

## **PORTAL TECHNOLOGY IN THE CSU: Opportunities, Obstacles, and Options**

### **Executive Summary**

A portal provides Internet users with a single, customized entry point to network-based campus. In the higher-education context, the portals of most interest are horizontal -- that is, they are designed to offer access to almost everything that an individual user associated with the campus needs to manage his or her relationship with the University. These users can include students, faculty, staff, parents, prospective students, alumni, and members of the community at large.

Ultimately, all universities will use portal technology; it is when and how that are difficult questions. Motivations for deploying a portal can include increased productivity, improved communication, possible revenue generation opportunities, and the prospect of building a stronger relationship within and among our constituents. One potential benefit for the CSU is that many of the technical issues that are addressed by a portal implementation, including authentication, authorization, and security, are aligned with the existing objective to improve the technology infrastructure both within and among our campuses.

An emerging consensus regarding portal development includes the following major best practices and considerations:

- There should be one AND ONLY ONE horizontal portal on campus;
- Portals should be developed iteratively;
- The portal should support “single sign-on”; that is, with a single user id and password each user can access all the applications and data that she or he is allowed to use;
- CSU campuses should consider integration with both legacy systems and CMS (PeopleSoft);
- Courseware management tools should be integrated with the portal;
- While revenue generation should not drive the development of a portal, the design should be allow advertising and e-commerce if desirable and appropriate;

The portal industry is about three years old, and vendors come into and out of the market every month. Since typical licensing and development costs are several hundred thousand dollars or more, vendor selection is high-risk. In addition to some eight major vendors (and dozens of niche players), a higher-

education consortium is in the process of developing an open framework called the JA-SIG portal. The current volatility of the portal market, and the lack of agreed upon standards, argues for institutions to wait to jump into a portal unless there is a clear need or benefit that requires one.

Campuses that do intend to begin the process of developing a portal need to consider the following issues:

- What short term problem does the campus intend to solve with a portal, and is a portal the best solution?
- Is executive management willing to mandate a single portal for the campus?
- Does executive management understand that a portal represents an ongoing commitment rather than a one-time investment?
- Who owns and manages the portal?
- Is advertising appropriate? E-commerce?

In addition, careful consideration of security, privacy, and protection of intellectual property must be part of the portal development process.

There are at least three routes to portal development: build your own, buy and implement a packaged system, or purchase a portal service, i.e. outsourcing. For most campuses, development and maintenance costs make building your own prohibitively expensive. However, given the volatile market for portal vendors, buying a portal has its own risks. In addition, the costs for supporting a packaged portal are still substantial. Likewise, the business market for portal service vendors is unproven.

In addition to the questions facing individual campuses, CSU presidents may wish to consider the relative benefits and costs of 23 individual approaches to portals versus some degree of collaboration and cooperation which may help to reducing licensing and support costs. Another option would be to consider PeopleSoft's portal solution because of its obvious synergy with CMS; however, PeopleSoft's portal technology is nascent and unproven.

A portal is a gate, a door, or entrance. In the context of the World Wide Web, it is the next logical step in the evolution to a digital culture.

Portals have become one of the most visible IT issues in higher education, as well as the commercial sector. The latest Gartner "Hype Cycle" curve places portals at its apex. Gartner estimates that at least five percent of U.S. higher education institutions will have partially or fully implemented portals by fall 2000 and, according to Merrill Lynch, the total corporate portal market reached \$4.5 billion last year and is projected to reach \$14.8 billion by 2002.

This paper is intended to provide presidents and senior management with an understanding of portals, and offer an overview of portal benefits together with the potential problems and policy issues associated with them. The paper does not explain portal technology; however, some basic design principles are offered. A bibliography of portal references is also provided. Campuses may use this information as a starting point for developing a coherent, campus-wide portal policy. Some options are offered on how campuses, collectively or individually, might proceed.

### **What is a Portal?**

As defined by IBM, an Internet portal is “a single integrated, ubiquitous, and useful access to information (data), applications and people.”<sup>1</sup> A portal may look like a Web site, but it is much more. The latter, while an important part of any university’s communications strategy, is primarily a way to provide static information.

