



THE ELEMENTS OF THE ASP MARKET

A Road Map for Building ASP Infrastructure

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Introduction

The move to hosted applications is on. Businesses of all sizes are beginning to understand the tremendous advantages of purchasing application services rather than application software, triggering a massive influx of players, partners, and platform vendors into the Application Service Provider (ASP) arena. The total market opportunity for ASPs is projected to grow from \$300 million in 1999 to as much as \$25 billion by 2004, according to various independent research firms.

It is clear that the ASP market is a tremendous business opportunity for independent software vendors (ISVs), systems integrators (SIs), telecom companies, and network service providers. It represents a chance to increase revenues, flatten cyclical income streams, address new markets, and get closer to customers.

What is not so clear is how to harness the potential of this burgeoning market quickly, effectively, and with minimal business and technical risk. The ASP business model and its competitive landscape are in a constant state of flux; even the definition of an ASP seems to be evolving as the market morphs.

As the pioneer of the dot-com age and the platform vendor of choice for service providers, Sun is in a unique position to help you understand, enter, and profit from the ASP business model.

This paper provides an overview of the ASP market and helps you structure your evaluation of the ASP opportunity for your business. It presents a road map to "ASP" your business and shows you how Sun's experience, end-to-end solutions, and third-party alliances can help you every step of the way.

SECTION 1: ASP BUSINESS MODEL

Application Service Providers (ASPs) solve a key problem that companies of all sizes have been grappling with for years: how to take advantage of the best software applications on the market without hiring expensive specialists, without waiting for lengthy deployment cycles, and without compromising on quality. ASPs provide a fresh alternative to purchasing and managing packaged software by selling outsourced software services rather than applications. This helps enable companies to begin using the applications they need immediately—often years earlier than they could have otherwise—and skip the pain of recruiting application specialists and constantly installing, upgrading, and then outgrowing software solutions.

This section presents a broad overview of the ASP business model; the next section shows how the ASP model creates new business opportunities for ISVs, telecom companies, and network service providers.

ASP Defined

An ASP is simply a company that hosts and manages application services on behalf of a client over a network. These applications can range from basic e-mail to groupware and data mart applications to extremely complex and demanding applications such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and Computer-Aided Design (CAD).

Typically, the ASP rents the application services to customers on a monthly basis, and maintains data center resources and wide-area networks for service delivery. Often the customer's own servers are used at the ASP's data center (a practice called "co-location"). The ASP manages the applications, houses customer data, and provides billing and support services.

ASPs use a variety of pricing models. Some charge a flat per-user or subscription fee based on the applications and options used. Others employ a usage-based economic model, charging by the transaction, connect time, or other measurable feature. Still others charge by success factors, such as a negotiated fee based on reduction in inventory turns. In addition to monthly fees, many ASPs also charge setup fees to help offset the expense of bringing new customers online.

The negotiated fee is often contingent on a specified Service-Level Agreement (SLA) that is defined for each customer. These agreements provide contractual assurance that a given level of availability, response time, or business service accessibility will be met. ASPs typically provide some type of compensation to customers in the event that these SLA criteria are not met, thereby reducing risk for customers.

Market Size and Growth Rate

Among independent research firms, there is a large disparity in size and growth estimates for the ASP market, but most seem to agree that the size will grow to \$5-25 billion by 2004 and that triple-digit compound average growth rates (CAGR) are likely during that period. The differences in estimates can be attributed to variations in the aggressiveness of forecasting, the types of services included, and the fungible nature of the ASP marketplace. Specific findings or predictions from selected research reports include:

- Forrester Research predicts that the application hosting market will reach \$10 billion by 2001 (Wall Street & Technology, May 2000)
- Gerard Klauer Mattison & Co. estimates that the nascent-stage ASP market will be slightly more than \$8.5 billion in 2004, and that the incremental ASP infrastructure market will climb to more than \$3.6 billion in 2004, exhibiting a CAGR of 106%.
- Meta Group expects the ERP outsourcing market alone to rise from about \$1 billion to \$6-8 billion within the next three to four years.
- IDC predicts that ASP revenue will increase from \$300 million in 1999 to \$7.5 billion by 2004. IDC also expects the size of the high-end ASP market alone to be \$2 billion in the next five years.

ASP Value Proposition to Customers

The ASP's business proposition to customers is compelling both from an economic standpoint and from a competitive perspective. In general:

- *ASPs can cut the cost of using high-quality applications.* ASPs create economies of scale through a centralized infrastructure, a distributed customer base, and extremely efficient use of scarce labor. Without the ASP model, labor costs are high because the company must find, hire, and pay the large salaries of specialists. In many cases, the expertise of these specialists is not really required on a full-time basis, resulting in inefficient use of capital as well as human resources. For example, the company must pay for 100% of a database administrator and 100% of an application expert when in fact only a fraction of those experts' time may actually be required. By eliminating these inefficiencies and creating economies of scale, ASPs are able to offer application services at attractive monthly rates.
- *ASPs can reduce deployment cycles.* In the dot-com age, most businesses cannot afford the 12-24-month deployment cycles that are typical for internally managed packaged applications. With the ASP model, they can be up and running with top-tier business systems in as little as a few weeks.

- *ASPs provide specialized expertise.* The technical staff hired by ASPs is trained in installing and managing specific applications (such as Oracle, Peoplesoft, J.D. Edwards, etc.). By outsourcing to an experienced ASP, customers let these application specialists focus on what they do best, while the customer's IT staff can focus on its own core competencies.
- *ASPs eliminate the pain of software upgrades.* ASPs upgrade their hosted applications and host systems continuously. When a company purchases traditional packaged applications, upgrades are typically undertaken only when it is an urgent requirement or crisis. Since the upgrade is time-consuming and expensive, the crisis may not be resolved for weeks or months. Under the ASP model, upgrades are relatively smooth, non-disruptive, and cost-efficient.
- *ASPs can offer capacity on demand.* In the dot-com age, it can be extremely difficult to predict the demand a company will have for specific applications or network services. ASPs can often deliver the type of unlimited, on-the-fly scalability that an internal IT department simply can't offer at a reasonable cost. There are two reasons for this: first, many ASPs partner with large third-party vendors who maintain huge data centers and provide capacity as needed; second, ASPs that maintain their own data centers in-house typically architect them specifically for massive scalability based on the expectation that both their business and their customers' business will grow rapidly.

Types of ASPs

Because there are so many different ways to host and manage applications, and because the ASP market is recognized as a hot growth segment, there has been a tremendous influx of companies into the ASP marketplace—to the extent that it can be difficult to gauge which companies are really ASPs.

In fact, the service provider market as a whole has become an alphabet soup of acronyms, including full-service providers (FSPs), business service providers (BSPs), Internet service providers (ISPs), Internet business service providers (IBSPs), Internet application hosting providers (IAHPs), capacity service providers (CSPs), Internet presence providers (IPPs), and many more. The chart on the following page provides an overview of who does what in the service provider market today. Neither the categories nor the examples shown are all-inclusive; the chart simply gives you an idea how fragmented the marketplace is becoming. In fact, many companies qualify under multiple categories.

Table 1: Service Provider Alphabet Soup

ACRONYM	STANDS FOR...	PROVIDES...	EXAMPLES
ISP	Internet Service Provider	Network access and application services	AOL, Earthlink, Mindspring
ISV/ASP	Independent Software Vendor/ASP	Hosting of their own established software applications	Oracle Business Online, Peoplesoft eCenter, Jde.sourcing
NSP	Network Service Provider	Network backbone infrastructure and services such as voice-over-IP, VPNs, bandwidth management, etc.	Qwest, UUNet, Concentric
FSP	Full Service Provider	Turnkey enterprise services, IT services	EDS, AT&T Worldnet
CSP	Capacity Service Provider	Data center infrastructure to other service providers	AT&T, AboveNet Communications, IBM
IAHP	Internet Application Hosting Provider	Capacity and other data center resources for hosting Internet-accessible applications	Loudcloud
IPP	Internet Presence Provider	Hosting of commercial Web sites	Exodus, UUNet, etc.
PSP	Portal Service Provider	Aggregation of network services and content	Yahoo!, Excite@Home, AOL
SSP	Storage Service Provider	Outsourcing of data storage and backup services	GTE Data Services, Qwest, Storage Networks
ASC/ASD	Application Service Creator/Application Service Developer	Create their own code and license it to an aggregator for delivery	Biztone.com, Niku, Portera, Weborder.com
ASP	Application Service Provider	Application hosting and management over a wide-area network	USinternetworking, FutureLink, Applicast, Corio...(see page 8)

The key to sorting out who is and who is not an ASP is to remember that the focus for true ASPs is applications. For the purposes of this paper, an ASP is a company that delivers hosted application services and owns the relationship to the end user. This is an important distinction because many participants in the service provider marketplace, such as Internet application hosting providers (IAHPs), system and storage capacity providers, systems integrators, and application service developers (ASDs) may provide elements of the ASP model but do not necessarily own the customer relationship.

It is useful to view the ASP as part of a dynamic, thriving ecosystem of interdependent service providers rather than seek an incontrovertible definition of the ASP's role. Many ASPs today outsource components of their solutions to other service providers. For example, many ASPs leverage existing data center resources built by other companies, such as Exodus Communications, AT&T, GTE Data Services, or UUNet. Other ASPs leverage the expertise of software vendors through alliances rather than actually hiring staff. And a large number of ASPs rely on outside consulting assistance, such as system integration services, to enable them to offer "full lifecycle" services. At the same time, many SPs are now providing applications in addition to hosting services, and many of the pureplay ASPs are now hosting. So the key is not to limit the view of the ASP market to a rigid definition but to see it as an interdependent, evolving group of companies all focused on delivering application services to customers.

