



E D U C A T I O N P O R T A L S

A White Paper

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INTRODUCTION

This document is designed to inform and educate IT professionals in the education market about Education Portal Computing that is emerging to benefit members of the education community.

Readers who will most benefit from this information include Application Service Providers, Internet Service Providers, Content Service Providers, Portals, and IT Managers from educational institutions. This document will also be useful for sales and marketing representatives who interact with these kinds of customers.

The paper first introduces the general concept of Education Portals for Education and the thought process behind the evolution of this new computing business model. The core components of this business model, and how these components deliver the solution to the education user, and the resulting benefits are then identified. Commonly used terms are defined, and the paper concludes with a list of frequently asked questions and easy-to-understand responses.

1. EXECUTIVE OVERVIEW

The two trillion dollar global education and training industry is going through radical changes. Market forces are providing a catalyst to alter the traditional ways education is delivered. Megatrends such as demographics, the Internet, globalization, branding, consolidation, and outsourcing all play major roles in this transformation.

Technology, and specifically the Internet, will play a key role in this transformation by reducing the costs of deployment, and increasing education's geographic accessibility. For example, digital libraries, distributed learning, virtual classrooms, multimedia together have the capacity to convey voice, data and video to almost any location. The result of these technology innovations is the emergence of a new economy driven by knowledge and information. Table 1 details the key characteristics of this knowledge-based economy.

New View of Education in Knowledge-Based Economy	
Old Economy	New Economy
Four-Year Degree	Forty-Year Degree
Training as Cost Center	Training as #1 Source of Competitive Advantage
Learner Mobility	Content Mobility
Distance Education	Distributed Learning
Correspondence & Video	High-Tech Multimedia Centers
One-Size Fits All	Tailored Programs
Geographic Institutions	Brand Name Universities & Celebrity Professors
Just-in-Case	Just-in-Time
Isolated	Virtual Learning Communities

(Source The Book of Knowledge, Merrill Lynch, 1999)

Table 1: New View of Education in a Knowledge-Based Economy

THE NEED FOR EDUCATION PORTALS IN THE EDUCATION COMMUNITY

Innovations in technology have also changed the demands and expectations in the educational community. Today's students expect web-based registration, online digital library privileges, smart cards, and a host of other learning services that save them time. University and school administrators faced with budgetary constraints combined with growing demands on their computing infrastructure, need to

deliver these services and many more, cost-effectively. They need an easy-to-use, scalable, reliable and cost effective computing environment, that requires minimal training and administration, and that enables volume deployment of its functionality for global student accessibility.

EDUCATION PORTALS

The increasing viability of the Internet has helped address the need for users to access information and services via the web. The search-engine, such as those available from AltaVista and Infoseek, was the first step in addressing these needs. With the emergence of the portal, a web site that provides organized access to the Internet through the aggregation of content and functionality, the delivery of a set of services tailored to the needs of a particular community was realized.

The key attributes of a portal are:

- Services Driven Network.
- Universal access by anyone, anywhere, anytime on any device.
- Simplified interface for all members of the education community.
- Personalized content.
- Customizable value-added services.
- Ease of use and constant availability.
- System maintenance and administration are managed by IT specialists and are transparent to the user.
- Scalable infrastructure providing high levels of service quality.

The increasing viability of the Internet as a network infrastructure is taking the concept of the portal one stage further, by fueling a movement toward subscription-based portals and creating a new class of specialized service provider. Under this externally managed portal, users contract with a service provider, then access critical applications using a Web browser, either over the Internet, virtual private network (VPN) or a dedicated network.

In the education sector, these subscription-based education portal services are provided by third-party companies, or education institutions, who are dedicated to bringing full-scale enterprise applications within reach of the education community. This volume deployment of functionality and services enables the education user to have access to a wealth of information and services previously unaffordable.

Merrill Lynch, in the 1999 report *The Book of Knowledge*, predicts that of the five identified major trends that will transform the landscape of the education and training industry over the next decade, education portals will play a key role in providing increasing learning opportunities for the education community.

SUN'S VISION FOR EDUCATION PORTALS

Sun Microsystems established the vision of the network—The Network is the Computer™—back in 1985. The dominant aspects of computing in the 1990s have been the network, desktop PCs and applications. Sun's vision is that computing is rapidly evolving to the utility model. Sun believes that the key trends for 2000 and beyond are Webtone, Devices and Services.

Under this vision:

1. Webtone will assume great importance for the user signifying constant availability.
2. Devices will be multifarious and will lend themselves to convenience for the user.
3. Services will become paramount in providing computing value to the user.

Figure 1 illustrates the move from the traditional IT infrastructure into a net-economy based infrastructure.

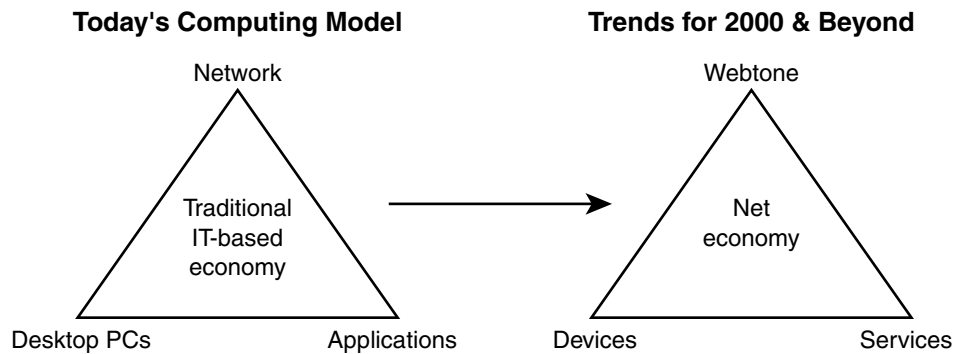


Figure 1: Technology Trends for 2000 and Beyond

Sun is now extending this vision to meet the demands of the new net-based economy by facilitating the delivery of the products, services and partnerships that will enable the educational community to reliably deploy cost effective education portal services, anytime, anyplace, and on any device.

