

A large, abstract graphic on the left side of the page, consisting of several overlapping, curved, semi-transparent shapes in shades of gray, creating a sense of depth and movement.

# **SUN DESKTOP INFRASTRUCTURE SOFTWARE — REALIZING THE DESKTOP CONTINUUM**

Technical White Paper  
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# Sun Desktop Infrastructure Software—Realizing the Desktop Continuum

## IT Today—Multiple Challenges, Multiple Opportunities

Today, IT organizations of every kind, large or small, public or private face a host of challenges. Pressure to deliver richer IT services while adapting to market, technology and organizational change is challenging IT departments to create more agile infrastructures that can keep pace with shifting business demands. Budgetary constraints require doing more with less, and IT organizations must find new ways to extend and improve services to take advantage of growth opportunities while containing costs, simplifying processes and reducing administrative overhead. Finally, the explosive growth in the value of information and electronic transactions demands maintaining the integrity of business processes and intellectual property in the face of escalating intrusion, theft and service interruption threats.

For too long, the desktop has been an overlooked chokepoint in the drive to overcome IT service delivery challenges. Longstanding choices for hardware, software and network architectures have often inhibited business agility. Any move to deliver new services to desktop users, or bring enterprise resources and services closer to employees, customers, partners and production sources that may be local or remote typically adds cost and complexity to an already stressed IT infrastructure. Finally, attempting to accomplish these tasks with a desktop technology that was never designed with security in mind leaves the organization vulnerable.

Fortunately, technology advancements and business conditions have converged to enable practical approaches that transcend the limitations of conventional desktop computing. By combining service-oriented architectural principles and open systems networking technology with hardware, software and services based on expertise, organizations can transition end user desktop IT service delivery to a network-delivered competitive advantage.

## The Need for a Network-Delivered Desktop

IT organizations are looking for ways to address service delivery challenges and give users the ability to move from place to place without losing the functionality of traditional fixed asset environments. For years, IT organizations have tried to adapt technology in new and different ways to tame these challenges and give end users maximum flexibility in how and where they add value to the organization. Indeed, while many IT leaders recognize that network-enabled mobility is essential for business success, existing approaches have fallen short. Incremental improvements to current technologies, infrastructure architectures or management practices have failed to provide needed functionality or improve the flexibility, agility, and mobility of IT service delivery. In order to provide a practical, cost-effective means to deliver headquarters-grade services to an increasingly mobile workforce, IT organizations need a new approach. Today, technology advancements and economics have converged to enable the creation of a network-delivered desktop, one that is able to provide business requirements-optimized solutions for anytime, anywhere access to enterprise IT resources from any device. A network-delivered desktop approach can help IT organizations:

- Provide consistent, high availability access to enterprise applications and services
- Reduce IT infrastructure complexity at the architectural, operations and maintenance levels
- Ensure cross-platform compatibility to support a variety of end user devices—both fixed and portable
- Reduce overall cost of hardware and software ownership
- Keep information and business processes secure

### Addressing the Deployment Continuum

Today, organizations deploy a wide variety of desktop configurations and consequently have a diverse set of needs for application delivery. Providing access to these applications is not an all or nothing proposition—it is a continuum (Figure 1). At one end of the spectrum, all applications run directly on a local desktop. While popular, this inefficient delivery method requires every machine to be modified when software installations or upgrades are required, making it difficult to keep track of the number, kind, and version of applications running on every machine. An alternative approach enables some or all of the applications—including the desktop environment—to be moved off individual desktop computers and centralized on dedicated application tier servers in the data center. These applications, and the desktop environment, are provided over the network. As a result, organizations are better able to take advantage of client device independence, provide true mobility for workers, reduce management costs, and keep information secure.

Providing a network-delivered desktop and application set requires sophisticated hardware and software. While Sun's product portfolio spans the entire spectrum, desktop infrastructure components become relevant once applications are moved out of the traditional fat client deployment model and into a distributed environment. As a result, this white paper discusses the majority of the application deployment continuum, and how Sun products and technologies can help provide solutions along the network delivery continuum. For example, Sun workstations handle fat client requirements, while the Sun Secure Global Desktop Software can help along the remainder of the continuum, providing diverse applications, including Windows, mainframe, and midrange applications, to clients like the Sun Ray™ device. With this flexible software, organizations can mix and match desktop configurations as needs dictate. Companies can exist at many different points in the desktop delivery continuum with the same hardware, providing convenient access for all users.