The ISV-to-ASP Trend

Independent software vendors (ISVs) are central to the success of the ASP model, because they write the software that has the functionality customers want to use in the first place and because they currently control the relationship with end users of their software.

The ASP market represents both an opportunity and a threat to ISVs. It is an opportunity because it is a high-growth market and a potential source of incremental revenue; it is a threat because it opens the door for other companies to take away control of their customer relationships. Therefore, many ISVs have recently transitioned some or all of their business to the ASP model. For example:

- Oracle launched Oracle Business OnLine, a subscription-based application delivery service. Oracle Business OnLine provides Oracle application services along with integration, implementation, and management services, giving customers a one-stop solution.
- Peoplesoft has introduced eCenter, its “next-generation ASP business,” which combines tightly integrated applications with data center services and customer service programs that enable customers to get an eBusiness up and running in just weeks.

The influx of ISVs into the ASP market significantly changes the competitive landscape – both for existing ASPs and for traditional ISVs. The section entitled “ASP Market Opportunities for ISVs, SIs, Service Providers, and Telecom Companies” examines the benefits of the ASP model in more detail.

ASP Market Segments

The ASP market can be segmented an infinite number of ways, but in general ASPs fall into the following five categories, reflecting five target customer groups:

- Mid-market*: These are ASPs that pursue opportunities with fast-growing mid-sized companies or divisions of large companies that are not adequately served by their internal IT departments. The mid-market is the sweet spot for many ASPs because most large enterprises maintain well-staffed internal IT departments, while smaller or start-up companies cannot always afford full-service ASP offerings.
- Aggressive-growth*: The dot-com age has given rise to a new breed of small companies (25-100 employees) that need to “get big fast.” These companies need immediate access to world-class applications, but do not have the staff or the resources to implement, deploy, and maintain the applications in-house. The ASP model is extremely compelling to these companies.
- Small companies*: Many small companies and start-ups (20-70 employees) do not have the expertise internally to deploy and manage packaged applications, but need the functionality of top-tier applications in order to compete.

- *Large companies:* Systems integrators and large telecom network service providers were early entrants in the ASP market as they developed new business models to serve their traditional customer base, which includes very large companies. Many of these large enterprises lacked adequate IT staff or needed to invest capital resources in core competencies rather than IT infrastructure.

- *Niche markets:* Some ASPs pursue opportunities within highly specialized businesses or specific vertical industries, such as health care, high-tech manufacturing, or finance.

The consumer market for ASP solutions has not yet materialized, but remains a possibility as the market matures. The chart below, excerpted from a report by Gerard Klauer Mattison & Co. and corporate reports, categorizes select ASPs (other than ISVs) within today's five customer market segments.

Table 2: Select ASP Categorizations

NAME	MARKET SEGMENT	FOCUS/FEATURES	DATA CENTER
Applicast	Mid-market, aggressive growth	Vertical industry templates	Co-locate (GTE)
AristaSoft	Mid-market	High-tech manufacturing	Co-locate (Exodus)
Breakaway Solutions	Mid-market, aggressive growth	FSP	Co-locate
Centerbeam	Small business	Turnkey IT department	Co-locate
Corio	Mid-market, aggressive growth	Standardized high-end applications	Co-locate
CSC	Large business	Custom applications	In-house
eALITY	Small and mid-market	Business process and home-grown apps.	Co-locate (Pilot Network Systems)
EDS	Large business	Custom applications	In-house
everdream	Very small business	Hardware-based Internet technology services	Backup at AboveNet
France Telecom	Large companies	Custom applications	In-house
FutureLink	Small and mid-market	Computer utility and total desktop management	In-house
HostPro	Small and mid-market	Services manageable from any device	In-house
InsynQ	Small business	Computer utility	In-house
NaviSite	Large enterprise e-commerce	Dot-com specialty	In-house and co-locate
ManagedOps.com	Mid-market	Great Plains focused	In-house
Service.net	Large business	Custom applications	In-house
Surebridge	Mid-market	High-tech manufacturing and professional services	In-house
TeleComputing	Small and mid-market	Computer utility and total desktop management	Co-locate (UUNet)
Trizetto	Niche (physician groups and medical players)	Healthcare solutions	In-house
USinternetworking	Mid-market	End-to-end in-house solutions for application development and hosting	In-house

Additional “up and coming” ASPs include:

- Asera
- Bidcom
- Bluetrain.com
- Capstan.com
- Done.com
- i2
- Infocast
- ITNET
- FusionOne
- Jamcracker
- Loudcloud
- ManageMark
- NetASPx
- SpaceDisk.com
- Weborder.com
- Yet2.com

Full Lifecycle Support Model

Even within the five market segments outlined on the previous page, there are substantial differences among ASPs in the level of support they provide during the lifecycle of delivering application services. Full-service ASPs combine packaged application software with a complete spectrum of services for implementing the solution, managing operations, providing customer care, and evolving the solution to meet the customer's ongoing requirements. Other ASPs deliver some combination of the lifecycle services below:

- *Implementation:* ASP implementation services include configuring the software for each customer's unique requirements, aligning the applications with business processes, migrating data, and training end users. Many ASPs employ rapid-implementation methodologies and advanced tools, enabling them to implement the applications in a matter of weeks or months. By taking the lead on implementation, ASPs position themselves to provide ongoing management services, as they have the ability to leverage methodologies and knowledge from implementation to operations phases.
- *Operations:* ASPs provide the data center infrastructure (in-house or through co-location) and teams of specialized staff to host and manage the applications. Included in the operations infrastructure is the physical equipment; the system software and applications; procedures for enhancing system reliability, availability, recovery, and monitoring; security policies and procedures; and people with a broad set of skills to execute and manage the procedures.
- *Customer Care:* Customer support activities range from call centers and Web-based technical support to 7 x 24, mission-critical support services. Full-service ASPs also provide education, training, and operations practices focused on minimizing downtime. They also provide dedicated account management and proactive services such as upgrades, additions of new modules, and expansion of software services to additional locations.
- *Evolution:* Full-service ASPs typically are able to support changes in their customers' strategies through the ability to add new software modules, increase data center capacity, improve application performance and network bandwidth, and so on. They are also able to offer an expanding variety of application packages, enabling their customers to expand their B2B and B2C activities through the same ASP.

ASP Technical Infrastructure

The service delivery infrastructure for ASPs usually includes these key components:

- *Web servers:* a combination of hardware and software for hosting the Website and providing an interface for browser-based access to applications and data that are requested by authorized end users

- *Application servers*: House the applications the customer has contracted to use
- *Database servers*: Store and provide access to data, files, and information requested by end users over the network

Most ASPs provide Internet-based access to services, although it is possible for ASPs to establish virtual private networks (VPNs) with customers for added security. System software is usually the Solaris™ Operating Environment, Microsoft Windows NT, or a combination of the two. The hardware components are housed at secured data center facilities on the ASP's premises or co-located at a capacity provider's premises. Customers typically interact with the data center via a Web browser as shown below.

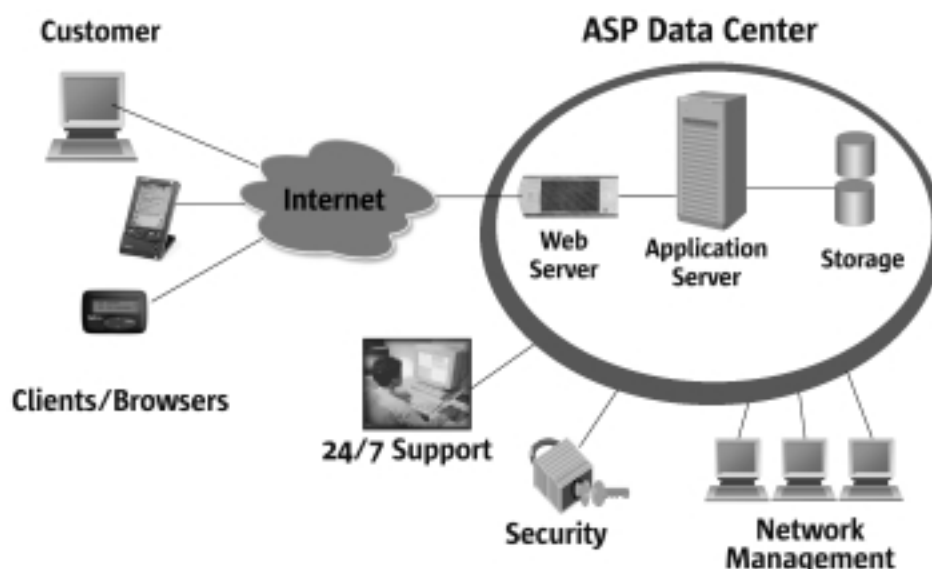


Figure 1: ASP Technical Architecture

Single-Tenancy vs. Multi-Tenancy Models

There are two general approaches used by ASPs to host applications for multiple customers. In the single-tenancy approach, the ASP dedicates servers and other resources exclusively to each customer. In the multi-tenancy approach, the ASP creates one or more pools of resources that are accessed by multiple customers. Customers tend to prefer the single-tenancy model because it gives them peace of mind and higher perceived security; for example, they feel more secure that other customers cannot access their confidential or sensitive data. ASPs favor the multi-tenancy model for its cost-effective resource utilization, flexibility, and management simplicity. The multi-tenancy approach is much easier to scale and enables higher availability and performance than the single-tenancy architecture.

Storage Architectures

Similarly, ASPs deploy a wide range of storage architectures depending on their customers' specific requirements. Storage devices, such as disk arrays or tape libraries, may be directly attached to servers, or they may be pooled via a storage-area network (SAN). The server-attached method can be offered at extremely low cost, but management is complex and scaling can be difficult. On the other hand, the SAN approach offers more efficient use of resources but can be technically complex and require expertise that not every ASP has on staff.

