



PEPPERDINE UNIVERSITY

NONSTOP WEB SERVICES USING SUN™ ONE

KEY HIGHLIGHTS

Institution

Pepperdine University

Industry/Market

Education

Business Context

- In 1999, Pepperdine overhauled its infrastructure from legacy, closed systems to an open environment
- Pepperdine followed it up with a strategic technology plan with a vision for a Web-based computing model
- The University needed a nonstop Web platform to complement the physical OneStop administrative service center where students accomplish all of their tasks in one physical location

Business Challenges

- Leveraging enterprise application investments
- Integrating applications via a campus portal
- Creating an open environment that will accommodate evolving business needs

Solution

- Sun™ ONE architecture
- Campus Pipeline Web Platform with iPlanet™ applications
- Sun™ servers and storage

ROI

- Saving students/faculty time
- Fostering community
- Exposing inefficiencies in business practices

Pepperdine is an independent, private University located in the Santa Monica Mountains overlooking the Pacific Ocean in Malibu, California. The University enrolls approximately 8,000 full and part-time students in its five colleges and schools. With a faculty of more than 300 professors and scholars, Pepperdine offers bachelor, master and doctoral studies in a wide range of disciplines.

The University also has international campuses in Germany, England, Argentina, and Italy. Additionally, it offers undergraduate and graduate programs through educational alliances with world-class institutions of higher learning throughout Europe, Asia, Australia, and Latin America. More than fifty percent of undergraduate students spend a semester or more abroad in international programs.

Pepperdine has built a digital campus to offer administrative services to students and faculty in a nonstop, 24x7 manner. This digital campus utilizes the Web Platform product from Campus Pipeline, which is built to the Sun™ Open Net Environment (Sun ONE) standards and incorporates iPlanet™ applications. This early adopter Sun ONE case study illustrates Pepperdine's business goals for the University service portal and the return on investment (ROI).

Sun ONE is an acronym for Sun Open Net Environment. Sun ONE is the vision, products, services and expertise to enable the delivery of Web services today and Services on Demand tomorrow. It is Sun's Web services strategy. Web services are self-describing applications that can discover and engage other DARTs (data, applications, reports and transactions) to complete complex tasks over the Internet. Services on

Demand understand user context, traverse multiple networks, and provide a rich user experience, all in an open architecture. Sun ONE is a platform that enables higher education to create, assemble, and deploy XML-based Web services.

Pepperdine's Strategic Technology Plan

Founded in 1937, Pepperdine is a Christian University with a mission *"committed to the highest standards of academic excellence and Christian values, where students are strengthened for lives of purpose, service, and leadership."*

To use technology effectively in delivering on its mission, during the 1997-98 school year, Pepperdine's University Planning Committee (UPC) reviewed some immediate needs in technology. The review led to some tactical plans that were implemented in late 1998 and 1999. As a result, significant changes to the University's technology infrastructure from legacy, closed systems to new, open systems occurred that included:

- Networking of all the student residential areas on its Malibu campus
- New network operating system
- Upgrading and standardization of network servers

- A new messaging platform that unified and expanded email accessibility
- Redundancy of data network routers and switches
- Increased WAN bandwidth to the education centers
- An enterprise storage strategy for data

Building on the momentum gained from this infrastructure overhaul, the Information Technology (IT) office, which is responsible for University-wide technology infrastructure and offers support services to faculty and students, developed a strategic plan for Pepperdine’s infrastructure. Its motivation: shape the University’s thinking about how to use information technology as a tool to service education and business management needs and lay a robust foundation to deliver future services (see Figure 1).

information delivery orientation to a more interactive, transaction-oriented mode.”

Pepperdine is laying the foundation for a Web model as a principal mechanism for both information delivery and information processing. The newly implemented one stop service station (called OneStop) at the University’s Thornton Administrative Center turned out to be a roaring success and became instantly popular with students, as it allowed them to accomplish all of their tasks in one location, with staff to assist, if necessary, instead of going from office to office to complete simple tasks.

