



“Using EAServer we were able to eliminate redundant processes, increase automation, retain our existing business rules, and leverage new technology.”

– Raghu Premkumar,
Senior Software Developer,
Option One Mortgage

Option One Mortgage

solutions

- Intro:** Option One Mortgage, a non-prime residential lender, has built a diverse collection of EAServer-based distributed applications to support their business processes. Applying solid engineering design principles, Option One has built a set of easily maintained modular applications with many shared code components. A workflow tool guides the complex loan process through the correct sequence of steps, including calling the appropriate EAServer application. Leveraging its solid technical infrastructure, Option One supports a loan administration outsourcing service for smaller companies.
- Industry:** Financial Services
- Business:** A workflow engine controls more than 25 EAServer-based distributed applications integrating internal and external functionality.
- Architecture:** Compaq® dual processor Windows 2000® machines running EAServer with PowerBuilder®, EJB, and Visual Basic COM components.
- Products Used:** Sybase EAServer, Sybase PowerBuilder.
- Benefits:**
- Automated solutions to complex and critical loan administration functions.
 - Outsourced loan servicing business is well supported by the applications.
 - Lowered development costs due to the high degree of code sharing.
 - Customers and internal employees use the same applications with user-specific interfaces.
 - Model-View-Controller design leads to easier integration of new front-end clients.
 - A clean architecture and seasoned development staff simplifies adding new applications.

EAServer Powers Home Loans to People with Less-than-Perfect Credit Histories

Option One Mortgage Corporation, a wholly-owned subsidiary of H&R Block Inc., is a mortgage banking firm involved in the origination, purchase, sale, and servicing of residential mortgage loans. Option One provides financing to American homeowners with hard-to-document income or less-than-perfect credit histories. This type of loan is referred to as a sub-prime or non-prime loan. Option One's non-prime servicing and outsourcing servicing operation manages over \$20 billion in assets. Option One was founded in 1992, and was purchased by H&R Block Inc. in 1997. Today, the company employs more than 2,900 people nationwide, with 1,100 employees located at the corporate headquarters in Irvine, California.

Option One Mortgage Creates a Large Suite of Distributed Applications

The complexity of the home mortgage business requires a variety of supporting applications. Using EAServer, Option One has created more than 25 distributed, production applications with another six currently under development.

“I have been getting lots of good feedback from my customers telling me how much time they save by using the applications. I'm happy to be associated with this system.”

– Nixon Philip, Senior Developer, Option One Mortgage

At the Option One Mortgage headquarters, 30 developers work directly on EAServer applications and applications that touch EAServer. Each division has its own EAServer machine running division-specific applications. On the business side of the house, Option One has applications for loan servicing, loan origination, corporate support, retail lending, and lead management.

In addition to the pure business-side applications, Option One uses EAServer to run its supporting and internal applications. Raghu Premkumar, Senior Software Developer for Option One, talks about some of the internal applications, “We have several Internet applications for submitting forms where we pull out the information and add it to our database. On the

Intranet side, we have applications that support searching, for instance, looking up appraisers. You input some query criteria and it pulls up a report. We also have data entry applications, workflow applications, and applications which are mainly processes that don't require any human interaction. For example, we get a file from a seller with loan information and that needs to go into the database. We use EAServer to process the data directly to the database."

PowerBuilder Legacy Deployed to the Web

Option One Mortgage has been using Sybase since the beginnings of the company. The early deployments of Sybase technology were PowerBuilder client/server applications. As the company grew and as Web enablement became a viable presentation method, Option One began converting their client/server applications to EAServer. This allowed them to leverage their legacy applications and business rules into EAServer components, creating a suite of distributed solutions available to company branches and customers.

"We like working with Sybase, we get a lot of support, they take care of us, and they often come to our site for hands-on discussions."

– Nixon Philip

To design and develop their innovative applications, Option One worked closely with Sybase field support technicians to make sure they were tapping the full potential of EAServer. Jim Kawanami, a Principal Systems Consultant for Sybase, summarizes the fruits of their collaboration, "The application server will play a key, expanding role in linking business activities with operational and back office systems. Option One Mortgage has created unique, distributed solutions based around J2EE™ and Sybase EAServer that will continue to be open and scalable into the future."

Using a mix of PowerBuilder, Visual Basic COM, Java™ and EJB components running on Sybase EAServer machines, Option One's home mortgage applications power a thriving business. Each division has a Compaq dual processor Windows 2000 machine running EAServer. Some internal processes, like user authentication are performed on an EAServer machine shared across all the divisions.

