



# BEA SYSTEMS, INC.

## Enterprise Infrastructure Services

BEA implemented an end-to-end architecture utilizing a set of Enterprise Infrastructure Services (EIS) built on BEA WebLogic Platform™ 8.1. The EIS architecture is designed to support applications that will make BEA's sales force more effective and productive, and enable timelier, more proactive customer support.

### OVERVIEW

At a certain point, linear expansion of an IT infrastructure begins to deliver diminishing returns. BEA had reached that point by 2003 and realized that radical change was necessary. To reduce IT costs, ensure data consistency across applications, improve customer support, and increase the productivity of BEA sales people, BEA challenged its IT staff to implement a new enterprise architecture.

The new architecture would be service-oriented, meaning data and business logic would be centralized and exposed to sales and support applications in the form of standards-based Web services. BEA turned to its own platform suite to implement the new infrastructure. BEA WebLogic Workshop™ 8.1 was used as the integrated development environment (IDE).

BEA refers to this project as the Future State Architecture (FSA) initiative. This new architecture transforms applications from their traditional roles as fat, isolated containers of data into new roles as facilitators of integrated business activities. All the data and business logic required for a task can be exposed via Web services to a single application. There is no need to bounce between screens to complete a job. Applications essentially become customized dashboards that are tailored based on a user's defined role.

The first two phases of the FSA initiative were built in only six months. The development team was comprised of eight people, none of whom had previous experience developing with BEA WebLogic Workshop. BEA estimates that its service-oriented architecture will cut more than 50 percent off the

manpower and cost needed to build, integrate, extend and manage its infrastructure. BEA anticipates that its cumulative cost savings and productivity improvements will top \$75 million over three years.

#### COMPANY BRIEF

BEA is the world's leading application infrastructure software company. In eight years, the company has grown from a small startup into a global organization. Today, BEA and its WebLogic® brand are among the most trusted names in business. The company earned nearly \$1 billion in revenue during its last fiscal year and has more than 15,000 customers and 3,000 employees in 31 countries.

#### BUSINESS PROCESS CHALLENGE

As the company grew, its information technology (IT) infrastructure expanded in size and complexity to meet the needs of the business. For several years, this IT philosophy was successful, enabling the company to operate smartly and efficiently. However, at a certain point, linear expansion of an IT infrastructure begins to deliver diminishing returns. BEA had reached that point by 2003 and realized that radical change was necessary.

Simply adding more disparate enterprise applications and data stores would not provide the payback that BEA seeks from its IT investments. The costs of deploying, integrating and managing more silos was becoming prohibitive. The infrastructure was unwieldy; it was impractical to build custom connections between every combination of systems that could conceivably exchange data. It was equally impractical to build applications with global reach from scratch every time a new business requirement was identified.

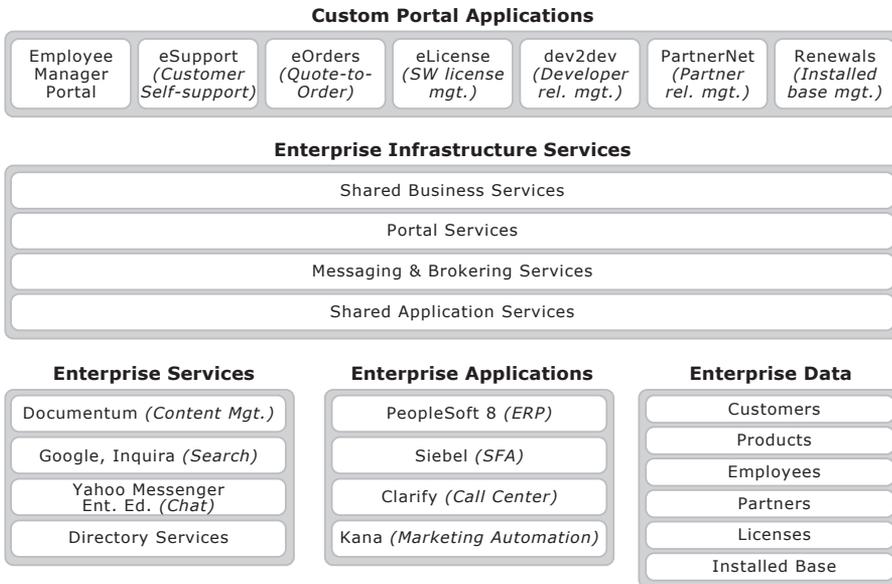
The impact of a sprawling IT environment was particularly acute for the customer-facing portions of the organization. Sales people and customer service representatives had to bounce between 12 points of entry into 30 enterprise systems that contained customer data. For example, viewing all open service cases for a client was extremely difficult, as was understanding the details of a client's license agreement(s).