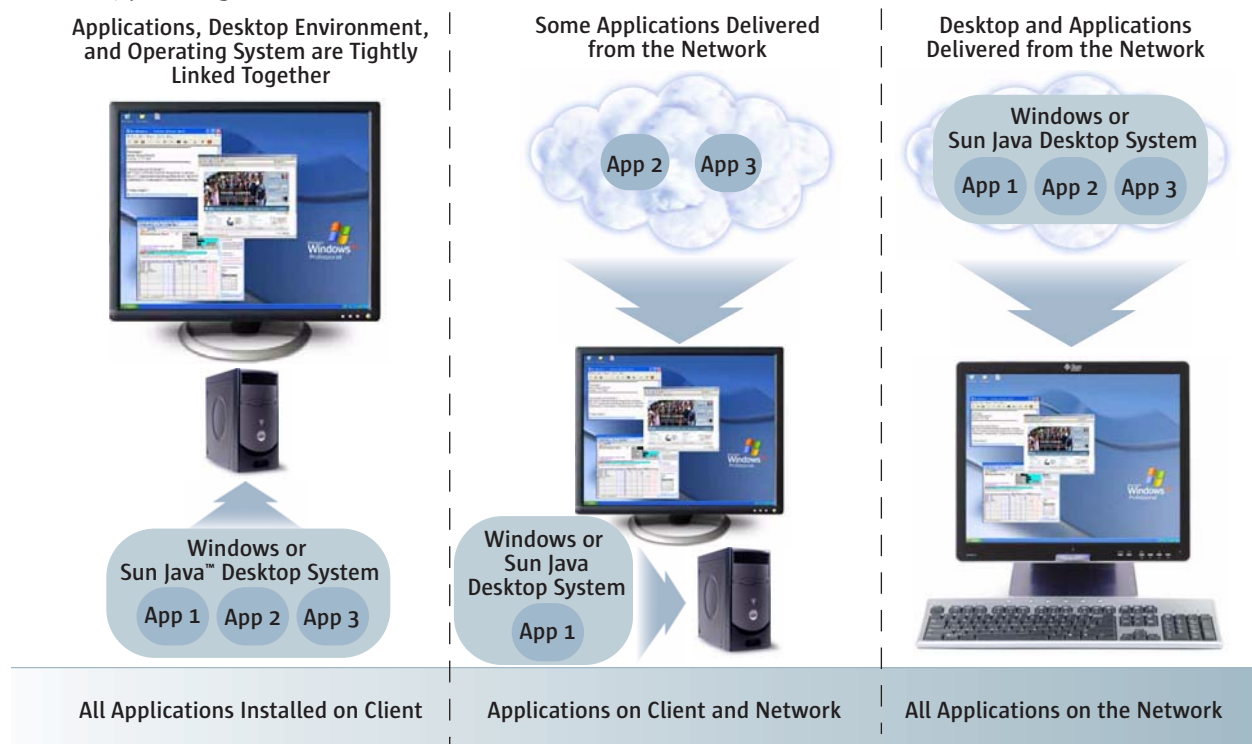


Figure 1. Sun desktop infrastructure software gives users the ability to access enterprise applications from virtually any location

## The Sun Desktop Infrastructure Software

Sun's desktop infrastructure software delivers applications and full desktop environments using a server-based computing model. With this powerful software portfolio, organizations in every industry—from banking, to health care, to human resources, government, and beyond—can streamline business operations and protect confidential information. Indeed, Sun's desktop infrastructure software portfolio gives organizations the ability to create and deploy systems that meet a wide variety of business requirements.

- Provides an enterprise desktop service delivery model that overcomes the costs associated with aggressive obsolescence cycles
- Enables flexible arrangements for user and session mobility (hot-desking)
- Fosters cost savings by extending the useful life of aging desktop PCs by decoupling applications from the client hardware
- Helps service providers gain new revenue opportunities by delivering virtualized services to multiple clients

## A Comprehensive Heterogeneous Architecture

The ability to transact business with low risk of data leaks, snooping, intrusions, and viruses remains one of the most important design objectives of the Sun desktop infrastructure software. Security measures begin with the software architecture—a three-tiered approach helps reduce opportunities for unauthorized access to enterprise resources (Figure 2). Toward this end, Sun desktop infrastructure software plays a key role with a dual mission of facilitating access to appropriate services by bona fide users while denying entry to unknown or insufficiently privileged users.



Figure 2. Solutions based on Sun's desktop infrastructure software portfolio feature a three-tiered architecture

### Application Tier

The application tier consists of one or more servers dedicated to hosting applications and services available to users, and is typically housed in a data center or other secure environment. Virtually any server platform is supported, including those running the Solaris™ Operating System (Solaris OS), Linux, Microsoft Windows, midrange, or mainframe operating environments. To support simultaneous access to multiple applications on a client, the application tier server layer may consist of a heterogeneous collection of servers linked to clients through a universal access layer. Software typically runs on the application tier servers without modification or tuning.

### **Access Tier**

Access tier servers reside between the application tier servers and clients, and manage user access to applications and services. In many respects, the access tier servers enable display virtualization—decoupling client devices that deliver application-generated video, audio and user interfaces from the actual provisioning and processing of application software. The Sun desktop infrastructure software is deployed on access tier servers. Access tier servers support all kinds of intelligent thick clients— PCs, laptop computers, UNIX workstations, intelligent terminals, mobile devices such as Internet capable PDAs, and more—and can accommodate thousands of concurrent users. Access tier servers can be horizontally scalable Sun servers with UltraSPARC® or AMD Opteron processors running either the Solaris OS or enterprise-class Linux implementations, such as the SuSE or Red Hat environments. In solutions that integrate multiple access tier servers into an array, a primary server administers array-wide workflow.

