BEAUMONT HOSPITAL

Patients in Ireland Benefit from Electronic Health Record System

HIGHLIGHTS

SOLUTION:
Service-Oriented Architecture

PRODUCT:
BEA WebLogic Platform™ 8.1

INDUSTRY:
Healthcare

PARTNER:
Mide Technologies

COUNTRY:
Ireland

BUSINESS CHALLENGE
Unstructured paper-based patient records, multiple stovepipe applications, and no single application model resulted in a fragmented view of a patient's health record.

SOLUTION
Beaumont Hospital has created an extensible electronic health record (EHR) repository and disease management system, based on BEA WebLogic Platform 8.1, which supports patient care processes in a range of internal and external care settings.

RESULTS
The hospital can record all encounters with a patient. All participants in the care processes share a consolidated, real-time view of patient information. A Service-Oriented Architecture allows the Hospital to be more responsive and adaptive to healthcare needs. System brought to market 50 percent more quickly than using traditional development tools.

Beaumont Hospital is one of the busiest general hospitals in Ireland, providing acute hospital care services for the Dublin area and 24-hour continuous emergency call service for a catchment area of 250,000 citizens. Last year, the hospital admitted 20,399 in-patients, 47,724 A&E patients, and 119,814 out-patients. Beaumont Hospital is a principal undergraduate and postgraduate medical training and research centre, attached to the Royal College of Surgeons in Ireland. It also houses a nurse training school and the National Referral centre for Neurosurgery, Neurology, Renal Medicine, and Transplantation. The hospital has 696 beds, more than 2,100 staff, and an annual budget of €196 million (2003).

BUSINESS PROCESS CHALLENGE
At first sight, the business and IT challenges in the healthcare sector appear insurmountable, and Beaumont Hospital is no exception. There is a constant battle to enhance patient care and reduce waiting times. Frozen healthcare spending necessitates improvements in process efficiency. IT managers need to improve the productivity of IT resources, extend the lifespan of legacy applications, and ease migration.

Fiscal challenges, service bottlenecks, clinical management, and the threat of litigation all demand joined-up, seamless service delivery—an environment within which hospital staff, GPs, comunity based care workers, and patients can all share the same, integrated view of the treatment process. Until now, Beaumont's patient health

records were fragmented over several systems and mainly contained in paper-based charts. This information was unstructured, mostly handwritten, clinicians' records in their own format and style. It was difficult to obtain access to relevant information within the file–it was sometimes necessary to read through an inch thick file to secure a view of a patient's history. Paper-based records were also impossible to share with external parties.

"The reliance on paper-based records was just one of our challenges," says Tony Kenny, the IT Project Manager at Beaumont Hospital. "The hospital's IT infrastructure has been assembled over the course of the last 18 years, with multiple stovepipe applications and no single application model," he says. "We had a fragmented view of our patients, clinical information, administrative systems, and other critical systems. Our goal was to integrate new applications into the IT infrastructure in a controlled fashion and increase the productivity of our resources. In the process we would unlock data from existing legacy systems."

The hospital's Epilepsy Department identified the need for a database of patient health records that would be used for research purposes. The key requirements were to create an electronic health record for epilepsy patients, record all encounters with a patient, and provide a consolidated view of patient information in the Epilepsy Department. Moreover, the solution aimed to support the main care processes in the Epilepsy Department, and provide face-to-face or remote contact with patients. A strategic decision was made to adopt an open standards application platform based on Java 2 Enterprise Edition, with a strong application

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Tony Kenny, IT Project Manager, Beaumont Hospital

development function. The result, a rich application infrastructure which would facilitate easy implementation of complementary application and integration architectures, such as a Service-Oriented Architecture (SOA), event driven integration, and process-based application assembly.

SOLUTION

The project team comprised resources from Beaumont, Mide Technologies (a systems integrator specialising in middleware and enterprise Java application development), and BEA who provided the underlying software infrastructure, BEA WebLogic Platform 8.1. By standardising on BEA WebLogic Platform, Beaumont Hospital has made huge progress towards delivering joined-up, inter-departmental patient care.

The solution comprises two loosely coupled systems– an EHR server and an Epilepsy disease management system, a client application of the EHR server. This Service-Oriented Architecture promotes a reusable EHR resource of which the functionality is exposed via Web service interfaces. Best practices from EHR standards bodies such as HL7, CEN, and open EHR were adopted. Clinical content and concepts are organised in extensible and flexible hierarchy. XML is core to the solution, and re-usable clinical concepts (types) as well as clinical document templates are defined as XML structures.

Key features of the EHR server were; seamless patient record management, retrieval and updating; end-to-end clinical document management and versioning; and electronic health record access control, security and auditing. The epilepsy application was geared to capturing all encounters with a patient, implementing a clinical workflow (initially in the Outpatient Clinic), as well as introducing clinic scheduling, administration, and reporting.

