

Solaris[™] Business Services: Solutions for the Enterprise

Enabling the Service-Driven Network



THE NETWORK IS THE COMPUTER[™]

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Executive Overview

Solaris™ business services extend the proven reliability and scalability of a Solaris™ Information Technology (IT) environment into today's enterprise by integrating next-generation Internet standards and capabilities. Highly available servers and networks establish a constant flow of information and data that users can count on. Solaris business services provide ready benefits:

- Users can receive information anytime, anywhere, on any device, in a secure and reliable manner.
- MIS/IT managers build and maintain a reliable, extensible, and more cost-effective Internet information backbone.

With a reliable, scalable network-based IT infrastructure designed around open Internet standards, IT resources are freed up from maintaining and administering the network. The focus of the IT organization can move beyond network maintenance and support to something much more productive — service delivery.

IT groups within today's commercial enterprise face daunting challenges:

- Scalability issues – fueled by corporate growth resulting from successful product and service initiatives, mergers, and acquisitions – are straining existing resources and raising operational costs.
- The IT infrastructure is becoming more difficult to manage as applications, platforms, and networks are becoming increasingly complex, creating problems based on poor interoperability and less than optimal integration.
- As lines of business seek greater market opportunities, they make more demands for more services.

Yet most IT organizations, faced with flat budgets and increased demands, are struggling just to keep up with growth and maintain existing service levels. To face up to this challenge, successful IT operations are looking to become Enterprise Service Providers (ESPs).

Similar to an Internet Service Provider, an ESP can:

- Deploy Internet-based applications that scale to hundreds of thousands of users, at extremely low costs. For example, the total cost of ownership (TCO) of corporate e-mail accounts can cost as much as \$3,836 per year (source: Creative Networks, Inc., *Messaging Cost of Ownership, Q3 1997*), yet ISPs provides the same capability for approximately \$240 per year.
- Create applications based on Internet standards that are accessible through any browser, for *anytime/anywhere* access to enterprise resources and applications.

Solaris business services deliver ESP capabilities and establish an IT foundation through the ready implementation of a *service-driven network*. The service-driven network is a dynamic and responsive network infrastructure that is optimized for constant and consistent delivery of information services. It enables organizations to do business better, faster, and cheaper. Sun provides the complete set of solutions and technologies that enable the service-driven network. Solaris business services deliver:

- **Scalability and Performance:** With more users per server, there are fewer servers to buy and fewer servers to manage. Ultimately, there are fewer administrators, resulting in a lower overall TCO than any other platform.
- **Accessibility and Security:** By providing access to key enterprise applications such as e-mail and calendar through standard Web browsers, corporate users can gain access to the information they need – wherever they are, whenever they need it. Strong security mechanisms make this architecture safe and practical for enterprise users throughout the world.
- **Rapid Application Deployment:** Using the Java™ development environment, IT departments can use robust application development tools to quickly create and deploy new services and applications. For example, an application can be created to run on the server and displayed via Web technologies on any browser. Legacy applications can also be integrated into a Web infrastructure through the use of Java tools.

Solaris business services deliver a fast, flexible intranet for the users, developers, and administrators of enterprise applications and information.

Information Technology for the Enterprise

Market Overview

The business market has embraced Information Technology as a concept that enhances organizational productivity. IT has increased productivity as we have moved from a “paper-based” model to an electronic model of information storage and distribution. This has increased the speed of information throughout the organization which in turn has increased efficiency and resulted in improvements to the bottom line. But now that both users and managers have seen what IT can do when properly applied, they naturally want more.

Furthermore, enterprises are pushing initiatives such as online trading partners, outsourcing, virtual workgroups (including both employees and consultants), home offices, and employees who need access to corporate network resources while traveling.

Consider the most essential enterprise application in today’s large organization — electronic mail. E-mail, and e-mail-enabled applications such as forms, is easily the most critical application deployed today.

- There are over 72 million electronic mailboxes today, and the number is growing by over 25 per cent per year (source: The Radicati Group, Inc., *Messaging and Software Services: Market and Product Analysis, 1997-2001*).
- According to a report by Creative Networks, Inc., the total cost per user for messaging systems at the desktop ranges from \$1,371 to over \$4,100 per year (source: Creative Networks, Inc., *Messaging Cost of Ownership, Q3 1997*; including hardware, software, training, support, and other comprehensive costs).
- Sun’s own field research shows that most large organizations have between 10 and 20 disparate e-mail systems – some have as many as 40 – further increasing costs and reducing productivity.