The IT office saw how effective the consolidation of accomplishing administrative tasks in one physical location was and, realizing the possibilities of Web-enablement, envisioned an electronic service center where students, faculty and staff could do

“We continue to move towards open systems and specifically towards the Sun ONE concept because it is going to give us greater flexibility with our dollars.”

*John Lawson, CIO,
Pepperdine University*

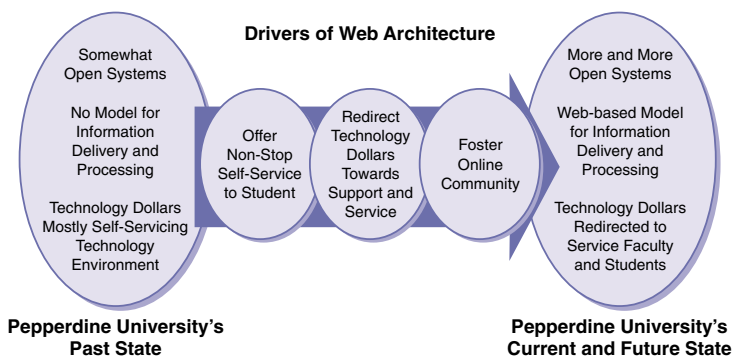
PepperdineXpress – The Digital Campus Built on Sun ONE

Pepperdine chose an enterprise class, Web-infrastructure software to unify all information and services into a nonstop electronic service center for students, faculty and staff. The IT team surveyed the various technologies available in the market to identify the one that would give them the most bang for the buck, the most benefit and the most return on investment.

Table 1 lists Pepperdine’s business goals as it went through the infrastructure decision. John Lawson, the University CIO, stressed as a key decision criteria that the new environment would “allow the ability to redirect funds that may otherwise be spent in supporting a complex infrastructure to provide better support and service.”

Following its investigation of the available solutions, the team selected the Campus Pipeline Web Platform product to serve as the foundation for its nonstop digital campus. Lawson cited two key reasons for the selection. First, the Web Platform had a proven ability to integrate well with the SCT administrative applications currently in use by the University. Second, it embodies the Sun ONE concept of open standards, critical

FIGURE 1: THE BUSINESS ENVIRONMENT



Translating Plan to Major Action Item: OneStop to Nonstop Service

Pepperdine, like many others in higher education, recognized the growing importance of Web in delivering University services. The expectation was that the Web, or Web-like technologies, would increase in importance through any practical planning horizon. According to the University’s strategic plan for infrastructure, “Pepperdine is as well positioned as any institution to attempt to track the evolution of the Web from its current largely one-way

all their tasks—moving from OneStop to NonStop. The NonStop concept meant that students could access University services at their convenience, in a self-service manner. Furthermore, it would enable the 24x7 nonstop component of OneStop. Students could first use the electronic center and see if they could accomplish what they needed to do before even walking over to the OneStop station and talking to a real person.

Thus began Pepperdine’s journey towards a Services on Demand framework enabled by Sun ONE.

TABLE 1

PEPPERDINE DIGITAL CAMPUS GOALS

Should integrate the disparate, proprietary applications

Must be open and flexible to allow purchasing of applications that “best satisfy need” going forward, even if it means they are not truly open

Must take away focus, in terms of money and time, from integrating disparate applications and allow focus on “core value” to provide service and support to faculty and students

for software intended to integrate the University's future choice of systems. Sun ONE and iPlanet, with their openness and scalability propositions, were considered vital in giving Pepperdine greater flexibility with its IT dollars.

With the decision to utilize Campus Pipeline's Web Platform as the foundation for the proposed nonstop service portal, the IT group next communicated and championed the decision with other University executives and participants. "Communication is critical," says Lawson, "we had to make sure that the finance and academic people understand where we are going and what we are doing. IT personnel specifically targeted faculty with one-on-one support to encourage the use of the portal and to create an understanding of the benefits for faculty and students."