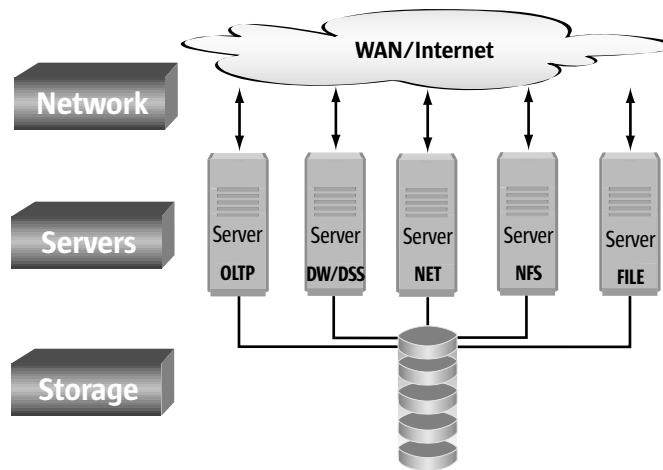


Figure 2: Storage Area Network

Security Considerations

Some prospective customers for ASPs are reluctant to allow a third party to manage the strategic or sensitive information that is contained within business applications. However, ASPs are often able to provide a level of security beyond what the company itself could offer, because they have expertise and because they know their business model depends on the assured security of their systems. Most ASPs maintain multiple tightly-secured data centers with redundant systems, ample spare parts, regular tape backup, and redundant network connections for extra protection against downtime and lost data. In addition, many ASPs offer extremely effective access control, authentication, encryption, virus protection, and frequent security audits to protect against virtually all types of cyber threats.

SECTION 2:

ASP MARKET OPPORTUNITIES FOR ISVs, SIs, SERVICE PROVIDERS, AND TELECOM COMPANIES

The ASP model is much more than a novelty for traditional software developers, service providers, and telecommunications companies. It is clearly being embraced by customers, by Wall Street, by investors, by analysts, by industry consultants, and by the press—and that means moving to the ASP model is fast becoming a strategic imperative. The opportunities are too great and the competitive threat is too real to remain on the fence, and that is why the question is no longer whether to make the move to the ASP model but how to do so quickly. This section summarizes the opportunities the ASP market presents; the next sections show you how Sun can help you get there fast, with maximum efficiency, and with minimal disruption to your existing operations.

Incremental Revenue Growth

The ASP model gives ISVs, SIs, and telecom companies in particular an opportunity to “go mid-market” with high-end, sophisticated applications, thereby increasing the addressable market and providing a source of incremental revenue.

Prior to the ASP model, there was no realistic way for small- or mid-sized companies to harness top-tier applications such as ERP, CRM, Sales-Force Automation (SFA), or Voice-Over-IP (VOIP). The costs of purchasing the infrastructure to run the applications, hiring specialists, and managing the applications were absolutely prohibitive.

The ASP model also takes pressure off vendors of top-tier applications to create mid-market versions of their applications in order to access small- and mid-sized customers, because they can simply make the full-featured versions available on a pay-as-you-go basis to everyone. Customers can rent the features they need immediately, and scale up the functionality as needed. This means ISVs can cut the cost of developing and supporting multiple versions of their software targeted for specific customer groups, which translates to higher net income.

The ASP model also extends the geographical reach of the vendor, enabling service providers and telecom companies to grow revenues through territorial expansion.

In addition, the ASP model opens the door to incremental revenue through advertising. ASP Websites are “sticky,” meaning they are visited frequently and for relatively long duration by a valuable customer base. This fact is not lost on advertisers, who base their online ad placements and the dollar value of their placements on the stickiness of the site.

Smoother Revenue Streams

The cyclical nature of revenue streams has long been a business challenge for software developers. When applications are sold as packaged items, the vendor is subject to seasonal variances and is dependent upon accurate forecasting for effective cash-flow management. The ASP model goes a long way toward solving the problem by instituting a regular monthly payment structure for application services as opposed to a one-time sale. This brings predictability to income streams, which is an attractive feature for stock analysts and investors.

Increased Customer Satisfaction

Under the ASP model, applications are easy for customers to use. They are usually Web-based for fast and simple accessibility, and most ASPs provide end-user training programs to help ensure that users maximize their productivity using the applications. Moreover, the ASP model requires little or nothing of end users in terms of software management or application upgrades—it is all done remotely by the ASP. These factors result in a higher level of customer satisfaction as well as higher employee productivity. And as recent studies show, customer satisfaction is becoming increasingly critical in the dot-com age.

Increased Control of Customer Contact

The ASP model is both an opportunity and a threat for ISVs, SIs, service providers, and telecom companies because ASPs own the customer relationship. The ASP hosts the Website which provides access to the applications; the ASP manages and maintains the data center infrastructure that delivers the application services; the ASP provides operations services; the ASP sends the bill.

By moving some or all of the company's business to the ASP model, traditional software vendors and service providers can keep control of customer contact, customer interactions, and customer satisfaction. The threat is that failure to move quickly to the ASP model could result in a competitor seizing the initiative and co-opting the relationship.

SECTION 3: HOW TO ASP YOUR BUSINESS: SUN'S "RAPID" ROAD MAP

In the ASP business, speed is of the essence. You will need to make your transition to the ASP model quickly and with minimal disruption; you will need to offer high-speed network access and high-performance applications to satisfy customers; you will need the technological infrastructure to get to market quickly with new or differentiated application services; and you will need to ensure fast, smooth, continuous upgrade capabilities for the applications you deploy.

That is why Sun has created “RAPID,” a road map that helps ISVs, service providers, and telecom companies make the transition to the ASP model quickly, efficiently, and with minimal business or technical risk. Sun’s road map is both a step-by step approach and a continuous process, because the nature of the market requires ASPs to constantly upgrade and add to their service portfolio. Sun and its third-party partners offer products, services, expertise, and advice to assist you with each phase. This section summarizes the milestones of the road map; the next section shows you how Sun and its allies can help you get where you’re going.

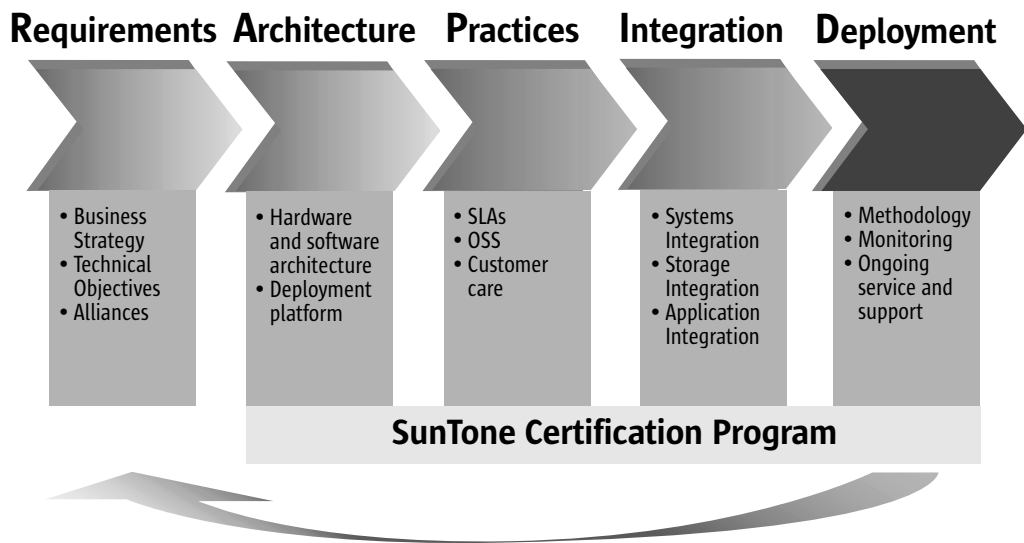


Figure 3: The “RAPID” road map guides you through the key steps of becoming an ASP

Requirements Definition

The requirements definition phase examines the business goals, the high-level technical requirements for moving to the ASP model, and the key alliances you’ll need to make your move.

Business Strategy

The first step is to formalize exactly what your business is trying to accomplish by moving to the ASP model. This means addressing such issues as:

- What are the primary opportunities you have identified and how do you prioritize those opportunities?
- Specifically, how will the ASP model help your company create a competitive advantage? How much is that advantage worth in terms of incremental revenue? In what timeframe? How will current revenue streams be affected?

- What will it cost your company NOT to move to the ASP model—in terms of lost sales opportunities, decreased productivity, and loss of competitive advantage or diminished reputation for service quality?
- How will the ASP model enable you to expand your addressable market?
- What will the impact of the move be on employee morale? On your business processes? On customer satisfaction? On industry perception of your company? On your stock price?

As part of this process, it is important to analyze what other companies within your industry are doing. In addition to your own research and analysis, it is often helpful to enlist the assistance of external consultants and industry experts to advise you about issues and trends specific to your industry.

Technical Requirements

Before you begin assessing specific hardware and software products and how they'll fit within an ASP model, it is important to get consensus between the IT department and management on issues such as:

- How do the technical requirements of an ASP infrastructure mesh with the capabilities of our current hardware, software, and network infrastructure? Are we looking at an upgrade to existing systems, an overhaul, or complete replacement?
- What is the skill gap between our IT department's current expertise and the requirements of running an ASP business? What will it take in terms of training, recruiting, and hiring to fill the gaps?
- How will transitioning to "ASP-ready" systems improve our non-ASP business?

