Introduction
The Web has become an integral part of daily life. In an attempt to provide an attractive, yet informative view of an organization, web sites offer links to a variety of types of information, combining the collective, traditional roles of newspapers, encyclopedias, weather and sports reports, dictionaries, and much more. However, without knowing the goals and purposes of individuals who navigate websites, the sites attempt to provide access to all types of information. This one-size-fits-all format, with no means of customization or establishing a perspective or context, can be a frustrating for users. In response to this obvious need for a customizable entry point, portals have appeared and evolved.

What is a “portal”?
Webopedia.com defines a portal as “a Web site or service that offers a broad array of resources and services, such as e-mail, forums, search engines, and on-line shopping malls. The first Web portals were online services, such as AOL, that provided access to the Web, but by now most of the traditional search engines have transformed themselves into Web portals to attract and keep a larger audience.”

Simply put, portals provide a flexible, customizable, personalized access and view of information based on the interests, roles and stylistic preferences of individuals. The information is often presented in the form of links and “channels” that relate to areas of interest, applications, events, calendars, discussions, searching, content management, and more, in formats tailored to the aesthetic and topical interests of individuals. Since portals require authentication in order to establish the identity of each user, the look and contents will be the same every time accessed and from any location. Web sites lack this portability, in that bookmarks are stored on a single machine and lack automatic portability.

Some of the most common features of portals are news, announcements, course catalogs, directories, calendars, library information, course management systems, alumni systems, registration, human resources information, menus, weather, financial applications, student information systems, employment opportunities, room reservations, campus store, and webcams.

---

1 http://www.webopedia.com/TERM/W/Web_portal.html
Portal user customization includes a personal greeting to the user, choices of appearance, layout, content by column, colors, themes, organization of content, language, refresh rate, time zone, and text size.

An example of a customized portal is MyExcite² shown below.

---

How Does a Portal Differ from a Web Site?

Web pages are customizable by the creator of the pages, but not significantly by the users. They look much the same regardless of the browser used or your identity or role. The browser acts as

² Copyright © 2001-2005 The Excite Network, Inc.
a common user interface. Pages may be public or generally viewable, or private, requiring authentication to gain access. Once you have access, the information will look the same to all users. Cookies provide some means of customization, but not nearly the same as with a portal.

Portals are customizable; their look and functionality may be different depending on who you are and the functions you have chosen to include or are authorized to use. Once you have identified yourself to a portal, the look and functionality may differ widely from those available to another user.

In general, portals provide a unified interface with the ability to access multiple types of information, varying from general interest topics such as the news and the weather, to topics relevant to groups with common interests you have chosen (or have been chosen for you) that may be based on your interests, identity, or role, such as specific applications or materials pertaining to course for which you have enrolled or the status of an account. Some portals provide resources for people who share a common interest, are members of a community, or work in a specific industry. Portals provide opportunities to customize the look and functionality available and to tailor the links, content, and applications you see based on the roles you play within the organization or group.

**Why Portals?**

“Modern software is complex and expensive, which has motivated many companies to invest in enterprise portals as a mechanism by which they can manage information in a cohesive and structured fashion.

Portals offer many advantages over other software applications. First, they provide a single point of entry for employees, partners, and customers. Second, portals can access Web services transparently from any device, in virtually any location.

Portals distinguish themselves from other software systems because they provide the ability to integrate disparate systems and leverage the functionality provided by those systems. As such, they are not mutually exclusive, and do not force you into an either-or decision vis-à-vis existing software systems. This point is of paramount importance, particularly when you consider the fact that Web services are destined to fuel the explosion of Web applications. Since portals can access any Web services, the conclusion is inescapable: portals provide a unique opportunity to leverage the functionality of nascent technologies as well as mature, well-established software systems.”³

**Portals Are Essential for Information Delivery on Campus**

While the web has provided a generalized means for communicating with the public as well as internal users, portals now provide a customizable environment supporting single sign-on authentication, administrative and academic applications, role-based information access, and communications. Typical applications delivered via the portal include announcements,

administrative applications, library information systems, course management systems, events calendars, group calendaring, and employment opportunities, all tailored to the individual and the roles filled by the individual – with the content and format chosen by or for the individual.

Proof of concept was established by early adapters. Some products were available to higher education with support provided via advertising. It quickly became a choice between cost to the institution versus permitting advertising on institutional portals. Commercial portals often include advertising as part of their business model. Higher education has not been enthusiastic about including advertising as a means of subsidizing costs.