SUN'S VALUE PROPOSITION FOR EDUCATION PORTALS

Sun aims to achieve this vision through the provision of four key ingredients, that combined, provide business, technology and measurement programs and services to enable the effective deployment of Education Portals.

The Education Service Provider Program is a series of engagement programs that enable Education Service Providers (EduSPs) to plan, implement, and manage their Education Portal services, efficiently and cost effectively.

SunConnect™ is a software architecture framework that guarantees interoperability between applications, their integration with legacy systems, and secure access to applications for business transactions. SunConnect software features scalable and reliable messaging, support for robust transactions, and solid security, and promotes component-based development and code re-use.

Genesys™ is a platform architecture, and associated multiple products and services that form a foundation to enable service providers implement, configure, operate, and manage their enterprise server, storage, and network resources. When combined the platform architecture, products, methodologies, and services create an environment that is especially flexible for running multiple applications.

SunTone™ Certified Program is a series of quality-based programs initiated and driven by Sun to help improve the quality of services in the service provider (SP) industry, to ensure the delivery of secure, reliable, and predictable services, and to make it easier for customers to evaluate product offerings.

SUN'S EDUCATION PORTAL MODEL CHANGING THE DYNAMICS OF THE EDUCATION COMMUNITY

Sun has a complete and integrated vision that is based on a long history of listening to customers and meeting their needs. Sun's goal with Education Portals is to enable the educational community to obtain quick, easy, and affordable access to information and solutions anytime, anyplace, and on any device.

With computing becoming a utility, and education portals delivering functionality over the web, the economics for the education community are changing from a high maintenance, fixed cost, depreciating infrastructure, to a maintenance-free, variable cost and easy to use environment... one that levels the playing field for education, and enables educators and students to focus purely on educational matters.

2. THE NEED FOR EDUCATION PORTALS IN THE EDUCATION COMMUNITY

Today the term "education" refers to the learning activities that take place in every aspect of our lives – in the home, the elementary school, high school, university and in the workplace. In recent years, efforts have been made all around the world to wire elementary, middle and high schools for the Internet with considerable success. For decades universities have been at the forefront in the development and refinement of the Internet; this has enabled wide access to information on every subject from all over

the world at any time from just about anywhere, using almost any kind of computer or computing device. However, the companies that provide access to this information, and their customers, are faced with a wide range of challenges in choosing a solution that meets their needs.

CHALLENGES FACING THE EDUCATION COMMUNITY TODAY

Environmental drivers for the movement toward Education Portal based solutions include the need for cost reduction, easier systems administration, increased revenues through expanded customer relationships, and improvements in customer service. Educational institutions, and the companies providing them with web-based applications, are anxious to leverage the economic benefits of today's new network technologies. They must do so within some critical constraints:

Choosing the Right Application: Users and institutions are faced with a vast array of data now available over the Internet, making finding what is needed increasingly difficult. In addition there is a need to provide communities of interest with quick, easy access to customized content and applications.

The Need for Rapid Development and Instant Deployment: There can be no disruption to on going mission critical operations. Any new solution or modification must fit seamlessly, quickly, and reliably into the existing environment without performance degradation, and must have the capability to integrate disparate systems often geographically dispersed.

Budgetary Constraints: The need to exploit a potentially cheap delivery channel, the Internet, yet protect major investments in legacy system equipment and software. Solutions are desired that can "plug-in" to existing environments, and integrate existing applications, rather than requiring new investments in technology.

Regulatory Constraints: The educational institution or educational service provider must retain sufficient control over the complete network and computing environment to meet its fiduciary, privacy, and reporting obligations to the education community, and regulatory authorities.

High Levels of Security: The need for the same level of security now found in centralized, proprietary systems using private networks must be supported.

EDUCATION PORTALS ADDRESSING USER NEEDS

Technology is advancing to address the needs of the educational community. In the traditional IT based economy the focus of the network was to enable the rapid movement of information on a global basis. Access to this information for the user was primarily through desktop PCs and value-added applications. Now with the growth

of the Internet this focus has changed to one of a net-based economy. Access to information is now available from a multitude of devices—handhelds, mobile phones, thin-clients—as well as the desktop PC, and applications are tailored to specific user needs on a just in time basis. With the Internet providing a ubiquitous network at low cost, the traditional IT infrastructure model can now be replaced with a net-based IT infrastructure model.

The emergence of the portal is also changing the dynamics of the IT environment by bringing context to the Web. The portal, a Web site that helps provide organized access to the Internet through aggregation of functionality, provides a set of services tailored to the needs of a particular community. An enterprise information portal might assist employees of a particular company to access order scheduling information, customer databases and decision support data. A consumer portal, such as Yahoo!, Lycos, or Netcenter, can be tailored to the needs of an individual, providing simple access to Web sites that the user frequently visits. An Education Portal enables users to go immediately to information and applications tailored to their educational needs.

Taking this one stage further, the fact that the technology infrastructure of the education portal business model is already in place, has made possible the adoption of paying for the use of computer applications on a rental basis. In the education sector, these subscription-based education portal services are provided by third-party companies, or education institutions, who are dedicated to bringing full-scale enterprise applications within reach of the education community. Leasing rather than buying access to applications, such as a budgeting package or student enrollment system, creates opportunities for education institutions that otherwise might be unaffordable. In the same way that consumers pay for their electricity each month based upon what they use, schools can now pay for access to applications and services based on their level of usage.

THE EDUCATION PORTAL MODEL — DELIVERING A KNOWLEDGE-BASED ECONOMY

Education Portals are changing the dynamics of the learning experience in the education community enabling the user to have access to a wealth of information and services previously unaffordable. Applications, which previously could only be run on a desktop or server computer on campus, can now be moved out into the Network. They can be located at sites owned and managed by third-party companies specializing in providing remote computing service to the education communities.

Education Portal computing provides a viable alternative to building and managing internal information technology operations. Now education institutions are

able to control more precisely the total cost of technology ownership through scheduled payment schemes. In short, the Education Portals Business model brings sophisticated computing to users whom otherwise could not afford it.