### **Client Tier**

Clients include any device used by end users to access services in a solution based on Sun's desktop infrastructure products. These devices are connected to the server via a wired or wireless LAN or WAN over a modem, cable modem, DSL, WiFi, or other communication channel. Users can access applications and services via a standard Java technology-enabled Web browser, such as Firefox, Microsoft Internet Explorer, Mozilla, Netscape, Safari, or through dedicated client software. Client systems can include desktop PCs running Microsoft Windows, UNIX and Linux systems, Macintosh computers, Sun Ray ultra-thin clients, mobile devices, and more.

## **A Tour of the Sun Desktop Infrastructure Software**

The Sun desktop infrastructure software consists of the Sun Secure Global Desktop Software and Sun Ray™ Server Software.

### **Sun Secure Global Desktop Software**

The Sun Secure Global Desktop Software realizes the network-delivered desktop concept by speeding the free flow of information across the enterprise through secure, universal and portable access to applications, data, and services. The three-tier end user IT service delivery architecture decouples application processing from service delivery. This enables users to interact with applications, or collections of applications, using the devices with which they are already familiar, including PDAs, PCs, workstations, Macintosh computers, laptops, thin clients, and more (Figure 3). Furthermore, users can receive uniform services whether working from a fixed office at the enterprise, or any location around the globe accessible to the Internet or telephone network.

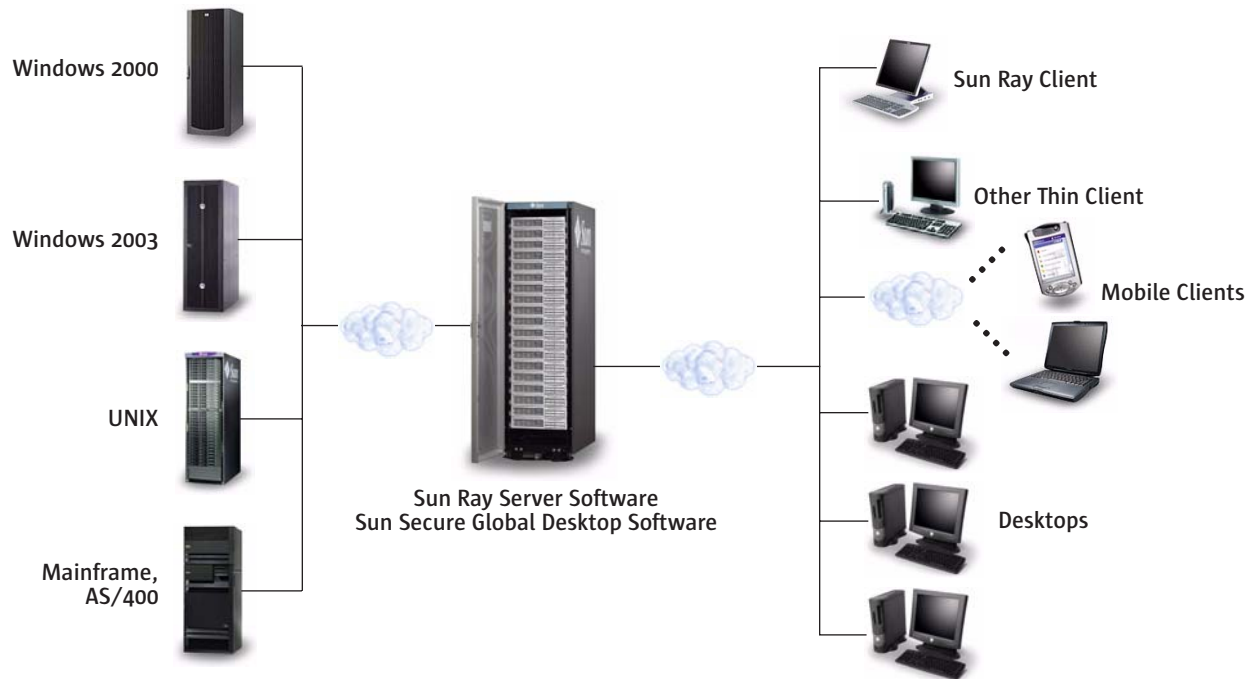


Figure 3. Sun Secure Global Desktop Software and Sun Ray Server Software decouples desktop applications from the underlying operating system and allows a wide variety of client devices to instantly access applications from virtually any location

### Key Benefits

The Sun Secure Global Desktop Software offers many capabilities that make secure, platform independent end user IT services a reality:

- *Anytime, anywhere access from any device*

By dissolving the server, client, platform, network, and application software dependencies, IT managers can provide more services—including outsourced services—to users regardless of client system characteristics. As a result, users are no longer constrained and are better able to run any application on any device at any time. Indeed, the Sun Secure Global Desktop Software gives IT organizations the ability to publish most UNIX, Microsoft Windows, midrange, or mainframe applications to almost any network attached client. A wide variety of client connections are available, enabling secure, wired or wireless, LAN or WAN access for any client, including Windows PCs, Macintosh computers, Sun Ray clients, and more.

