

# DELIVERING EFFICIENT CAREGIVER MOBILITY WITH SECURITY

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## Chapter 1

# Improving Efficiency by Delivering Secure and Timely Information to Mobile Caregivers — On Any Device, Anywhere

While pressure to cut healthcare costs has never been greater, the need to securely deliver the right information to the right person at the right time has become a priority of the highest order.

In many organizations, hospital information systems (HIS) consist of a vast array of information technology designed to collect, manage, communicate, and store information about patients. These systems have traditionally existed independent of one another, making it difficult for caregivers, mobile or otherwise, to access a complete view of a patient's care record. Complicating the matter for caregivers, the data is often time and security sensitive.

Sun technology can securely deliver clinical information to patients, doctors and mobile caregivers on virtually any device, at the point of care, whether as part of an office visit or at the patient's bedside. Because patient information is stored on centralized servers, there is less chance that the data can be compromised if an individual device is stolen.

Sun solutions can also deliver enormous benefits such as reducing costs and improving response times. By providing mobile access to patient data, health professionals can look up individual statistics, prescriptions and test results at the critical moments they're needed. And as institutions move to electronic patient files, duplicate records can be archived and easily accessed in the event of a disaster.

This white paper looks at how Sun Microsystems' healthcare solutions can help caregivers provide better care for patients in a secure, flexible environment — anytime, anywhere, on any device with a solution that offers:

- Fast, secure access that supports natural workflow within the hospital
- Seamless integration into existing heterogeneous clinical and business IT infrastructures
- Securely scales across departments, systems, applications, and locations
- Securely share patient information across the organization
- Provides remote access to mission critical clinical and business applications

## Chapter 2

# Healthcare Technology Today

To match increasing workloads, improve efficiency, and deliver higher-quality medical service, hospitals around the world are introducing comprehensive information systems.

An example of this is the picture archiving and communication system (PACS), which enables digital imaging without film. Eventually, these tools may make physical copies of X-rays unnecessary.

In a drive to consolidate and increase administrative efficiency, a hospital information system may include not only PACS, but also the computerized physician order entry (CPOE) system and an electronic medical records (EMR) system. The large amounts of data these systems create, moving quickly and securely over the network, requires secure terminals.

All of this new technology gives providers the flexibility to respond quickly to ever-changing needs throughout the medical environment. Typically 20% to 30% of a physician's or caregiver's day is spent accessing or locating patient information. With the right healthcare solution, new applications and processes can be launched faster, while remote information can be accessed almost instantly. Furthermore, with added efficiency, physicians can see more patients and make decisions more quickly.

Systems that include stateless desktops require no management or maintenance, reducing requirements to support desktop technologies. They also lower acquisition and refresh costs through resource optimization. Employees can improve efficiency by reducing redundant activities such as multiple log-ons and log-offs, enhancing operational productivity.

This improved mobility can extend over departments, campuses, metropolitan areas, even wide area networks (WANs), resulting in improved caregiver workflow and satisfaction. Just consider the circumstances of an on call physician, who could be at home or making rounds at another hospital. With secure anytime, anywhere access, that doctor can retrieve critical information and assess the urgency of a situation prior to arriving at the hospital — all without leaving a trace of data behind.

Ultimately, these changes are aimed at improving patient care and reducing medical risks, while complying with regulations. However, many technology-related issues remain to be solved such as the unification of environments with diverse platforms, applications, and client devices. In addition, healthcare IT departments are hesitant to upgrade networks and systems for fear of losing data or interrupting services, yet healthcare workers need mobile and remote access to applications so that they can provide better patient care.

Compliance also poses significant challenges. The Health Insurance Portability and Accountability Act (HIPAA) continues to affect how healthcare organizations deliver information, update and maintain their systems, control access to data, ensure security, and simplify business processes. Stringent mandates from HIPAA are putting pressure on healthcare organizations to find secure application access solutions that offer features for tracking and monitoring network activity. Without highly automated, flexible, and secure identity management, healthcare organizations cannot manage the growing amount of complex, valuable, and sensitive digital identity information.

## Chapter 3

# Components of Sun's Caregiver Mobility with Security

From desktop to data center, Sun offers a single-source, integrated product suite solution with the hardware, software, and storage necessary to create and maintain a fast, secure, centrally managed environment for health information exchange, improved workflow and caregiver mobility.

Built on open source software and open standards, Sun's integrated product suite consists of components that are designed to work together seamlessly. The aim is to help lower the capital costs to deploy and maintain desktops, while eliminating traditional barriers to entry and exit. Components can be leveraged independently, or incrementally, as needs change within the organization, or as budgets expand.