Alliances

With the increasingly heterogeneous nature of today's networks and system architectures, no single vendor can provide a complete, comprehensive solution that addresses every aspect of the technical infrastructure. This is particularly true in the ASP arena, where systems, software products, and network infrastructure from multiple vendors must be stitched together in every implementation, and where an ecosystem with many niche players has formed.

Therefore alliances have become a critical factor in the equation, and each prospective ASP must carefully examine what types of alliances will be needed at each phase of the road map and who the leading players are within each category. For example, if you decide that co-locating your data center resources makes sense, you will need to identify the right capacity provider. If you are offering your customers mission-critical application services such as ERP, you may need to partner with support providers that

can increase your uptime or performance levels. If your objective is to gain a competitive edge through quality of service, you may need to partner with companies that can help you define and monitor service-level policies.

Architecture

The second phase of the RAPID road map is building the technological infrastructure that supports your ASP business. This involves constructing a flexible hardware and software architecture and selecting the deployment platform on which the application services will be delivered. Again, alliances can play a role in this phase because they can often provide outsourcing of key components of the infrastructure, including data center capacity, security services, storage and backup services, and so on.

Hardware and Software Architecture

Building service-driven, dot-com systems is no small task. It requires the right software tools, working together the right way, and the expertise to bring it all together.

Being an ASP is about service delivery, and delivering services with maximum performance, availability, scalability, and accessibility requires a Service-Driven Network architecture. The Service-Driven Network concept is not a Sun product or a Sun program but a goal every ASP should be striving to achieve. It is a smooth, seamless, flexible network services architecture that enables any client (at the top) to access any service (in the middle) that runs on any platform (at the bottom).



Figure 4: The Service-Driven Network

While the specific hardware and software architecture of each Service-Driven Network will vary with business and technical objectives, the attributes of Service-Driven Networks are tangible and consistent. They are modular, dynamic networks based on

Internet standards. They adapt on-demand to meet new user requirements. They are extensible – meaning you can grow and scale them to meet unpredictable demand for your network services. And they evolve to accept new technologies.

Through its own internal transition to a Service-Driven Network architecture and through its role as an advisor to hundreds of service providers worldwide, Sun has identified several general principles that will be useful to you in building your ASP architecture. The architecture should be:

- *Physically distributed*: It should be possible to distribute processing across multiple physical network devices. This maximizes your ability to protect (through the firewall) discreet processing elements and to meet spikes in demand for services.
- *Logically tiered*: Functionality should be partitioned according to logical function. This “separation of concerns” enables services to be deployed independently of the underlying hardware and system software infrastructure.
- *Services-based, not API-based*: Software should be implemented as components that are readily available across the enterprise and capable of being managed and controlled to achieve the needed quality-of-service (QoS) levels.
- *Externally managed and controlled*: Professionals should manage the environment; users should simply use the functionality. To achieve this, management and control facilities must be “external,” to the functional components themselves.
- *Implemented in layers*: Layered implementation maximizes your flexibility in selecting, tuning, and evolving platforms in response to changes in demand or technologies. The diagrams below show the difference between traditional “client-server” architectures and the layered architecture that meets the needs of dot-com businesses.

By following these basic principles, you will create an architecture that is optimized to deliver services to end users at high performance, with high levels of reliability, and virtually unlimited scalability, security, and adaptability.

Deployment Platform

The selection of the actual hardware and software products on which the applications will run is obviously a key decision, but if you have implemented your architecture properly it will enable each network service to be designed and deployed on a variety of platforms. This approach provides flexibility in assigning appropriate QoS levels to each application service; it also provides enough structure to permit the overall architecture to evolve and grow over time.

Therefore, flexibility and adaptability are the key attributes to look for in hardware and software platform infrastructure products such as servers, switches, routers, and system software. The products should provide the high levels of availability, scalability, performance, security, and accessibility demanded by dot-com applications, but they should also offer a high level of interoperability, connectivity, and platform independence to enable them to adapt to changing business conditions.

SunTone™ Certification and Branding Program

The SunTone™ Certification and Branding program is an industry-wide initiative that provides a brand mark for network services that meet rigorous criteria for quality. This serves as a “mark of excellence” that enables customers to identify high-quality services quickly and easily, and also helps ASPs differentiate their service offerings. The SunTone program impacts the way ASPs architect their data center infrastructure, their business practices, their application and systems integration processes, and the deployment of their application services.

Practices

The third phase of the RAPID road map is determining the types and the scope of operational practices you will implement as an ASP. These operational practices include everything from operations support systems (OSSs)—which handle service quality management, order management and provisioning, and customer care and billing—to your service-level agreement (SLA) policies and procedures, to data center operations and practices.

On the OSS front, new packaged software solutions targeted at ASPs are expected to emerge in the near future, combining traditional operations support systems with ASP-specific elements such as billing and SLA metrics.

In terms of data center operations, transitioning to the ASP model requires that you carefully plan and institute well-defined policies for each of the following:

- *Asset management*: The application hosting infrastructure must be managed separately from the company’s other network resources. Each ASP customer may have dedicated servers, or the ASP may maintain multiple server and storage networks to consolidate application services for multiple clients. In either case, managing these assets and tracking specific versions and models are core requirements.
- *Change management*: ASPs need to have policies and processes in place to manage all changes to the operating environment as well as the applications they support. All modifications should be planned to minimize system or application downtime, and should be well documented to aid in troubleshooting efforts.

- Backup and restore capabilities*: Data protection is vital to ASP customers who entrust their mission-critical applications to ASPs. You will need to completely address the backup, recovery and archiving needs of the data associated with each hosted application. You may also need the ability to perform backups concurrently with the processing of data to meet application accessibility guidelines set forth in SLAs. Separate backup tapes for each customer (no co-mingling of data) and off-site storage and backup tapes for disaster recovery is standard practice in an ASP environment.
- Problem management (call flow)*: Regardless of whether you intend to offer full-lifecycle support services as an ASP, you will need to be responsible for providing complete and continuous call-center and technical support to customers. Policies need to be defined for both general support and escalation of urgent issues. This means you will need to define problem resolution, organize resources, and adequately staff to provide prompt and thorough support.
- Customer relationship management*: Customers need to have clearly defined contacts for support, sales, change of services, and billing, and need a channel for requesting new features or enhancements to current applications.

Integration

Regardless of their market niche or application specialty, ASPs must provide their customers with systems integration expertise. Today's enterprise systems and networks are increasingly heterogeneous, and service-driven networks must provide anytime/anywhere access to any type of networked device.

Many ASPs find that the quickest path to offering systems integration expertise is through partnering with a leading SI such as EDS or Arthur Andersen. Others purchase the capability by acquiring systems integration companies or consulting firms with expertise in the ASP model.

Another form of integration is the integration of applications offered by the ASP. For example, Corio offers a pre-integrated suite of applications for aggressive-growth companies, enabling them to deliver functionality across their entire value chain of partners, suppliers, and customers.

Similarly, some ASPs are also beginning to pre-integrate service packages both to enhance the value of their offerings and to reduce the time and expense of systems integration. For example, Conita Technology's PVAServer offering turns any phone into a voice portal and enables off-site workers to access CRM or SFA applications from anywhere. This value-added service provides competitive differentiation against ASPs that simply offer CRM or SFA applications.

Deployment

Once you have designed your architecture and finalized your integration strategy, you need to implement and manage the production environment in such a way that it delivers the quality-of-service levels your end users demand. This includes regular monitoring, evaluation, and refinement cycles to ensure that the architecture continues to serve your customers well and meet end-user quality-of-service requirements in the long term. This means addressing each of the issues described below.

Methodology

The deployment methodology is the structured approach you bring to the deployment of your ASP infrastructure. There are many different philosophies and methods employed by different vendors, but in general there are five key phases that need to be addressed:

- *Solution Design*: Defining your current service-level commitments and the steps you will need to take to create a production environment that can achieve the service levels you expect to deliver to your customers.
- *Implementation Planning*: Creating detailed specifications and plans based on the solution design elements identified in phase one. This helps ensure that all the objectives defined in phase one will be met by the production environment. The focus should be on readiness and planning for people, process, and product requirements, ensuring a complete solution.
- *Prototype Implementation*: Integrating the components for the target production environment—including production tools—in a prototype environment. By providing a safe place to test the environment, this staging process reduces the risks ordinarily associated with bringing complex systems into production.
- *Production Implementation*: Configuring and integrating the production environment and testing to help ensure stability and recoverability of the system and data.
- *Production Release*: Also called the “go live” phase, the production environment is released into production. When this step has been completed, the production environment is now active.

Monitoring Service Deployments

While it is important to monitor and measure service levels, it is no less critical to monitor and measure the systems on which the services are deployed. Here are a number of things to watch for:

- *Is the rate that the service is being accessed consistent with the load on the systems? Are there any deviations from your models?*

- How much more headroom do you have before the system will require an upgrade?
- If a service is deployed across multiple systems, are they all experiencing similar loads, or are some being accessed more than others?
- If the service is experiencing periods of performance degradation (long access times/low bandwidth), what system activities is the degradation correlating with?

SECTION 4: HOW SUN CAN HELP

With end-to-end platform infrastructure for Service-Driven Networks, leading-edge software development tools for Web-enabled applications, strong alliances with best-of-breed solution providers, and award-winning service and support capabilities, Sun is in a unique position to help your company make the transition to the ASP market.

Sun can serve multiple roles for your organization – from strategic technology advisor and network computing expert to infrastructure supplier and support service provider. Together with our allies, we can deliver a comprehensive solution for your specific requirements. The section below maps our products, services, and initiatives – along with those of our third-party partners – to the road map outlined in the previous section.

