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IMPLEMENTING SUN™ TECHNOLOGY for HEALTH INFORMATION EXCHANGES

White Paper
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Chapter 1

Overview

Healthcare communities worldwide continue to adopt new approaches to better serve an increasingly complex patient population. Improved patient safety, streamlined provider workflow, more rapid and distributed access to medical information, and better clinical audits all place strains on healthcare infrastructures, which were originally designed for a single-entity approach. With the maturation of electronic health records and Health Information Exchanges (HIEs) to address these business challenges, the focus most recently has shifted to patient-centered or “consumer-driven” healthcare, requiring a new level of integration between healthcare services and IT systems. As a result, clinical and business transformation of healthcare infrastructures has become central to business and political agendas, aiming to involve consumers, physicians, payers, and employers as never before.

Health institutions, governments, and coalitions worldwide are teaming to deliver fundamental transformation of healthcare IT and information services through three interrelated objectives. The impact of this effort is being felt across the entire healthcare continuum:

- Clinicians are integrating their independent record and technology assets to create agile, patient-centered electronic health records, realizing new levels of patient safety and information exchange through organizational, regional, and national ways of working.
- HIEs are bringing together distributed enterprises and investing in standards for data sharing, integration, and information presentation across care settings.
- Clinical transformation and interoperability of health information technologies on a national level is rapidly advancing health information exchange and driving public health initiatives, such as public health disease surveillance programs.

The integration challenge

For a number of years, leading hospitals have been using integration technology to capture and control the flow of important patient and procedure information across departments such as Patient Administration, Radiology, Pharmacy, Laboratory, and Emergency. The benefits of this approach are well documented and include faster and more accurate service delivery, reduced errors in diagnosis and treatment, and a reduction of administrative workload. However, the participation in Healthcare Information Technology (HIT) programs was limited to local or intersystem use, creating fragmented patient information and redundant, inefficient efforts, as shown in Figure 1. Information sharing has historically consisted of manual record requests, time-consuming test result investigations, inefficient claims processing and payment cycles, and laborious administrative processes that cut into business agility and market capture.

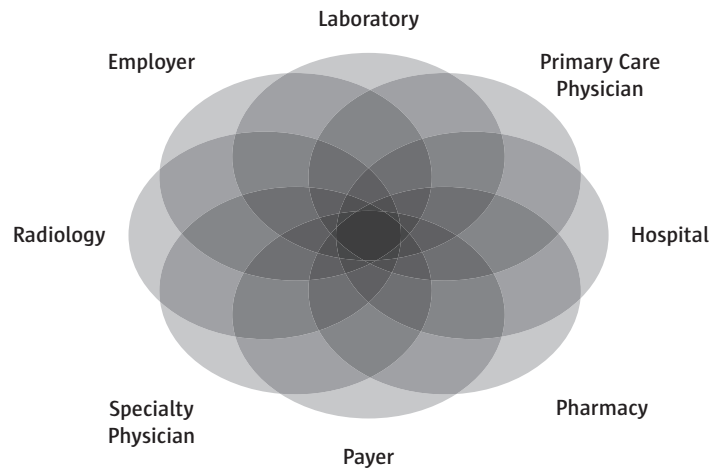


Figure 1. Redundant Information Management

In the past, healthcare organizations have taken a siloed approach to the maintenance and storage of patient record information. This means that competitive concerns, organizational mandates, and privacy or security roadblocks have prevented the sharing of patient information within the health community.

To eliminate the barriers to accessing a secure, comprehensive, 360° view into a patient's medical history, regional healthcare providers must rely on identity management, integration, and single patient view technology to create an appropriate, unified picture of patient identification and care episodes across their respective geographic areas. Information coordination between and across organizations is essential to ensure that care providers work together effectively to support integrated care initiatives that deliver the highest levels of service and efficiency.