The combination of these factors — growth, cost, lack of commonality, new corporate initiatives — coupled with underlying security issues underscore the difficulty IT managers face.

Enterprise IT Embraces Internet Standards

Enterprise organizations today are moving well beyond the wall of the corporate campus to get closer to their customers, field representatives, suppliers, and service providers. To do this, the enterprise organization is moving beyond the LAN. The Internet is almost universally embraced as the common language of information technology, and is rapidly becoming the new global WAN. As IT organizations embrace the Internet:

- Information is available anywhere, anytime
- Communications is established and enhanced, not only within the company but *between* companies
- The IT organization can establish, manage, and administer connectivity on a global scale

Baseline Commercial Application Requirements

The specific IT requirements of each enterprise are as diverse as the businesses themselves; however, there is an dominant baseline of application functionality that is required to do business today.

- **Electronic Mail:** E-mail connects people while overcoming time zones and distance. The world is moving to Internet standards, driven by e-mail connectivity. According to a Radicati Group, Inc. study, there are 24.8 million Internet mail desktops today, growing at 34% CAGR to 79.9 million by 2001 (source: The Radicati Group, Inc., *Messaging and Software Services: Market and Product Analysis, 1997-2001*)
- **Web-enabled Applications:** Applications that can present corporate information through universal interfaces such as HTML and Java technology. For example, a Web-based human resource handbook provides instant access to continually up-to-date employee information. In this case, specific users may have access to management information through the use of security mechanisms, while Java applets enable all users to calculate retirement benefits or accrued vacation time.
- **Calendar and Scheduling:** Applications that facilitate and resolve multiple user schedules and corporate resources such as meeting rooms and video conference equipment. Though widely used, calendar applications don't scale well, and various calendar applications do not interoperate with each other.

- **Information Access:** Enabling the access of enterprise data and information by anyone who needs it, anywhere it's needed. Strong authentication and access controls need to be in place before this can be fully implemented.

Enterprise IT Challenges

Today's enterprise IT organization faces many challenges. Our research shows that most enterprises are working to overcome significant issues in some or all of the following areas.

Total Cost of Ownership: Solutions must be cost-effective to use, not just to buy. Despite the maxim that cost of hardware and software declines over time, IT managers understand that it is the total cost of ownership (TCO) that must be evaluated, not just acquisition costs. Initial hardware and software cost is a relatively small percentage of overall TCO. In the Creative Networks, Inc. *Messaging Cost of Ownership*, the hardware and software costs are less than 10% of TCO, though this is usually because PC-based systems cost more to administer and support than so called "open systems." Creative Networks cites four areas comprising TCO — acquisition, training, support, and maintenance — although some models try to account for downtime and lost productivity.

The report states that annual costs per user for file-sharing e-mail systems, such as cc:Mail and Microsoft Mail, is \$4,178.27; for client/server systems, such as Microsoft Exchange and Lotus Notes, it is \$3,355.53. The desktop hardware component for both of these cases is under \$400 per user annually.

Reliability: Reliability means uptime. As enterprises rely on IT resources to meet business goals, maximum reliability becomes a prime goal. Without network services, most business units would have to operate at reduced efficiency, if they could operate at all. The goal for most IT managers is to make network services be as available and reliable as the telephone dial tone, where outages are extremely rare occurrences.

Scalability: Scalability means how many users can be connected per server, not how many servers can be connected together. For example, while it is possible to connect hundreds of PC-class servers together to replace a data center server — and the hardware acquisition costs may be less — the on-going administration and reliability costs would more than offset any initial savings.

"Internet commerce demands unprecedented scale and uptime. As large companies jump on the iCommerce bandwagon to reach customers and integrate with suppliers, they will need systems that guarantee 24x7 uptime, run giant databases, and handle tens of millions of transactions." (source: Forrester Research, Inc., April 1998)

Accessibility: For maximum productivity, users want their information where they are. Users who require the information from places other than their corporate desktop complicate matters with low-bandwidth requirements and security issues.

Security: Delivering information outside the walls of the corporate environment is a complex problem. Access control, information compartmentalization, and logging are fundamental security components. Information privacy — encryption — is key when sending out sensitive information across public networks such as the Internet. And while users understand the need for security, they don't want it to get in the way of their job.