Christopher Connolly of Villanova University writes that “a portal.....is a gateway to the Web that allows the plethora of information available on Internet and intranet Web sites to be organized and customized through a single entry point. A good portal provides seamless access for non-authenticated users until sensitive information is requested, when it then prompts for a username and password. Authenticated visitors or those known to the site by cookies (textual information passed to the client to be stored on the client’s system) are presented with a more individualized view of the organization’s Web site.”<sup>2</sup> A portal “knows” the individual using it and changes with the individual; it is an individual’s personal assistant or proactive agent, ready to act on his or her behalf.

There are several kinds of portals:

- Vertical portals provide access to a variety of information and services about a particular area of interest. For example, <www.wine.com> is a vertical portal. Such portals offer information and services customized for niche audiences (e.g., undergraduates, faculty, and alumni).
- Horizontal portals, often referred to as “megaportals,” target the entire Internet community. Sites such as <www.yahoo.com>, <www.lycos.com>,

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<sup>1</sup> IBM Global Education Industry, “Higher Education Portals: Presenting your Institution to the World”, September, 2000 .

<sup>2</sup> Connolly, Christopher, “From Static Website to Portal”, EDUCAUSE Quarterly, Number 2, 2000.

and <www.netscape.com> are megaportals. These sites always contain search engines and provide the ability for a user to personalize the page by offering various channels (i.e., access to other information such as regional weather, stock quotes or news updates). Providers of megaportals hope individual users go to their sites, first to access the rest of the Internet. Their financial models are built on a combination of advertising and/or “click-through” revenues.

- Enterprise portals can be either:
  - Vertical - focusing on a specific application such as human resources, accounting, or financial aid information.
  - Horizontal - offering access to almost everything an individual user within the enterprise needs to carry out his or her function. Authentication and access are based upon the role or roles the individual plays in the organization.. Horizontal Enterprise Portals (HEPs) are customizable and personalizable. If properly designed, they can replace much of the user’s computer “desktop”.

Like a TV remote control, portals offer a number of channels. These might include reports and documents needed for class assignments; calendars; administrative information such as grades and degree audits; campus news and events; collaboration and discussion groups; reference material and links to other sources; and personal leisure, financial, or family information. Portals represent the next logical step in home page, intranet, and general Web evolution because they integrate all three.

In addition to a sophisticated search engine, other basic elements of portal development include authentication and security; caching; automated taxonomy engines; application integration middleware; relational databases; and metadata dictionaries. Many of these are “under the hood” functions, but are essential for evaluating vendor alternatives.

The balance of this paper will address horizontal enterprise portals (HEP) in a university environment,

### **Should a University Have a Portal?**

A Web portal may be the answer to a question that has not been and may never be asked. However, the hype surrounding portals and the vendors knocking on

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the door makes them impossible to ignore. Compelling reasons to develop a portal are that an increasingly Internet-savvy student body expects it, and the horse is already out of the barn. It would be hard to find a campus where someone, whether the alumni association, sports, university development or a large academic department has not either built their own portal or ordered one. This may have occurred without the knowledge, coordination, and assistance of the CIO, let alone the president..

Portal vendors often approach higher education executives with promises of revenue generation, cradle (or at least application) to endowment relationships with students, and productivity gains for all university constituencies. Although these may be potential outcomes, revenue generation also involves broader policy questions of the appropriateness of advertising on an academic portal. Other e-commerce applications may generate privacy concerns. . Individual campuses engaged in selling merchandise or services on the Web run the risk of complaints from local business people who may object to competition from a public institution.. For these reasons, it is doubtful if revenue generation should be the primary reason for development of a university portal..

That being said, ultimately, all universities will use portal technology; it is when and how that are the difficult questions. Developing a campus portal is a key strategic technology decision, which will impact the entire campus community and every other strategic technology program such as the CMS. The decision on a portal strategy requires careful analysis of long term and short term needs.

### **Who Will Benefit from a Portal, and How Will They Benefit?**

Regardless of whether the campus is looking for recognition, for ease of operations, for productivity gains and cost savings or a combination of all of these, the portal will succeed or fail based upon the perceived benefits to the university community. Theoretically, every member of the university community should benefit from the portal. It should make it easier and more efficient for every individual to carry out his or her role in the institution.

One obvious reason to deploy portals is to improve productivity by increasing the speed and customizing the content of information provided to internal and external constituencies, similar to groupware applications. Portals also serve a knowledge management function by dealing with information-glut in an organized fashion. In some ways , portals offer a technical solution, but not a total answer, to knowledge management.

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For CSU, another real benefit is that many of the technical issues which must be addressed in a portal implementation: authentication, authorization, security, messaging, etc., align themselves with efforts underway in building out the technology infrastructure. Those issues are central to a robust, end to end, inter and intra-campus network.