Beyond the early adapters, early followers have expanded the range of applications available through a portal. The concept has been proven and the deployment, while not without costs and issues, has been successful, regardless of open source or vendor portals. It is now realistic to expect that portals will become the standard entry point or door to the information enterprise.

The latest generation portals include customization of the look of information, are intuitive and quick to navigate and use, integrate diverse applications, deploy “best practices” for security and privacy, and facilitate communication among members of communities. Their effect is improved communications and information flow, increased collaboration, secure access to information, convenient access to a wide variety of applications, and support for self-service applications, all with local and mobile access. No project is without costs, so portals should not be viewed as a money saver. However, they should be viewed as a means for extending its presence in a branded environment.

**Importance of Portals**

Finding and deploying effective means of providing communication and access to information is an ongoing challenge for all organizations. There are many types and sizes of communities of interest (e.g. applicants, students, faculty, staff, alumni, vendors, donors, governmental agencies, and more), each with diverse interests and needs for information. Developing and maintaining web sites for each unique community is both cost prohibitive and confusing when an individual fits more than one category. Imagine the task of keeping many, many web sites updated and in sync.

With customization as an integral feature, individuals may be assigned rights that facilitate access to features, channels, and information targeted to their roles and needs, thus simplifying communication with target groups or audiences. Previously, such communication was done via using intranets or email to lists (now viewed as spam).

Portals provide the best means yet for facilitating communication, authenticating who the user really is, and having a single place to find timely and commonly needed information or access to applications. As such, the portal becomes a user’s personal door to the information enterprise.

**Open Source and Vendor Portals**
While all portals have certain common attributes, there are basic differences between open source and vendor portals.

**Open Source Portals**
The key words associated with open source portals are no license fees, no annual fees, the ability to customize, and collaborative development and support efforts. There are many open source development projects including operating systems, productivity suites, and, of course, portals.

Typically, open source portals:
- Have no licensing fee
- Available to the public for use and modification
- Provide full and free access to source code
- Rely on the community of users to provide development and support, and freely share modifications and improvements

Open source portals have the following advantages:
- Local control of customization
- No long term vendor licensing and support costs (No escalating annual fees)
- The greater the number of organizations involved in developing the software, the better the support, functionality, enhancements, and integration to other products and applications

Open source portals have the following disadvantages:
- Customization and support is provided locally through support staff or through other organizations using the product; i.e. there can be a significant cost for local support
- Support is dependant on the community of institutions; there is no vendor to rely on
- It is difficult to estimate annual costs for budgeting

“(The) use the free source code effectively could require hours of interdepartmental planning and a degree of technical expertise beyond that which most webmasters possess, say campus-technology experts involved in the collaborative programming project.”

“uPortal is a free, sharable portal under development by institutions of higher-education. This group (JA-SIG) sees an institutional portal as an abridged and customized version of the institutional Web presence... a "pocket-sized" version of the campus Web. Portal technology adds "customization" and "community" to the campus Web presence. Customization allows each user to define a unique and personal view of the campus Web. Community tools, such as chat, forums, survey, and so on, build relationships among campus constituencies. uPortal is an open-standard effort using Java, XML, JSP and J2EE. It is a collaborative development project with the effort shared among several of the JA-SIG member institutions.”

---


5 [http://www.uportal.org/index.html](http://www.uportal.org/index.html)
Vendor Portals
Vendor portals share the characteristics of portals in general, but are licensable products from vendors, usually with the expectation on ongoing development and support from the vendor for a fee. Typically, vendors consider their source code as proprietary and do not supply source code to customers, but do provide means for interfacing applications and offer services for customization. Vendor portals are often associated with a suite of applications.

Most vendor portals are:
- Licensed for a fee
- Do not usually provide access to source code
- Supported by the vendor (usually for an annual fee)

Vendor portals have the following advantages:
- Primary support is provided by the vendors, thus minimizing the need for in-house technical staff to support portal
- Application development and security fixes are provided by vendor
- No (or not as much) research and development funding is needed
- Predictable budgeting (fixed annual cost)

Vendor portals have the following disadvantages:
- Customization can be extremely difficult (particularly when source code is not provided)
- Annual support contracts keep support costs high
- Initial investments may be high, which may lead to reluctance to change to another vendor or platform.

Both open source and vendor portals may adhere to a variety of standards for their framework, design, functionality, tools, development languages, implementation process, and interoperability.