The Sun[™] Solution — Solaris Business Services

Extending upon proven foundation of open systems development and delivery, Sun is delivering Solaris business services that enable a service-driven network. It comprises two essential concepts:

- The network platform services are ready for commercial-grade deployment. The services at this layer enable an interoperable information backbone that is reliable and scalable, built on Internet standards, and delivers high performance across all deployment situations. The underlying network services does more than simply connect network objects together – it does so in a manner that is always available to users to meet their needs.
- A service-driven network offers core applications that complement the service platform. These applications are scalable, reliable, and developed such that they offer unique value and can be integrated into an environment that uses applications from other vendors.

Sun delivers fast, reliable, and highly available Internet information services that can be accessed by users any time, from anywhere, using any device. Solaris business services are Sun's solutions for providing integrated Internet information services that enable:

- Users to receive information anytime, anywhere, on any device, in a secure and reliable manner
- MIS/IT managers to build and maintain a reliable, extensible, and cost-effective Internet information backbone

The service-driven network extends the proven reliability and scalability of a Solaris IT environment into today's enterprise. This architecture appeals to enterprise IT organizations because it integrates robust network services into a secure and scalable operating environment. Solaris business services enable a service-driven network that is reliable, scalable, accessible, interoperable, fast, safe, and manageable.

- The service-driven network provides a reliable foundation for the delivery of services based on integrated network functionality.

- For IT managers, the reduction in reactive administration enables a shift in focus to pro-active delivery of value-added services to users. The IT organization is available to provide service and not just support. This enables IT managers to meet business goals, not just create IT network connectivity.
- By supporting thin clients – Web browsers and JavaStation™ systems – and mobile devices on a secure network foundation, Solaris business services enable information access to anyone anywhere, any time.

Solaris Business Services — Summary

TABLE 1 Solaris Business Services Features and Benefits

Feature	Benefit
Scalability	<ul style="list-style-type: none"> • More users per server results in lowers administrative costs, lowering overall TCO
Connectivity	<ul style="list-style-type: none"> • Connect to virtually any platform, network, or application, lowering integration costs; increased network integration improves productivity and deployment flexibility: <ul style="list-style-type: none"> • Server-to-server connectivity using Internet standards results in better interoperability • Client-to-server access works with Internet standard clients – HTML access means any browser is a client
Availability	<ul style="list-style-type: none"> • Clustering options increase information access, maximizing productivity
Performance	<ul style="list-style-type: none"> • Maximizes usage from given resources, lowering TCO; fewer servers to buy and manage, less software to upgrade and synchronize, fewer administrators
Security	<ul style="list-style-type: none"> • Protects corporate assets from unauthorized users
Accessibility	<ul style="list-style-type: none"> • Maximizes user productivity –enables anywhere/anytime concept with HTML and Java technology interfaces
Rapid Application and Service Deployment	<ul style="list-style-type: none"> • <code>cgi bin</code> is replaced with a real development environment, raising productivity and decreasing time to market • Fast application development – create server-display applications viewable in any browser • Java servlets can provide the interface to existing applications, minimizing deployment time

Solaris Business Services — Key Enterprise Applications

“By 2001...Internet Computing will put fat clients on a permanent diet. The world’s business will be conducted through browsers, HTML, and Java front-ends — not fat Win32 clients.” (source: Forrester Research, Inc., April 1998)

Solaris business services comprise a set of layered services and platform enhancements that provide basic Internet information services. Designed with Internet technology on the scalable and reliable Solaris operating environment, Solaris business services provide access to essential enterprise applications from any browser or Java-capable device from any Internet connection.

By taking full advantage of and integrating with the Solaris operating environment, information can be safely delivered to a wide range of devices — at very low TCO. The Solaris operating environment enables connectivity to virtually any legacy and PC server environment. Existing services are more reliable and less expensive to operate, while new services are easier to develop and faster to deploy.