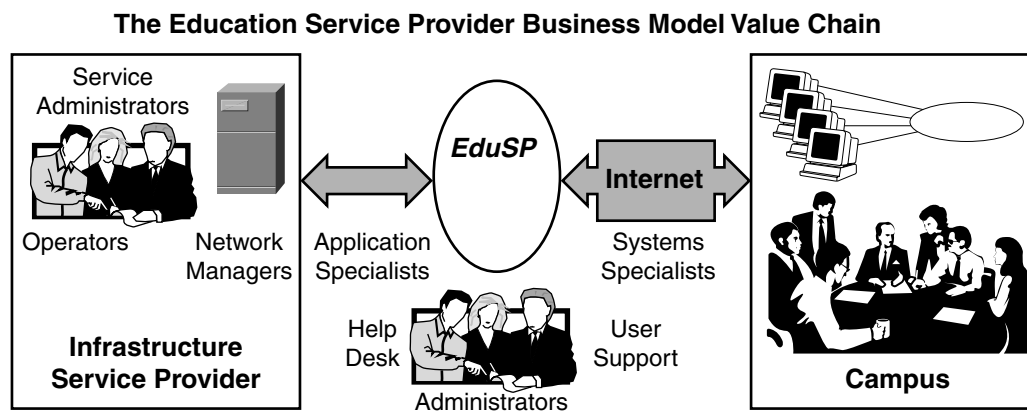


Figure 2: Education Portal Value Chain

3. SUN'S VALUE PROPOSITION FOR EDUCATION PORTALS

Sun Microsystems established the vision of the network—The Network is the Computer™—back in 1985. Sun is now extending this vision to meet the demands of the new net-based economy by facilitating the delivery of the products, services and partnerships that will enable the education community to deploy cost effective education portal services, anytime, anyplace, and on any device.

Sun's Education Portal business model enables the education community today to leverage the power of the Internet to provide access to information at anytime, anywhere and to anyone. That is, by utilizing existing IT infrastructure assets, complemented by additional service components, delivered over a secure delivery mechanism, customized Education Portals can be developed tailored to the needs of each educational institution.

Sun's Java™ technology is strongly positioned to play an important role in this business model for the education community by:

- Leveraging the existing IT assets and infrastructure.
- Enabling distributed multi-tier applications in a heterogeneous environment.
- Offering extensible platform architecture.
- Maintaining scalability, reliability, security, and portability.
- Offering education services support (transactions, distance learning, etc.).
- Supporting environments for time sensitive applications (shared whiteboards).

In addition, the increasing viability of the Internet as a network infrastructure is fueling a movement toward subscription-based portals and creating a new class of specialized service providers focused on providing applications and services tailored for the education community.

SUN'S EDUCATION PORTAL BUSINESS MODEL FOR THE EDUCATION COMMUNITY

In Sun's web-based Education Portal business model, services are delivered to students, parents and educators through Education Service Providers (EduSPs), companies dedicated to bringing full-scale enterprise applications within reach of education institutions. EduSPs can be either third party companies, contracting their services to an institution, or education institutions who provide such services to other institutions.

With this web-based model of computing, EduSPs are able to optimize the use of the Internet to cost-effectively, and securely deliver curriculum, administrative content, digital libraries and communications tools to education institutions worldwide. For example, user constituencies such as students, faculty, administrators, suppliers, alumni, and others can have easy access to a range of integrated functions: student administration, human resources, finance, facilities, distance learning, library services and curriculum management.

Various enterprise and other software applications are available to the different groups through the desktop. The education portal also provides the infrastructure of e-mail, calendaring and other personal information management tools, as well as collaboration tools that enable information sharing and discussion.

DELIVERING EDUCATION PORTAL SOLUTIONS TO THE EDUCATION USER

The Education Portal lets users access selected customized services and applications without the worry of constant upgrades and maintenance. An EduSP acquires the hardware and software necessary to run the application, and pays the lease and maintenance fees. They employ the trained staff necessary to implement, manage, support and maintain the application software and its supporting infrastructure. They then contract with schools and universities to provide these services for a specified number of years, charging a monthly fee for said services.

An education portal enables the aggregation of information and services provided by a large number of independent information sources or service providers from all over the Internet. In order to bring this seamless set of applications and services to the student, teacher, or administrator, a range of different behind-the-scenes services must be integrated and implemented by the EduSP.

These activities range from purchasing the software license for an application from the Independent Software Vendor, marketing the application, through to providing friendly, competent help-desk assistance to end users of the application. Management of the end-to-end delivery of the applications and services across the Internet, as well as the security of the data and privacy of the users, must also be accommodated.

Sun's model of an Education Portal, or web-based service delivery, is continually evolving but the core value chain elements includes the following elements. The EduSP, often supported by application service providers (ASPs) and content service providers (CSPs) who provide the content and applications tailored to the user needs, and infrastructure service providers (ISPs) who host the hardware on which the applications run. The Education Portal, the tailored window displayed in the browser and personalized to the school—as well as the individual teacher, student or administrator using the system. The pipelines that link the EduSP to the desktop browser. These would include the network within the school, the Internet and the network within the EduSP's computing facility. The desktop device (PC, NC, etc.) on which the browser is run to access the Education Portal. Figure 3 illustrates how these value chain components interrelate to provide the solution for the user.