- *Simplified application deployment and administration*

With the Sun Secure Global Desktop Software, organizations need only install and maintain a single instance of an application on the application tier server. Each application is made available to all qualified users over the network, eliminating the need to install and maintain every application on every client platform.

- *Powerful, centralized management*

While the Sun Secure Global Desktop Software gives users unprecedented freedom in how and when they access enterprise IT services, managers retain full control over who has what kind of access to specific resources and information. This level of management control includes a wealth of data security features that help maintain process integrity and reduce administrative overhead even as enterprise computing becomes much more flexible.

- *Support for secure computing services*

With threats on the rise, the Sun Secure Global Desktop Software seeks to provide efficient and secure computing services. Built-in state-of-the-art security features combine with the latest user authentication, firewall and encryption technologies to create a platform IT organizations can rely on to protect valuable business information. In addition, the solution provides new opportunities to reduce regulatory compliance and litigation risks that emanate from inconsistent data retention processes.

The Sun Secure Global Desktop Software enables communications between access servers and end user clients. This powerful software provides an interface to one or more application tier servers, depending on user privileges, as well as user ID, login and resource access privilege administration, data encryption, and other security-oriented services. A complete set of management tools enable efficient administration of Sun Secure Global Desktop Software solutions. Administrators can manage Secure Global Desktop servers through a single remotely accessible control point, regardless of whether the installation is centrally located or geographically dispersed. Access server user privilege management functions can also be integrated with enterprise-wide user ID and directory server services to enable secure, single sign-on for end-users. Additional management features include:

- Object Manager, providing the main administrative console for defining new application tier servers and desktop applications, and selecting publishing options, as well as administration of individual user accounts, including setup, password, and smart card management, privilege administration, and usage monitoring
- Array Manager, enabling administrators to monitor and manage workloads performed by multi-access server arrays
- Configuration Wizard, expediting setup and on-going management of Sun Secure Global Desktop Software solutions

At the client level, the Secure Global Desktop Software strives to keep local, client-based processing and storage at a minimum. This reduces the risk of hackers stealing information from clients that may be easier to break into than a centralized enterprise IT infrastructure or those liable to physical theft, user error (data erasure, obvious passwords, unencrypted wireless communications), viruses, and spyware, such as laptop computers, PDAs or other portable devices. In environments where security is less of a concern, local storage and attached devices can be utilized, improving performance and the user experience when accessing remote applications.

Maintaining a secure environment is always a race with innovative, hostile forces seeking to wreak havoc. To help this effort, the Sun Secure Global Desktop Software offers state-of-the-art encryption and authentication technologies, and is designed for expeditious upgrades to more advanced measures as they become available. The current release of the Sun Secure Global Desktop Software includes components to implement the following security measures:



- Microsoft Windows Server smart card support
- Secure Sockets Layer (SSL) v3 support
- Advanced Encryption Standard (AES) 256-bit encryption
- X.509 public key server certificates
- Secure firewall traversing with SSL tunneling
- Status and login analysis tools
- Proxy server support, including SOCKS protocol
- Support for RSA SecurID, LDAP, Microsoft Active Directory, Microsoft Windows Domains, and UNIX passwords

### Sun Ray Server Software—Ultra-Thin Client-Based Service Delivery

The Sun Ray Server Software enables user access to applications and services from Sun Ray compatible thin client devices. Since Sun Ray devices and compatible thin clients do not contain any local processing or storage resources, these functions are performed centrally on Sun Ray servers. Although their inherent capabilities may seem limited than more intelligent clients, such as PCs, workstations and many PDAs, this lightweight approach has several advantages compared to thick-client desktop and portable systems.

#### Key Benefits

Key benefits of the Sun Ray Server Software include:

- *Reduced cost*  
Sun Ray systems are more obsolescence resistant, resulting in longer useful lifecycles than a typical PC desktop. Owners can expect a useful life of five to ten years, as opposed to the two to four year life span of most PCs. In addition, Sun Ray systems are inherently inexpensive as they eliminate the processor, memory, graphics and storage subsystems included in PCs, laptops and other thick clients.
- *Improved reliability*  
With less complex designs, Sun Ray systems contain fewer components. As a result, fewer subsystems are likely to fail. In the event a Sun Ray system needs to be replaced on a user's desktop or workspace, a simple plug-and-play operation is all that is needed. There is no need to reload software, recover files, and configure network settings and user preferences.
- *Greater session mobility*  
Since the user session executes on the Sun Ray server rather than the client device, users can migrate from one Sun Ray system to another and have the session follow their movement. The session instantly appears in the new location once the user is identified through a keyboard login or the insertion of a smart card in the terminal's built-in card reader slot. This hot desking capability is possible whether a user moves to the next cubicle or checks in from a Sun Ray device on the other side of the world.
- *Inherent data security*  
Since Sun Ray systems do not contain disk drives, it is impossible to copy data onto them, or to inadvertently erase data that may be required for regulatory compliance archiving. While it is possible for a user to copy data to an external USB micro drive, this can only occur if enterprise data management policies permit. Even then, administrators can monitor and record all data copied from Sun Ray systems to outboard data storage. In addition, servers and Sun Ray clients communicate via encryption technologies that can range from commercial

128-bit technology, to the most stringent military-grade methods. The Sun Ray Server Software also includes an interface to LDAP directory servers and optional smart card-based user login and identity functions.