This interconnected electronic health information exchange must also capitalize on the investment made in existing legacy systems, such as provider electronic medical records and payer benefit administration systems, while also allowing for the creation of new information views and processes. At the same time, remediation of duplicate records with best match and unique patient identifiers is central to delivering accurate, reliable information at the point of care. Because growth must be accounted for, today's HIEs will surely expand, and with forthcoming interoperability mandates and standards, information technology must be scalable and designed to support it.

Clinical and business transformation

Today, healthcare organizations are learning that patient safety and cost-reduction pressures demand information sharing at the point of care and with payers and employers, as appropriate. HIEs are central to this clinical and business transformation, offering patients, payers, and providers access to Web-enabled, secure longitudinal views of electronic health records across disparate technology environments. Creating such a common framework for connecting community health organizations requires robust health information technology that can:

- Leverage existing systems and utilize an incremental deployment approach
- Be built without a national patient ID — Support remediation of patient records and provide IDs, such as social security numbers and other various identifiers
- Safeguard privacy — Control access to sensitive information via identity management and access control to help meet Health Insurance Portability and Accountability Act (HIPAA) guidelines
- Provide interoperability — Employ an open, standards-based common framework that is deployable via the Web
- Protect patient information — Remain decentralized, residing at source systems and being accessible via an information “spine” on demand
- Enable data sharing — Initiatives have local sovereignty, but follow organization, national/federal standards and policies to enable interoperability and future mandates

In fact, the introduction of an integrated, service-oriented architecture (SOA) for health information exchange can have a dramatic impact on the cost of healthcare delivery by preserving and extending current system investments. The availability of composite application development technology further enables rapid implementation of new solutions for the enterprise and eases adoption of the solutions. With SOA and composite applications, HIEs can be rewarded with a rapid return on investment and lowered total cost of ownership for systems already in place, reduced administrative costs, improved physician and staff workflow, and the ability to meet evolving legislative, regulatory, and accreditation compliance.

Healthcare is now in the process of readjusting to the brave new world that is to come, where health technology suppliers, providers, and payers must adapt to the demanding consumer-directed model or go out of business. The most important aspect of this adaptation is developing the capability to support the interoperability road map, sharing common data and communication standards as defined through network, regional, and national health transformation initiatives. Going forward, this evolution of clinical and administrative processes will depend on combining information from all participating systems. The introduction of business process management and composite application technology can provide the needed control to enable these end-to-end processes. The future of healthcare will certainly change for the better, eliminating the redundancy in place today, and creating a secure information management exchange, as shown in Figure 2.



Figure 2. Centralized Information Management

Chapter 2

SOA-based Composite Applications for HIE Success

Beyond integration, utilization of SOA can enable HIEs to integrate previously siloed, redundant, and inflexible information systems, while rationalizing and extracting greater value from existing technology assets. The way to unlock this value and dramatically improve operations is to assemble the appropriate pieces of existing technology to create new, flexible, and integrated composite applications. Composite applications are enterprise-scale, interactive, end-user applications that span multiple, cross-organizational business processes to provide the right data to the right people, systems, and devices at the right time.

Beyond enterprise application integration (EAI), SOA-based composite applications bring together people, processes, and systems as never before. Healthcare providers and business administrators are able to visualize and control business processes, and identify opportunities for automation and exception escalation. Processes can be optimized through business process design and execution, streamlining and coordinating people and processes within and outside the enterprise. At the same time, SOA enables organizations to leverage existing systems to support new and existing business processes. In essence, composite applications facilitate HIE success by unlocking the value of existing IT infrastructures and human assets for business adaptability and flexibility.