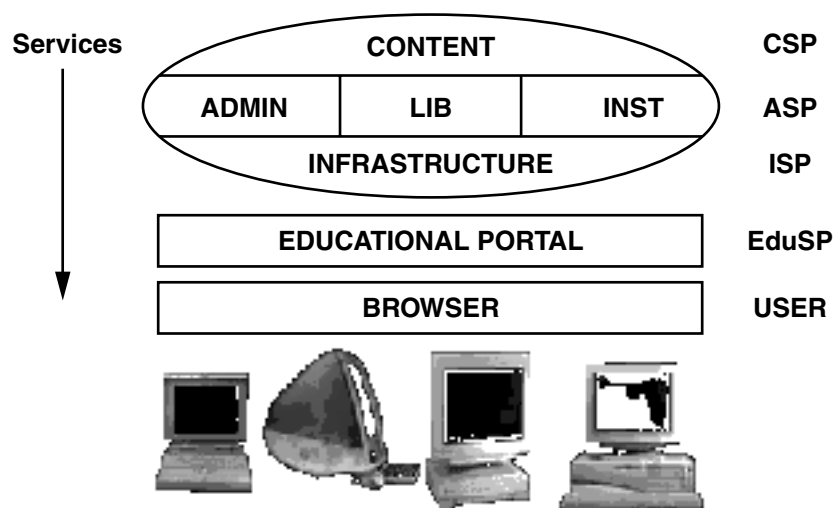


Figure 3: Value Chain Components of an Education Portal Business Model

WHAT THE EDUSP PROVIDES TO THE EDUCATION USER

The EduSP, in most cases, depends on several other service providers to provide them with specialized services. An infrastructure service provider may host the hardware and software required to run the EduSP's applications and services. Numerous content service providers may provide the EduSP with both general and specific information sources and services. The EduSP may even outsource billing service to yet another service provider. The web-based technology enables all of these sources and services to be brought together seamlessly on the user's desktop, providing sophisticated capabilities in an easy-to-use format. Figure 4 illustrates how the EduSP integrates these different sources into one solution for the end user.

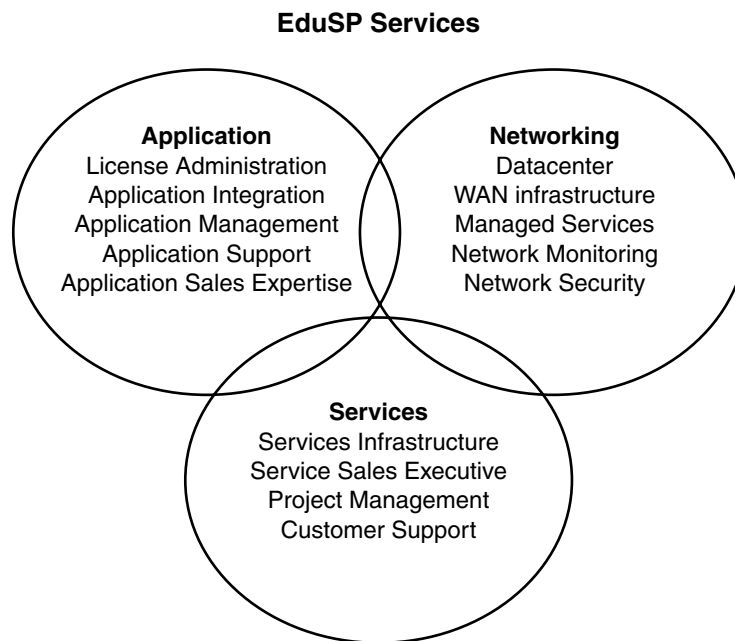


Figure 4: Service Solution Provided by an EduSP to the Education Community

This ability to integrate functionality from multiple sources enables an EduSP to come to market very quickly with a viable service offering. In addition, by EduSPs establishing strategic partnerships with synergistic vendors, the necessity for their education customers to incur the costs associated with installing and maintaining everything themselves is avoided.

SUN'S EDUCATION PORTAL BUSINESS MODEL

To facilitate the adoption of this Education Portal model by service providers and their customers, Sun has developed four essential ingredients, that combined

provide a business, technological and measurable environment for planning, developing and deploying web-enabled applications to the education community worldwide. Figure 5 details the components involved in this model.

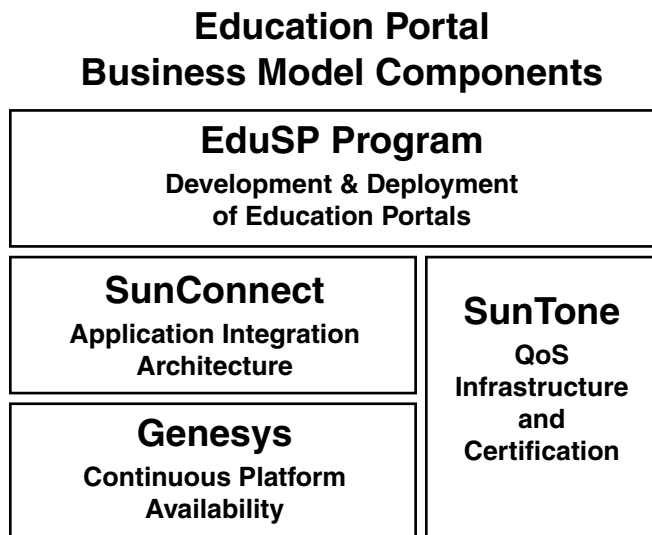


Figure 5: Building Blocks in Developing an Education Portal Business Model

1. EDUCATION SERVICE PROVIDER PROGRAM

To help the EduSP meet the challenge in deploying the Education Portal business model for the education community, Sun has developed the EduSP Program. Designed to enable service providers (SPs), independent software vendors (ISVs), systems integrators (SIs), and value-added resellers (VARs) deliver web-based educational content and applications to education institutions, quickly and cost effectively, the program elements include assistance in planning, implementing, and managing an Education Portal service.

To provide the EduSP with the ability to create a comprehensive portfolio of applications, Sun provides a forum for developing synergistic relationships with other vendors. The SchoolTone Alliance, ISV Alliance, and Sun-Netscape Alliance programs bring together best of breed web-based educational content, portal technologies, solutions and service specialists required by EduSPs to provide a robust infrastructure for a mission-critical, highly scalable applications hosting environment and compelling service for their education customers.

2. SUNCONNECT SOFTWARE ARCHITECTURE

SunConnect is a software architectural framework, based on Internet, CORBA and Java™ technology industry standards, to provide developers with an open environment. The SunConnect framework addresses specific user and developer needs by providing transactional support, guaranteed message delivery mechanisms, component development and deployment, robust development tools and a consistent management model. As such, it is designed to help service providers develop and deploy software products swiftly, and deliver them via a diverse set of electronic channels.