University portals can be a means for establishing a long-term relationship with the institution. They not only make it easy to do business with the institution, but they allow for interaction and collaboration among students, faculty, staff, and alumni with similar needs and interests. Properly implemented, portals can be a strategic asset for the institution. In that sense, they do far more than a traditional Web site of static information ever could.

Beyond institutional gains, portals offer obvious benefits to students, faculty, staff, and external stakeholders.

Students benefit from:

- Web interface to courseware and/or required information about courses.
- Increased, and easier communications with faculty.
- On-line access to grades, financial aid information, class schedules, graduation checks.
- Access to the communities of interest within the university, sports, clubs, and community services opportunities.
- Increased life-long learning opportunities.

Faculty and staff benefit from:

- Real time communications with students.
- Simplified course management tools.
- Instant access to information for advising students.
- Easily accessible information for every facet of their job.

### **What is the Current Status of Portal Development in the CSU?**

In October 2000, the CIO at Chico sponsored a survey of CSU campuses on the status of portal plans, negotiations, or deployment. Five questions were posed; 15 campuses responded, although not to every question. A follow-up question was also asked and four campuses responded. The full text of campus responses can be found at <http://spider.csuchico.edu/ladmin/bpost/portal/index.htm>" <http://spider.csuchico.edu/ladmin/bpost/portal/index.htm>. The survey addresses only portal activities of which the CIO's were aware. Following is a brief summary.

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- Only one campus indicated that it had no specific plans to implement a portal in the next two years.
- Half of the campuses indicated they will use a vendor or partnership model to provide portal technology. Others are not far enough along to make a build or buy decision.
- The consensus was that the portal should not contain advertising or shopping channels. However, some campuses believe that alumni/athletics/foundation activities may need to be exempted ..
- Most campuses have not made a vendor decision. The main vendors the campuses are looking at appear to be Mascot, Campus Pipeline, and Blackboard as well as the JA-Sig uPortal consortium.
- Some campuses agree that this may be an area where a multi-campus collaboration or volume purchasing agreement could be put in place.

### **How Does a Campus Get Started?**

At this point, the challenge is not getting started; it is corralling the disparate efforts on campus and taking a unified approach to portals. This may involve some level of executive intervention.

Some degree of consensus seems to be emerging among students of portal development concerning best practices and potential obstacles. The major ones to date include:

- There should be one AND ONLY ONE horizontal portal on campus. Theoretically, each member of the university community will sign on to the portal every day whether to access class schedules, class notes, homework assignments, calendars, e-mail, daily task lists.
- The point above does not preclude the possibility, indeed the probability, of several vertical portals nested behind the single horizontal enterprise portal.
- Build it iteratively. Generation one portals emphasize content. Generation two portals will add applications and process integration. Generation three portals will integrate data, voice, and video over wireless networks.
- There should be a single sign-on for each individual, regardless of his or her campus role. That sign-on should be designed so an individual can access

whatever information he or she is permitted to have, including access to the vertical portals. The sign-on should follow the user through any campus vertical portals.

- Sign-on should allow for the possibility of overlapping roles. For example, some students are part-time employees. Some staff are either part-time students or alumni. Administrators may be part-time faculty, etc.
- CSU campuses should consider both legacy systems and CMS. Campuses should neither build nor buy a portal without having a clearly defined strategy for migration from legacy systems to the PeopleSoft suite of software, either with the design team or the vendor. This strategy should be communicated to the campus community.
- Because the goal of a portal is a single, seamless interface to all necessary applications, whatever course software packages a campus uses should interface with the portal. To the extent possible, campuses should attempt to limit the number of course software packages that will be supported by the portal.
- While revenue generation should not be the driving force behind development of a portal, the design should not preclude revenue from advertising and/or e-commerce applications.
- Because each campus is both an institution in and of itself and also a member of a system, the concept of a common technical architecture for all CSU campuses should be considered. This does not mean that all campuses should have the same brand of portal; even less does it imply a CSU systemwide portal. It does mean that portal technologies do not stand by themselves. Both CMS and end-to-end networking are realities that will drive sharing of data in ways heretofore unheard of in CSU. The portal architecture should enable, not impede interoperability.