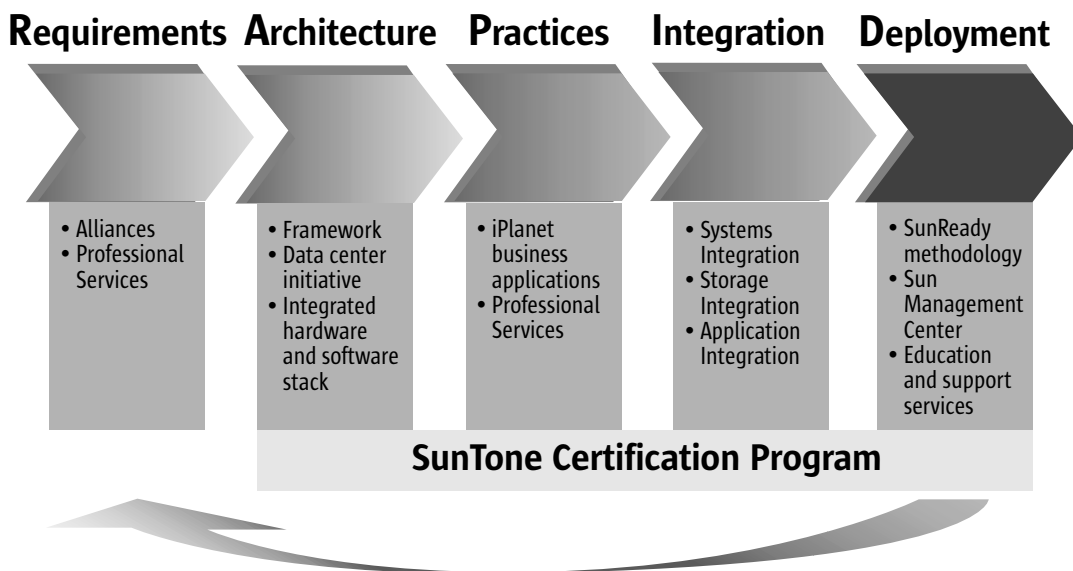


Figure 5: How Sun Can Help at each step with “RAPID”

Requirements Definition

Sun’s partnership-oriented business model enables you to leverage our alliances with top-tier consultants, integrators, and solution providers. We also give you access to Sun’s experienced consultants, who have helped numerous ISVs, telecom companies, and service providers move to the ASP model quickly and successfully.

Alliances

Sun offers the expertise and the top-caliber alliances to help you define your business strategy and objectives. Through its iForce™ Community, Sun can connect you with leading consulting firms that specialize in providing assistance with all aspects of developing and refining your business strategy for the ASP model. In addition, Sun's own professional services organization can advise you about how Sun technologies can help meet your needs, as well as advise our consulting allies in how best to take advantage of Sun technologies.

Because Sun has such a strong presence in today's corporate data centers, most top-tier systems integrators offer a high level of technical expertise working with Sun systems. To help up-and-coming e-integrators develop their understanding of the Sun platform, Sun has developed a series of programs that build knowledge and confidence working with Sun systems. In addition, Sun and its third-party allies work closely together at customer sites to help ensure the highest level of success.

Sun Professional Services

As a leading supplier of expert consulting services for service providers and enterprises with Net Economy data centers, Sun Professional Services can offer you a broad range of services designed to help you with any and every facet of transitioning to the ASP model, including defining your business strategy. Sun consultants can create customized programs to help you evaluate your opportunities and your options, define your objectives, and begin mapping the transformation from vision to reality.

Architecture

As the pioneer of the open systems movement and an end-to-end supplier of integrated hardware and software products, Sun is the vendor of choice to supply the expertise and the products and services to help you build a flexible ASP architecture.

Architectural Framework

The "services age" age has fundamentally changed the rules for building architectural framework. Legacy architectures were simply not designed to deliver on the new set of requirements for accessibility, availability, scalability, security, and manageability, and are not flexible enough to adapt quickly. To address the needs of today's users, ASPs need to provide access to application services at any time, from anywhere, using anything—from laptops to PDAs to cell phones and pagers.

An ASP architecture needs to support what might be described as an enterprise *utility model*. Like electricity through a power outlet or water through a faucet, services need to be provided around the clock from standard access points to any network device.

Thus, the requirement for ASPs is to build a services-driven architecture — an architecture that achieves flexible quality of service for end users and enables rapid deployment of new Web-based applications.

Sun's approach to creating this service-driven architecture is to add a "services layer" between client devices and back-end resources. Through this approach, back-end resource functionality is made available via well-defined, network-callable components. These components can make back-end functionality readily available to Web clients, but unlike traditional architectures they provide building blocks for combining simple services into full-featured, value-added services that themselves become Web-available.

Creating this architecture means focusing on service delivery, not hardware products, and basing the development and deployment platform entirely on industry standards, such as XML, HTTP, and Java™ technology. This way, the architecture helps eliminate dependency on proprietary hardware and software products, and it keeps your options open. Among the additional benefits:

- *Faster deployment:* It is easier to create, modify, and deploy new services — or to build on existing services. That means users have faster access to the services they need.
- *Tuned deployment:* You can set the desired levels of scalability, availability, security, and bandwidth consumption individually. This allows you to match system-level resources to services.
- *More efficient use of resources:* You can pool resources and use what you have more efficiently.

Sun provides consulting expertise to assist you with any and every phase of building your service-driven architecture, along with the products and services you need to keep it operating at peak efficiency for your application deployments. In addition, the SunTone Certification and Branding program helps guide your infrastructure decisions, as it recognizes the platform technologies that have met industry standards for quality.

Sun™ Datacenter.com Initiative

Traditional data centers were built for predictability and control — dominated by mainframes and staffed by experts in lab coats who brought rigorous discipline and procedures to computing. But the chaos of the Internet, combined with the increased demand for anytime/anywhere network services, has forced change on the data center. The ASP's data center must combine the predictability of the traditional data center with the need for increased flexibility and connectivity in the Internet age.

The Sun datacenter.com initiative helps deliver real-world implementations of the architectural vision outlined in the previous section. It is a networked data center, bringing together the best features of open network computing and traditional data center disciplines. The networked data center contains three key layers:

- *Universal Access*: Defines how end users will connect to the center. It provides universal user access with fine-grained control and security. This layer has been enabled through technologies such as the Web and browsers. Sun has expanded the concept of access through its Jini™ technology, the foundation software that enables users to connect any device with any other device.
- *Networked Application and Services*: Allows application services to be delivered transparently to users and devices regardless of platform. Sun has built a strong second layer, networked application server and services, using Java technology, which allows developers to write cross-platform applications once and then run them anywhere.
- *Data Center Platform*: A comprehensive platform strategy that defines how to implement, configure, operate, and manage the resources and infrastructure that comprise the networked data center. Sun's platform architecture is a program of products and services focused on helping customers evolve from existing data center models to the Sun datacenter.com model.

By addressing the three key layers, the Sun datacenter.com initiative creates an integrated infrastructure and brings together the server, storage, software, and network resources to form a flexible platform architecture and solutions for ASPs.

Sun's Integrated Hardware and Software Platform

Building the infrastructure for ASP service delivery is no small task. It requires the right combination of hardware and software, working together the right way, to ensure anytime/anywhere service delivery to any network device. That is why Sun has focused on developing an integrated platform of hardware and software products that work well individually and work well together.

A key benefit of Sun's integrated hardware and software stack is that it is standards-based and open to multiple products from multiple vendors. That means you can build your Service-Driven Network your way, using virtually any combination of hardware and industry-standard software products. You are not limited to products made by Sun; you can select among hundreds of best-of-breed products made by third-party companies.

Platform Hardware Products

- *Sun Enterprise™ servers*: From the single-processor Sun Enterprise™ Ultra™ 5S work-group server to the world's most powerful UNIX® server, the 64-way Sun Enterprise™

10000 server, Sun servers deliver the scalable horsepower you need for virtually any dot-com application. All Sun servers are binary compatible, so you can simply upgrade as your needs change—with no changes to the operating system and no changes to applications. Sun also offers a full range of exceptional servers for specific industries, such as telecommunications.

- *Sun's Netra™ systems:* Sun's Netra servers bring unprecedented levels of availability and space-efficiency to telecom and service provider markets, enabling customers to deploy cost-effective, standards-compliant power in any increment with full binary compatibility across the product family.
- *Sun StorEdge™ storage devices:* Sun has transformed storage from a passive resource into a strategic weapon by designing storage solutions to solve business problems rather than to meet technical goals. Today, our Sun StorEdge arrays and tape libraries carry the tradition to a new level, enabling you to implement Managed Storage Networks that are massively scalable, available, and manageable; that easily incorporate third-party products; and that remain open to innovation from multiple sources.
- *Ultra™ workstations:* Sun's Ultra line of workstations is the runaway leader in the UNIX workstation market, renowned for their processing power, their graphics capabilities, and the wealth of third-party applications that are developed on and optimized for the Sun platform.
- *Sun Ray™ clients:* Sun Ray clients and the Sun Ray Hot Desk architecture usher in a new era of thin-client computing. Sun Ray clients are enterprise “appliances” that make computing for enterprise users as friendly and reliable as picking up and using a telephone handset. Like a telephone, the new book-sized Sun Ray 1 enterprise appliance is easy-to-use, affordable and reliable, and works the instant it's plugged in. The Sun Ray appliance requires no changes to existing applications, never needs upgrading, and most importantly, unlike a PC, does not tie the user to a fixed location (e.g., a desk). Since the ASP model is designed for companies to concentrate on their core business and not use their own IT resources to manage systems and applications, the Sun Ray client supports this model by taking away the cost and resources required to manage the desktops.
- *Third-party products:* A wealth of hardware and software platform products are available through Sun's best-of-breed allies—from boards that incorporate SPARC™ processor technology to specialized systems to information appliances.

