

"We can produce systems 3 to 4 times more efficiently with Eiffel than we could with C or Fortran."

Eiffel Software Case Study:

AXA Rosenberg Employs Eiffel Software-based "Knowledge Repository" to Lower Costs, Boost Employee Productivity

Abstract:

Customer wanted to seamlessly migrate from an extensive, well-established legacy system to a readily extendable platform that embodied the knowledge of the firm in a clear and accessible way. Customer achieved this objective, and reaped several other large benefits.

Key Results:

- Created a company knowledge base that is easily shared and reused among employees
- Reduced the cost of producing new applications by **75%**
- Effortlessly migrated a huge system from an older platform (VMS) to Windows and .NET
- Shortened employee learning curve by **50%**

Background:

Dr. Barr Rosenberg, a global authority on finance and investments and a founder of Modern Portfolio Theory, established Rosenberg Institutional Equity Management in 1985 to manage broadly diversified equity portfolios. Now called AXA Rosenberg Investment Management LLC, the Orinda, California-based firm is a recognized leader in the systematic analysis and management of equity portfolios and draws on Dr. Rosenberg's modeling of complex processes with substantial elements of risk.

AXA Rosenberg's U.S., European, and global equity products have consistently outperformed their benchmarks by using technology to examine some 17,500 stocks worldwide and identify small mispricings in equities that can present opportunities for profit.

The company's broad base of accumulated responsibility, experience, and knowledge places tremendous demands on its in-house computing systems and capabilities.

A growing challenge facing AXA Rosenberg was capturing and analyzing an ever-expanding body of knowledge within its investment management software. All the company's software is involved in a quantitative investment process and AXA Rosenberg had built virtually all of its software in-house. This includes everything from the underlying model for buy-and-sell recommendations, to research, modeling, trading systems, portfolio accounting, and bank reconciliation to the back office -- in short, everything related to the investment process. As a result, some two million lines of code had been written, mainly in FORTRAN and some C.

A top priority in this computing-intensive environment is AXA Rosenberg's need for unquestionably reliable software that is both flexible and robust. In upgrading its software technology, the company also wanted to avoid the onerous and time-intensive task of sacrificing and then rebuilding its existing software.

To address these issues with a single solution, AXA Rosenberg elected to begin converting to Eiffel-based software to achieve the following three goals:

- · Build a company-wide knowledge base that is easy to access, automate, and modify
- · Assure that all software applications perform exactly as specified
- · Optimize software reliability and data integrity.

"Our employees now have a better, faster way to learn how to contribute best to the company. Our new ability to share knowledge shortens the learning curve by 50%, and takes employees 50% further in their understanding of our business."

Solution:

AXA Rosenberg started to move from its legacy software to Eiffel by building its new software applications in Eiffel, a purely object-oriented programming language. As a proof of concept, AXA Rosenberg's first Eiffel application permitted the company to access fundamental data much more quickly than with its legacy software. Initially, AXA Rosenberg software developers questioned Eiffel's ability to perform as fast as C, because of the presumed tradeoff between garbage-collection and speed. Their Eiffel system proved to be not only *10 times faster* than their prior work in C, but also prevented memory leaks - a classic problem in C and C++ programming.

Results:

AXA Rosenberg's migration from VMS, a platform with a limited future, to the Windows platform has proceeded very successfully without interruption to its legacy system. Eiffel software permitted this migration to be seamless and also allowed immediate access - through Microsoft .NET -- to the most recent advances in software technology.

AXA Rosenberg now has all of the fundamental classes in place. They are being used by all of AXA Rosenberg's new applications, in addition to many of its most important legacy applications.

	Started with...	Migrated to...
Language	Fortran & C	Eiffel
Platform	VMS	Microsoft Windows
Database	Indexed & sequential (VMS RMS)	Relational (Microsoft SQL Server)

The conversion to Eiffel software has allowed AXA Rosenberg to achieve the following results that we believe could not be achieved with any other development system:

- **1. Successful Migration:**
 - a. □ Approximately 80% of AXA Rosenberg's legacy software code was written in Fortran, and 20% was written in C. With the conversion well into maturity, nearly all of the company's new systems are now in Eiffel, with a little in C#.
 - b. □ An unexpected bonus of moving to Eiffel was that Eiffel enabled AXA Rosenberg to migrate effortlessly to .NET - allowing the company to easily incorporate third-party software modules (and source-code) - in a more straightforward manner than with COM objects.
- **2. Knowledge Base Consolidation:**
 - a. □ AXA Rosenberg successfully created a company "knowledge repository" that contains their historic knowledge in a single, centralized, and more accessible Eiffel library.
 - b. □ This central repository of company knowledge is more easily understood by long-term and newer developers within the company and is readily accessible for new application development.
- **3. Productivity Boost:**
 - a. □ Having established a foundation of reusable business objects defined in the Eiffel class library, new system development and assembly can proceed much more efficiently than was possible with the legacy software, leading to significant gains in productivity.
 - b. □ AXA Rosenberg anticipates further gains in productivity with the maturing of its knowledge base represented in the Eiffel class library. Ease of access and use of this knowledge base is possible because of Eiffel's Design by Contract specification of interfaces and the simplicity and clarity of its syntax.

"Eiffel makes it dramatically easier to do what you say you do. In fact, using the Eiffel method allows you to do things you couldn't do before. We view Eiffel as a language for simulating reality."

What management at AXA Rosenberg says about Eiffel software:

"Our employees now have a better, faster way to learn how to contribute best to the company. Our new ability to share knowledge shortens the learning curve by 50%, and takes employees 50% further in their understanding of our business."

"We determined that Eiffel was the optimal way for us to not only document our knowledge, but also to implement that knowledge through software."

"EiffelStudio gives us the powerful ability to consolidate legacy code and company knowledge into a central, more functional and accessible application."

"Eiffel ENViSioN! will allow us to easily build upon our Eiffel enterprise applications to quickly make client-specific applications within the popular Visual Studio .NET environment."

"Our Eiffel developers are very enthusiastic about their enhanced productivity."

What developers at AXA Rosenberg say about Eiffel:

"We can produce systems 3 to 4 times more efficiently with Eiffel than we could with C or Fortran."

"Eiffel makes it dramatically easier to do what you say you do. In fact, using the Eiffel method allows you to do things you couldn't do before. We view Eiffel as a language for simulating reality."

"Eiffel has assertions built into the language, so you can actually specify in assertions exactly the behavior that you want."

"We view Eiffel as a knowledge-sharing medium. Our application would have certainly been harder to do in any other programming languages, and it would have been impossible to do well."

"EiffelStudio has opened up a whole new world for us by providing immediate and effortless migration to .NET. We can more easily incorporate third-party software modules and source code than we could with COM objects."

About Eiffel Software:

Eiffel Software (a division of ISE) is the world leader in Eiffel true object-oriented programming tools. Founded in 1985, Eiffel Software produces proven professional tools and component libraries for business-critical and enterprise software developments, as well as Eiffel training and consulting services. Eiffel Software's products and methodologies enable their customers to output more and higher-quality software in less time than with any other development tools available. Its users span the globe, in industries ranging from large financial institutions, to technology manufacturing, to government and defense contractors, to health care providers and more.

You can visit Eiffel Software on the Web at <http://www.eiffel.com>, or by telephone in the USA at +1-805-685-4395.

* * *