- *Simplified administration*

Administering and managing Sun Ray accounts is easier and less expensive than supporting networked or remote access from PCs. All user account settings and access privileges are maintained on the Sun Ray server. This greatly simplifies the process of adding, moving or changing users, as all personal configuration information and settings stored externally to Sun Ray clients. Similarly, user help desk services can focus on resolving problems at the server level, rather than worrying about failures or configuration errors on individual desktop systems.

### **Solaris™ Enterprise System**

The Solaris™ Enterprise System provides a complete platform upon which the Sun desktop infrastructure software can operate. With business applications, identity management, and open source applications integrated with the powerful Solaris™ 10 Operating System, the Solaris Enterprise System provides everything needed to create robust computing infrastructures. The foundation of the Solaris Enterprise System, the Solaris 10 Operating System provides a complete, open source-based alternative to proprietary desktop environment and office suite software. The software integrates the GNOME desktop environment; StarOffice™ productivity suite (word processing, spreadsheet, presentation graphics); Mozilla Internet browser; instant messaging; Evolution e-mail and calendar client; and the Java™ 2 Platform, Standard Edition (J2SE™) platform. Using the Sun desktop infrastructure software, the Solaris OS desktop environment can be delivered to any client.

### **Sun Desktop Infrastructure Software Portfolio At Work**

The Sun desktop infrastructure software portfolio can be deployed in a variety of situations, including:

- Government and commercial handling of sensitive information
- Fat and thin client terminal replacement
- Mobile, dispersed and flexible workforces
- Alternative desktop services delivery

### **Government and Commercial Sensitive Data Access**

Data security has risen to the top of the agenda for many private and public sector organizations. While absolute security is probably an impossibility, organizations can take steps to significantly reduce security risks and vulnerabilities. PC-based environments are particularly susceptible—they contain their own localized processing, storage and communications resources. As a result, PCs are at greater risk from spyware, viruses, and data theft. In addition, it is easier for users to mishandle data, and physical theft becomes a security issue for laptop and other portable computers.

Deployments based on Sun Secure Global Desktop Software access technologies and Sun Ray ultra-thin desktop clients can significantly reduce these risks. In security-optimized Sun Ray environments, all processing and communications are hosted on firewall-protected servers running the Solaris OS, which contains extensive security, isolation, and auditing functions. Furthermore, end user attachment of peripherals, such as removable storage devices, to Sun Ray USB ports can be strictly controlled at the system administration level. Even if IT policies permit attaching external storage, all reads and writes can be monitored and archived.

### Sun Secure Network Access Platform (SNAP)

Many public sector organizations are challenged to comply with new and changing regulatory demands. Indeed, required legislation, such as the Health Insurance Portability and Accountability Act (HIPAA), the Sarbanes-Oxley Act, the U.S. Patriot Act, and legislation such as the United Kingdom Financial Services Act, the Japan Personal Information Protection Act, and the European Union Model Requirements for the Management of Electronic Records (MoReq), place strict requirements on the handling and management of sensitive information. In these and related scenarios, desktop environments must be designed to provide high levels of confidential data protection and the opportunity to integrate security with data retention and archiving solutions. With regard to support for regulatory or legal discovery data archiving, the same Sun Ray attributes that prevent unauthorized copying of data to portable storage also guard against end user generated data gaps and omissions that may have serious regulatory and legal consequences.

To deliver on these requirements, Sun created the Sun Secure Network Access Platform (Figure 4). While this end-to-end solution is designed to provide a high security environment for government agencies handling classified information, it can be also be applied in commercial settings. The Sun Secure Network Access Platform enables the delivery of multiple networks—including secure networks—to a single desktop. To ensure networks remain segregated, connections between domain networks are only permitted under exceptional circumstances. Historically, this has forced many government organizations to deploy separate PCs or terminals on user desktops to access information on multiple compartmentalized networks. These constraints have been significant impediments to information sharing, internal collaboration, and agility in responding to changing situations and evolving requirements. The Sun Secure Network Access Platform enables multiple networks to be made available to users while supporting varying degrees of classification. This is made possible through the management of user access privileges that grant qualified users access to specific networks and display content on Sun Ray devices. All processing takes place behind a firewall, and the system can monitor every keystroke a user makes to ensure appropriate use of sensitive content.