The nonstop digital campus, named PepperdineXpress or PepXpress went live in the fall of 2000. The initial release of PepXpress was based on the 2.2 version of the Web Platform, which included an iPlanet directory server. Today, PepXpress is built upon the 3.1 version of the Web Platform, which includes the iPlanet email and calendar servers. Due to the open standards maintained by Sun ONE and Campus Pipeline, Pepperdine was able to effectively integrate its MS Exchange email system into the Web Platform while still enjoying the full integration benefits of the iPlanet calendar.

The functionality of PepXpress is a subset of the much larger functionality required in a University. This larger subset of portal functionality is shown in Table 2.

TABLE 2: DATA AND APPLICATIONS IN A UNIVERSITY

CATEGORY	TYPE OF APPLICATION
Student	Registration, transcripts, demographic, health records, grades, GPA calculator
Academic	Library, University catalog, reference material, access to individual course materials, academic deadlines, exam schedule
Campus	Academic calendar, student organizations, dining, transportation schedules, parking, computer facilities, housing
Administrative	Admission Management, Personnel, Financial Management, Procurement, Accounts Receivable, Student Loan

PEPPERDINE'S INFRASTRUCTURE PARTNERS

- SCT Plus
- Blackboard
- WebCT
- Voyager Library System
- Diebold Smart Card Billing
- Microsoft Exchange
- Campus Pipeline, iPlanet and the Sun ONE Architecture
- Sun Servers and Storage

Why Sun ONE?

Standard and modular building blocks make sense in building and future-proofing complex Web portal applications. The key underlying building blocks for any student self-service solution are:

- A directory to manage user access, access rights, and set policies. Directories house all the constituent data—who they are, what privileges they have, and what part of your business they need to interact with.
- An application server for building Web-based student applications and presenting dynamic content to the Web.
- A portal server to deliver applications customized and packaged for the student's specific needs.

- An integration server to easily link up crucial DARTs.
- A messaging and mail server.
- Development tools such as J2EE™ to help put it all together.

Because Pepperdine insists on maintaining its ability to independently choose the technologies that produce its digital campus, the alternative to unifying Pepperdine's extensive array of DARTs with the Web Platform would be to build its own integration and directory servers. "Because we used a Web-infrastructure that adhered to the Sun ONE standards, we did not need to waste valuable staff time on the creation of an in-house integration server. Staff can instead spend time on serving constituents and integrating more services into PepXpress," notes Lawson.

Developing and deploying applications is hard enough without having to build the entire infrastructure from scratch. Even with a well-staffed and skilled technology team, universities like Pepperdine and others can benefit from building digital campuses upon a proven vendor product. "Because we did not have to recreate the wheel, we were able to really focus on customizing our digital campus to meet the needs of our

SUN ONE OFFERS A SERVICES-CENTRIC COMPUTING MODEL THAT IS:

- *Multi-Platform*: prevents organizations from being locked into a single platform. Supports a mixed IT environment.
- *Integratable*: connects and integrates with existing systems.
- *Scalable*: designed to easily change or expand to meet business needs.
- *Standards-driven*: consistent with standards ensuring interoperability with components from other vendors.
- *Complete*: comprehensive platform that includes the tools, products, and technologies.

varied and specific audiences and project our culture,” noted Lawson.

The Sun ONE architecture delivers the plumbing elements, essential for building Web Portals and integratable services. Having these robust capabilities embedded in various software building blocks helps Campus Pipeline and in turn Pepperdine deliver complete, integrated self-service solutions to students and faculty in record time and at lower total cost. Figure 2 shows the architecture that Campus Pipeline delivered to Pepperdine with embedded Sun ONE building blocks.

Return on Investment (ROI) from Sun ONE

PepXpress integrates a range of online services including registration, tuition payment, online course pages, Web-based email and calendar, student Web pages,

personalized news and secure, class-specific chat and message boards. Pepperdine students, faculty and staff can access all of these services from any computer with Internet access and gain significant savings in time.