Platform Software Products

- *Solaris 8 Operating Environment:* The selection of an operating system is possibly the most critical decision ASPs face. The operating system must provide the level of performance end users require; the inherent scalability to accommodate sudden

and unexpected spikes in demand for application services; high availability to help ensure continuous operation for mission-critical applications; interoperability with multiple platforms; and strong security to protect users and their data. In Solaris 8 software, Sun delivers a trustworthy, universal operating platform to meet the needs of ASPs and their customers in businesses of all sizes. The Solaris Operating Environment is the network computing platform of choice for service providers, e-commerce sites, and large-scale enterprises, bringing 64-bit computing and mainframe-class reliability, availability, and serviceability to mission-critical environments. It is proven in both traditional data centers and dot-com start-ups around the world.

- *Jiro™ Storage Management Platform*: The Jiro platform provides a universal framework for developing open storage applications and services based on Java technology. Now developers can write storage applications that can be deployed anywhere, and their customers are freed from the restrictions and expense of proprietary, single-purpose storage boxes.
- *Sun Cluster™ software*: Sun's clustering software brings a new dimension of availability to Sun systems through advanced failover techniques. Now customers can achieve extremely high levels of availability in clustered systems with a proven, cost-effective software solution.

Service Creation Software

- *Forte™ Development Suite*: Sun's Forte Development Suite combines workflow and XML to create the industry's leading enterprise 4GL Enterprise Application Integration (EAI) environment. A range of Forte development tools are available to meet specific requirements, including Forte™ for Java™ technology for standards, ubiquity and power; Forte C++ and FORTRAN for performance and control; and Forte 4GL for enterprise-class TTM applications.
- *Development and Integration Tools*: Sun's integrated software development environments include all the tools you need to design, build, integrate, and deploy your mission-critical applications on the Solaris Operating Environment, the Linux environment, Java technology platforms, or Microsoft Windows NT platforms. The flexibility and range of features in the integrated development environments (IDEs) make them powerful development tools for developers at any level. Developers who are just getting started can build applications quickly, while advanced features within the development environment enable you to build more sophisticated applications that are performance-driven, can scale to n-tiers, are Internet-enabled across multiple platforms, or all of the above.

Service Connection and Delivery

- *Jini Technology*: Jini software enables any device to connect to any network service – in much the same way that Java technology enables software to run on any device. Now you can simply connect any device to an “instant on, always on” network.
- *Java 2 Technology*: Java 2 software is the “Write Once Run Anywhere™” technology engine for end-to-end e-business solutions. It is a unified platform that combines the power of Java technology and XML to simplify the development of enterprise applications.

Client Services

- *iPlanet™ e-Business Software*: iPlanet e-business applications enable you to design, manage, and evolve your dot-com environment quickly and correctly. Core iPlanet applications include iPlanet™ Portal Server software, iPlanet™ Communication Server software, iPlanet™ Web and Application Server products, and the iPlanet™ Unified Directory System.
- *StarOffice™ Suite*: Sun's StarOffice software suite makes cross-platform productivity applications such as word processing, spreadsheet, presentations, and calendar available in a Web-based model. Now you have anytime/anywhere access to full-featured productivity software on any of the most popular platforms, including the Solaris Operating Environment, Linux, and Microsoft Windows NT.

Implementing Sun's Architectural Framework: Sun Professional Services

Sun Professional Services has created an array of consulting services that address all aspects of architecture analysis, design, and deployment. The architecture consulting practice leverages Sun's significant knowledge base and expertise from its Java Center™ practice and Advanced Internet practice. It is wholly focused on providing companies with the Net and e-business technologies that can impact the profitability and competitiveness of their business.

Practices

Sun and its third-party partners can assist ASPs with defining and implementing their business and operational practices with a wide range of products, services, and programs including:

SLAs: The SunTone Certified Applications Program

The marketplace is already inundated with the offerings of service providers—so much so that it can be difficult for customers even to determine which services and vendors to evaluate. Sun has made it easier for ASPs to prove that their services have met strict quality-of-service requirements through the SunTone Certified Applications program.

By qualifying for SunTone certification for their services, ASPs qualify to use the SunTone brand in their marketing. The SunTone brand serves as a mark of excellence, showing your prospective customers that your company and network service offerings have completed an extensive array of qualification tests and are able to demonstrate and maintain the quality of the service offering. Sun looks at every aspect of the way the service is designed, deployed, and maintained. Equally important, we ensure that each qualifying vendor has the technical competencies to support the service and the ongoing investment to continue offering the service over the long term. Sun provides specific training on the Solaris Operating Environment and Java technologies required by service providers. Training suites are delivered in Web-based format in order to quickly develop needed skill sets.

The SunTone program is a winning proposition for everyone involved. Customers can easily see which ASPs are creating quality products; ASPs gain a key differentiator for their products; and systems integrators and VARs have an easier way to identify the right partners for their businesses.



iPlanet™ Applications

Sun's alliance with Netscape has resulted in the iPlanet™ business software suite. iPlanet software helps you design, manage, and evolve your business and operational practices quickly. Below are just a few examples of the types of business software solutions available through the Sun/Netscape Alliance.

Application Infrastructure

- *Application server software (iPlanet Application Server or iPAS)*
- *Messaging and collaboration software (iPlanet Messaging Server or iPMS)*
- *Calendar server software (iPlanet Calendar Server, or iPCS)*
- *Web server software (iPlanet Web Server)*
- *Directory and security services (iPlanet Webtop)*

Integration Solutions

- *Application integration software (Netscape Meta-Directory)*
- *Partner integration software (iPlanet™ ECXpert)*
- *Process integration software (Netscape Application Server Process Edition)*

E-Commerce Applications

- *Commerce Exchange (iPlanet™ CommerceXpert)*
- *Bill Presentment (iPlanet™ BillerxPERT)*
- *Information Services (iPlanet™ PublishingXpert)*
- *Online Procurement (iPlanet™ BuyerXpert)*
- *Online Selling (iPlanet™ SellerXpert)*

Portal Services

- *Community Portals (iPlanet Portal Server)*
- *Corporate Portals (iPlanet Portal Server)*

Customer Care: Sun Professional Services and the SunVIP™ Service

Sun Professional Services can assist ASPs with the design and implementation of customer care operations such as call centers and help desks. Our expertise in designing Sun's own internal support systems enables us to act as a strategic advisor; our servers and workstations are excellent foundation products for customer care center implementation; and our third-party allies provide a complete spectrum of value-added products and services to facilitate your planning and deployment activities.

Sun also supports your own need for prompt, responsive technical support through the Sun Vendor Integration Program (SunVIP™). The SunVIP service helps speed problem resolution when products from multiple vendors are involved because it provides a single point of contact. You call Sun once and our technicians respond with a resolution, working behind the scenes with our SunVIP third-party partners. This helps eliminate the fingerpointing that can otherwise occur among vendors and results in faster answers to technical issues.

Integration

The term "integration" has several meanings within an ASP environment. It refers to systems integration, which is the integration of the multiple hardware and software platforms that inevitably exist within an ASP infrastructure; it refers to storage integration, which involves designing the data storage networks and backup mechanisms needed to manage customer data; and it refers to application integration, which is the process of extending the data or functionality of one hosted application to other hosted applications. This section examines Sun's offerings in each of these three areas separately. Again, the SunTone Certified Application program is useful in each area, as it provides assurance that services bearing the SunTone mark have met industry standards for quality.

Systems Integration: Alliances

Sun's allies offer a wealth of expertise that can be applied to help your business develop and execute an effective systems integration strategy. For example, Sun's industry partnerships include:

- *Implementation Allies:* The world's leading consulting firms partner with us to provide you with whatever mix of outside resources you need to create and integrate end-to-end solutions for your business.
- *Service Providers:* Our top-tier service provider allies can give you access to additional capacity, data center resources, and leading-edge technologies. At the same time, they can dramatically reduce your integration costs, lower your total cost of ownership, and increase the flexibility, reliability, security, and overall performance of your systems.

Storage Integration: Managed Storage Networks

The integration of adequate storage and data protection solutions into the overall infrastructure is a critical issue for ASPs, particularly given the increasingly data-intensive nature of today's networked applications. Sun understands that storage networking is not just about hardware components, it's about comprehensive software management capabilities—the ability to control and extract value from storage-area networks (SANs). That is why Sun is leading the industry in the delivery of open, robust software solutions for dynamically managing distributed SANs. Sun's "Managed Storage Networks" allow ASP businesses to consistently meet the service levels they commit to while continuing to minimize costs. Managed Storage Networks combine the hardware, software, and practices that enable storage to become a seamlessly scalable, highly available, easily manageable network resource, regardless of underlying hardware platforms and operating systems.

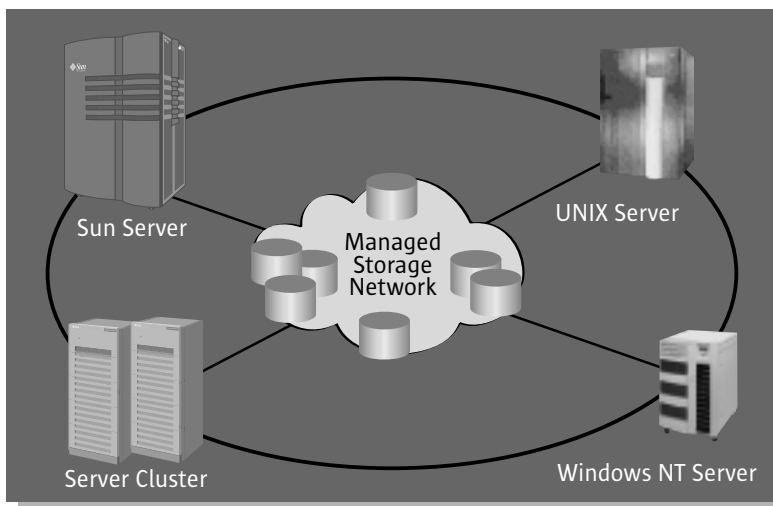


Figure 6: Sun's Approach — Managed Storage Networks

The Managed Storage Network model is the vision upon which all of our storage products are based. It is not a Storage-Area Network (SAN) strategy or a network-attached storage (NAS) approach; it is a way of extracting maximum value from storage networks.