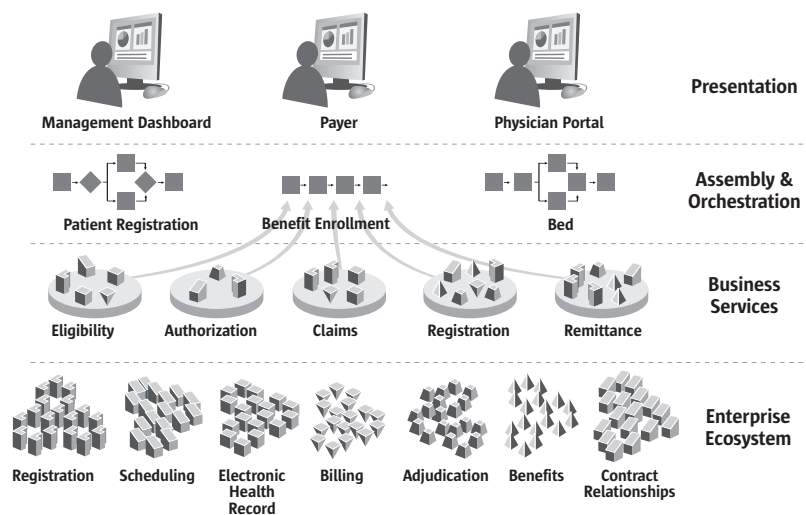


Figure 3. A Service-Oriented Architecture for Healthcare

Creating a single view of the patient is at the core of many new HIE initiatives, whether to support integration of clinical processes across departments or at regional or national levels, or to support emerging initiatives such as member self-service across multiple channels. A key premise of many of these initiatives is that patient information, once captured, should be available for use across all potential care processes. This can prove to be very challenging, because patient information is stored differently in each IT system and patient identifier conventions used are often not the same.

Creating a single patient view is only the beginning of how an HIE can contribute to the overall success of the healthcare entities it represents. Additional business objectives, such as HIPAA transaction management, electronic health records, and physician portals, lend themselves to HIE-specific composite applications that offer a flexible and reliable means for the collection and exchange of disparate data. The management of HIPAA claims with accuracy and proficiency within a single gateway provides tailored Business Activity Monitoring (BAM). Subsequently, electronic health records and physician portals connect multiple information systems and clinical applications to deliver an effective resource for on-demand patient information sharing among clinicians, hospitals, and health systems. In addition, business process improvement and workflow-based composite applications make the most of Web services, systems, people, and organizations while saving tens of millions of dollars in new system investments. By creating a technology environment that is flexible and responsive, control can be given to the HIE, its clinicians, and business partners.

Because each HIE is unique, the solution for creating this foundation for healthcare IT infrastructure must be responsive and adaptable to each organization's specific business requirements. The creation of composite applications to meet those requirements is not a vision for the future. Rather, customized and comprehensive information views to match specific HIE needs are available today.

Composite applications deliver the right data at the right time

The achievement of a single patient view is fundamentally a question of data quality management and process integration. The Sun Java™ Composite Application Platform Suite (CAPS) provides a comprehensive integration platform to build and manage composite applications that preserve an organization's investment in existing applications while flexibly enhancing, aggregating, and leveraging customer data. Using service-oriented process integration, a single-view composite application can access customer data held in customer relationship management (CRM), enterprise resource planning (ERP), financial, and legacy applications. It employs intelligent data standardization and matching algorithms to recognize related customer information distributed across these applications and link the siloed, application-centric record identifiers to a universal patient, record, or provider ID, building a master person index.

The Sun Java Composite Application Platform Suite (CAPS)

Java CAPS is a core component of the Sun Java Enterprise System. This infrastructure software is designed to deliver business agility, security, and optimization solutions to IT organizations while reducing software cost and complexity. It offers a highly productive, scalable, and open platform for developing, executing, and managing end-to-end, integrated business processes such as composite applications for HIEs.