The main Sun components for Secure Caregiver Mobility include:

- Sun Ray™ Virtual Display Clients and Sun Ray Software
- Sun™ Virtual Desktop Infrastructure (VDI) Software
- Sun™ Secure Global Desktop Software
- Sun™ Secure Communication Collaboration Suite
- Sun™ Java Composite Application Platform Suite (Java CAPS)
- Sun™ Java Identity and Access Management Suite
- Sun™ Glassfish Web Space Server

## Chapter 4

# Fast, Secure Access that Supports Natural Workflow Within the Hospital

User-provisioning implementations are growing in number and complexity, largely because of regulatory pressures. Sun Java System Identity and Access Management Suite is one of the most complete solutions proven to reduce the cost of managing identities, both inside and outside the organization, while mitigating compliance risks — making the process repeatable and sustainable.

The Sun Java Identity and Access Management Suite solves many problems for healthcare providers. It helps deliver automated management of digital identities for other providers, patients, physicians, clinicians, and payers. It's not unusual for caregivers to log on and off multiple times a day to remain mobile and compliant. Single sign-on and federated identity management can aid in streamlining the process of providing secure access to privacy-regulated healthcare information, while adhering to strict mandates. Delegated self-service password management can also reduce administrative demands and costs, and offer increased quality of service to caregivers and time constrained physicians. Complete auditing and reporting capabilities can help healthcare organizations comply with HIPAA regulations, as well as internal security policy and corporate governance policies.

Another component that supports fast, secure access, aligned with the natural workflow within the hospital, is an ultra-thin client, virtual desktop like the Sun Ray. The simple, low-power, low-cost Sun Ray device requires no desktop administration. Doctors and other mobile users can utilize passwords or smart cards, like the Java Card, to authenticate them at any available Sun Ray terminal, anywhere their healthcare responsibilities take them.

With billions of cards shipped, the Java Card platform is one of the leading technologies for multi-application smart cards. Java Card devices provide a secure means to authenticate users quickly. This allows session mobility without the need to log in and log out repeatedly as caregivers move throughout their work areas — allowing both caregivers and doctors to see more patients.

As a typical doctor makes his or her rounds through a large hospital, this could save up to an hour every day. Multiply that by all the healthcare employees who access patient data numerous times a day and the potential savings are enormous.

With the advent of contactless Java Card products, even more healthcare organizations can benefit from secure Java Card technology. Rather than requiring users to insert a card into a reader, contactless cards can be quickly and easily read up to four inches (10 cm) away.

## Chapter 5

# Integration Into Existing Heterogeneous Clinical and Business IT Infrastructures

Further aiding caregiver mobility is Sun's commitment to open source technologies. Sun solutions are built on open source software technology that can securely deliver clinical information to patients, caregivers, physicians and providers on virtually any device. This technology not only provides secure access at the point of care, but also offers healthcare organizations cost effective solutions that integrate seamlessly in existing infrastructures.

Building on Sun's vision that "The Network is the Computer™," the open architecture of Sun Virtual Desktop Infrastructure Software (VDI) allows healthcare organizations to leverage existing infrastructures including a broad selection of client devices, virtual desktop operating systems and virtualization hosts, which increases a healthcare organization's flexibility, management efficiency and IT utilization.

It also gives healthcare administrators the choice of using existing Windows PCs and Macs as client devices or energy efficient thin clients or a virtual display client like Sun Ray, lessening the learning curve for busy physicians and other healthcare professionals. Many healthcare institutes will initially deploy on a mixture of new Sun Rays and an existing desktop infrastructure. Replacing PC's with Sun Rays can free up future desktop replacement budgets for other efforts.

The affordable Sun Ray virtual display client offers PC functionality without the PC complexity and vulnerability. Zero-administration Sun Ray terminals enable access to applications on many different platforms — the Solaris™ Operating System (OS), Java™ technology, Linux, UNIX®, Microsoft Windows, AS/400, and mainframes. They differ from complex PCs and other thin clients because they have no local operating system (such as Windows XP Embedded or Windows CE) to manage and administer.

In addition to being well-suited for a large range of clients like the Sun Ray, VDI software also supports a wide variety of virtual desktop operating systems including Windows XP, Windows 2000, OpenSolaris and Ubuntu. IT architects can also opt for either a VMware Infrastructure or Sun xVM virtualization to host the desktop environments, or even a mixture of the two.