**Horizontal and Vertical Portals**
In addition to having both vendor and open source portals, portals made be viewed from another perspective and characterized as horizontal vs. vertical. Horizontal portals usually serve an entire enterprise by providing information and applications across multiple categories of users representing all members of a community. Most vendor portals are intended to be used as horizontal portals, and usually include channels for news, email, weather, finance, and search engines.

Vertical portals deliver organization-specific content oriented toward a topic or a segment of a population or a specific audience (a hobby, a business sector, etc.) and all the information needs related to that segment. “winespectator.com” is an example of a vertical portal. Access to specific content is established by the authorizations of the individual user. An organization may have multiple vertical portals, each tailored to the needs of that segment.

---

6 2005 Wine Spectator Online
“University or enterprise portals, which can be either vertical – focusing on a specific application such as human resources, accounting, or financial aid information, or horizontal – offering access to almost all the information an individual within the university needs to carry out his or her functions.”

Best practice indicates that there should be only one horizontal portal for an organization. Having multiple portals is quite costly and presents issues related to governance, procedures, authentication, training, support, and confusion to users. The support of multiple portals should be discouraged. Should that be unattainable, the deployment of a high level portal may present a means to integrate existing portals.

**Major Portal Vendors**
Within recent years, the number of portal vendors has grown smaller. Major ERP vendors usually have a portal product that interfaces to their applications. This is true for Oracle/PeopleSoft, SAP, and SunGard/SCT. Examples of other sources for vendor portals include Apache, BEA, Blackboard, BSR, IBM, Microsoft, Sybase, and Vignette. The JA-SIG\(^7\) provides access to the major open source portal, uPortal.

**The Evolution of Portals**
As with all other software, portal have evolved through generations of design and development, each adding new or improved functionality and focus for local and mobile users.

First generation portals provided a single, customizable place from which users could access commonly used information and applications. The emphasis was on content. Typical applications were searching, announcements, and content management within a common framework with navigation features similar to the web.

Second generation portals added and integrated functionality, particularly to facilitate collaboration, and expanded the usefulness to the mobile user. The emphasis was on services. The transition from generation one to two also strengthened the basic framework while placing greater emphasis on security.

Third generation portals began to address a wider audience than prior generations. Enterprise applications and data warehouses began to be accessible via portals. This generation represents the merger of multiple portals and dawning of an enterprise portal. Third generation portals focused on integration and enterprise solutions.

Fourth generation portals extend the functionality for collaboration and communication. Chats and discussions became a way to facilitate communication and make the experience interactive. This is the first generation of portal to provide a desktop environment from which users could manage much of their daily tasks, regardless of their roles. Fourth generation portals focus on

---

\(^8\) [http://www.ja-sig.org/](http://www.ja-sig.org/)
federation of information from within the enterprise and external sources as well as the merger of multiple portals which may have been created in response to the absence of an enterprise portal. Generation 4 enterprise portal solutions will more frequently incorporate evolving architectural components, such as application platform suites (APSs) and smart enterprise suites (SESs).  

Fifth generation portals are beginning to emerge with an orientation toward application delivery, the simplification of the application integration effort, and the incorporation of a myriad of standards. While the effort for the standardization of browsers has been less than successful, the effort will continue to establish standards for portals.

The Future of Portals
Certain predictions can be made regarding the directions of portals. There will be a further reduction in number of viable vendors. Vendor portals are consolidating around ERP suites. Advertising-based portals will no longer be in the mix of choices. Open source portals are becoming more mainstream as the size of the development community continues to grow.

Regardless of the source of the portal software, the future will include enhanced communication and collaboration tools, flexible customization features, an even broader set of channels and applications, and the integration with mobility devices, all with a strong emphasis on security and privacy.

As institutions have recognized the necessity of have web sites as their official, branded presence on the Internet, portals will become the official, branded gateway for accessing the resources of an organization.

Issues to be Addressed
Despite the evolution of multiple generations, there are still many issues that need to be addressed. Customization, enhancements, costs, and modification of applications are all key issues that still need to be addressed. Single sign-on is a difficult problem when dealing with older, legacy applications. The availability of source code and the talent to modify it remain outstanding issues.

While single sign-on is attractive, there are many security and privacy issues to address. Authentications, the definition of roles/authorization, and the use of tokens instead of passwords are important security issues that are not unique to portals. Privacy issues to be addressed particularly when defining roles with permission to access confidential data. This, too, is not unique to portals.