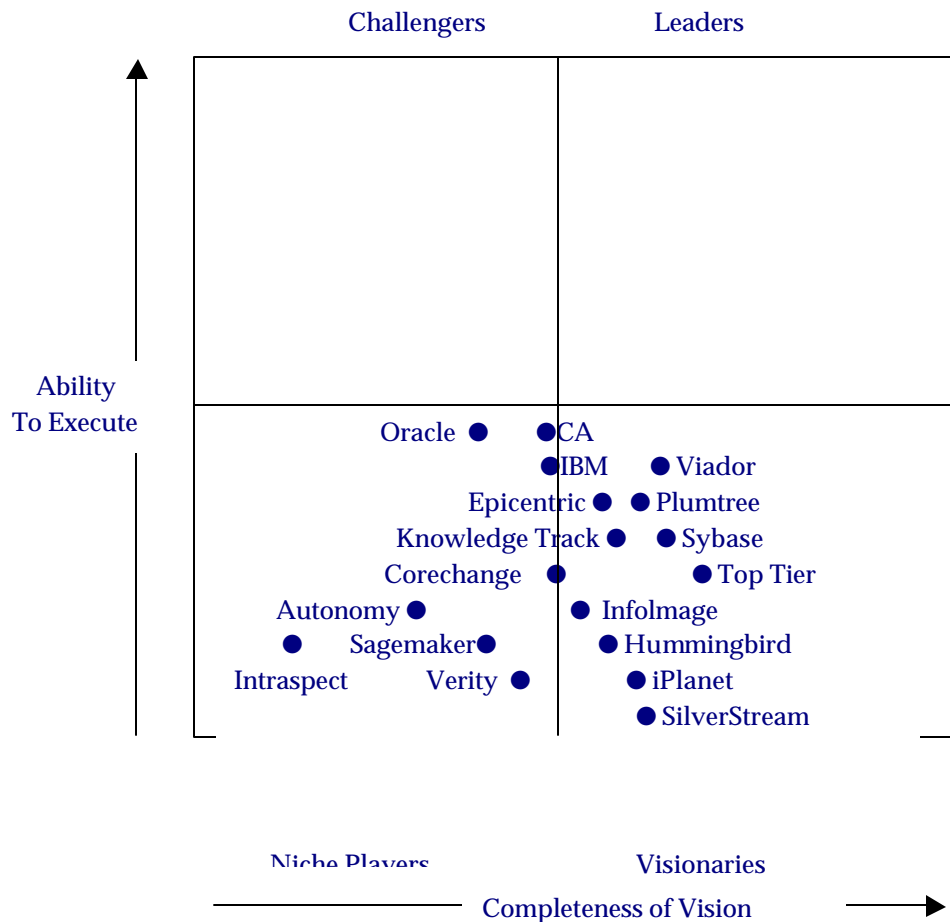
### **Who Are the Leading Vendors and What Do Portals Cost?**

The portal vendor industry is in its early stages of development, no more than three years old. Major shakeouts occur on a near monthly basis among the roughly 100 vendors. The risk for any institution in choosing a vendor under these conditions is considerable.

The Gartner Group estimates that it could cost an institution anywhere from \$50,000 to \$250,000 for a portal license fee plus 15-20 percent for maintenance.

Services and training can cost two to four times the price of the license fee. Accordingly, they recommend that institutions always deploy and test a pilot system first, and build the basic functions of content integration, database and applications integration, and process integration in an iterative fashion. Other critical functions, such as security, caching, taxonomy development, searching, and personalization should also be approached in phases rather than all together.

The Gartner Group developed the following map of portal vendors in October 2000. Currently, Gartner suggests that while there are plenty of visionary (e.g., IBM) and niche players (e.g., Brio, Oracle), there still are no leaders in the industry and no challengers.<sup>3</sup>



<sup>3</sup> Phifer, G., "Portal Products 2H00 Magic Quadrant," Gartner Group Research Note, September 29, 2000.

## Who are the Portal Providers for Higher Education?

Typically, a portal should provide personalized access to information; integrated access to data systems and attendant applications; and process integration between individual schedules and institutional calendars (often the most difficult requirement to satisfy).

The most important factor in choosing a portal vendor is the extent of its business partnerships and relationships, both horizontal and vertical. A successful portal vendor must borrow from the best practices of companies that specialize in critical areas: content providers, systems integrators, search engines; operating systems, even mobile networks.