SunConnect Components:

SunConnect is composed of three modules and three frameworks as follows:

Modules:

1 Enterprise Integration (EI) Module: The Enterprise Integration Module is the integration interface and specifications needed for partners to integrate the SunConnect environment to existing applications and data in the enterprise.

2 Integrated Transactional Applications (ITA) Module: The Integrated Transactional Applications Module ensures that all transactional and messaging services are provided in a predictable and consistent fashion, meeting the stringent requirements of financial service organizations, and is applied across all of the core SunConnect frameworks and modules.

3 Secure Channel Computing (SCC) Module: The Secure Channel Computing Module provides the security services that are applied consistently throughout the entire architecture on an end-to-end basis, including the modules introduced by all SunConnect partners. This security module ensures that all components address key issues such as authentication, authorization, and privacy in a predictable and consistent fashion.

Frameworks:

1 Development Framework: The Development Framework provides the APIs and specifications that enable partner development tools to fit in the framework, so that application developers can create SunConnect-compliant applications.

2 Management Framework: The Management Framework is a set of APIs and specifications that enable partners' management components to be an integral part of a SunConnect solution, ensuring that all partner-provided components can be managed and monitored centrally and consistently.

3 Component Transaction Framework: The Transactional Middleware Services Framework recognizes that most companies have many different environments already deployed, and that these environments must be able to fully integrate and participate in the SunConnect environment. This Framework provides the APIs and service definitions that enable third-party middleware to be directly integrated to SunConnect, while ensuring that transactions and security are implemented consistently and reliably across these environments. As an example, the Framework can be used so that SunConnect is tightly coupled to legacy host environments.

The SunConnect Inception Service:

This is the natural first step when service providers are adopting the SunConnect framework. The service includes requirements definition, preliminary architectural design, program planning, synthesis and documentation. The SunConnect Service provides an effective way to leverage Sun's cumulative Internet infrastructure and object-oriented Java technology application design experience. Sun's architects work side by side with the Service Provider's team, so they can leverage SunConnect development methodologies to jump-start their development efforts. These architects have access to a network of Sun specialists who can assist with issues that arise during the consulting engagement.

3. GENESYS PLATFORM ARCHITECTURE

The Genesys platform architecture addresses the Service Provider's goal to create an integrated infrastructure, capable of dynamic resource sharing, and centralized management.

The three key steps provided by the Genesys framework are:

Step 1. Creating an Integrated Infrastructure:

Genesys focuses on the physical infrastructure required to run server applications. This includes the servers, the associated storage, and interfaces to the network. The aim is to address the performance, availability, and scaling of the overall infrastructure, and to facilitate proactive scaling to meet anticipated application and system growth, while increasing operational simplicity.

The building blocks of this integrated physical infrastructure are:

The Solaris™ Operating Environment and SMP servers: To provide continuity and investment protection, as well as predictable, easily tuned systems and application behavior. The use of Solaris allows legacy applications to run unaltered, and provides a consistent user interface. SMP provides a simple tuning model and an excellent real-world scaling of systems.

System Domains: To enable the service provider to dramatically increase their ability to allocate and share resources. A system domain is, in essence, a virtual server that provides a mechanism for isolating applications from the physical infrastructure, and is the primary managed element within Genesys. All Sun server systems are domain-based.

Sun Cluster™ software: To provide the logical glue between the server and the storage layers to enable global access to these shared resources. Applications can easily share data. It also allows applications to take advantage of the inherent redundancy of the plex, and automatically failover to other resources within the pool. It also facilitates management of systems within the plex.

System and Storage Area Networks: To combine system resources together physically to form a pool of resources that can be allocated between multiple applications.

Step 2. Implement Dynamic Resource Sharing:

There is a core need to run multiple applications on one set of resources as well as manage the boundaries between those applications. Having built the integrated pools of resources, Sun's dynamic reconfiguration technology allows the size of server resource pools to be expanded or contracted as required, without shutting down systems or applications. This capability can increase overall system availability by eliminating a key source of planned downtime.

Step 3. Centralize and Simplify Management:

As an enterprise IT infrastructure scales, it inevitably gets more complex. The effort required to manage resources tends to grow faster than the resources themselves. Genesys therefore focuses not just on scaling the environment, but also on reducing the management effort needed. Centralization, simplification, and automation are key to this effort. Sun provides an integrated set of tools to enable service providers to achieve this integration, leading to not only the reduction in complexity of management, but also reduction in operational risk and costs.

4. SUNTONE CERTIFIED PROGRAM

The SunTone Certified Program is designed to address user concerns for high levels of security, reliability and predictability by defining and auditing the service providers' infrastructure, operational practices, hardware, software, and ultimately, overall service delivery, to ensure stringent levels of performance, security, availability, and uptime.

The associated SunTone Certified logo and marketing programs recognize and promote investments in process, methodology, and infrastructure—the core

elements that promote the delivery of secure, reliable, and predictable Internet services. Using the SunTone Certified logo as a guide, the education user can quickly and confidently identify top-quality vendors that have demonstrated competencies in developing SunTone services and applications.

In turn, this program generates best-of-breed industry partnerships. Value-added resellers, ISVs, web developers, systems integrators and others who must deliver high quality web-based services will find the SunTone architecture critical in deploying services that meet high QoS (Quality of Services) standards. For the education service provider (EduSPs), SunTone recognizes providers that have invested in strong architectures, infrastructures and operational practices displaying the SunTone Certified brand. Certified EduSPs can assure their customers that they are getting secure, reliable, and predictable services, and provides a key differentiation for SunTone certified EduSPs against their competitors.

SunTone Certified Service Program

SunTone Certification has been developed based on high-level guidelines. These guidelines, and their corresponding result measures, provide a specific means to assess a service as SunTone Certified. Service providers that have services that meet or exceed all standards listed in the specification earn the right to use the SunTone Certified logo. Additionally, in deploying SunTone services, service providers follow a recommended methodology for building services, enabling predictable service levels, and promoting reliability and scalability.

SUMMARY

Sun's Education Portal business model provides a viable alternative to building and managing internal information technology operations. Through the provision and integration of the Education Portal business model components by service providers, Sun is able to facilitate the volume deployment of functionality and information resources needed by the education community. The scalability feature of this model also means that once the infrastructure is in place, the incremental cost of adding more users is minimal. In short, the Education Portal model brings sophisticated computing facilities to institutions that previously were unaffordable.

