

## Trifolium Creates Next-Generation Internet Banking Application That's Right on the Money.

*With the intense competition for market share between the nation's banks, the leaders are continually searching for ways to differentiate their company and better serve customers. For First Union National Bank, Internet banking is an important strategic advantage in reaching a greater number of customers and reducing operating costs in the number of banking centers required.*

*To meet the challenges of serving a growing customer base and stay ahead in the Internet services arena, First Union turned to Trifolium for assistance in creating a next-generation Internet banking application. Using Trifolium Frameworks™ and TXSeries products, Trifolium delivered an open, scalable solution that met all the goals of First Union.*

*Trifolium continues to add enhancements and new WebSphere technology to match the bank's evolving business needs.*

With assets of \$237 billion, First Union National Bank is the sixth largest bank holding company in the United States. It serves 16 million customers through 2,400 financial centers and 3,700 automated teller machines. With First Union's Online Banking, customers can access savings, checking, credit cards, consumer loans and brokerage accounts. The system makes it easy to receive up-to-date account information, transfer funds between accounts and make loan or credit card payments.

### A history of changes and challenges

Having undergone more than 80 mergers and acquisitions since 1985, First Union was no stranger to rapid growth or changing demands. The bank took several steps to better satisfy customers, including the introduction of new services such as the Capital Market account for investors. They also made the decision to replace their already stretched Internet banking application with a second-generation system that could serve an expanding customer base, while remaining flexible enough to add new services as they were identified.

### Defining needs and goals

First Union outlined several architectural requirements for the new Internet banking application. First, the system of record — First Union's mainframe system — would continue to be the data repository. Therefore, any n-tier application must use existing database records.

Secondly, to allow parallel operation, the new system must seamlessly integrate with

the existing Internet banking application. Finally, the new application must be scalable with built-in redundancy, to ensure continued service even in the event of a hardware failure.

The timeframe for delivery of the new application was short. As First Union determined that outside assistance was needed for architecture design, development and implementation of the new system, Trifolium joined the project team. After assisting with design requirements, Trifolium defined a high-level application architecture with a robust infrastructure that could handle both current and future needs. Trifolium project and development managers were able to implement the design even faster than expected.

### Open, scalable architecture

The application architecture consists of four replicated Trifolium Frameworks servers running over the WebSphere Encina TP Monitor. Each of these servers can run with multiple threads and processing agents.

Multiple occurrences of each server can be defined and running at any time. The architecture is designed for maximum scalability and fault tolerance.

### Reliable performance

Customers access the system through the browser of their choice via First Union's web site. A HydraWeb front end balances the load among 15 web servers at three sites stretching between Charlotte, North Carolina and Jacksonville, Florida. These sites give the application intersite redundancy, allowing any site to be lost without impacting the customer.

C++ CGI programs on the web servers communicate with the Trifolium Frameworks servers and dynamically build the HTML pages on the customer's browser. The servers handle user authorizations, ticket creation, customer role management and business logic. The installation of new WebSphere servlets to replace the CGI programs will provide even more functionality and flexibility to the user's browser.

In each First Union site, there are also redundant Frameworks application servers, providing automatic failover and restart capabilities on an intrasite basis as well. The Frameworks servers communicate with the mainframe through both an Encina PPC gateway and MQ Series messaging. The application utilizes a metadata driven approach, which enables the construction of generic processing components.

### Plans for the future

The success of this project has allowed First Union to decommission their older Internet banking application, thereby reducing support costs and simplifying operations. In addition, Trifolium Frameworks has greatly reduced the development cycle by the use of pre-defined classes and objects providing the infrastructure of the application. Together, Trifolium and First Union are developing new WebSphere Java servlets and XML capabilities to further enhance the services offered to customers.

## Advantages of Trifolium's Internet Banking Application

~ **Additional functionality**, including access to Capital Market accounts, brokerage accounts and credit card accounts. Customers can see the value of their entire brokerage portfolio, check credit card balances, transfer funds between accounts and make credit card or consumer loan payments, all from the comfort of home.

~ **Increased performance** for the 2.1 million customers who now utilize the new application. The new application cut response times in half during peak usage periods, serving approximately 1200 customers per hour, reducing the load on the mainframe.

~ **Reliability** through redundant processes on redundant machines across multiple sites. The previously high error rates due to lost communications were eliminated. Now, a single machine or an entire site going off-line does not impact a customer's ability to access account information.

~ **Security**, including session-level authentication with key expiration and auditing features. The application also features encryption of messages with secure keys.

~ **Improved navigation** through a more intuitive screen design. The process is continuing in later phases with a complete graphical redesign.

~ **Fast development** of 55 days from project authorization to delivery of an application ready for customer acceptance testing. The cost of the application was a fraction of the cost of the original first-generation application.

Trifolium, Inc. has a proven track record in providing object-oriented, n-tier architectures that can be used to integrate existing systems, streamline operations, or completely re-engineer a business to address changing needs.

Trifolium, Inc. is an active partner with IBM Corporation and IONA Technologies and a voting member of the Object Management Group. Trifolium is also a founding member of the Enterprise Integration Standards Council.



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