The various benefits to Pepperdine from the portal built on the Sun ONE architecture includes: student timesavings, student satisfaction improvements, faculty productivity improvements, extending previous investments, and future proofing.

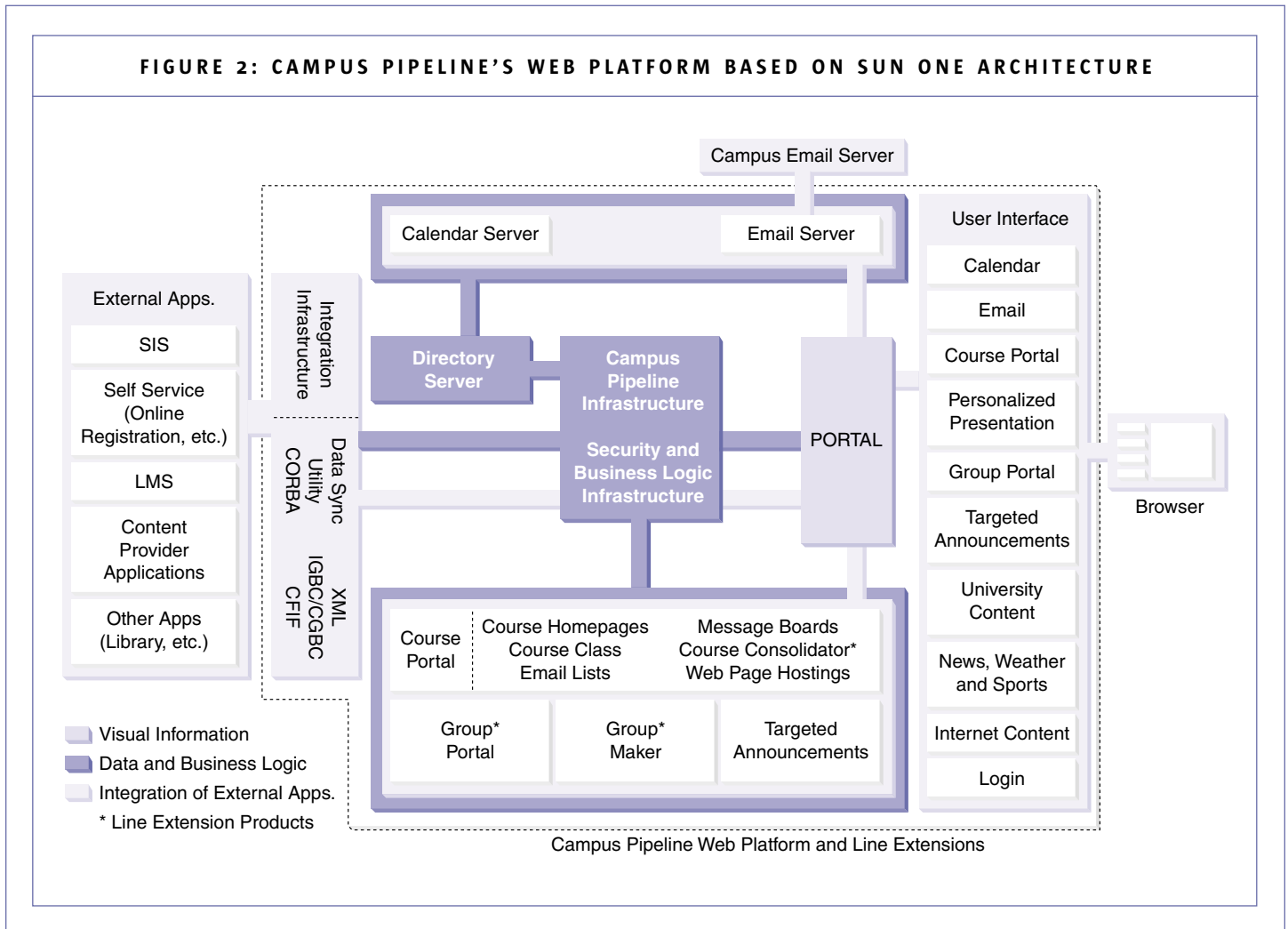
Saving Faculty Time

Faculty members save significant time as they use PepXpress to complete many tasks, such as reviewing class enrollment lists, checking the academic progress of students and submitting grades. According to Candace Jones, adjunct faculty member and system administrator, instructors are