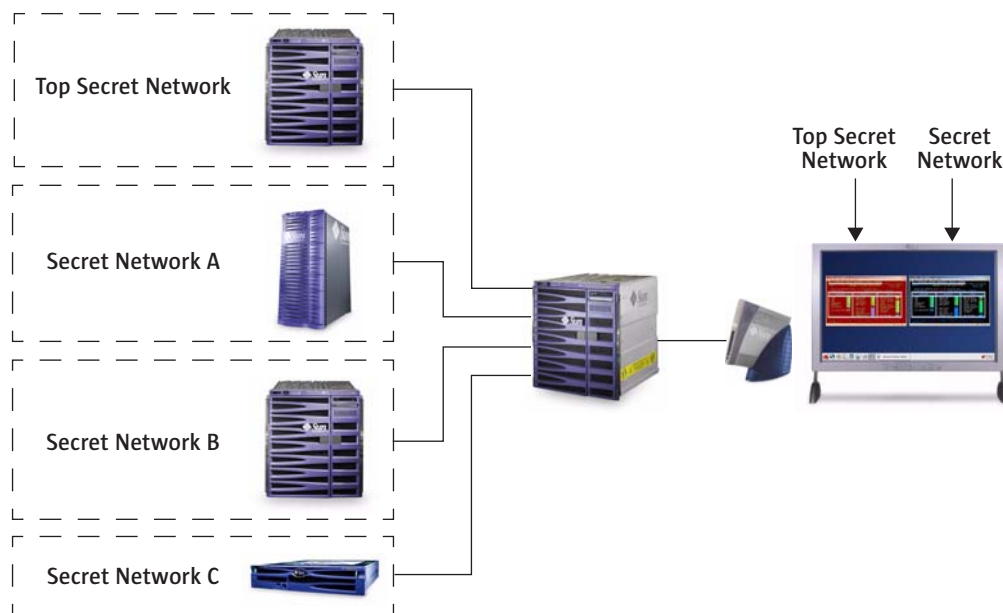


Figure 4. The Sun desktop infrastructure software provides firewalled multi-domain access from a single Sun Ray client

Sun Ray Server Software running on the Trusted Solaris™ 8 Operating System—a hardened version of the Solaris OS that implements several security enhancements—is the core of the Sun Secure Network Access Platform. In this architecture, the Trusted Solaris 8 OS maintains isolation between multiple compartmentalized networks connected to a Sun Ray server while use of Sun Ray clients provides for information security at the desktop level. Because Sun Ray devices are stateless, traditional buffering and caching techniques that present an information disclosure risk are not a concern.

### Heterogeneous Application Access

Thin client technology has been a mainstay in environments requiring access to a limited set of mainframe or server-hosted applications, such as call centers, service counters, bank branch, back office, retail, and factory floors. Today, the widespread use of PCs has blurred the terminal market, with newer categories of Microsoft Windows-based terminals and UNIX and Linux thin clients joining traditional IBM 3270 and VT-100 displays as deployment options. In fact, many organizations use PCs to perform the same work that would otherwise be performed by terminals. This spectrum of terminal options has created a major dilemma. While low cost, dumb terminals offer reasonable security, easy maintenance, and control over workloads performed on terminal networks, they lack flexibility in application and network architecture choice. On the other hand, thick clients and PCs offer access to a wider array of modern, commercial applications and services, but are expensive to buy and costly to maintain, especially in settings that undergo frequent asset redeployment, reconfiguration, and application and service reprovisioning.

Simultaneously, many organizations desire to move beyond their current approach of providing access to a series of siloed terminal-accessed applications to implement a service-oriented architecture (SOA), in which related systems are loosely coupled through standards-based best practices. An incremental approach that emphasizes wrapping and reuse can yield long-term benefits without undue risk or disruption.

Sun's family of network desktop products can provide an excellent solution for providing a presentation tier for accessing applications in an environment where there is a transition to a SOA approach underway. The Sun desktop infrastructure software can provide immediate benefits by providing flexible access to a wide variety of enterprise applications without modifying existing desktop or infrastructure. Over the course of SOA adoption, client-displayed Web browsers can also begin to be used to interface with new Web-based application front-ends. As organizations evolve their IT architecture beyond dependency on local execution of PC Windows applications, enterprises can derive further cost reductions and operational agility by deploying Sun Ray ultra-thin client desktop systems in place of PCs.

Sun's family of network desktop computing products offers superior advantages over traditionally architected Windows PCs with local application execution in several areas, including:

- Sun Ray devices, in conjunction with Sun Secure Global Desktop Software, can interface to any application hosted on a UNIX, Windows, or mainframe application tier server.
- Applications retain their familiar user interface, reducing training costs and user errors.
- Multiple applications from diverse host platforms can display on a Sun Ray monitor screen.
- Back-end application tier server resources can be a mix of in-house and outsourced infrastructures.

- Superior security supports the unique demands of the finance industry, transportation, and homeland security settings.
- Connections to the application tier server infrastructure can be made over any kind of local or wide area network.
- The effort to perform routine network administration actions, such as additions, moves and changes, application upgrades and installations, and user account administration is significantly reduced.