Public and Private Interfaces to the Same Application

EAServer components are natural building blocks for creating modular applications that present different interfaces to different users, without attaching interface dependencies to the underlying business rule code. In their Sybase EAServer implementations, Option One has used the Model-View-Controller approach in designing their applications, separating the user interface, or view, from the underlying system.

The information involved in loan processing is privileged, and needs to be available only to the borrower and Option One authorized employees. Loan administrators have full access to this information on Web pages rendered with JSP on EAServer. Because authenticating a borrower via the Web is less reliable, Option One does not display loan information to a borrower's browser. Instead, the loan information is faxed or emailed to the borrower. Raghu Premkumar explains Option One's reasoning in taking this approach, "We won't show it on the Web pages for security reasons. We don't want somebody to sneak in through the public interface and get information about a loan."

"The internal versions of these applications use the same EAServer components as the public versions."

– Nixon Philip, Option One Mortgage

Nixon Philip, an Option One Senior Software Developer, discusses the underpinnings of one of these applications, "If a borrower has a loan through Option One, and needs a verification certificate documenting that they have a mortgage with us, they go to our Web site and enter their loan information and social security number. We use this information for authentication. When the form is submitted, we validate the borrower information and look up the loan, using EJB components on EAServer. A PowerBuilder component builds a data window for the certificate form, populates the form, and prints it to a PostScript file format. The PostScript file is converted into a PDF format. Finally, EAServer polls for the PDF file, and attaches it to an email or faxes it using a print fax server."

Taking a Model-View-Controller approach to application design also makes it easier to support new types of front-end clients. Plugging in a new front-end client becomes as easy as writing a view and a controller for it and wiring them into the underlying model. For example, the same verification of mortgage certificate application has a phone front-end borrowers can use to enter their information. Raghu Premkumar explains, “We also have a phone interface for this certificate request. Using a phone, you can enter your loan number, social security number and fax number and we will fax the certificate to you. We have a Voice Response Unit (VRU) application that collects all the information from the phone request and runs stored procedures to our database; after validating the information they put the data into one of our database tables. On EAServer we have a service component; a component which runs at a specified interval to poll that table and read the information. For each VRU request, it goes through the same process of generating the PDF file and sending it to the fax server.”

“The important point is that the backend components are the same for all of these front-ends. Regardless of whether it is a Web or telephone request, the output is the same.”

– Raghu Premkumar,
Senior Software Developer,
Option One Mortgage

Appraiser Tools — Shared Data Leads to Shared Components

EAServer components also lend themselves to creating separate applications that share a common code base. In their Sybase EAServer implementations, Option One has developed a large number of EAServer components shared between different applications.

In the mortgage business it’s important to know a home’s current real estate value. A lender wants to make sure the loan amount does not exceed the appraised value of the home. Because Option One

makes loans across the United States, they need to work with independent appraisers. Using Sybase EAServer, Option One has created an online system for the appraisers to sign up with the company and an internal companion application for approving the prospective appraisers.

The hopeful appraiser goes to the Option One Website and fills out a form generated by Sybase EAServer using JSP. The form gathers information from the appraiser including their fee schedule for different types of appraisals and work references. The information is extracted from the form and written into a backend database. The Corporate Appraisal Department uses an internal EAServer application which works through the queue of applicants. The corporate appraisal staff can view all the data the appraiser supplied, and if the information conforms to the corporate guidelines, a person calls the appraiser’s references and verifies the work experience. If the references check out, the last step of the application is to approve the appraiser for future Option One work.

This process uses two applications, the public application used by the appraiser to apply with Option One, and the internal application used to approve the appraiser. Since the data is the same for both of the applications, they share many of the same EAServer components. This clean, modular approach to building Web applications saves development costs on the front end and maintenance costs later in the application’s lifecycle.

Authorization Through a Shared Authentication Framework

Each division at Option One has their own EAServer machine running its division-specific set of applications. All Option One Internet applications use the same authentication system, which is kept on a shared EAServer machine. The authentication security framework was developed in-house and uses EJB components. Nixon Philip explains, “I am sure the authentication system is the most used code in the organization. This set of EAServer components sits on the backend, and has API calls each application can use. You can create one login name and password for any application. We have a servlet which will for-

ward this information to an EJB with the application name. The EJB validates the user for this application with their particular role and grants them authorization to use the application.”

The authorization framework provides a single sign-on capability. Users log on once and they are presented with their homepage showing them a list of their authorized applications. Security information is stored in the database and maintained with a Web-based security administration tool.

