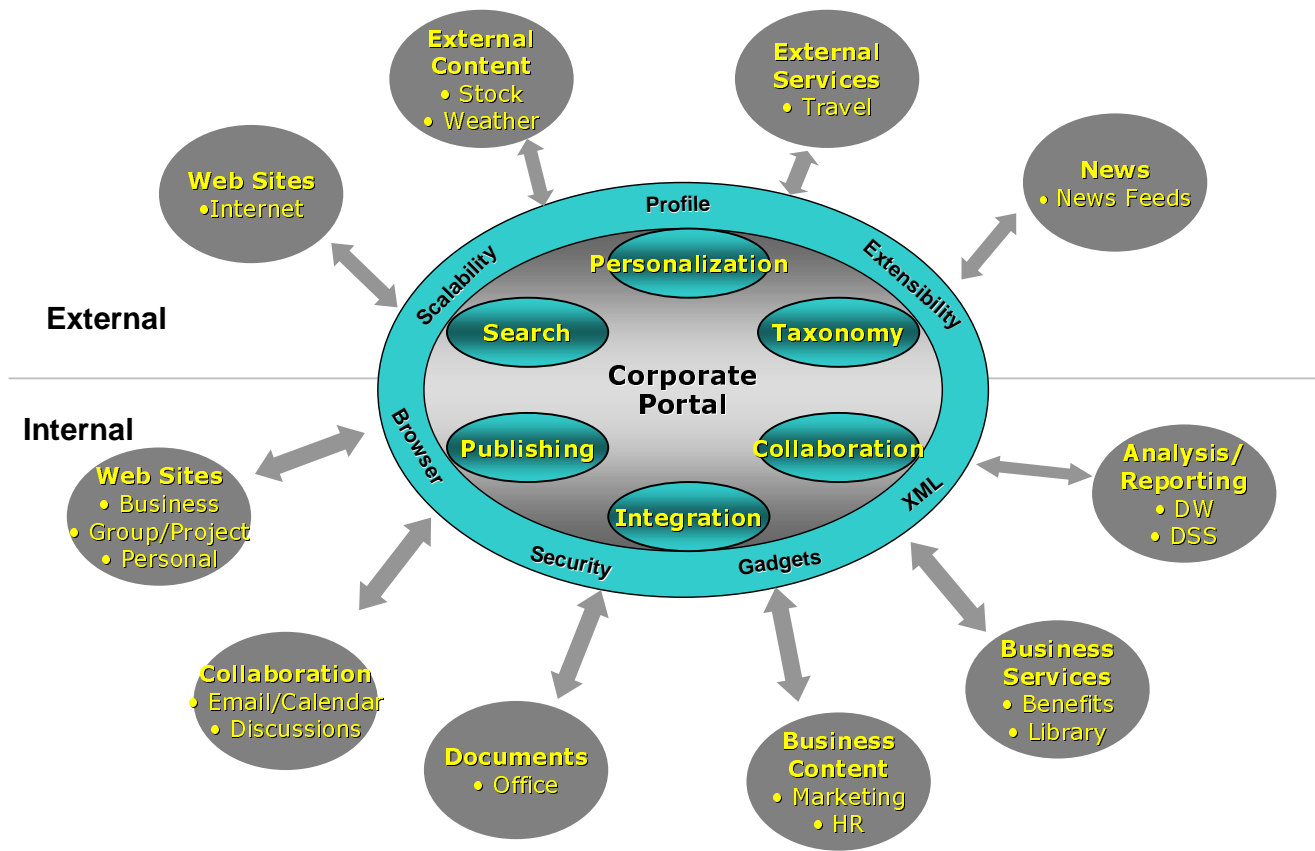


Figure 2: Corporate Portal Framework

## Categorization

The sheer volume of data maintained on Intel's Intranet Web sites is expanding rapidly and is scattered throughout the company without any context. A portal can provide the structure, organization, and context necessary to transform this information into a significant Intel resource. A Yahoo\*-like structure that organizes information under specific categories is an efficient way to enable employees to find specific information of interest.