Figure 5. Sun Ray clients provide access to any application on a corporate network, from green screen terminal displays to the most graphically rich commercial software

For example, one of the largest cable television operators in the world utilizes Sun Ray technology in a call center supporting regional operations in a densely populated area of the U.S. This call center handles over 150,000 transactions per day. To support the Sun Ray ultra-thin clients, Sun servers running the Solaris OS provide Web-based access to applications. Since its deployment, the Sun solution has helped the organization realize a host of benefits:

- *Reduced customer wait time*, from 23 seconds to three seconds
- *Improved productivity*, with Customer Relationship Specialist (CRS) productivity rising 30 percent
- *Increased system availability*
- *Simplified administration*, with IT staff reporting the effort required to upgrade applications, provide access to new applications, and administer user accounts is trivial compared to the previous generation thick-client based solution—changes are made on the server side of the infrastructure, eliminating the need to touch every affected desktop
- *Increased operational agility*, as CRSs can be quickly reassigned to service different queues or relocate from one work location to another

### Dispersed, Mobile, and Flexible Workforce

Globalization and the need to bring business closer to customers, suppliers and partners are spurring the demand for secure anytime, anywhere computing. For example, secure, reliable access to server-based IT services and software applications in oil and gas exploration—seismic processing, analysis, characterization, drilling—must be available worldwide, both on land and offshore. Local and remote workers need access to the right information, in the right place at the right time. Beyond exploration and production, downstream energy refining, generation, and distribution industries need to optimize business process efficiencies in a tightly cost controlled and demand-driven environment. Leveraging existing infrastructures—servers, clients, software, and networks—is a key element in achieving optimal cost-effectiveness. This complex mix of diverse IT resources and business process requirements makes it difficult to share information between distributed teams, and results in an arduous administration task.

For example, a large, multinational oil field company acquires, processes, manages, markets, and provides associated data management solutions. In addition to owning four floating production, storage and transfer systems, as well as operating numerous offshore oil and gas production facilities, the company owns the industry's largest multi-client 3D seismic library. They needed to transfer seismic data quickly and securely from the offshore exploration fleet to operation centers, employees, and worldwide clients, as well as find a way to reduce large data file transfers from offshore locations. With file transfers taking up to 20 hours and graphics processing-intensive applications in remote locations suffering from poor performance, field-based workers were struggling to get data where and when it was needed.

The Sun Secure Global Desktop Software was deployed to address the mobile computing needs of the organization and enable remote workers to run server-hosted graphical applications in the field over secure, high bandwidth connections. With the Sun Secure Global Desktop Software, users can run intensive seismic applications remotely, interfacing with headquarters-based application tier servers using PCs running standard Web browsers. The company reports that field-based seismic analysis is now generated and received up to 200 times faster than the previous solution. Today, the remote workers interact with the company's powerful seismic data processing systems in real time—a significant improvement over previous text-based connections to remote land and offshore locations.

Additional benefits resulting from the deployment of the Sun Secure Global Desktop Software include:

- *Faster access to data*

The ability to share crucial data in seconds on a global scale provides a competitive advantage in the energy industry. Headquarters can interact with powerful on-board or remote processing systems in real time, and at LAN-like speeds. The inherent scalability of the Sun Secure Global Desktop software enables servers to be installed at key locations worldwide points, facilitating communication from remote locations and collaboration with local staff to examine geological, chemical or other critical, time-sensitive data.

- *Improved collaboration*

The success of the initial deployment had led to new sites in Abu Dhabi, Aberdeen, Scotland, and Kazakhstan. Now, geophysical experts can log into these remote locations and collaborate with local staff to look at seismic data.

- *Simplified, remote administration*

With the Sun Secure Global Desktop Software solution, engineers can remotely manage production systems using up-to-date, graphics-rich applications rather than text-based commands. The Aberdeen office is now the company's first truly remote center, with production systems controlled from the company's London processing center. The geophysical staff runs applications quickly and remotely over a 2 Mbit/second WAN connection. Performance has exceeded expectations, with users saying it is as if the data resides on their local disks.

### Enabling the Emerging Desktop Service Provider

The widespread acceptance of Internet technologies is opening a new market that promises to provide affordable access to applications that were once only available to large corporations. By delivering outsourced applications to users using Internet technologies, service providers are able to merge the best features of distributed computing with the reliability and performance advantages of large scale data centers. By breaking the tight link between applications, operating systems, and the underlying hardware, service providers can provide the desktop as a service to employees, small to medium sized businesses, or even end users.

Desktop service providers (DSPs) may have multiple, often competing, customers in a given market who require compartmentalization to protect confidential information and intellectual property. Not only does sensitive information, such as engineering design files or Customer Relationship Management (CRM) data need protection, DSP support and service personnel may even be constrained from telling company B how they resolved a similar issue at company A.