## Chapter 6

# Securely Scales Across Departments, Systems, Applications, and Locations

The Sun Ray architecture consists of two components: the Sun Ray terminal and Sun Ray Software. Sun Ray Software provides healthcare providers with encryption between server and client, as well as user session management. It not only enhances security, but also helps reduce the complexity and administration of the IT environment. It offers healthcare customers automatic load balancing, optimizing performance by distributing sessions across the servers in the group. The Sun Ray platform, when used with a Java Card, can also enhance compliance. When the card is removed, viewing access to patient data on the display is terminated and does not appear again unless the user reinserts the card and enters their password.

Load balancing takes into account each server's load and capacity (number and speed of its CPUs), so larger or less heavily loaded servers bear more of the load. Increased availability is supported by creating failover groups. In the event of a Sun Ray server failure, other servers in the group provide services to affected desktops.

Sun Secure Global Desktop Software helps enable healthcare organizations to more quickly realize the benefits of cross organization, Web-enabled application delivery: speed of application deployment, reduced client complexity, reduced administrative costs, and better control and accuracy of business data.

Scalable by nature, Sun Secure Global Desktop Software provides secure access to applications running on a variety of platforms from any device capable of running a Java technology-enabled Web browser. Client devices may range from traditional desktops running Microsoft Windows, the Solaris OS, Linux, or Mac OS X to thin clients, PDAs, and Web-enabled phones. This allows healthcare organizations to consolidate applications into the data center, where they can be managed by IT staff.

By centralizing information on data center servers, users are no longer tied to a particular desktop system for access to their applications because applications can be accessed from any location. Access controls and audit functions are also easier for IT staff to perform because these functions reside on servers rather than on a number of individual desktops. With the Sun Virtual Desktop Solution, IT staff can provision desktops and applications to end users who are assigned appropriate access rights based on individual, role based, or group criteria.

Centralization is a key concept in Sun Secure Global Desktop Software. By centralizing a healthcare provider's corporate assets in the form of computer resources, and applications, data can be better controlled, protected, and more fully utilized as compared to distributing it in an uncontrolled manner among dispersed computers and users. At the same time, centralization can substantially reduce administrative overhead because it helps remove complex and troublesome software from difficult-to-manage client devices, placing it instead on centrally managed servers.

## Chapter 7

# Securely Share Patient Information Across the Organization

Sun's vision is a healthcare environment that is a single integrated community, where patient information flows seamlessly across departments, facilities, regions, and even nations. It's a world where information moves almost at the speed of thought, where crucial medical records are available at the snap of a finger, where the right information gets into the right hands at the precise moment it's needed. That vision is quickly becoming reality.

As healthcare becomes a marketplace where patient data and electronic health record data are shared, the need to expose data to external partners, customers or governmental agencies continues to grow.

Rather than having to access multiple applications, each with their own log on processes and passwords, Sun's Glassfish Web Space Server is Sun's next-generation portal server platform. Based on the Liferay open source portal project, it enables healthcare businesses large and small to pull together applications and content from a variety of Web-based and internal sources and present them as a unified, customizable portal on Web browsers, kiosks, and mobile devices. This offers an aggregated view of all information and services needed by a provider (physicians, nurse, technician) at the point of care. A portal can connect multiple information systems and clinical applications to deliver an effective resource for on-demand patient information sharing among clinicians, hospitals, and health systems.

The portal may be used to integrate patient records, images, results, orders, face sheets, hospital round data, calendar, messages, and more in a single desktop that can be accessed anywhere, using any device. To healthcare providers, it delivers real-time updated information, accurate results, reports, and images, solving the difficulties of processing digital images and delivering immediate results to medical staff. The portal makes it possible for healthcare organizations to comply with regulations for patient information security and privacy while improving caregiver workflow.

Sun Java Composite Application Platform Suite (CAPS) is a powerful solution for integrating existing IT processes and automating healthcare information exchange. Automation reduces costs. It also reduces wait times, improving decision-making and quality of care at the bedside. Built-in audit trails and security features allow the Sun Java CAPS to meet the requirements of the most stringent healthcare organizations.

Sun's software infrastructure technology, including GlassFish Enterprise Service Bus (ESB), Java CAPS and our identity management portfolio of products can help healthcare organizations around the world securely exchange information, manage patient identities and consolidate disparate health records into 'single patient views'.