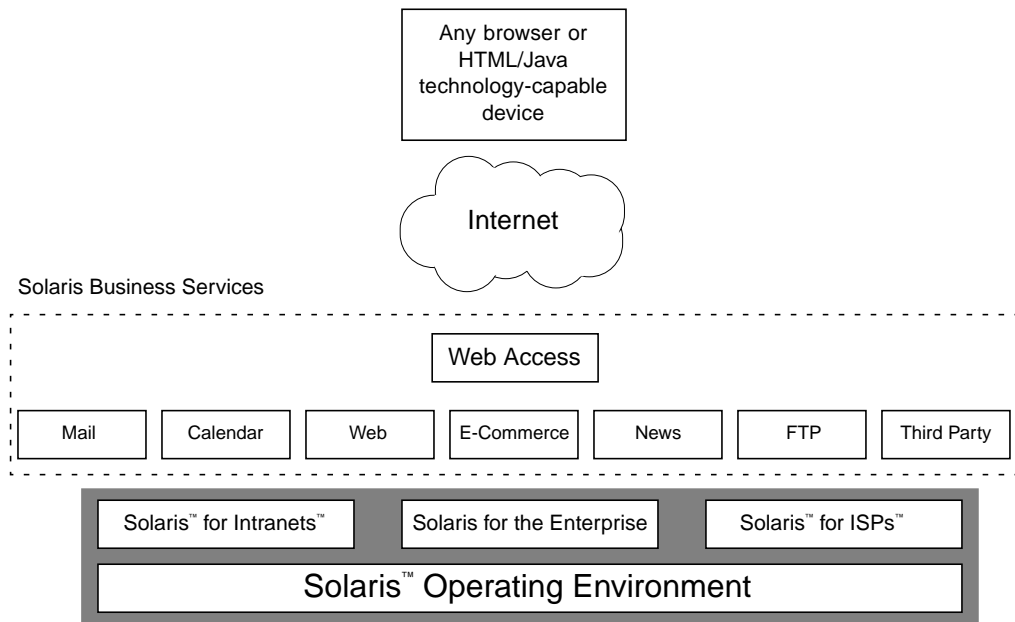


FIGURE 1 Key server applications from the Solaris business services architecture include both Sun™ Internet Mail Server™ 3.5 and Sun™ Internet Calendar Server software, along with core Web software servers providing Web server, news, and FTP services.

- **Sun™ Internet Mail Server™ 3.5:** Sun™ Internet Mail Server™ software is a leading e-mail server delivering the performance, scalability, reliability and low total cost of ownership required by enterprise organizations. It scales cleanly from small workgroups to hundreds of thousands of users – while dramatically lowering the cost of managing a highly reliable e-mail service.

Sun Internet Mail Server has been enhanced further for the version 3.5 release. Its enterprise-class features now include:

- Improved scalability through a more modular design and implementation
- Improved reliability and availability with support for Solaris clustering options
- Enhanced security, including support for the Entrust Certificate Authority (X.509 certificates)
- Improved administration for large configurations
- Support for more e-mail clients, including Web browsers – users can now access their corporate mailbox through any Web browser
- Microsoft Exchange client support and server migration
- **Sun™ Internet Calendar Server 1.0:** Sun™ Internet Calendar Server, scheduled to begin shipping in the latter half of 1998, supports calendaring and scheduling.
 - Access is easy – scheduling information is accessible from any Web browser. Personal and group calendar options enable sophisticated scheduling.
 - A multithreaded architecture delivers more active users per server, lowering TCO.
 - Sun Internet Calendar Manager is based on the emerging iCalendar standards from the Internet Engineering Task Force (IETF).
- **Sun™ WebServer™:** Sun™ WebServer™ 2.0 software is the scalable, high-performance HTTP engine for the service-driven network. It is a highly reliable, secure, standards-based Web server for accessing, managing, and distributing information over intranets, extranets, or the Internet. Developed for Internet Service Providers, Sun WebServer 2.0 enables secure next-generation services for users. Sun WebServer offers:
 - Support for HTTP 1.1, including named virtual hosts and content negotiation for improved system performance
 - Enhanced scalability, enabling multiple instances of the server process to run on a single machine – all managed through a common administrative GUI for reduced administration costs

- Java servlet support, providing the cross-platform advantage of the Java language on the server side, with improved response over CGI scripts
 - Scalability and performance are increased while administration costs are reduced
 - Servlets simplify and solve many of the traditional problems of server-side programming, including inextensible scripting solutions, platform-specific APIs, and incomplete interfaces
- Improved HTTP security, including support for Secure Sockets Layer (SSL) 3.0, provides increased security options available to administrators
- Microsoft FrontPage extensions decrease support costs for customer-authored content
- **Sun™ Internet News Server™**: Sun™ Internet News Server™ software delivers an efficient, manageable, and cost-effective USENET news server. This service is easily installed and maintained, and efficiently scales to multiple servers and thousands of simultaneous connections. Sun Internet News Server is an efficient way to manage and distribute information and online discussions.
- **Sun™ Internet FTP Server™**: Sun™ Internet FTP Server™ software is a scalable, high-performance FTP server that is fully compliant with Internet standards. Sun Internet FTP Server enables users to share and distribute files and information from any platform.