The result was that sales and support personnel were spending a large percentage of their time on non-value-add tasks just to stay current on client account activity. This cut into time that sales people could spend selling and generating revenue, and hampered the ability of support staff to be proactive and close cases rapidly and efficiently.

To reduce IT costs, ensure data consistency across applications, improve customer support, and increase the productivity of BEA sales people, BEA challenged its IT staff to implement a new enterprise architecture. The new architecture would be service-oriented, meaning data and business logic would be centralized and exposed to sales and support in the form of standards-based Web services. The goal was to provide a unified customer view that would allow account teams to better understand a customer's situation, support customers in a timelier and more cost-effective manner, and enrich BEA's customer interaction to build more lucrative and mutually beneficial long-term relationships.

Rhonda Hocker, BEA's chief information officer, articulated the business case. "We wanted to decouple the presentation layer from the business logic. This would enable us to manage, expose, and secure data more effectively, and rapidly deploy applications and functionality for distinct audiences, such as customers, sales reps, and customer service reps. The desired results are substantially lower IT costs, superior customer service, increased revenue (made possible by getting information into the hands of inside and outside sales reps when they need it), and greater company-wide productivity facilitated by streamlined workflows."

Although the project was focused on customer-centric applications, the new architecture would provide benefits that extend to every corner of the organization. The architecture that BEA was envisioning would employ fully reusable software code that could be leveraged repeatedly to improve workflows for accounting, human resources, marketing, operations, and other groups. As the new architecture becomes more mature, and the library of reusable software grows, future projects could



**ENTERPRISE APPLICATION ARCHITECTURE**

This radical new architecture transforms applications from their traditional role as fat, isolated containers of data into new roles as facilitators of integrated business activities.

be completed faster and cheaper than would be possible using traditional development strategies.

**SOLUTION**

The new architecture is essentially comprised of four layers of enterprise infrastructure services (EIS) that provide a unified development and integration framework. All future applications will incorporate some or all of these services rather than be created from scratch and then wedged into a real-world environment for which they are not optimized. This will allow the IT staff to mix and match services as it builds applications to create logical process flows. In other words, business processes will be created—or existing processes streamlined—to serve the needs of the business. The business will no longer have to work around inflexible applications.

The first layer of the EIS architecture is Application Services. Examples of these services include transaction logging, exception handling, application monitoring, and data storage. These are services that most enterprise applications typically require.

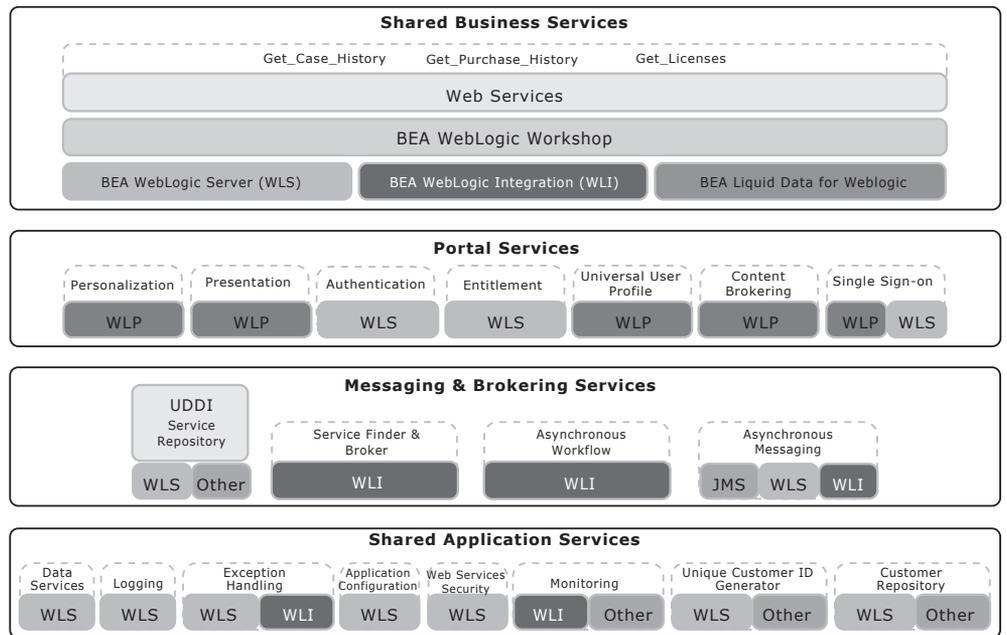
The second layer is Messaging and Brokering Services. Examples include service finder and brokering (necessary to route real-time messages), asynchronous message delivery, and asynchronous workflow management. This layer is the guts of the new infrastructure, ensuring that all applications and services can communicate with one another.