## Chapter 8

# Remote Access to Mission Critical Clinical and Business Applications

More and more, healthcare workers require mobile and remote access to information and applications so that they can provide better client care, reduce medical errors, see more patients and lower the cost of delivering efficient services. Rewriting applications for Web delivery is not only costly and time-consuming, it can strip away familiar user interfaces, making applications difficult to use for people like physicians who have scant time to spare.

The Sun Virtual Desktop Solution utilizes familiar interfaces for applications and desktops, so there is no need to retrain users, and log-ons take seconds, not minutes, in an environment where time is a critical component of care.

The Sun Virtual Desktop Solution also provides always-on mobile and point-of-care access for physicians, nurses, and healthcare professionals on the move, in surgery, at the bedside, or even at home, reducing the time it takes to access critical data. The Solution's hot desking feature allows a user to stop using a desktop or application at any time on one device and resume the session later on a different one, without session interruption or loss of data. As an added benefit, mobile application access reduces manual data entry and associated human error that can affect the integrity of patient data, while providing caregivers the ability to move about freely.

“With the Sun Ray ‘hot desking’ solution, our doctors and nurses are able to access critical patient data at any Sun Ray within the medical center without the need to log on and off every time they move from room to room. In a primary care, multi-treatment room environment this can save up to 40 minutes per day — time that we can now use to focus on caring for our patients.”

— Charles T. Becker, Chief Financial Officer, James E. Van Zandt VA Medical Center in Altoona, PA.

The Caregiver Mobility with Security solution allows individual healthcare providers to gain access to hospital-based information systems while they are at a remote location such as a physician's office, on rounds at another hospital, on call at home, and so on. The solution offers a single integrated view of patient records and can be accessed remotely using any device with virtually complete security and privacy.

Sun Java CAPS provides a secure method to exchange data between disparate systems, which are prevalent in health information exchanges (HIEs) and regional health information organizations (RHIOs). Sun's delivery of a single-vendor solution to improve patient safety and increase efficiency is aimed at helping all healthcare organizations to cost-effectively benefit from secure access to clinical and financial histories.

## Chapter 9

# Sun Customer Examples

Please note: These results may not be typical of what other customers can expect.

## Denver Health

Denver Health serves as a model for safety-net health institutions across the nation. In order to reach patients who cannot afford health insurance, Denver Health strives to minimize costs and maximize the number of patients examined each day — all without compromising on high quality care.

At Denver Health, doctors and nurses update patient information by logging in to PCs as they move from one examination area to another. Until recently, the login process could take 30 seconds or more to insert a smart card and enter the proper credentials. Denver Health realized that this procedure wasted thousands of minutes when applied to all patients over the course of a year. Additionally, the cost of repairing, replacing, managing, and supporting PCs across the organization — everything from help-desk calls to electricity — was expensive.

“Denver Health’s implementation of the Sun Ray technology is saving our organization time and money. In addition, doctors and nurses are using it without further training. We install it and they use it immediately.”

— Jeff Pelot, Chief Technical Officer, Denver Health

To address these challenges, Denver Health examined a variety of IT technologies such as remote PC management, Terminal Services, software asset management, certificate management, virtual and blade PCs, and thin clients. The organization determined that a solution emphasizing server-based computing and thin clients would be the most cost-effective over time. After evaluating the Sun Ray 2 and Sun Ray 270 clients running the Solaris 10 Operating System, Denver Health chose these as its thin-client devices.

Denver Health worked with Sun to integrate the Sun Ray technology into its IT environment and to have Sun support its existing implementation of smart cards and Active Directory. The organization also wanted the new solution to offer a feature-rich desktop based on Citrix software. Because Denver Health planned to deploy the solution gradually, it worked with Sun to develop a protocol for existing PCs to emulate the Sun Ray technology during the transition period. This would give employees a consistent user experience on either device.

Key benefits of the Sun Ray devices for Denver Health include their easy and rapid setup. “With Sun Ray devices, little setup time was required,” says Jeff Pelot, Chief Technical Officer at Denver Health. “Two of our technicians rolled out 24 units to an in-patient floor in less than an hour. And, after six months and 150 units in operation, we’ve received only one trouble ticket call.”

The Sun Ray devices have also enabled Denver Health to streamline its login procedures and potentially to see more patients. Now, an employee’s first logon of the day takes less than 15 seconds, and subsequent logins require only a password for nearly instant access. As a result, the organization calculates that the time savings may translate into 1,000 more patient sessions per year, yielding a possible increase in annual revenue of up to \$81,000 in the organization’s Orthopedic Clinic. And finally, the Sun Ray devices are energy-efficient. A potential electricity savings of up to \$130,000 has been calculated based on a model from Xcel Energy.