3. BENEFITS OF EDUCATION PORTALS FOR THE EDUCATION COMMUNITY

While the financial advantages of the Education Portal model bring benefits to the education institution's bottom line, there are also distinct benefits to the application users—the students, teachers and administrators—such as usability and accessibility.

ACCESS TO RANGE OF INTEGRATED APPLICATIONS

Education Portal solutions enable education institutions to enhance the learning and administrative process by delivering applications previously unaffordable. Students, parents, faculty, administrators, staff, suppliers, alumni and others can now have immediate access to a range of integrated functions, including student administration, human resources, finance, facilities, distance learning, library services and curriculum management.

Applications accessible through an EduSP's portal might allow students to:

- Register for classes
- Check grades
- Read or send e-mails
- Receive a priority instant message regarding an upcoming event
- Enter a course-specific chat-room for a test review
- Search the Web for information related to a project
- Purchase text books
- Verify that a tuition bill has been paid
- Access the school library catalog

The possible scenarios are limitless. Each month there are hundreds of new applications and services finding their way onto the Internet.

CUSTOMIZED FOR USER PREFERENCES

The portal provides the infrastructure for e-mail, calendar maintenance and other personal organizing tools, based on user preferences so that even the smallest elementary school can take advantage of a sophisticated library management system. The on-line catalog can be tailored to reflect the school's book holdings using a personalized view of a comprehensive, commercially available catalog of all the books in the market. When the school acquires new books, the librarian is now able to use an accession application from a browser running on a desktop computer to change that school's catalog "view" to include entries for the new books.

Different access levels can be made be available for each of the users on the portal. For example, a parent can log onto the portal to help a child do research for an assignment by accessing resources such as an online encyclopedia. Parents might also check the week's homework assignments, read a teacher's evaluation of their child, or check the event calendar for the date of the next Parent/Teacher Meeting. However, they will not have access to any other functions beyond those that directly affect or are related to their child.

INCREASING USER PRODUCTIVITY AND ACTIVITY LEVELS

The range of activities made possible by the EduSP services, coupled with an Education Portal model, is impossible to foresee. The following, however, are available right now:

A college student is in his or her residence and wants to check on the sports schedule for the next week. The student can log in to a campus portal, click on 'sports' and view the schedule for the next week, month or year. The student can also register for classes through the portal rather than waiting in line. The student will immediately know the status of his registration for a class. If put on a waiting list, the student will be informed by e-mail if the course opens up and he is granted a seat.

A parent is helping a child complete a homework assignment. By logging in to the school portal, the parent and the student can do research for the assignment by using on-line resources such as the Encyclopedia Britannica. The parent might check the week's homework assignments and read the teacher's evaluation of previous homework. The parent might also access information such as the next scheduled meeting of the parents' association and perhaps request to be put on the agenda to address a specific topic.

A school administrator needs to communicate to all of the students, parents, faculty and other administrators that the date of a school event has changed. From the computer in her office, she can simply send an e-mail to all interested parties. A similar announcement can be sent to local radio and TV stations, as well as to the local newspaper.

Using the award winning, Java technology-based Quiz Studio, a high school student takes a test on a geography project from the comfort of home. The quiz consists of textual questions, requires the student to point out locations on maps displayed in the browser window, and returns the student's score upon test completion. It can also show the student how her results compared with others taking the same test. The teacher created the test using a powerful, easy-to-use test creation toolbox.

REDUCING ADMINISTRATION AND MAINTENANCE FOR THE INSTITUTION

For education institution administrators there are numerous benefits associated with outsourcing the administration and maintenance to an EduSP:

No Investment Required in System Administration Knowledge: In the education portal model, issues like system maintenance and version control of applications are outsourced, and therefore transparent to users. There is no longer the need for the education institutions' employees to invest in the knowledge required to understand the technical complexities of maintenance and administration necessary when a system is internally hosted.

Centralized Upgrades & Application Integration: Users can access selected and customized services and applications without worrying about constant upgrades and maintenance. Upgrades are a snap since individual desktops do not need to be configured.

Centralized Outsourced Administration: All the administration and maintenance is performed at one location, the EduSPs, by IT specialists. This model of an Education Portal resembles the structure of today's utilities, such as a telephone service, where service is available through a handset, but the infrastructure is housed and maintained at a central location.

Data Protection & Security Provided by the EduSP: Previously the majority of education institutions could not afford to use a disaster recovery service due to budget constraints. In the Education Portal model, the EduSP provides this service as part of the lease package.

Education Portal Solution	
Customer	Education Portal
Challenges/Problems	Computing Solution
Hardware upgrades are frequent and expensive	EduSP buys Hardware, installs and upgrades
Application upgrades are frequent and expensive	EduSP upgrades software as frequently as needed
Hardware and software maintenance is expensive	EduSP contracts for maintenance
Hiring IT staff is expensive and increasingly difficult	EduSP recruits and retains expert staff
Planning for IT obsolescence	Because costs are spread across multiple institutions EduSP can afford to replace equipment & software as required
No disaster recovery	EduSP contracts with disaster recovery service
Financial resources for capital expenditures	Lease model eliminates need for capital outlay

Table 2: Administrative and Operational Advantages of an Education Portal Solution

SUMMARY:

Sun's Education Portal model provides schools and universities with a cost-effective platform to access, and benefit from, powerful computing tools.

Firstly, since the system infrastructure costs are incurred by the EduSP, it eliminates the education users need for capital outlay in new IT equipment.

Secondly, since all maintenance, upgrades and data recovery services are now outsourced to the EduSP, it removes the investment previously needed for recruiting, managing, and retaining highly compensated technicians to maintain complex in-house information processing systems.

Finally, by accessing these services based on scheduled payments, the education user has more control over their IT budget. This service, centrally maintained by an EduSP, is both more reliable and much less expensive, so that now even the smallest schools can take advantage of the wealth of information and resources available.