Categorization of corporate information is critical because it provides employees with a navigation directory that can be browsed to find specific information. During the categorization process, each piece of information must be labeled to indicate what it contains and how it relates to other pieces of information. For example, a collection of

documents can be organized alphabetically, or by subject, function, business group, geography, projects, products, etc. The challenge is to create categories that make the most sense to business users. To address the needs of different users, it can be an effective strategy to create multiple views of the same sets of documents.

The first step in the categorization process is to identify the high-level categories under which information can be organized. Once this classification, or taxonomy, is created, the next step is to define the process of evaluating how content and documents will be indexed within the taxonomy. In the past, this was done manually. Today, automatic categorization technology is maturing quickly; although it still requires manual intervention by a librarian. In either case, users must be able to use a Web browser to browse the taxonomy.

One of the key issues for searching and assessing content is establishing context: what is it, what it is about, when was it created, who created it, and for what purpose was it

\* Other brands and names are the property of their respective owners.

created. Metadata can help establish this context. Metadata is information about information. For example, metadata consists of keywords and summaries that help provide context for information on the Web. In addition, metadata from different documents can be used to describe the relationships among documents.

## **Content Publication and Management**

Content lifecycle management helps to prevent content from becoming dated. One useful practice is to specify an expiration date for all content. When the content expires, the owner is notified and can then extend the content expiration date or let the content be archived. Therefore, when creating a corporate portal, the process for authoring, approving, and publishing different types of content must be defined. Utilizing an automated workflow can ease this process.

The most effective time to capture metadata is during the authoring process because authors usually have the most knowledge about the content. Some document formats allow metadata to be stored inside the document itself. HTML contains <TITLE> and <META> elements for storing such metadata as titles, keywords, descriptions, and author information. Microsoft Office\* documents can store standard summary information such as title, description, and author.

Where possible, XML tags should be used to identify each searchable attribute in a document so that search engines, robots, and applications can locate the document when searched. Using metadata to search within documents for specific fields such as author, title, or location enhances the ability to pinpoint information.

## **Integrated Search**

Because corporate information resides in numerous places, an integrated search capability across multiple information repositories (Web/Intranet, e-mail, discussion forums, databases, and applications) is essential.

A full-text search function can produce highly accurate results. As mentioned above, the capture and use of metadata across content is another way to improve search results. Whether searching text or metadata, the search capability must function both within and among selected repositories.

---

\* Other brands and names are the property of their respective owners.

## **Personalization**

The goal of personalization is to deliver content relevant to an individual user or group of users based on their roles and preferences. The ability to present a personalized, relevant set of information is critical to portal success. Each user's portal experience must be tailored to that user's preferences, security levels, and access authorizations. Also, users should be able to subscribe to specific content, and should be informed (by a notification service) when that content changes.

Personal profiles are the architectural components that contain user information and preferences. These profiles can be created from information manually entered by the user, or by gathering user information from existing databases. User profiles can then be used by portal services to tailor their content for the user.

Several architectural considerations are necessary for personal profiles. Should there be a profile within each application that will be personalized. If yes, should the profile be based on a common schema. Or, is the personal profile commonly shared across applications. Using a common personal profile offers several advantages, including a single place to store and manage user profile data. This removes the necessity of having the same user (who needs access to different systems) in multiple profiles.

When creating a personal profile, it is often difficult for users to specify all their preferences up front. Over time, their preferences will evolve and change. Through user behavior monitoring and analysis, automatic profiling can help to address the issue of out-of-date user profile data. In addition, users need to have the ability to modify and update their profile data.

Moreover, because user profiles contain personal data, privacy is a significant issue. Privacy strategies must be established to effectively protect private data. Because many countries have specific privacy laws and requirements, an understanding of international privacy laws is also critical.

## **Goal-Oriented Interface and Navigation**

The design of the interface and navigation scheme is key to the success of a corporate portal. Information must be available through a common, browser-based user interface. Moreover, the interface must be intuitive enough that users do not need to understand and configure a complex system in order to gain value from the site.