“absolutely excited about” the online grades submission feature. “Most of our faculty have really taken to it. Usage from one semester to the next has skyrocketed from about 30 percent to about 85 percent. It’s so popular that the dean has said there will be no more usage of ‘bubble’ forms for grading. This method is antiquated and has to go.”

Further, the online grading feature gives students instant access to their grades. Where Pepperdine once dedicated a full-time employee for nearly two weeks to process grading forms, today faculty members can enter students’ grades into the system without any staff support. As soon as faculty members enter grades, students can view them. Pepperdine estimates that today there is a five-day reduction in grade delivery time.

FIGURE 2: CAMPUS PIPELINE’S WEB PLATFORM BASED ON SUN ONE ARCHITECTURE



ROI FROM SUN ONE BUILDING BLOCKS

PepXpress portal is expected to save at least 15 minutes of productivity time per week for 300 faculty members—adding up to more than 4,000 man-hours per year.

Saving Students Time

Current students use PepXpress free of charge to save significant time in accomplishing administrative and other tasks: register for classes, check e-mail and grades, make payments to student accounts, and acquire information about specific courses and instructors. If they do need offline assistance, they can simply visit OneStop, rather than traveling from office to office to accomplish individual tasks.

Offering Students Convenience

More than 50 percent of students take a temporary leave from the main campus to attend one of Pepperdine's overseas campuses at some point in their college career. The portal keeps them in touch with the home campus. When it is time for such students to register for classes that they will take in Malibu the next semester, they would be at a great disadvantage due to time zone differences; they would have to get up in the middle of night to register over the telephone. PepXpress gives them "a

"In a society where the expansion of the Internet has been criticized as one of the most isolating activities of all time, the creation of PepXpress builds a connection that transcends this isolation."

*Currents Magazine,
Pepperdine University*

viable, more convenient way to register and compete for class space," according to Dan Kelo, Special Projects Manager. PepXpress keeps overseas students in touch and involved in Malibu campus life.

Building Community

PepXpress plays a vital role in fostering community. Newly registered students are mailed their PepXpress access credentials early in the spring, prior to their first classes the next fall, long before they actually arrive on campus. Students can familiarize themselves with their schedule, administrative services, campus calendars and events. They can make contact with faculty with whom they are interested in fostering an academic relationship. "When students actually arrive on campus, they already feel they are part of our community," said Jones.

Exposing Inefficient Business Practices

PepXpress is showcasing the inefficiencies of some of the University's business practices and policies. For instance, it's now imperative that all databases be kept current with information like 'who's teaching what class?' as soon as the data becomes available, rather than updating the information in a more leisurely timeframe. Without accurate information, students will not get the level of service they need during the first few weeks of a semester, for instance, when they scramble to adjust their schedules during the drop/add period. The value of accurate and reliable processes and data is enormous.

Leveraging DART Investments

The Sun ONE architecture has helped in converting Pepperdine's DARTs information assets into services and put them on the Web. This translates into tremendous time-savings. PepXpress is fully integrated into the University's administrative system (SCT Plus), email system (Microsoft Exchange) and course management systems (WebCT Campus Edition and Blackboard Course Tools). The University is also working to integrate its library system (Voyager) and smart-card billing system (Diebold). The value proposition is that only with this level of integration will students and faculty truly benefit from the nonstop service paradigm,

as it eliminates the hassles of logging in and out of multiple systems, and perhaps even from different locations at different times, for different tasks.