Professional Services

Few, if any, companies can provide all solutions to all businesses. Sun Microsystems provides not only enterprise platform hardware and software products, but professional services and support organizations. Sun's Professional Services organization is available to customize and integrate Sun products, to help provide exactly the solution required. Sun's worldwide service organization offers 24 hours a day, 7 days a week (24x7) support.

The Sun Professional Services group includes an Advanced Internet Consulting Practice, offering services tailored to support enterprises seeking state-of-the-art IT infrastructures. As a pioneer in Internet design and integration, Sun provides scalable, secure, reliable, and versatile platforms for mission-critical environments.

Next generation architectures are required to support this new class of Internet systems, and highly specialized skills are needed for implementation. Sun Professional Services architects and implements solutions to help IT organizations move ahead in the marketplace and make innovative service-driven network services a reality.

TCO: Competitive Advantages of Service-Driven Networks

Total Cost of ownership (TCO) is difficult to measure because there are so many “soft costs” involved. Considerations such as the acceptable level of down time, training levels, and security levels and accessibility from non-desktop environments all weigh heavily on any TCO calculation.

Support Costs

There are generally accepted concepts in determining TCO: in equivalent environments, fewer servers, greater reliability, remote administration, and common administration and support tools tend to lower operational costs.

A recent management study reinforces this. In a report by Creative Networks, Inc., based on interviews with 66 large North American organizations with an mean of 4,890 users, Internet servers based on Internet standards costs less per user.

TABLE 1 Example TCO

	Sun Internet Mail Server ¹	Lotus Notes/Microsoft Exchange ²	Internet Standards-based Server ²
Users per Server	10,000	189	233
Users per administrator	>5,000	600-800	2,396
Annual Cost per User	Under \$100	\$541	\$178

1. Sun estimates

2. Source: Creative Networks, Inc.

As shown in Table 1, a Sun Internet Mail Server solution costs significantly less than proprietary or Internet standards-based systems. In this example, a single Sun server can support 10,000 users (on Sun's smallest available server), while the other mail servers would require between 40 and 50 servers to perform the same task.

According to a recent report by Forrester Research, Inc. (April 1998), "NT can't run multiple applications on a single server or scale beyond four processors, so new servers must be constantly added. The result? IT has to manage an ever-growing population of server hardware, network connections, and application and database partitions."

Sun is the leader in delivering Internet technology. The world's largest e-mail system, Microsoft's HotMail, runs on Solaris. Despite attempts to move the environment to NT, published accounts state that "...NT does not scale..." (source: Network News, April 28, 1998)

TCO Conclusion

With compelling advantages in scalability and performance, Sun Internet Mail Server software:

- Runs with more users per server – more than other Internet-based mail systems, and significantly more than proprietary systems
- Is less expensive in initial hardware and software costs on a per-user basis
- Requires fewer servers to run a business

This all adds up to a much lower TCO than other alternatives.

Unfortunately, today there is not much in the way of comparison studies for messaging products. Sun has commissioned an independent study of electronic messaging products, the results of which will be available in the fall of 1998. Once complete, the study will be posted to the Sun Web site at:

<http://www.sun.com/sims/>

Conclusion

Sun is emerging as the vendor of choice in the enterprise market. With both strategy and products based on Internet standards, Sun delivers the type of reliable, fast, highly available Internet information services that can be accessed by users any time, from anywhere, using any device.

By extending its competitive advantages — reliability, scalability, lower TCO — with new and enhanced solutions aimed at the enterprise, Sun clearly provides premier set of solutions for enabling the service-driven network. Now IT managers can:

- Deliver more services, more reliably, faster to the end-user at a lower TCO than ever before
- Focus on meeting business goals, not maintaining infrastructure
- Deliver reliable network services to their end-users
- Take advantage of new technologies as they emerge
- Use Internet standards to deliver information anywhere, anytime – securely and reliably

By drawing upon Sun's experience, technology, and business model, enterprise IT groups deploying Solaris business services can solve their core challenges today while positioning their organization for the future.



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