As an integral part of our Managed Storage Network vision, Sun provides a variety of outstanding data protection solutions to help ensure that your valuable data is always available and accessible when you need it. For example, Sun StorEdge Network Data Replicator software protects your customers' information assets by enabling you to replicate data between physically separated servers—in real time and from any distance. Sun StorEdge™ Network Data Replicator (SNDR) software is a critical component of a sound disaster recovery program. The software can be leveraged for data availability during scheduled maintenance, remote backups, data migrations, remote data analysis and more.

Application Integration: Tools and Solution Sets

ASP customers are beginning to demand integrated applications—the ability to share functionality and data among a number of applications as opposed to a single hosted application service. Sun facilitates your ability to provide this capability through application integration tools such as the iPlanet ECXpert product for third-party application integration and the Netscape Meta-Directory.

In addition, Sun provides a variety of both horizontal and vertical solution sets for customers in specific markets. We evaluate and rigorously test—for scalability, integration, and more—the offerings of independent software vendors along with those from Sun and create aggregations of best-of-breed, tightly integrated products. This enables you to implement complete solutions quickly.

Deployment

The deployment and management of your infrastructure and the applications that run on it is a continuous process of evolution and refinement. Sun is with you every step of the way, offering a wide range of products and services that help you deploy and manage virtually any application service from any location.

The SunReady™ Methodology

The SunReady™ Methodology is a comprehensive program that helps you optimize your dot-com production environment to meet your service-level commitments to end users. It maximizes the efficiency of your systems by addressing the people, process and product requirements of implementing a mission-critical dot-com environment, by leveraging Sun's expertise. Sun carefully analyzes your current data center resources and considers the people, process, and product requirements for meeting the service-level commitment you want to offer your end users.

The SunReady Methodology is a five-phased process in which Sun consultants design, specify, implement, deploy, and finally release a customized production-ready environment based on your desired end-user service levels. As a result of the service, you will achieve:

- *Reduced operational risk*
- *A technical architecture that is supported by robust processes and correctly trained people*
- *A future-ready infrastructure that evolves easily with growing demands*
- *Operational knowledge transfer from Sun to your staff through skills assessment, mentoring, and customized training programs*
- *Correct and cost-effective implementation based on Sun's data center technology and e-business core competencies*

Monitoring: Sun Management Center and Sun Remote Services

Ensuring consistent quality of service requires constant management of all network assets. Sun™ Management Center 2.1 software brings together the best technology for managing Sun systems, instant integration with industry-leading management platforms, and a powerful development environment that makes it easy to unite thousands of system components under a single management console. Sun Management Center software is the single solution for managing multiple systems, devices, and mixed-vendor network resources. It provides single-point-of-management convenience for all Sun servers, desktops, storage systems, the Solaris operating environment, applications, and data center services, as well as hooks to third-party management products. As a result, ASPs can:

- *Scale Quickly and Easily:* Sun Management Center software lets you scale the management of a single system to thousands of systems on a single, unified management platform.
- *Increase Uptime:* With predictive failure reporting and comprehensive event and alarm management, Sun Management Center software warns you of potential problems – so you can solve them before they cause downtime.
- *Reduce Administration Costs:* Sun Management Center software simplifies the management of your Sun environment, so you can use your administration staff and technical resources more efficiently and reduce the cost of delivering network services. For example, the product provides remote online control, so administrators can work from anywhere; and “no cease” management provides uninterrupted monitoring while new features are added or existing features are reconfigured. What’s more, built-in security enables multiple administrators with different responsibilities to manage the environment.

- *Monitor Health and Performance in Real Time:* Sun Management Center provides real-time system performance and configuration data, enabling administrators to isolate bottlenecks and optimize network performance. It also provides health monitoring, along with suggested steps for problem resolution, resulting in simplified administration. It even provides optional centralized data storage and performance analysis, including historical trend analysis.
- *Secure access to resources:* Sun Management Center provides enterprise-wide security measures, such as authentication, data integrity, and access control lists for management of data and active management functions.
- *Integrate with leading management platforms:* Sun Management Center software is the best tool for managing Sun systems, and it provides tight integration with an array of industry-leading third-party enterprise management, application management, and operating system administration platforms.

Sun also facilitates system monitoring from remote locations with Sun Remote Services (SRS). The SRS solution addresses the dynamic system and storage requirements of the Net economy by enabling continuous remote monitoring and management of the entire integrated solution—operating system, application software, server, and storage. Remote monitoring and proactive support solutions provide customers with the support they need, before they even know they need it, thereby ensuring that strategic information is always available.

Ongoing Service and Support

Once the architecture has been developed and the production systems have been placed in service, it is crucial to have a sound service plan in place for ongoing maintenance and support of your network assets. In addition to the many service and support program Sun offers ASPs at other stages of the road map, Sun has developed comprehensive support packages that combine professional services, customized education and training programs, and hardware and software support packages that include everything from 24 x 7 telephone and onsite support to dedicated account management, customized availability guarantees, diagnostic tools and predictive failure reporting, and more.

SUN: AN INDISPENSABLE ALLY TO ASP YOUR BUSINESS

The ASP arena has no shortage of platform infrastructure providers or participants in its value chain. Sun stands out as the vendor of choice to service providers for three key reasons:

- *Sun understands the market.* Our foundation technologies helped make the ASP boom technologically possible, and our platform hardware and software products are market leaders among major service providers today. In fact, 15 of the top 20 ISPs run on Sun, and 75% of ISP servers are Sun servers.

- *Sun delivers end-to-end products, services, programs, and solutions.* Our architectural frameworks, data center technologies, and integrated hardware and software stack provide a comprehensive foundation for any and every aspect of the ASP business model.
- *Sun's partnership-oriented business model enables ASPs to succeed.* We recognize that no single vendor can offer an all-encompassing solution to every ASP's requirements, so we partner with best-of-breed and top-tier up-and-comers to deliver a complete solution. And because our products are based on industry standards, our solutions remain open to innovation from multiple sources.

Simply put, Sun is your indispensable ally as you make your move to the profitability and competitive advantages of the ASP business model.

FOR MORE INFORMATION

The following sites on Sun's external website contain ASP-related information:

- <http://www.sun.com/software/solutions/third-party/hosting> – market development information on ASPs and Sun
- <http://www.sun.com/sp/> – Sun's site for Service Providers and the telecommunications industry
- <http://www.sun.com/sp/serviceprovider/> – Sun's site for its ServiceProvider.Com initiative

Other external websites such as <http://www.webharbor.com> and <http://www.aspnews.com> provide general information on the ASP industry.

The Sun-internal website, <http://asp.eng/>, contains a collection of available ASP marketing, sales, and technical information within Sun. Specific information on the site includes:

- ASP infrastructure
- ISV to ASP migration
- Sales tools
- Press and industry information
- Customer case studies

ABOUT SUN MICROSYSTEMS, INC.

Since its inception in 1982, a singular vision, "The Network Is The Computer™" has propelled Sun Microsystems, Inc. to its position as a leading provider of industrial-strength hardware, software, and services that power the Internet and allow companies worldwide to dot-com their businesses. With more than \$15.7 billion in annual revenues, Sun can be found in more than 170 countries and on the World Wide Web at www.sun.com.

GLOSSARY

— A —

Application logic

The computational aspects of an application, including a list of instructions that tells a software application how to operate.

Application program interface (API)

Create the “hooks” in applications that allow them to be linked. The more open the APIs, the easier it is to set up middleware between applications.

Application service creator (ASC)

Provides one’s own software on a remotely hosted and managed basis.

Application service developer (ASD)

Create their own code and license it to an aggregator for delivery.

Application service provider (ASP)

An ASP deploys, hosts and manages access to a packaged application to multiple parties from a centrally managed facility. The applications are delivered over networks on a subscription basis. This delivery model speeds implementation, minimizes the expenses and risks incurred across the application life cycle, and overcomes the chronic shortage of qualified technical personnel available in-house.

ASP infrastructure providers (AIPs)

A hosting provider that offers a full set of infrastructure services for hosting online applications.

Availability

The portion of time that a system can be used for productive work, expressed as a percentage.

— B —

Backbone

A centralized high-speed network that interconnects smaller, independent networks.

Back-end application

A “back-end” application or program serves indirectly in support of the front-end services, usually by being closer to the required resource or having the capability to communicate with the required resource.

Bandwidth

The number of bits of information that can move through a communications medium in a given amount of time; the capacity of a telecommunications circuit/network to carry voice, data, and video information. Typically measured in Kbps and Mbps. Bandwidth from public networks is typically available to business and residential end-users in increments from 56Kbps to T-3.

Business ASPs

Companies that provide mainly prepackaged application services in volume to the general business market, typically targeting small- to medium-size enterprises.

Business-critical applications

The vital software needed to run a business, whether custom-written or commercially packaged, such as accounting/finance, ERP, manufacturing, human resources and sales databases.

Business service providers

These are companies that provide online services aided by bricks-and-mortar resources, such as payroll processing and employee benefits administration, printing, distribution or maintenance services. The category includes business process outsourcing (BPO) companies.

Business-to-business (B2B)

The exchange of products, services, or information between businesses rather than between businesses and consumers. B2B is e-commerce between businesses. An earlier and much more limited kind of online B2B prior to the Internet was Electronic Data Interchange (EDI).