Java CAPS contains everything an organization needs to develop and deploy an SOA platform for the reuse of existing applications and delivery of new services. It also enables legacy and packaged applications to rapidly integrate within an existing infrastructure. The Suite delivers a rich set of integration and composite application capabilities, including Business Process Management (BPM), industry-leading messaging, rich transformation, and a broad and deep array of connectors to facilitate integration into customer data silos. Java CAPS also features Business Activity Monitoring (BAM) for the development of sophisticated dashboards and alerting; a portal server for collecting and personalizing content; Extract, Transform, and Load (ETL) capabilities for moving bulk data; extensive business-to-business (B2B) support; and an advanced facility for enabling the development of single-view composite applications for managing master data. All these capabilities are unified via the single shared configuration Repository, Enterprise Designer development environment, Enterprise Manager runtime environment, Integration Server runtime container, and Message Server persistence layer.

Real-time, automated data cleansing standardizes, matches, and cross-indexes client records

The Java CAPS single-view composite application employs a probabilistic matching algorithm to match entities in disparate systems using the various data elements available, such as first and last name, date of birth, identification number, and address. This matching logic, in conjunction with configured thresholds, determines whether an incoming unidentified record contains a new identifier for an existing record or an entirely new record to add to the index. As records are matched across multiple systems, the single-view application builds a cross-index that can be utilized to translate local identifiers in real time between these systems. This single view allows integrated systems to seamlessly share information as needed. Because Java CAPS single-view applications are service-oriented, third-party data quality tools and engines can be employed to meet specific data profiling, standardization, and matching requirements.

Java CAPS is the first business integration platform to go beyond the traditional realm of EAI. Sun's innovation in providing rapid access to customized management of information across all systems, applications, and enterprises on a network, regional, national, and global basis is paramount to the HIE mission.

As seen in Figure 4, Sun enables the management of information across the continuum of care, and brings value to the HIE by facilitating business activities and communication.

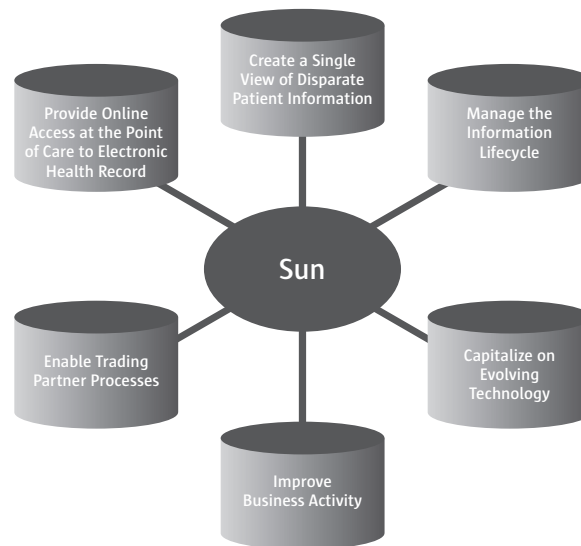


Figure 4. Enabling Information Management

Chapter 3

Sun Identity Management for Healthcare Providers

Without highly automated, flexible, and secure identity management, healthcare organizations cannot manage the growing amount of complex, valuable, and sensitive digital identity information associated with IT advances. Sun identity management for healthcare providers addresses these challenges by:

- Automating the management of digital identity information for the entire universe of users inside and outside the organization
- Controlling costs and improving users' online experience through automated provisioning, secure delegation of administrative activities, self-service password management, and other everyday tasks
- Centralizing administrative control over access to resources to improve the security of sensitive patient data
- Offering a federated identity framework for online collaboration with patients, physicians, payers, and other care providers
- Providing robust auditing and reporting to help ensure ongoing compliance with HIPAA and other regulatory requirements as well as internal security policies

A family of products

Sun identity management for healthcare providers encompasses several products, which together provide the capabilities that healthcare organizations need to support digital data operations — securely and cost-efficiently.

Sun Java System Identity Manager software enables healthcare organizations to easily and efficiently manage the identity lifecycle for a dynamic universe of users.