Developing an intuitive user interface requires significant research. The first step in the process is to define who the users of the site will be. Next, learn about their goals and

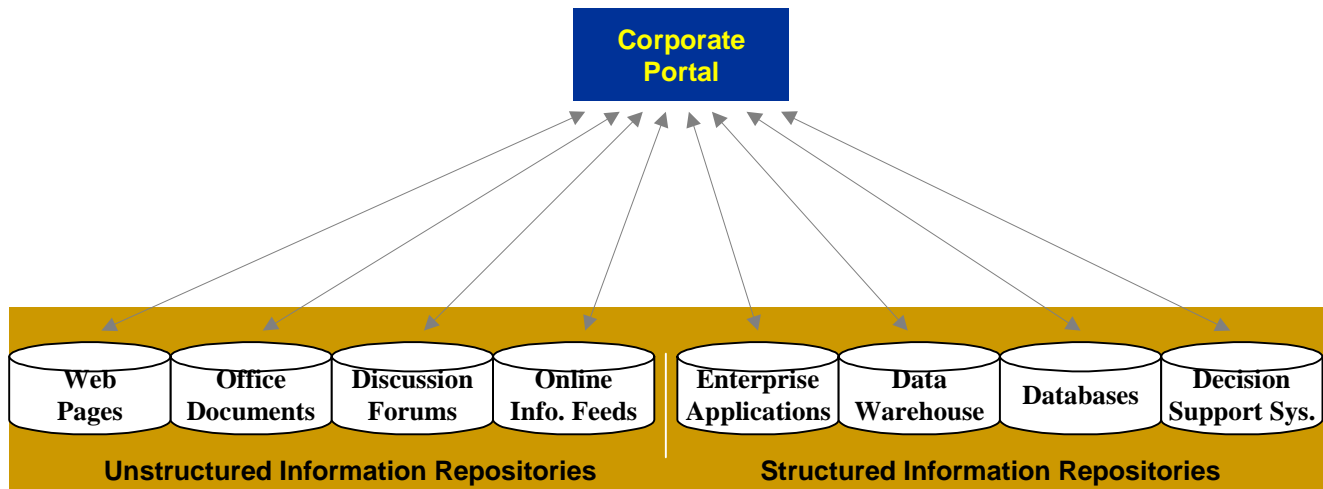
motivations, such as what problems are they trying to solve. An understanding of how users do their work is also very helpful. Then ask how the interface can help the user reach these goals.

Formulate your usability criteria, and then test it with the potential users of the portal site. Show the site to them and document their experiences. Watch them navigate. Note their body language as pages appear on the monitor. Most importantly, let them control the mouse. Finally, use the information you gain during the testing period to make adjustments to the interface. And, make sure the design has built-in flexibility so that adjustments can be made quickly and easily throughout the life of the portal site.

**Integration**

The ability to present a unified view of corporate information depends on integration capabilities. A key enabler is the definition of an information architecture for the corporate portal.

As mentioned previously, corporate information is spread across many sources within Intel. The seamless integration of information from both structured and unstructured repositories is a challenge. The appropriate level of integration must be determined. Figure 3 shows various information repositories that need to be integrated through the corporate portal.



**Figure 3: Structured and unstructured repositories**

**Collaboration**

A corporate portal can effectively create a shared community across the organization. This community is critical in an age when virtual teams and groups are becoming more significant.