At the heart of the solution is the BEA WebLogic Server™ 8.1, residing on a high-end Intel platform, running Linux. This robust, J2EE-based server environment enables the hospital's development team to

quickly and effectively build, integrate and manage applications, in a simplified, interoperable environment. BEA WebLogic Integration™ 8.1 provides the foundation for the systems integration components and services between the Epilepsy application, EHR Server, and the Hospital Information System. It enables users to access data in the existing legacy systems, automates the shared patient care process, and makes information available in near real-time. It also provides data transformation, message brokerage, and back-end application connectivity.

So why did Beaumont Hospital choose BEA? "We needed to leverage our J2EE skills and BEA WebLogic Platform provided a single, integrated platform for building, modifying, integrating, and deploying the next-generation healthcare system," Kenny explains. "This best-of-breed application infrastructure platform blends both integration and development–it allows Beaumont Hospital to extend the lifespan of existing applications and serves as a foundation for a Service-Oriented Architecture."

BEA WebLogic Workshop™ 8.1 is proving to be a real asset to the development team. This unified and extensible development environment enabled a single team to quickly create a Web service and integrate data. "With a minimal amount of extra work, the team were able to present the newly integrated data to users via a portal." Kenny continues. "By removing the complexity of J2EE development and focusing on business logic, not application code, they are significantly more productive."

Austin Poulton, Technical Architect at Mide Technologies, comments, "BEA WebLogic Workshop is a superb integrated development environment for Java enterprise design and programming. The separation between design views and implementation is truly innovative. BEA WebLogic Workshop allows designers and application architects to quickly model Web flows and workflows, hence providing a specification for later implementation. BEA WebLogic Workshop has a strong

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focus on programmer productivity, seamlessly taking care of many tedious programming tasks in the background. The suite of wizards that auto generate various J2EE components and controls alleviates a large measure of boiler plate coding. This allowed the development team to assemble the solution in a record time."

Portal development has also been streamlined using BEA WebLogic Portal™ 8.1. "The flexible deployment architecture and the ability to share portal resources put BEA WebLogic Portal 8.1 in a class of its own," comments Kenny.

BEA also offers a solution for the hospital's HL7 and CDA standard message specifications. The BEA WebLogic Adapter for HL7™ can be deployed to optimise the integration of these and other transactions with back-end transaction processing systems. The result–faster, simpler, and more robust critical applications integration.

RESULTS

The solution is initially deployed in the Epilepsy Department, and serves as a re-usable template for other disease types. It enables hospital staff to record all patient encounters, regardless of whether these are internal and remote. Participants in the care processes, including hospital staff, GPs, and community based care workers, can log on to a clinical Portal to gain a consolidated, real-time view of a patient's health record. "We are steadily creating a hospital without walls," Kenny adds.

"We are building a technology infrastructure that allows Beaumont Hospital to remain at the fore-front of patient care. We required a solution that not only integrated old with new, but also built upon our existing skills set. BEA WebLogic Platform 8.1 combines integration and development in one IT process, which can improve the time to value of our new IT initiatives. Owing to the ease of integration using BEA WebLogic Platform 8.1, we have bro-ught this ground-breaking healthcare system to market 50 percent more quickly than we would have done using traditional development tools."

This rapid, open, and scalable integration is only half the story. By embracing a Service-Oriented Architecture, the hospital is also more efficient, responsive and adaptive to healthcare needs.

For example, the EHR repository offers a range of re-usable Web Services for maintaining core elements of a patient's record. It is now possible to invoke a Web Service to retrieve patient demo-graphic information, hiding from the calling appli-cation the detail of where this information is stored or where it is retrieved from. This single, aggregated access point to patient demographic information prevents the necessity for replicating information.

The Service-Oriented Architecture has also trans-formed the value of Beaumont Hospital's HP9000 mainframe environment. By wrapping this legacy environment with a Web services based Service-Oriented Architecture, it has become a 'heritage' system, delivering even more value as new joined up services. Moreover, it reduces the risks of future system migrations and upgrades. By adopting a

service-centric approach to IT, Beaumont Hospital is benefiting from a greater re-use of its assets–witness the pharmacy system–faster time to value, and greater adaptability to support change. "We are under pressure to deliver more with fewer resou-rces," Kenny concludes. "BEA WebLogic Platform 8.1 is enabling Beaumont Hospital to make sure patients receive the best possible care, maximise our finite healthcare budgets, and plan for the future."

ABOUT BEA

BEA Systems, Inc. (Nasdaq: BEAS) is a world leader in enterprise infrastructure software, helping enable companies to improve business responsiveness through service-oriented architecture (SOA), a software design approach that more closely aligns IT with business objectives. With 15,000 customers worldwide including the majority of the Fortune Global 500, BEA and its WebLogic® and Tuxedo® brands are among the most trusted names in business technology. Headquartered in San Jose, Calif., BEA has 75 offices in 36 countries. More information on BEA products and services is available at www.bea.com.

ABOUT MIDE TECHNOLOGIES

Mide is a specialist software infrastructure (middle-ware) consulting company. Mide partners with BEA Systems, Inc, to provide future-proofed business integration solutions based on BEA WebLogic Platform™. Mide's advanced skills on enterprise application, and integration architecture, Enterprise Java, and BEA's middleware products consistently ensure successful project delivery. Based in Dublin, Mide services clients across Ireland, United Kingdom, and Europe.