- Automated user provisioning and deprovisioning eliminates inefficient and error-prone manual processes — speeding service, reducing costs, and improving security when users should no longer have access to the system.
- Password management enables automated password reset and synchronization along with self-service and delegated password management, reducing the cost of help desk support.
- Synchronization services make it possible to synchronize identity information and services across the extended identity environment, helping control costs and ensuring that authoritative data is accessible and available.

Sun Java System Directory Server Enterprise Edition provides secure, scalable, and highly available directory services for healthcare organizations, while helping ensure the accuracy and reliability of identity data.

- A centralized repository for identity application and network resources streamlines identity information storage and management, increasing efficiency and lowering costs.
- Extensive dynamic access control ensures granular access to sensitive identity information, tightly controlling which person has access to what information.
- High-performance technology meets the demands imposed by tens of thousands of authentication and authorization requests per second, delivering the reliable response expected by users.
- Protection of core identity data enables failover operations and prevents attacks that impact availability of service, improving the ability to consistently deliver reliable access.
- Password synchronization with Microsoft Active Directory automatically synchronizes passwords between Java System Directory Server and Active Directory, enabling interoperability in heterogeneous technology environments.

Sun Java System Identity Auditor helps healthcare organizations streamline processes required to maintain security policy, regulatory compliance, and privacy on an ongoing basis.

- Real-time auditing provides up-to-the-minute auditing — of authentication attempts, authorizations, and changes — to help enable compliance with HIPAA and other regulatory requirements while also improving security.
- A robust reporting function provides reports on violations, remediations, and exceptions, making ongoing compliance easier and streamlining compliance audits.
- Packaged HIPAA audit policies help establish common compliance evaluation criteria, such as segregation of duties, enabling rapid implementation of processes for improved compliance.

Sun identity management for healthcare providers supports the transition from paper-based operations to digital operations with a comprehensive set of services for securely and efficiently managing online digital identities. In addition to protecting sensitive information while making it available to authorized users, the Sun identity management solution includes a full auditing and reporting component. This is critical in helping healthcare organizations to provide ongoing compliance with HIPAA and other regulatory and legal requirements for data privacy and security.

Sun server and storage products

Sun utilizes a systems approach to innovative products, technologies, and methodologies, enabling organizations to manage data while also helping to ensure it is identity-enabled. This makes data access more affordable and increases data utilization and retrieval.

The fifth-generation, 64-bit UltraSPARC® IV+ processor with Chip Multithreading (CMT) technology leads Sun's wide range of servers built on the UltraSPARC platform. These massively scalable, highly available servers are designed for mission-critical network computing, helping organizations deliver innovative new applications and services with more agility and less risk. With more than two times the throughput in the same footprint, and running the legendary Solaris™ 10 Operating System (OS), this platform offers five times the industry average server utilization, unbroken binary compatibility, and an application guarantee that protects existing IT investments.

Along with its proven family of servers running the Solaris 10 OS, Sun also provides high-performance servers for the Windows community. Systems built on the x64 platform have already set new standards for performance, reliability, and energy efficiency. To further enhance Sun's x64 server line, integrated systems with networking, storage, and software are also available.

The massive amounts of healthcare records generated by hospitals and other caregivers must be stored, archived, and secured. For this purpose, Sun StorageTek™ NAS solutions offer unmatched total cost of ownership and superior price/performance. They provide healthcare providers with quick deployment, simple manageability, seamless integration, and flexible policy-based services. New systems can be installed in minutes with no disruption to data environments.

Sun also offers a line of desktop clients with many advantages for healthcare environments. With Sun Ray™ ultra-thin clients, organizations can manage thousands of desktops with just a few administrators, virtually eliminate the cost of client virus attacks, centralize data and applications for greater security, and cut application upgrade time from weeks to hours. These systems deliver an interoperable computing solution that reduces the maintenance, upgrade, and operational costs of most desktop environments.