Using a Workflow Engine as an External Locus of Control

The different services associated with providing financing are a complicated but well understood set of tasks, lending themselves to a workflow approach. There are multiple steps, which depending on the task, may include a process flowing from one application to another, or human intervention such as signoffs, and scheduling an appraiser visit. Option One uses a workflow engine named In Concert, with tasks assigned to individual users. Sybase EAServer does the work of prompting the user with JSP screens, communicating with internal and external processes, and connecting to the backend database.

Raghu Premkumar talks about the role of the workflow engine, “The workflow engine only manages the current activity for a specific task or workflow. It tracks the user, and the current state of the user’s job related to this workflow. Whatever data the user entered on the JSP screen related to this task, or whatever report needs to be retrieved, is going back to our main transaction database, which is maintained through EAServer components.”

EAServer’s ability to interact with users, hook into different backend databases, and pass information between both internal and external distributed applications makes it a natural extension to a workflow tool. For Option One’s workflow-based processes, EAServer is slaved to the workflow engine, carrying out tasks under its direction. By taking advantage of EAServer’s flexibility and pairing it with a smart workflow tool, the Option One developers created a powerful symbiotic solution to regulate the steps in the loan process.

Reaching Out, Integrating External Business Functions

Unlike standalone applications, distributed applications can incorporate expertise residing in other companies. By building distributed applications, a company like Option One can lean into their own strengths, while reaching outside for other specialty services.

Before loaning someone money it’s important to know if they are a credit risk. Option One uses an outside company that offers credit report services in near real-time. Using information from the prospective borrower’s loan application, EAServer components open a port through the firewall and connect to the credit reporting company’s application. Using the credit company’s API calls, the loan information is passed to their application. The credit check is made and a data packet containing the credit information is sent back to Option One. An EAServer component extracts the information and stores it in the database.

Option One uses an outside mainframe company to perform the major number crunching on their loans, including validating legal compliance issues that vary from state to state. Raghu says, “We use a mainframe company to keep all our loan servicing information. We upload all our loan information to them using EAServer and PowerBuilder components. We need to send this information in a text file of 80 character records, the old time punch cards with punched holes. After we generate the loan, we write all this information into a big text file and give it to the mainframe company using FTP. This is an automated process using PowerBuilder components on EAServer.”

Infrastructure to Spare — Servicing Other Companies’ Loans

Option One has built a world-class suite of distributed applications to support the non-prime mortgage business. Using this same suite of applications, Option One offers a loan servicing business to companies lacking the infrastructure to service their own loans.

Option One's loan servicing business makes it possible for small companies to offer loans without the overhead of multiple departments. Option One takes care of sending out loan information, collecting money, and working with borrowers who are late on making their payments.

Using FTP, the smaller client companies send Option One their loan information in a specified format. If a company is unable to provide that format, Option One will build an EAServer-based translator to convert the information. The normalized loan information is saved into a folder. A queue manager built from EAServer PowerBuilder components polls the folder, picks up the information, and places it in a table. At the end of the day, the loan information from the smaller companies is sent to the mainframe company along with the Option One loan information.

Many Facets of EAServer

Option One uses Sybase EAServer as the foundation for its internal and external loan servicing applications. Making extensive use of J2EE standards, EJB, and JSPs as well as a thoughtful implementation of Model-View-Controller principals, they have created a scalable application infrastructure capable of supporting their own business needs and an outsourced loan servicing business.

There is very little redundant code in their applications. Some Option One Mortgage applications have a public interface and an internal company interface, each with different capabilities but sharing the same application components. Other companion applications, discrete, but related to each other share a common set of EAServer components. All of the Internet applications use an authentication system kept on a shared server.

At Option One, EAServer sits in the center of their solutions—the integration point for all their applications. It connects to the backend database, email servers, fax servers, their workflow engine, and other EAServer machines. It also reaches outside the company, connecting to external mainframe services, credit check services, and their outsourced loan servicing clients.

EAServer can be a self-directed tool, triggering scheduled activities and responding to file uploads and Web page interactions. Option One's method of integrating their workflow engine demonstrates a unique implementation of EAServer, where the control comes from an outside agent. In this scenario, EAServer is slaved to the workflow engine, performing all the work under the direction of the workflow engine.

Finally, the Option One Mortgage development team is using a best in class Java IDE, Borland®'s JBuilder, with the EAServer JBuilder Plug-In for rapid application development and direct server deployment of JSP and EJB components.

The range of design solutions Option One Mortgage used to create more than 25 production applications, demonstrates both the engineering acumen of their developers, and the strengths of EAServer.

“EAServer has all the main features we need, and I must say it has been very stable, so what else would we want? We have good service, we have a stable product, and we have all of the features.”

– Raghu Premkumar,
Senior Developer,
Option One Mortgage

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