Future-Proofing via Integrability

Pepperdine is currently evaluating upgrades to its key administrative software. An upgraded SCT system or one provided by Peoplesoft, Oracle or another vendor could easily be introduced to campus without much ado through PepXpress. Adherence to the Sun ONE recommendations provides integrability and a framework that allows Pepperdine to plug in its various DARTs. "New software will no longer be introduced as a discrete application. Our constituents will go to the same place, use the same credentials to access a familiar environment with new tools to use. It will help dissolve the intimidation level of constituents in accepting and using new technologies," says Lawson.

"The advanced, in-depth integration available between Campus Pipeline Web Platform and other Web service technologies creates a solid digital campus that increases efficiency and enables self-service."

*Dan Kelo,
Special Projects Manager,
Pepperdine University*

Paving the Way for A Service-Oriented IT Organization

While pinpointing the return on investment (ROI) is vital, information technology at Pepperdine is seen as another layer of support in its mission. This mission increasingly is to continuously provide students and faculty instant and consistent services. "Anything we can do to help the students and help those who are directly interacting with them" is becoming a rallying cry of the University.

To this end, the IT group sees the need to redirect its budget to support the faculty and students it serves. In essence, the group

sees the need to turn itself into a service-oriented organization. Lawson describes the situation: "Rather than technology dollars being used in a self-serving manner to support technology, each dollar we spend on technology should provide direct improvement to student service and learning."

Rapidly introducing new services to customers is clearly a requirement for Pepperdine. With PepXpress, the IT group has been able to refocus some of its internal programming time and staff towards providing more direct services to faculty and students. It is the group's expectation that its investment into the open, scalable, and integratable Sun ONE architecture and iPlanet technologies will continue to redirect its dollars towards supporting the students and faculty as opposed to supporting the technology infrastructure.

The next steps for PepXpress include the expansion of online course resources to better support faculty. This will be accomplished through the integration of multiple learning management systems into the Campus Pipeline Web Platform. "Choosing to integrate just one learning management

system or set of online course tools would lock our faculty into a specific technology, and in some ways, restrict pedagogy. We need to offer our faculty choice and respond to their needs. The Sun ONE value of open-integration standards is crucial to our faculty support strategies," explains Lawson.

As Pepperdine looks into the future, it is already visualizing next generation services such as anywhere anytime e-learning, collaborative team learning and wireless and mobile services. The Sun ONE architecture enables Pepperdine to continue to leverage the existing investments as they expand in the future.

Key Take-Aways

At a fundamental level, Pepperdine is transforming itself around a student-centric vision. From administration to technology staff, providing service to students is the central theme of that vision. The University is accomplishing this through an integrated "brick and click" strategy. The University's OneStop station offers services to students under a single physical roof, in a truly one stop fashion.

Now, to complement that, Pepperdine has implemented a nonstop service-oriented digital campus to offer services to students anywhere, anytime. The goals are:

- Work towards a Web-based model for information delivery and information processing.
- Foster a community that revolves around the student.
- Build a service-oriented institution.
- Redirect technology resources to service the faculty and students that they are meant to support.

Pepperdine today has built one of the most comprehensive digital campuses in North America. It will serve as a national reference site for other higher education institutions looking to simultaneously right size the administrative systems environments and delivering optimized service levels to its user community.

The bottom-line: Due to its open, scalable and services vision, the Campus Pipeline solution built on the Sun ONE architecture will allow Pepperdine to accomplish the delivery of Web services and migrate from a one stop to nonstop service institution.

"The quality, accessibility and caring nature of Pepperdine faculty and staff have long been Pepperdine's major strengths. Facilitating online communication and making online services more accessible and convenient through our partnership with Campus Pipeline builds upon the Pepperdine distinctions of quality learning and service."

*Andrew K. Benton, President,
Pepperdine University*

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