Offering unmatched levels of privacy, increased accountability, and reduced risk of security violations, the Trusted Solaris™ Operating System (OS) provides built-in security on a commercial-grade OS. With the Trusted Solaris OS, users from the desktop to the datacenter continue to reduce security risks and have higher confidence in the security of their networks. Users and roles can be limited to a specific set of commands and actions that are needed for individuals to perform specific jobs. This enables users to bypass security restrictions when needed to accomplish a defined set of tasks, without providing them access to everything.

Chapter 4

Expertise in Health Information Exchange Initiatives

A leading supplier to the healthcare community for many years, Sun delivers SOA-based composite application solutions that produce real results. Sun solutions have become the standard for healthcare infrastructures worldwide. In the U.S., Sun solutions are used in more than 400 hospitals, including regional Enterprise Master Patient Indexes (EMPIs). In Europe, Sun is used by more than 450 hospitals and trusts. Most notable is Sun's part in the United Kingdom's National Health Service (NHS) National Programme for IT (NPFIT), one of the largest IT integration projects in the world to date. Sun was selected to support the integration and single patient view solution as a national application service provider (NASP), and to provide the integration solution for three of five regional local service providers (LSPs).

National programs

National healthcare initiatives are applying many of the concepts introduced at the network or regional level and augmenting them with new capabilities to deliver a consistent set of services and a unified view of the patient across entire nations. The NPFIT is the most advanced of these initiatives, delivering an IT information infrastructure that will improve patient care by increasing the efficiency and effectiveness of clinical and other NHS staff. This involves the rollout of common, regionally supported systems for key healthcare processes, sharing 50+ million electronic patient records, online booking of appointments across a range of 250+ hospitals, electronic transfer of prescriptions, patient demographic services, and services to provide feedback on quality of care. Other current national initiatives include a central repository for pharmaceutical information, increasing access to high-quality healthcare in rural areas, streamlining claims and payment processes through the use of smart card technology, and regulation of direct patient access to certain healthcare providers such as hospitals.

Regional and local healthcare providers

One of the largest health trusts in the U.K., Salford Royal NHS Hospital Trust services a population of more than 300,000. It is using Sun solutions to manage the integration of information from patient administration, pathology, radiology, and other systems with a central electronic patient record system to provide the ward and consultants with a list of patients and their results in real time. All such information about a patient is visible to a caregiver on a single screen, improving the service that patients receive, both within the hospital and as outpatients.

Sun health services framework

Sun offers a comprehensive framework for the collection, management, and exchange of health data, enabling the creation of new business processes leveraging existing infrastructures. This is achieved through the deployment of composite application based on an SOA — all delivered with the support of a superior Sun Services team and powered by Java CAPS. This framework covers all of the major aspects of healthcare integration, enabling organizations to implement best practice services in a rapid and robust manner.

Healthcare professionals now have access to an overview of patient medical data, which can be used for the documentation, planning, and administration of all aspects of healthcare services across departments, regions, and even nations. With the aid of Sun's advanced information management functionality and composite applications, a patient's progress through the healthcare chain can be logged and monitored, improving the standard of care by offering all relevant data on demand for decision-making purposes.

Sun is the only vendor offering an integrated package of application-to-application integration, organization-to-organization integration, master person indexing, business process management, human workflow management, and an integrated patient access and update portal (Single Patient View). Sun's solutions provide a flexible infrastructure for hospitals, regional and national projects including the creation of electronic health records, and physician portals spanning the care continuum.

As a leading supplier of integration solutions to the healthcare industry, Sun has unparalleled expertise in helping hospitals, networks, regional healthcare providers, payers, and employers deliver the next generation of healthcare systems for business success. Sun's proven composite application technology is now accepted worldwide as a key platform to enable this transition. Sun solutions augment the strengths of distributed core clinical and administrative applications, delivering the flexibility required to support the aggressive evolution of healthcare infrastructures towards regional and national objectives.