The data compartmentalization attributes of Sun's desktop infrastructure software product family can help organizations defend against leakage of intellectual property. In a representative DSP deployment, the Sun Secure Global Desktop Software and Sun Ray servers can be housed within an outsourced data center and be administered by internal IT staff or a desktop service provider partner (Figure 5). From there, DSPs can deliver services to the customer's client system of choice—PCs, workstations, Sun Ray devices and other thin clients, mobile devices, and more. This allows the desktop service provider to maintain control over all aspects of administrative and security policies, as well as control access to application tier servers and software.

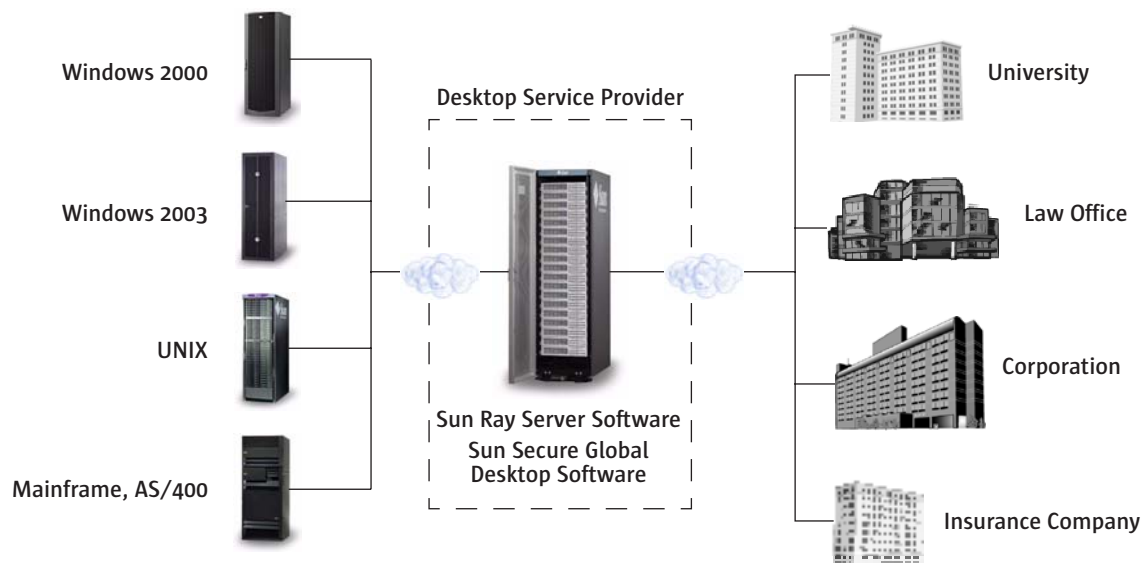


Figure 6. Sun's desktop infrastructure software portfolio enables desktop service providers to support multiple customers with strong protections for proprietary information and intellectual property

The Solaris 10 OS includes support for Solaris™ Containers technology, an extremely powerful isolation, security, and virtualization feature, which in conjunction with Solaris resource pools and Solaris™ Resource Manager facilities, provides a flexible and dynamically manageable mechanism for isolating application infrastructure and information within a data center. This supports the prevention of unintended IP leakage without the extra cost and logistical complexities of maintaining numerous decentralized servers.

### **Sun's Commitment to the Network-Delivered Desktop**

Today, the computing industry and its end users are experiencing radical technological change. Rapidly increasing performance, sophisticated applications, and the growth and exploitation of networks are changing the way people work. Hardware, software and networking advancements are enabling geographically dispersed users to collaborate in real time, and mobile computing and communications technologies are enabling workers to take their virtual offices on the road. With the convergence of compact computing devices, ubiquitous communications, and changes to the IT infrastructure, remote computing is becoming mainstream.

The Sun desktop infrastructure software portfolio takes remote computing to a new level, and the concept of secure access to applications at any time, from any device, in any location is now a practical reality. It brings together open source technologies to create an innovative, open systems approach to delivering computing services to local and remote, desktop and mobile clients. This powerful solution enables access to applications and services to qualified users, and gives organizations the ability to select the hardware, software and services that best suit business needs. By centralizing administration, support, service provisioning and network management activities are significantly reduced, thereby lowering the cost of IT service delivery while creating a more agile and secure IT infrastructure.

Sun is constantly looking to, and shaping, the future of computing by investing in new technology. They recognize that a consistent, continuous application of resources is needed to meet the needs of a rapidly changing communications and computing marketplace. Significant investments in high performance, low-cost networking technologies, interactive services, advanced administration tools, and networked solutions ensure that Sun customers will always have access to the best products available. Sun also pursues partnerships with other industry trendsetters in an attempt to find new ways of delivering products and services that promise a bright and productive future.

Sun knows that networking alone is not enough. Customers need a complete line of systems and software that, allied with networking, solves business problems. Sun has carefully crafted a highly integrated distributed computing architecture that includes powerful, binary compatible desktop and server systems; an operating environment that incorporates key industry standards; software and hardware products which provide security, reliability, economy of administration, and ease of use; and a range of expert services to help ensure proper configuration, installation, and quick recovery from problems. With Sun, organizations can take advantage of innovative products, technologies and solutions to build more agile IT infrastructures that adapt to changing business demands.



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