The next layer is Portal Services. This is the key layer for usability and accessibility. It manages personalization, user profiling, user authentication and entitlements, content brokering, and single sign-on. Based on each user's profile, he or she is routed to the appropriate portal (e.g., customer, sales force, etc.) after being authenticated. Although the portals are built on a common foundation and are integrated with the same data stores, each portal offers users a different combination of functionality and content.

The top layer is Shared Business Services. This includes customer-support case histories, software-license details, purchase histories, and customer profiles. Customers, support staff, sales reps, marketing staff, and accounting

**FUTURE STATE  
ARCHITECTURE  
(FSA) PROJECT**

BEA WebLogic Platform 8.1 spans all four layers of Infrastructure Services and is architected so that the products seamlessly work together. This new service-oriented architecture will cut more than 50% off the manpower and cost currently needed to build, integrate, extend, and managed its infrastructure.



could all potentially consume these services. By making these shared services, BEA ensures that everyone who views the data is looking at consistent, up-to-date information regardless of their point of entry.

This radical new architecture transforms applications from their traditional roles as fat, isolated containers of data into new roles as facilitators of integrated business activities. All the data and business logic required for a task can be exposed via Web services to a single application. Because the data is centralized there is no risk of inconsistent information. Applications essentially become customized dashboards that are tailored based on a user's defined role.

“We can build smart applications that are more appropriate for our business,” said Hocker. “This architecture allows us to bring data in real time to decision makers. For example, sales people are able to see a wide range of relevant information about their customers in a single location rather than having to dig for it in multiple functional silos. That will allow sales personnel to make better decisions, use their time more productively, capitalize on more opportunities and build more valuable relationships with customers.”

BEA turned to its own award-winning application platform suite for the tools needed to build the new infrastructure. BEA refers to this project as the Future State Architecture (FSA) initiative. The new infrastructure leverages all components of BEA WebLogic Platform 8.1, including:

- > BEA WebLogic Server™ – all applications are being built and implemented on the world's most widely deployed Java application server
- > BEA WebLogic Portal™ – all Web interfaces for BEA's key applications are being built on BEA's enterprise portal framework that simplifies the production and management of custom-fit portals
- > BEA WebLogic Workshop™ – all development is conducted within BEA's integrated development environment, which empowers all developers, not just Java experts, to rapidly create, test, and deploy enterprise-class applications and Web services
- > BEA WebLogic Integration™ – BEA's integration platform provides guaranteed message delivery and business process management (BPM), essentially acting as the process engine of the new infrastructure
- > BEA Liquid Data for WebLogic™ – BEA's innovative aggregation solution enables users to aggregate business-critical data in real time for maximum visibility

across the enterprise and faster, more insightful decision making.

In addition, the company will leverage BEA WebLogic JRockit™ to optimize the performance of its hardware. For maximum price/performance, BEA standardized on Intel-based servers running Red Hat Advanced Server Linux 2.1. The combination of Intel and Red Hat minimizes the initial cost of deployment and delivers a dramatic, ongoing cost savings on licensing and maintenance compared to proprietary Unix and Windows operating environments. Hardware costs alone are expected to be hundreds of thousands of dollars lower for an Intel/Red Hat platform than they would have been for a Unix environment.

## RESULTS

The first two phases of the FSA initiative were built in only six months, which is an extremely rapid deployment schedule for a project of this size, scope, and strategic importance. The development team was comprised of eight people, none of whom had previously developed with BEA WebLogic Workshop.