5. SUN'S ROLE IN ENABLING THE EDUCATION PORTAL BUSINESS MODEL

Sun's role is one of market facilitator. Sun is inspired by the concept of bringing full-scale enterprise solutions to the entire education community by enabling schools and universities to access such enterprise applications over the Internet and to pay for them by subscription. By tailoring these products and services to closely fit the needs of the emerging Education Service Providers (EduSPs), and their customers, Sun expects to become the leading supplier to this market. This is a fitting reflection of Sun's vision—The Network is the Computer. Sun has built on this vision and today, it leads the industry in network computing through its products and services.

Some of the support services and associated programs initiated by Sun to facilitate the technical deployment and market adoption of the Education Portal model include the following programs and services.

EDUCATION SERVICE PROVIDER PROGRAM

Sun offers a comprehensive suite of services and programs that reduce the time taken by Education Service Providers (EduSP) to bring their offerings to market. These provide assistance with the initial planning of the EduSP's business operations and service strategy; providing an architectural framework for implementing the service infrastructure; through to ongoing management and support.

Business Planning: Sun account managers hold regular meetings with each EduSP to establish business priorities and goals, a strategic business plan, and to ensure that business growth is maintained.

Product Purchase Programs: Product purchase and leasing programs, available to qualified EduSPs, provide companies with assistance in the deployment of their services efficiently and cost effectively.

Integration Assistance: Strategic Alliance programs bring together the best of breed web-based educational content, portal technologies, solutions and service providers required to implement both compelling application services for sale to customers and a robust infrastructure for mission-critical, highly scalable applications hosting environment. A worldwide network of Competency Centers, enable Education Service Providers to minimize the risk associated with activating new services by integrating, testing and tuning their applications, Sun platforms, and enabling technologies in advance of the installation of their own systems. The SunConnect software and Genesys platform architectures address the products, process and personnel aspects of .com-ming Education Portal platforms for the education community.

Joint Marketing: Sun Account Managers work with EduSPs on sales and marketing activities to generate market demand and sales of their Education Portal services. The SunTone Certification Program provides qualified EduSPs the use of the SunTone Brand and SunTone logo in their promotional activities.

Service and Support: Technical Training Programs provide the EduSP's administrators, architects and developers with the knowledge and skills to effectively install and support an EduSP solution. Quarterly review meetings ensure that the services meet the EduSP's long-term business objectives and user expectations. Sun Professional Services Consultants provide invaluable expert help with all aspects of systems and network management, including security, help desk, asset management, data and storage management and performance management.

SUN'S PRODUCT AVAILABILITY AND RELIABILITY GUARANTEE

For EduSPs and their customers, Sun provides products and technologies that are scalable to handle the rapid growth that many providers will experience, and secure enough to protect their customers' data. Sun's products have the proven track record of reliability and 7X24 availability that is business critical to companies offering data processing services to multiple schools, universities and not-for-profit institutions, as well as government departments and agencies. Sun's service and support capabilities will play a major role in facilitating the fast growing and incredibly dynamic Education Portal market.

6. SUMMARY

Sun has a complete and integrated vision that is based on a long history of listening to customers and meeting their needs. Sun's Education Portal business model realizes Sun's goal to dot.com the education community by providing quick, easy, and affordable Education Portals to all education users around the world, anytime, anyplace, and on any device.

By leveraging the power of the Internet, and applying technology already available to the education environment, the Education Portal model introduces a new level of simplicity into locating information and utilizing services across the entire Internet.

The infrastructure of networked workstations and browsers, installed for use of the Internet, is immediately available to administrators, educators and students, allowing them to take advantage of the growing number of educational applications and services available from Education Service Providers (EduSPs).

By outsourcing the day-to-day administration and maintenance of the information system, the model provides the education community with access to information and solutions that were previously unaffordable.

It protects the institution's previous investments in technology infrastructures by enabling older or inexpensive computers running a Web browser to be used to access the applications running on the EduSP's computer equipment. This reduction in the cost of information technology frees up funds that will allow the education community to invest in other valuable education programs.

All of the inhibitors that have made the Internet and the World Wide Web difficult to use are dissolving. The bandwidth available on the Internet is steadily increasing across the globe. Technologies such as Sun's Java™ programming language are ensuring that powerful multimedia applications can be efficiently executed even on the thinnest clients. The possible scenarios are limitless.

7. FREQUENTLY ASKED QUESTIONS

EDUCATION PORTAL MODEL

What is a Portal?

A portal is an aggregation of information and services. An enterprise information portal might assist employees of a particular company to access order scheduling information, customer databases and decision support data, as well as human resources information such as the individual's 401K plan. A consumer portal, such as Yahoo!, Lycos, or Netcenter, can be tailored to the needs of an individual, providing simple access to Web sites that the user frequently visits. EduSPs provide Education Portals, which enable users to go immediately to the information and applications provided by that service provider tailored to their needs.

What is the advantage of an Education Portal Solution to a school or university?

The school can acquire access to web-based computer applications that would otherwise be too expensive by contracting for a monthly fee with an EduSP who has licensed the software and arranged for the computer systems to run them. The EduSP also employs a staff with the skills necessary to maintain the software and who are expert in providing assistance to users of the applications.

What is the advantage of an Education Portal Solution to a student?

When the students' school subscribes to an EduSP's services, the student will have access to applications such as on-line quizzes, library catalogs and research resources to which they otherwise would not have access. With a powerful, personalized portal, students will quickly and easily be able to locate and access the resources needed to complete coursework or projects.

What is the advantage of an Education Portal Solution to a teacher?

Through the EduSP's portal solution, teachers, lecturers and professors will gain access to otherwise unaffordable computer applications. Easy-to-use course development software will enable the development of on-line courses for distance learning; quiz programs will allow the development of end-of-term tests which can be taken anywhere; and many administrative tasks—considered necessary chores today—will become easy to complete, thereby saving a teacher's valuable time.

What is the advantage of an Education Portal Solution to a school administrator?

Education Portal solutions will provide a great number of applications and services to ease the burden of school and university administrators. Among these will be e-mail services, financial and budgeting packages, class-scheduling applications and student enrollment systems.