Appendix A lists eight portal vendors that are especially active in higher education together with descriptions of their revenue models and key “selling” points. . Obviously, the advertising and e-commerce features of these products are both controversial and uncertain, and could involve higher education institutions in matters beyond their expertise or interest. However, in the words of Looney and Lyman, “...the entrepreneurial world has looked around the Internet and realized that the most connected population with the best commercial demographics is in higher education.”<sup>4</sup> The e-commerce implications of portals will never be far away, however much some wish they should be. The challenge for higher education is to adapt portal technology intended for commercial purposes to academic pursuits and academic virtual communities.

In addition to commercial vendors, the Java in Administration Special Interest Group (JA-SIG) has released the first portal framework designed by and for higher education institutions. Tentatively named uPortal, this product allows institutions to build customized portals using a publish-and-subscribe interface and functional channels developed and shared among the uPortal user community. The software is available for download free of charge from the JA-SIG clearinghouse site ([www.ja-sig.org](http://www.ja-sig.org)).

The potential advantages of uPortal are lower costs compared to commercial products, greater institutional control over content, and a Java-capable staff available to support implementation. Community sourcing is the key feature of and the key challenge to JA-SIG. Although community sourcing spares much of the cost of in-house development, uPortal still requires significant interface

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<sup>4</sup> 3 Looney, M. and Lyman, P., “Portals in Higher Education,” *Educause Review*, v. 35, n. 4, July/August 2000.

design, campus Java expertise, and users may have to develop their own channels. About 12 higher education institutions expected to have uPortal at least partially operational by December 2000.

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## What Policy Issues Should Be Considered?

In the current environment, extreme due diligence is the only protection against the volatility of the portal industry. If an institution can wait to deploy a portal, it should wait until consolidation among vendors and price competition take hold. Moreover, the industry is at least 12 to 18 months away from agreement on basic standards. If a university can not wait, then the following questions and issues should be considered:

- *What short term problem is the campus attempting to solve with a portal? Why is the portal the only, or the best solution?*
- *Is executive management willing to mandate a single portal for the campus? A portal can be a tool for building a virtual campus community. It can also drive process transformation that result in cost-efficiencies. Multiple, non-integrated portals defeat both of these purposes.*
  - *Does executive management understand and is it willing to communicate to the campus that the investment in a portal is not a one time event? Portals require a continuous investment as they evolve and migrate from interfacing with legacy systems to interfacing with CMS and all of the version changes inherent therein.*
- *Who “owns” what data and how will conflicts between data owners be resolved? Who manages the portal? The CIO is (or should be) the person on campus charged with the resolution of conflicts between data “owners”. The CIO should be ultimately responsible for access to all information systems and the seamless integration of these systems for presentation through the HEP.*
- *Is advertising appropriate on an academic HEP? Each campus must make this determination for itself. This question will be driven by a number of factors, not the least of which is campus culture.*
- *Is e-commerce acceptable through the campus HEP? E-commerce is a far broader topic than can be addressed here. There are aspects of e-commerce that are already commonplace on campuses. These include on-line catalogs and on-line purchasing; electronic funds transfer, bill payments, etc..*

One example of e-commerce is an arrangement between the campus and amazon.com where every time an individual accesses the online bookseller through the campus portal, the campus receives a small percentage of the purchase price of goods. This could pose a potential conflict with the campus

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bookstore and other campus auxiliaries. Other issues that should be considered relative to e-commerce are competitive pressures from local business people.

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Other policy considerations include:

- Security and insuring the privacy of student and employee data. There is nothing new about either of these concerns and campuses have always taken these issues seriously. However, when the possibility exists for a single sign-on to virtually every existing university information system, security becomes more than a line in someone's job description. It becomes mission critical and the responsibility of every campus employee.
- Intellectual property could become as big an issue in portal deployment as infrastructure integration (e.g., witness the Napster controversy). This is an especially sensitive issue for faculty, and policies should be established in advance of deployment.

### **We Want a Portal. What's Next?**

There are at least three routes to portal development. The first is to build your own; experts are nearly unanimous in arguing against this approach. The second option is to purchase a pre-integrated, packaged product. The third alternative is to purchase a portal service—in effect, outsourcing.

Maintenance of a “home-grown” product may be problematic. At a recent EDUCAUSE conference, one major university discussed how they had built, and now run, their own HEP. Unless they badly misrepresented their situation, there is one (very) young man who did the entire design and implementation and is the sole manager of the system.