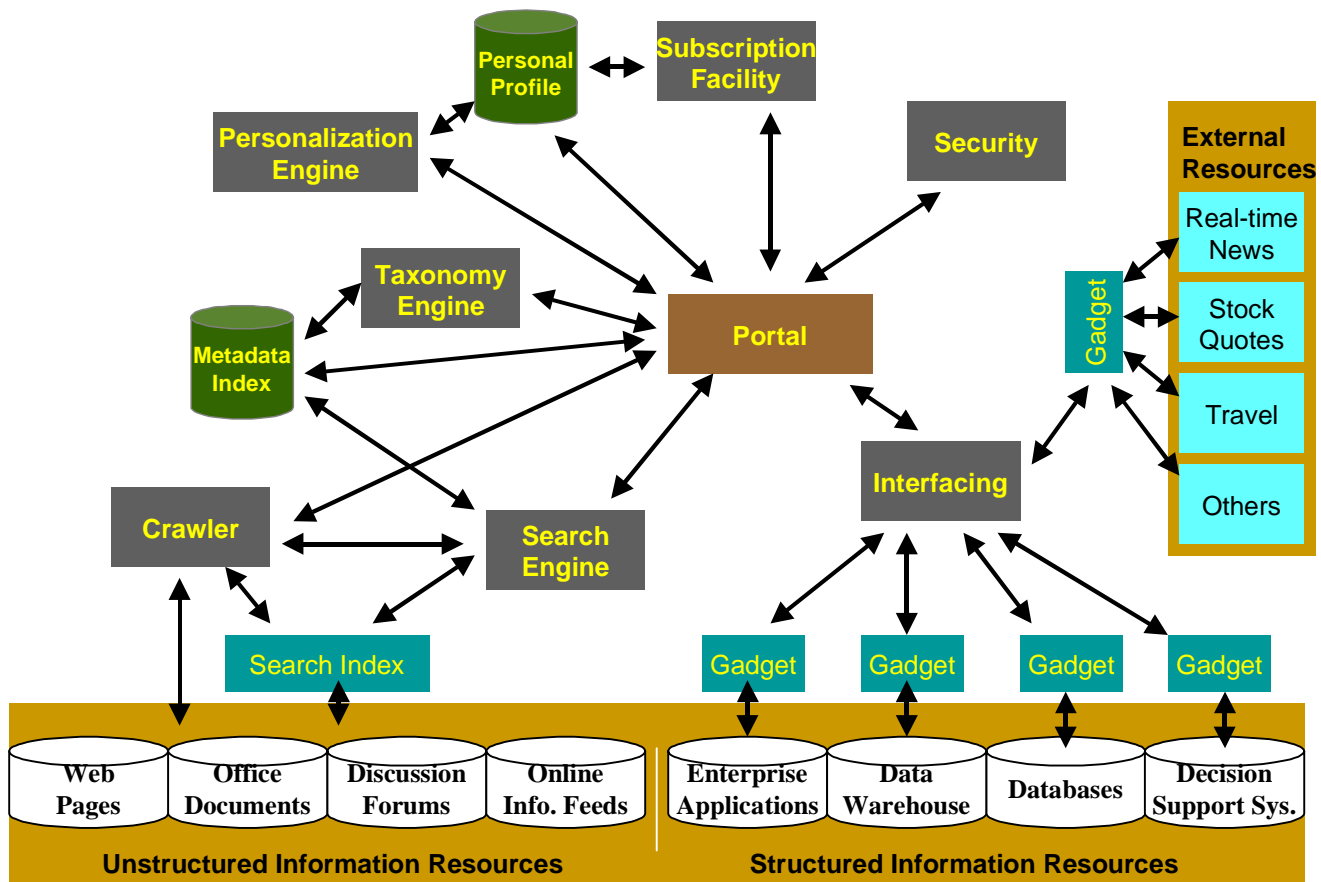
The corporate portal also can be used to project the organizational identity, deliver corporate messages, and interact with employees.

Advanced capabilities to build community are critical to a corporate portal. Asynchronous capabilities include e-

mail, discussion forums, etc. Synchronous capabilities include online meetings, video conferencing, and chat. Network bandwidth must be considered when implementing synchronous collaboration capabilities.

**CORPORATE PORTAL ARCHITECTURE**

Figure 4 shows a corporate portal capability architecture. A few of the architectural principles underlying a corporate portal are described below.



**Figure 4 : Corporate portal capability architecture**

**Plug-and-Play**

The portal framework needs to offer a plug-and-play capability that will allow additional functionality as the portal grows to meet future requirements.

**Standards-Based Tools**

The portal framework utilized several emerging standards, specifically, HTTP, IP, HTML, and XML.