Legacy applications continue to be difficult to interface to portals. The lack of source code or talent to modify the programs will continue to hinder integration. Over time as legacy systems are replaced or upgraded, this problem should be diminished.

---

Organizations currently supporting more than one portal will likely find the need to merge them into one or create a single enterprise portal with a common strategy and governance.

Important factors to consider are the needs and expectations of the project, definition of the target audience(s), the content and functionality needed, the granularity of roles to be implemented, and the portal’s governance structure. Decisions need to be made regarding prioritization of new developments, functionality, support, initial and ongoing funding, and intellectual property rights. In addition, it is wise to consider the viability of a vendor or collaborative consortium before committing to a supplier.

In deciding between vendor and open source portals, institutions must face the critical issues of interoperability and support. There are also some free portals that depend on advertising for revenue. However, advertising-laden portals are rarely used as the basis of enterprise portals. In addition to the real estate dedicated to advertising, there are many questions related to both security and privacy of information. It is not considered wise to use such a portal when providing access to confidential or sensitive information.

Critical questions for Enterprise-Level Portals include the following:
What is the portal product market segment, and what is the likely survivability of the institution’s proposed or current vendors? What are the TCO (total cost of ownership) implications of these vendors’ technology?
Given the stage of maturity of the institution’s enterprise portal, what is the best strategy to address low-cost operations and high user satisfaction?
What are the best practices for portal development, deployment, and support for the institution?
How can the institution build/enhance a portal to be the unifying platform for the future—today as part of a portal ecosystem and tomorrow as the portal fabric?10

Conclusions
“Portals have many advantages, which is why they have become the de facto standard for Web application delivery. In fact, analysts have predicted that portals will become the next generation for the desktop environment.”11

Portals have become the tool of choice used by institutions to facilitate access to timely, targeted communications to students, faculty, staff, community, and alumni. The question of whether to implement a portal has been superseded with questions of when and how to provide portal functionality. When fully integrated with major applications, the portal will become the entry point or gateway to the daily functions of each user and a personal door to the information enterprise.

11 http://portals.apache.org
Related EDUCAUSE 2005 Sessions

**Current Issues Meeting** Enterprise-Level Portals
10:30 a.m. – 11:20 a.m. Wednesday
Administrative Systems, Portals, Web Administration, Design and Development

**Track Session** Creating Connectivity with a Portal
11:40 a.m. – 12:30 p.m. Wednesday
Portals

**Track Session** The 2005 Campus Computing Survey
11:40 a.m. – 12:30 p.m. Wednesday

**Track Session** Portal Growing Pains: Aligning to Your Institutional Goals
2:15 p.m. – 3:05 p.m. Wednesday

**Poster Session** Equal Library Opportunities: Insights for Off-Site Programs
4:55 p.m. – 6:10 p.m. Wednesday
Electronic Resources, Information Literacy/Fluency, Libraries and Technology, Partnerships, Portals, Teaching

**Poster Session** Identity Management: Our Road to One ID
4:55 p.m. – 6:10 p.m. Wednesday
Identity Management, Middleware, Network Security and Applications, Portals

**Constituent Group** Web Administrators
12:45 p.m. – 2:15 p.m. Thursday
Instructional Technologies, Partnerships, Portals, Web Administration, Design and Development

**Constituent Group** Enterprise Electronic Content Management
2:45 p.m. – 4:45 p.m. Thursday
Electronic Resources, Instructional Technologies, Knowledge Management, Portals, Standards, Web Administration, Design and Development

**Constituent Group** Web Portals
2:45 p.m. – 4:45 p.m. Thursday
Open Source, Portals, Technology Selection, Web Administration, Design and Development

**Poster Session** Best Practices for Supporting Customers with Homegrown Portal Solutions
4:55 p.m. – 6:10 p.m. Thursday
Portals, Support Services
Beyond the Basics: Maximizing Your Portal Investment
4:55 p.m. – 6:10 p.m. Thursday
Planning, Portals, Web Administration, Design and Development

Community Source: Cutting Costs and Sharing Success
4:55 p.m. – 6:10 p.m. Thursday
Applications Development, Open Source, Partnerships, Portals

Deploying SharePoint: A View from Four Colleges
4:55 p.m. – 6:10 p.m. Thursday
Portals

Mission Impossible: Building a Mission/Vision-Driven Enterprise Content Management System
9:30 a.m. – 10:20 a.m. Friday
Instructional Technologies, Portals, Web Administration, Design and Development