Buying, however, is also not a risk free proposition. Vendors have various financial models. Some depend on advertising revenue; others on click-through revenues for e-commerce. Still others offer a model where the institution is charged for the number of web pages the constituents access. All of these vendors will sell their product outright – at a very high price. These are not turnkey systems and still require technical support and expertise on the part of campus personnel.

Another potential pitfall is the relative immaturity of the industry. These are “dot coms” in the truest sense, fraught with all the problems recently in the news. Most have seen the wisdom of partnering with larger, more experienced firms. However, in some cases the partnership dictates the “back room” system and/or course software solution, severely limiting campus choice. In addition, the necessity of interfacing with the PeopleSoft suite of software may be difficult.

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Everyone says they can interface with everything, and maybe they can. It has yet to be proven.

In addition to the questions that individual campuses must ask, CSU presidents need to think about the systemic ramifications of individual decisions. This paper neither advocates nor opposes a systemwide approach to portals, but offers these options.

*Option 1:* Each campus makes its own decisions relative to the purchase and implementation of a HEP. Certainly, almost all students, faculty and staff identify with the home campus, not the system. On the other hand, a go-it-alone approach can also result in higher costs for acquisition, development, maintenance and support.

*Option 2:* As many campuses as wish agree to work collaboratively on the acquisition/development and implementation of a horizontal enterprise portal. This approach makes future course and resource sharing easier for participants and has the potential for significant cost savings.

A sub-group of the Information Technology Advisory Committee (ITAC) is considering whether to work with several portal vendors to develop a product specifically for CSU. This effort is just getting started.

*Option 3:* Because CSU has such a considerable financial investment in CMS, a PeopleSoft portal solution may be worth considering. Preliminary investigation indicates that PeopleSoft can provide the interface to all legacy systems. Easy migration to their software is an obvious advantage. On the other hand, commitment to closed or proprietary architectures can limit an institution's ability to link with external partners and can reduce the overall value and flexibility of the portal.

### **What Institutions of Higher Education Already Have Portals?**

Based on discussions in the professional literature, the following universities appear to have the most well developed portals in higher education. Together, they offer a variety of design formats, content, and funding alternatives. Their experiences should inform any campus or systemwide decision in the CSU.

In the final analysis, portal deployment is much like anything else—one can have it fast, have it good, or have it cheap. The catch is that only two out of three are possible.

- University of Washington -MYUW- <<http://myuw.washington.edu>>
- UCLA -MYUCLA- <<http://www.my.ucla.edu>>
- Boston College <<http://www.ja-sig.org>>
- LSU- PAWS - <<http://paws.lsu.edu>>
- University of Minnesota - My ONE STOP - <<http://onestop.umn.edu>>
- University of British Columbia- MYUBC - <<http://my.ubc.ca>>
- University at Buffalo – MyUB- <[www.buffalo.edu/aboutmyub](http://www.buffalo.edu/aboutmyub)>

### **What will be the Role of the Information Technology Advisory Committee in Portal Implementations throughout the CSU?**

The technical challenges associated with portals and their interface to CMS and the network are not trivial. As indicated, standards are not yet stable and will not be so for a year or more. Because campuses that choose to implement portals will be facing a continuous investment in their upkeep and interoperability, the ITAC will continue to closely monitor technical changes and standards development. ITAC will make recommendations to the system CTO on guidelines and practices and on policies which should be forwarded to the Executive Council through the Technology Steering Committee.

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APPENDIX A

<b>Providers</b>	<b>Revenue Model</b>	<b>Differentiators</b>
Blackboard	Bundled with Level 3; e-commerce optional	Productivity tools, revenue sharing; Datatel alliance
Campus Cruiser	Ads, e-commerce, fees	Productivity tools, revenue sharing; Datatel alliance
Campus Pipeline	Ads, e-commerce, fees, sponsorship	Integration APIs, local hosting, SCT & WebCT alliances
Jenzabar	E-commerce, fees, sponsorship	Own four higher education ERP companies, instructional support, nonenterprise accounts
Mascot Network	Limited ads, e-commerce, fees, connectivity revenue	Community niche orientation, free implementation, coexistence strategy
PeopleSoft Portal	Free to PS customers; e-commerce optional	Pre-integration with PS; community tools alliance with iSun
UPortal	Community sourced	JA-SIG sponsorship; JAVA-based architecture; IBS partnership
Z University	Ads, sponsorship, e-commerce	Focus on alumni relations niche; revenue sharing

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