— C —**Capacity**

the ability for a network to provide sufficient transmitting capabilities among its available transmission media, and respond to customer demand for communications transport, especially at peak times.

Capacity service provider (CSP)

Provides data center infrastructure and resources to other service providers.

Client/Device

Hardware that retrieves information from a server.

Clustering

Group of independent systems working together as a single system. Clustering technology allows groups of servers to access a single disk array containing applications and data.

Customer Relationship Management (CRM)

An integrated information system that is used to plan, schedule and control the presales and post-sales activities in an organization. A full-spectrum CRM application architecture consists of the integrated automation of business processes encompassing customer touch points, including sales (contact management, product configuration), marketing (campaign management, telemarketing, data mining), and customer service (call center, field service).

— D —**Data center**

The location where the applications and data are stored and managed.

Data mart

A subset of a data warehouse, for use by a single department or function.

Data warehouse

A database containing copious amounts of information, organized to aid decision-making in an organization. Data warehouses receive batch updates, and are configured for fast online queries to produce succinct summaries of data.

Decision support systems (DSS)

Applications emphasizing user-friendliness and ad hoc query, reporting, and analysis capabilities.

— E —**Electronic Data Interchange (EDI)**

The electronic communication of the business transactions (orders, confirmations, invoices etc.) of organizations with differing platforms. Third parties provide EDI services that enable the connection of organizations with incompatible equipment.

Enterprise ASPs

Companies that typically deliver a select range of high-end business applications, supported by a significant degree of custom configuration and service.

Enterprise resource planning (ERP)

An information system or process integrating all manufacturing and related applications for an entire enterprise. ERP systems permit organizations to manage resources across the enterprise and completely integrate manufacturing systems.

Ethernet

A local area network used to connect computers, printers, workstations, and other devices within the same building. Ethernet operates over twisted wire and coaxial cable.

— F —**Fat client**

A computer that includes an operating system, RAM, ROM, a powerful processor and a wide range of installed applications that can execute either on the desktop or on the server to which it is connected. Fat clients can operate in a Server-based Computing environment or in a stand-alone fashion.

Fault tolerance

A design method that incorporates redundant system elements to ensure continued systems operation in the event of the failure of any individual element.

Front-end application

A “front-end” application is one that application users interact with directly.

Full service provider (FSP)

A service provider specializing in turnkey enterprise application and IT services encompassing the full lifecycle from implementation to ongoing maintenance and support.

— G —**Gbps**

Gigabits per second, a measurement of data transmission speed expressed in billions of bits per second.

— H —**Hosted outsourcing**

Complete outsourcing of a company's information technology applications and associated hardware systems to an ASP.

Hosting providers

This category covers all providers who operate data center facilities for general-purpose server hosting and co-location.

— I —**Integrated services digital network (ISDN)**

An information transfer standard for transmitting digital voice and data over telephone lines at speeds up to 128Kbps.

Internet application hosting provider (IAHP)

A provider of system and/or storage capacity and other data center resources for hosting Internet-accessible applications.

Internet presence provider (IPP)

A service provider that specializes in hosting commercial Web sites.

Internet service provider (ISP)

A company that provides access for users and businesses to the Internet.

Independent software vendor (ISV)

A firm that develops software applications that is not a part of a computer systems manufacturer.

Internetworking

Sharing data and resources from one network to another.

IT service providers

These are the traditional IT services businesses, including IT outsourcers, systems integrators, IT consultancies and value added resellers.

— J —

— K —

Kilobits Per Second (Kbps)

A data transmission rate of 1,000 bits per second.

— L —

Leased line

A telecommunications line dedicated to a particular customer along predetermined routers.

Local/Regional ASPs

Companies that deliver a range of application services, and often meet the complete computing needs, of smaller businesses in their local geographic area.

— M —

Mean time between failures (MTBF)

Average time before failure of a system or device occurs.

Mean time to recover (MTTR)

Average time required to repair a failed system or device.

Megabits per second (Mbps)

A transmission rate where one megabit equals 1,024 kilobits.

Middleware

Software that connects two otherwise separate applications. Middleware is especially important when the ASP wants to share data between disparate applications, either within its own data center or between its data center and the customer's existing systems.

Modem

A device for converting digital (data) signals to analog and vice versa, for data transmission over an analog telephone line.

Multi-User

The ability for multiple concurrent users to log on and run applications from a single server.

— N —

Network computer (NC)

A "thin" client hardware device that executes applications locally by downloading them from the network. NCs adhere to a specification jointly developed by Sun, IBM, Oracle, Apple and Netscape. They typically run Java technology applets within a Java-based browser, or Java-based applications within the Java virtual machine.

Network computing architecture

A computing architecture in which components are dynamically downloaded from the network onto the client device for execution by the client. The Java programming language is at the core of network computing.

Network service provider (NSP)

A service provider specializing in network backbone infrastructure and services such as voice-over-IP, VPNs, and bandwidth management

— O —

Outsourcing

The transfer of components or large segments of an organization's internal IT infrastructure, staff, processes or applications to an external resource such as an Application Service Provider.

— P —

Packaged software application

A computer program developed for sale to consumers or businesses, generally designed to appeal to more than a single customer. While some tailoring of the program may be possible, it is not intended to be custom designed for each user or organization.

Performance

A major factor in determining the overall productivity of a system, performance is primarily tied to availability, throughput and response time.

Portals

This category is for companies whose primary business is operating a Web destination site, hosting content and applications for access via the Web.

Portal service provider (PSP)

A service provider that specializes in aggregation of network services and content.

— Q —

— R —

Remote access

The hookup of a remote computing device via communications lines such as ordinary phone lines or wide area networks to access distant network applications and information.

Reseller/VAR

An intermediary between software and hardware producers and end users. Resellers frequently "add value" (thus Value Added Reseller) by performing consulting, system integration and product enhancement.

Router

A communications device between networks that determines the best path between them for optimal performance. Routers are used in complex configurations of networks such as enterprise-wide networks and the Internet.

— S —**Sales force automation (SFA)**

Methodology that enables sales personnel to concentrate on selling, and providing better information exchange in the sales cycle (lead generation, marketing, support, and order management/fulfillment).

Scalability

The ability to expand the number of users or increase the capabilities of a computing solution user without making major changes to the systems or application software.

Server

The computer on a local area network that often acts as a data and application repository and that controls an application's access to workstations, printers and other parts of the network.

Server farm

A group of servers that are linked together as a single system image to provide centralized administration and horizontal scalability.

Service-level agreement (SLA)

A contract between the provider and the user that specifies the level of service that is expected during its term. SLAs are used by vendors and customers as well as internally by IT shops and their end users. They can specify bandwidth availability, response times for routine and ad hoc queries, response time for problem resolution (network down, machine failure, etc.) as well as attitudes and consideration of the technical staff.

Specialist ASPs

Provide applications which serve a specific professional or business activity, such as customer relationship management, human resources or Web site services.

Storage service provider (SSP)

A company that outsources data storage and backup services.

Supply chain management application (SCM)

Analysis used to forecast inventory levels and requirements and determine efficient distribution strategies. Analyze purchase patterns to determine their impact on supply chain effectiveness and efficiency.

Symmetric multiprocessing (SMP)

SMP (symmetric multiprocessing) is the processing of programs by multiple processors that share a common operating system and memory. In symmetric (or "tightly coupled") multiprocessing, the processors share memory and the I/O bus or data path. A single copy of the operating system is in charge of all the processors. SMP, also known as a "shared everything" system, does not usually exceed 16 processors.

Systems manufacturers

Manufacturers of servers, networking devices and client devices come in this category.

— T —**Telecommunications providers**

Both traditional and new-wave telecoms and network providers (telcos) fall into this category.

Thin client

A low-cost computing device that accesses applications and and/or data from a central server over a network. Categories of thin clients include Windows-Based Terminals (WBT), which comprise the largest segment, X-Terminals, and Network Computers (NC).

Total cost of ownership (TCO)

Model that helps IT professionals understand and manage the budgeted (direct) and unbudgeted (indirect) costs incurred for acquiring, maintaining and using an application or a computing system. TCO normally includes training, upgrades, and administration as well as the purchase price. Lowering TCO through single-point control is a key benefit of server-based computing.

Transmission control protocol/Internet protocol (TCP/IP)

A suite of network protocols that allow computers with different architectures and operating system software to communicate with other computers on the Internet.

— U —**User interface**

The part of an application that the end user sees on the screen and works with to operate the application, such as menus, forms and “buttons.”

— V —**VAR (Value added reseller)**

A company that buys hardware and software, adds more features or services, then resells the upgraded products.

Vertical market ASPs

Businesses which provide solutions tailored to the needs of a specific industry, such as the healthcare industry.

Vertical market software

Software aimed at a particular vertical market and can be contrasted with horizontal market software (such as word processors and spreadsheet programs) that can be used in a cross-section of industries.

Virtual private network (VPN)

A secure, encrypted private Internet connection.

— W —

Web hosting

Placing a consumer's or organization's Web page or website on a server that can be accessed via the Internet.

Webtone

Immediate and continuous access to the Internet in the same way that we think of dialtone when we pick up a phone receiver. To have webtone in the same way that we have dialtone, most users of the term believe that not only is access required, but also sufficient bandwidth to meet user demand, as well as the same quality of service we expect today from the telephone system.

Wide area network

Local area networks linked together across a large geographic area.

Wireless application protocol (WAP)

An initiative started by Unwired Planet, Motorola, Nokia and Ericsson to develop a standard for wireless content delivery on the next generation of mobile communicators.

— X —

— Y —

— Z —

Notes

Notes



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