What is Total Cost of Ownership (TCO)?

TCO is the code name for the aggregate cost of owning a computer over a period of time—usually three years. It includes the initial cost of buying the hardware and software, as well as the ongoing maintenance, upgrades and user support that must be provided for the computer to be effectively used in the organization.

EDUCATION SERVICE PROVIDER PROGRAM

What is the EduSP Program?

The EduSP Program pulls together the critical components needed by an Education Service Provider to meet the start-up challenge in developing Sun's EduSP service offerings. These components comprise a suite of services, to complement its hardware and software products, which will ensure the efficient, safe deployment of the platforms, applications and business processes necessary to meet the EduSP's business objectives.

What is the advantage of using an EduSP for the education community?

Using a Sun Education Service Provider enables the education community to take advantage of the Education Portal model for their education users by leasing access to powerful computing applications and services via the Web. Schools and universities gain access to these applications without the

capital outlay or the investment in recruiting, managing and retaining technicians to manage and maintain the systems.

What is an Application Service Provider (ASP)?

An ASP is a company that provides access to applications on a subscription basis. MediaSeek and LearningStation.com are examples of ASPs.

What is a Content Service Provider (CSP)?

A CSP is a company that provides data and information for inclusion on the Web. Encyclopedia Britannica, McGraw Hill and Oz New Media are examples of CSPs.

What is an Education Service Provider (EduSP)?

An EduSP is a Service Provider specializing in providing information technology services to the education marketplace. Blackboard.com is an example of an EduSP.

What is an Independent Software Vendor (ISV)?

An ISV is a company that develops, markets and supports software applications. PeopleSoft is an ISV that develops and markets a widely used Enterprise Resource Planning (ERP) package.

What is an Internet Service Provider (ISP)?

An ISP is a company that provides the facilities necessary for individuals or organizations to access the Internet via dial-up or dedicated lines. AOL, Netcom, AT&T and GTE are among the many ISPs in the United States.

What is a Service Bureau?

A service bureau is a company which provides computing services to multiple small- and medium-sized businesses so that they have neither the expense nor complexities associated with owning and running their own in-house computing systems.

SUNCONNECT ARCHITECTURAL FRAMEWORK

What is SunConnect?

SunConnect™ is an architectural framework for education institutions and companies serving the education market, to develop and deploy transactional application services using Java™ technology. The SunConnect development environment includes the necessary tools, resources and services needed to develop said applications, including security, legacy integration, transaction services, scalability and development tools.

Is it a product or a program?

SunConnect is not a product but rather a set of three Frameworks and three Modules combined with a certification (SunTone Program) and marketing program. SunConnect encourages partners to make their core components available within the SunConnect framework—including run-time environments, security modules, management environments, or any other core service.

How does SunConnect compare with similar industry programs?

SunConnect is an extensible architecture that enables the implementation and deployment of highly transactional applications using Java and CORBA technology, tightly integrated to any number of other environments. This integration is made possible by Sun's release of specifications that assure compatibility and specify minimum levels of functionality. This ability to enable any core service to be supplied by any vendor, combined with the specification of minimum services and functionality, is what extends SunConnect well beyond the limitations of other frameworks.

Is SunConnect based on a proprietary platform?

No. Although Sun is focused on bringing the benefits of SunConnect to the Sun platforms, SunConnect itself is based on standards and is completely platform independent. SunConnect provides the needed specifications and certification that enable SunConnect services to be integrated directly to any number of products and services, including legacy environments and new Internet solutions.

What is the technology behind the SunConnect architecture based on?

Based on proven technology. Although the SunConnect architecture employs a number of new technologies, it is derived from a solid, proven foundation. It is built on Sun's established leadership and strengths in open systems and Internet/Intranet solutions. Much of what is incorporated in SunConnect is the result of Sun's worldwide experience as the leading supplier of Internet platforms, and as a major supplier of open network-based solutions to the education market.

GENESYS PLATFORM ARCHITECTURE FRAMEWORK

What is Genesys?

Genesys™ consists of a platform architecture, and associated multiple products and services that form a foundation that enables service providers to implement, configure, operate, and manage their enterprise server, storage, and network resources. When combined, the platform architecture, products, methodologies, and services create an environment that is especially flexible for running multiple applications.

What are the key elements provided by the Genesys framework?

Genesys focuses on three key steps: Creating an integrated infrastructure—the physical infrastructure required to run server applications. Implementing dynamic resource sharing capability—to enable multiple applications to run on one set of resources, and manage the boundaries between those applications. Centralizing and simplifying management of that infrastructure—to enable the scaling of the environment, and the reduction in the management effort needed.

What is the key benefit of Genesys to an EduSP?

Genesys enables the service provider to address the platform aspects of deploying an Education Portal to the education community, by enabling the provision of higher levels of availability and dynamic scalability, and centralized resource sharing and management that is both simplified and flexible.

SUNTONE CERTIFIED PROGRAM

What is SunTone?

The SunTone™ brand represents a series of quality-based programs initiated and driven by Sun to help improve the quality of services in the service provider (SP) industry, to ensure the delivery of secure, reliable, and predictable services, and to make it easier for customers to evaluate product offerings. SunTone Certified members meet established requirements for hardware infrastructure, security, and operational processes, and follow a recommended methodology for building services, providing security, and ensuring reliability and scalability.

How does SunTone compare with similar industry programs?

SunTone is not an uptime guarantee, 99.999% availability program, or a service contract. SunTone goes well beyond that. SunTone is a set of best practices born from an architectural council representing small and large industry leaders from around the world. Sun is collaborating with its industry colleagues to gain wide consensus around SunTone's content and nature and ensure that the program becomes the best it can be. SunTone is the only industry program that certifies service provider operations and infrastructure.

Who is defining The SunTone specification?

The SunTone Architecture Council is developing the SunTone service delivery specification and the SunTone Ready application specification. The SunTone Architecture Council is a review group made up of senior technical people selected from companies that are committed to providing best-of-breed services, software and applications for the service provider market, by meeting SunTone criteria for reliability, availability, and security.

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