The new infrastructure will rely on a set of portals, built on WebLogic Portal, as the primary access points for internal and external users. From the portals, users will be able to open all relevant applications, see all appropriate data, and complete their tasks without having to log in and out of numerous screens, or rely on phone calls and faxes to share information. This is in contrast to the current infrastructure that relies on 12 points of entry and nine interaction points. The portals also encourage customer self service. Customer inquiries that can be completed via self service cost BEA only pennies on the dollar compared to inquiries that require manual intervention.

BEA estimates that its new service-oriented architecture will cut more than 50 percent off the manpower and cost currently needed to build, integrate, extend, and manage its infrastructure. BEA anticipates that those savings, plus the increased productivity of its sales and support staffs, will be worth more than \$75 million to the company over the next three years.

That figure is based on the returns BEA is expecting from just the first three applications built using the EIS architecture—eLicense, eOrders, and eSupport. Together, these tightly integrated applications automate much of the work involved in providing price quotes, tracking order status, generating and managing software license keys, renewing licenses, troubleshooting, and initiating service requests.

“The huge cost savings is only part of the benefit,” said Hocker. “Customers will be better served. Sales people will be able to move more product. By exposing our data stores via Web services, we’re extending the ROI and lifecycle of older assets, such as Clarify for our help desk and Siebel for sales force automation. And, simplified application development that no longer requires custom ‘plumbing’ or business logic will allow us to bring new functionality to market very fast. The sum total of all these benefits will strengthen our bottom line and make us a more competitive, opportunistic, and flexible organization.”

Hocker added, “The architecture is enabling new ways for business units to define and fund application development. Instead of building monolithic applications, business units can partner and share the cost of standardized, reusable components. The business units can then assemble the components to suite their own needs.”

“BEA WebLogic Workshop 8.1 is the key to the entire project,” said Yogish Pai, director of architecture for BEA’s Enterprise Infrastructure Services organization. “It would have been nearly impossible to get this project off the ground without a tool to simplify and accelerate the development of Web services. By the time we’re done, we expect to have 100–200 Web services in production, all of which can be reused by any application.”

The development team leveraged BEA WebLogic Workshop for much more than simply building Web services. The team used BEA WebLogic Workshop to build nearly every element of the infrastructure, from messaging and brokering workflows to portal templates and Web applications. BEA WebLogic Workshop also provided the testing and debugging environment. In



fact, Workshop is the development environment for BEA WebLogic Server, BEA WebLogic Integration, and BEA WebLogic Portal.

Pai noted that the development team became proficient on BEA WebLogic Workshop in less than two days. He said that the initial proof of concept was developed within two weeks, a schedule that would not have been possible with any other integrated development environment (IDE). For the entire project, Pai estimates that BEA WebLogic Workshop provided a five-fold increase in development time versus other IDEs.

One particularly powerful aspect of BEA WebLogic Workshop is its ability to abstract much of the complexity out of development, speeding up the process dramatically. For example, BEA WebLogic Workshop utilizes XMLBeans during development to represent XML documents. This shields developers from having to understand the complexities of XML. Developers use XMLBeans during coding, and BEA WebLogic Workshop is automatically able to link the beans to actual XML documents without explicit instructions from the developers.

Another example of abstraction is Controls. Controls for items such as Java Messaging Service (JMS) and Web services eliminate the need for developers to

understand the low-level details of these technologies. With Controls, developers are able to integrate these services without having to worry about any of the subtleties, such as application programming interfaces (APIs).

“Thousands of companies, including most of the Fortune 500, have been putting their trust in WebLogic for years,” said Hocker. “This project demonstrates why WebLogic has achieved such broad adoption. The platform combines pragmatism and outstanding technology. Using BEA WebLogic Platform 8.1, we’ve increased our productivity, reduced our cost structure, and empowered our IT staff to better support the business.”

#### ABOUT BEA

BEA Systems, Inc. (Nasdaq: BEAS) is the world’s leading application infrastructure software company, providing the enterprise software foundation for more than 15,000 customers around the world, including the majority of the Fortune Global 500. BEA and its WebLogic® brand are among the most trusted names in business. Headquartered in San Jose, Calif., BEA has 77 offices in 31 countries and is on the Web at [www.bea.com](http://www.bea.com).

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