The eXtensible Markup Language (XML) separates content from how that content is presented. Data is kept completely independent from its known, and maybe yet-to-be-determined, output format(s). The separation of data and format allows the same content to be presented in multiple views. One possible application for the corporate portal is building personalized views based on user preferences.

Style sheets determine how an XML-based document is rendered for presentation. Style sheet standards include the following:

- Document Style and Semantics Specification Language (DSSSL) provides facilities for display and transformation of SGML and XML data.
- Cascading Style sheets (CSS) provide straightforward, generally sufficient features for using styles in the context of XML and HTML.
- Extensible Style Language (XSL) is designed in a template-oriented fashion to provide powerful features to display and transform XML data.

**Extensibility Through “Gadgets”**

“Gadgets” are new application tools and services in the portal, provided via modular components. “Gadgets” provide the architectural construct to enable future extensibility without having to completely redevelop the portal. By using gadgets, new functionality could be easily added.

## CHALLENGES

There are two key challenges facing developers of corporate portals: available technology and viability of corporate information. Today, many technology suppliers are repositioning themselves as portal vendors, but not all of these vendors have comparable solutions. A careful analysis of these vendors is necessary to fully understand their specific capabilities and technical approach.

It is also important to realize that a portal is only as good as the corporate information repositories that it accesses. If the information in these repositories is not correct or up to date, then the portal information will not be correct or up to date.

## DISCUSSION

Do integrated packaged portal systems provide a better solution than custom-developed corporate portals?

Two potential approaches can be taken when creating a corporate portal. The first approach is for developers to select and use the best solution for each capability defined in the corporate portal framework. The second approach is to look for an integrated solution that offers most of the defined capabilities. Our research suggests that truly integrated corporate portal solutions contain more functionality, are easier to maintain, less expensive over the complete lifecycle, and are faster to deploy.

## CONCLUSION

Corporate portals are the logical evolution of Intranet sites as organizations continue to look for ways to improve employee productivity and job satisfaction. To this end, Circuit, Intel's Intranet home page, is evolving into a corporate portal. Currently there is a team working on a next generation prototype of this corporate portal and a pilot of this new technology is planned for Q2, 2000.

Due to the fast pace of change in portal technology and in business requirements, the strategy and architecture of a corporate portal should be flexible enough to evolve over time in response to these ongoing changes.

## ACKNOWLEDGMENTS

We thank IT R&D Council for allowing us to research this key emerging area. We also thank IT management for recognizing this area of importance and for believing in us. We acknowledge the cross-functional R&D Corporate Portal Team .

## REFERENCES

- [1] *Enterprise Information Portals*, Merrill Lynch, 16 November 1998.
- [2] G. Phifer, *Portal Trends Emerge Among Confusion*, Gartner Group, April 1999.
- [3] M. West, *A Framework for Enterprise Portal Simplifies Intranets*, Gartner Group, April 1999.
- [4] *Corporate Portals*, Delphi Group, April 1999.
- [5] Reynolds, H. and Koulopoulos, T., *Enterprise Knowledge Has a Face*, March 30, 1999, Intelligent Enterprise.

## AUTHORS' BIOGRAPHIES

**Atul Aneja** is an architect in the IT Strategy & Technology group where he leads Intel's R&D efforts in the areas of corporate portals, personalization, and e-Business architecture. His other research interests include software architecture and emerging application capabilities. His e-mail is [atul.aneja@intel.com](mailto:atul.aneja@intel.com).

**Chia Rowan** is a manager of Circuit, Intel's corporate Intranet site and is responsible for its evolution into a corporate portal. Her email is [chia.l.rowan@intel.com](mailto:chia.l.rowan@intel.com).

**Brian Brooksby** is the Technical Marketing Engineer for "Circuit," Intel's corporate Intranet site. He has designed document management and Web publishing systems for several Intel Web sites and is currently focused on developing Intel's corporate portal. His e-mail is [brian.brooksby@intel.com](mailto:brian.brooksby@intel.com).

Copyright © Intel Corporation 2000. Legal notices at <http://www.intel.com/tradmarx.htm>.