## University of Alabama at Birmingham Health System

The University of Alabama at Birmingham (UAB) Health System manages the healthcare needs of Alabama’s diverse population, including inpatient and outpatient services, rural clinics, a research facility ranked 16th in National Institutes of Health (NIH) Funds, and a health plan that claims more than 65,000 members and 5000 physicians. To aggregate patient information and deliver it across all points of care, UAB deployed Sun Ray terminals, Sun Fire servers, the Solaris OS, and Sun Java technologies.

Maintaining patient and business information is vital yet challenging with facilities spread geographically. With the growing demands of electronic medical records and patient lab, radiology, and ancillary systems, UAB required an integrated solution that could meet diverse interoperability requirements while at the same time help to lower system maintenance and development costs.

“What Sun gives us, in one word, is integration — the ability for us to share our clinical information from the outpatient side to the inpatient side. It makes information available to all the clinicians who are involved in the patient care. And we have definitely achieved benefits from our Sun purchases through return on investment, the longevity of the products, and the low maintenance costs.”

— Joan Hicks, CIO of UAB Health Services

UAB deployed more than 600 Sun Ray clients for patient information access and plans to add more than 3000 over two years. UAB employs Sun Java System Identity Manager to integrate with the Sun Java System Portal Server and Sun Ray clients. To enable integration of legacy systems, UAB uses Java CAPS and Sun SeeBeyond eGate™ Integrator.

“With Java and Sun’s Java CAPS integration engine, we can deploy the Web and utilize Web tools that allow us to give information to our providers quicker and at a lower cost. We can also build incrementally without having to rebuild the underlying infrastructure and change legacy systems. Using Sun tools we’ve been able to take information in disparate systems and aggregate it at the enterprise level, so it rolls up to the patient level and it’s available across the enterprise for that patient. And with Sun Ray clients, we’ve been able to demonstrate that we can decrease the amount of time it takes to get to the information, and do that with less maintenance cost.”

— Dr. Waldrum, Chief Operating Officer, UAB Health Services Foundation

## Busan Adventist Hospital

A general hospital in South Korea, Busan Adventist Hospital (BAH) has 280 beds and plans to add 100 more in the near future. Previously, BAH employed a general office file system and PCs for medical and research personnel. Sun analyzed the BAH computing environment and supplied every component, from main servers to terminal units — the first system of its kind in Korea. The new system efficiently administrates 150 machines from the same computing environment with optimal security. The hospital’s goal is to become completely digital, no longer dependent on paper or film.

Relying on secure storage of patient information and state-of-the-art digital imaging, BAH will continue to deliver greatly improved medical services. As one of the first hospitals in Korea to introduce Sun Ray terminals, Busan Adventist Hospital has greatly reduced TCO and improved efficiency. For example, installing 100 Sun Ray 170 terminals reduced management costs by about 50 percent. As a BAH system administrator said, “I was too busy to manage 150 PCs. It was very expensive to buy the software for each PC and to change it every other year. Introducing the Sun Ray 170 has meant advantages, such as managing efficiently and reducing expenses.” As this project demonstrates, Sun continues to advance customers’ business goals through consulting and providing support for its servers, clients, and network solutions.

## Chapter 10

# Conclusion

Healthcare of the future is a world where technology comes to the aid of everyone — not just patients and practitioners but also labs, clinics, hospitals, insurers, administrators, and data centers. However, before anyone can enjoy that integrated community, where medical records are in the right hands at the precise moment they're needed, much work remains. Systems must be put in place that are highly reliable, secure, and easily accessible, while offering the agility to meet future business needs. Regulatory compliance must be achieved without endangering quality of care. And organizations need to stop spending capital chasing application changes with technology upgrades.

It is clear that Sun's Caregiver Mobility with Security provides healthcare providers with faster access to patient records at the point of care, while increasing information sharing and improving the quality of healthcare delivery.

Sun solutions provide mobile and secure remote access to centralized information and applications so caregivers can provide better client care, reduce medical errors and lower the cost of delivering efficient services. In addition to improving the mobility and flexibility of physicians and healthcare professionals, the solution helps meet regulatory, compliance and accountability regulations through authentication, authorization, auditing, and reporting functions.

Because Sun's Caregiver Mobility with Security helps lower maintenance and support costs, provides faster ROI, and preserves investment in legacy systems, organizations can employ Sun solutions to stretch strained budgets, while striving to maintain safe, effective patient care.

