Microsoft .NET
Customer Solution Case Study

Defined Contribution Pension Site and Application is Streamlined

Overview

Country or Region: United States
Industry: Financial Services

Customer Profile

InvestLink offers software solutions for the Defined Contribution pension and Health Savings Account markets. Its clients represent over 500,000 participants and administer over $30 billion in assets.

Business Situation

InvestLink needed to modernize its systems to elegantly support both Windows and Web clients, to improve scalability and support dramatic account growth, and to reduce operational costs.

Solution

Aided by partner twentysix New York, InvestLink built a new system, TSM.NET, using SQL Server 2005, Visual Studio 2005, and .NET Framework 2.0.

TSM.NET launched in April 2007.

Benefits

- Scalability improved by >100%
- Development cost < half
- Improved user interface
- Improved customer productivity
- Reduced cost of distribution

All of InvestLink's customers chose to upgrade to the new system. In addition, several new customers have signed up on the strength of demonstrations of the new system.

Tim Slavin, Founder and CEO, InvestLink

InvestLink, a major technology provider to the Defined Contribution industry, was outgrowing its existing system, and decided on a redesign to meet its immediate and long-term needs. After finding that an Oracle-based solution would have cost more than twice as much as a SQL Server 2005 and .NET Framework 2.0-based solution, InvestLink contracted with Microsoft partner twentysix New York to jointly build a solution around the Microsoft Application Platform. This solution was brought to market successfully in 18 months. The new solution boasts better scalability and security, lower ongoing costs, and higher productivity for programmers and users alike.

TSM.NET Architecture

Situation

The need for systems to manage Defined Contribution pension plans and health savings accounts has been growing rapidly, and InvestLink, a prominent player in this field, has been feeling growth pains. Founded in 1997, InvestLink has grown to be roughly the third largest technology provider to the Defined Contribution industry, with over 500,000 participants and over $30 billion being administered.

InvestLink's Total Service Manager (TSM) does record keeping, information processing, trading, portfolio balancing, and administration for 401Ks and all other Defined Contribution pension plans as well as Health Savings Accounts. The earliest system from InvestLink used LAN-based client/server architecture and was implemented in FoxPro in 1999. The TSM system grew organically over the years to support Web access and a hosted database and by 2005 InvestLinkASP was using Microsoft® Visual Basic® 6, SQL Server™ 2000, Classic ASP, FoxPro, and Crystal Reports. Unfortunately, this system was difficult to maintain, expensive to operate, and lacked the scalability to handle the company's growing customer base.

InvestLink decided to redesign the TSM system to meet its immediate and long-term needs. The company put together a set of requirements, and went shopping for a partner to help them design and implement the new architecture.

InvestLink had three categories of requirement for the new system: user interface, operational, and business. These reflected the needs of third-party administrators, company plan administrators and plan participants, as well as InvestLink's own needs.

For the user interface, the requirements were:

- Elegant support for both Windows and Web front ends
- Must use common business logic code
- Web must be easy to design, support
- Windows UI must be maintained for "keyboard-addicted" back office users
- Everything must be hosted, even the Windows code

Operationally, the key items were:

- Investment in Crystal Reports must be preserved and tightly integrated into new infrastructure
- Privacy for sensitive data, like SSNs
- Automation of server-side batch jobs for data loads and report runs
- Superior performance on the database
- Scalability to handle dramatic Defined Contribution pension and health savings account growth

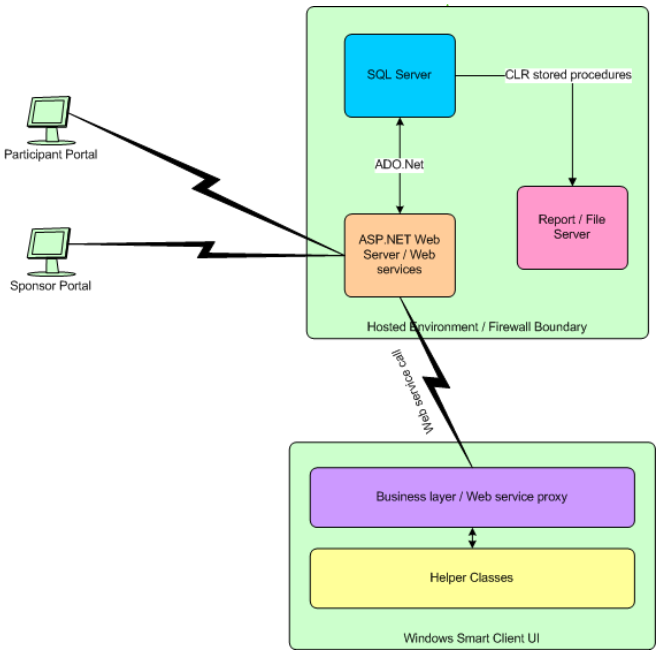
The business needs were:

- Cater to all sizes of Third Party Administrators (TPAs)
  - Hosted: scale out is crucial
  - Economical: limit the "pull-through" licensing costs
  - Adept: rich Windows client for TPAs, groups administrators
  - Attractive: Web client for plan participants
- "Commoditized sophistication"
  - High-end features, high reliability, controlled costs

InvestLink wanted a partner to help with the initial design and development, but wanted to bring the ongoing development of the new product in-house. The company contacted several development organizations for quotes, with a wide range of answers.

Solution

One major programming services organization proposed an Oracle-based solution; a local Microsoft partner, twentysix New York, proposed a solution built around



SQL Server 2005, Visual Studio® 2005, and .NET Framework 2.0. The Oracle-based quote was roughly 2.5 times higher than the SQL Server-based quote, and the decision was obvious to InvestLink: the company chose the Microsoft Application Platform.

The new software took roughly 18 months from inception to "rollout", using a team of 10 consultants and 8 in-house developers. It amounted to roughly 2.5 million lines of code, primarily written in Visual Basic .NET and Transact-SQL.

According to Andrew Brust, Chief of New Technology at twentysix New York and a well-known author and conference speaker, TSM.NET has a "nice layered N-tier architecture, with business, data, and UI layers. Third party administrators (TPAs) and HR people use a Windows Forms interface that is heavy on data entry, has complex menus, and has many forms. Plan participants, on the other hand, use an ASP.NET Web site. Both user interfaces share the business logic and data layers."

One of the requirements of the TSM.NET project was to preserve InvestLink's sizable library of Crystal Reports. TSM.NET uses .NET Framework Common Language Runtime (CLR) stored procedures to call Crystal Reports Web services directly from SQL Server 2005.

In addition, the application uses CLR stored procedures to import flat files by calling a Web service that reads and preprocesses files that have been uploaded by the TPAs. The Web service converts the data into XML from Excel files and comma-delimited ASCII files. SQL Server 2005 then reads the XML, parses it, and converts it to table rows.

There is another advantage to XML. "Using XML as an input type effectively gives SQL stored procedures a variable number of parameters," said Brust. "That's a nice way to augment Transact-SQL."

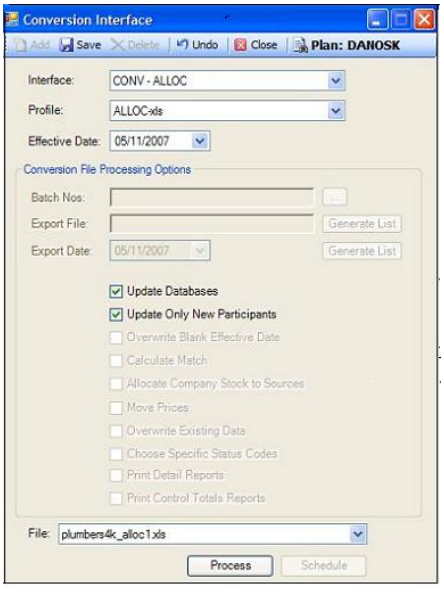
TSM.NET takes advantage of several other new features of SQL Server 2005 to streamline the database code. These include several new Transact-SQL features: queue processing extensions, ranking functions, PIVOT/UNPIVOT operators, and common table expressions.

- **OUTPUT clause.** "The OUTPUT clause is used in UPDATE statements to save changed values to an audit table," explained Brust. "This eliminates the need to write triggers for auditing purposes."
- **Ranking.** "The ROW_NUMBER function is used to automatically generate a unique row identifier for a result set," said Brust. "This is a nice way to implement paging for the user interface, since you can test the row number in the WHERE clause of your SELECT query."
- **PIVOT/UNPIVOT operators.** "The PIVOT and UNPIVOT operators turn rows into columns, and vice versa," Brust explained. "This is helpful when the normalized table structure of the database doesn't match the desired reporting format. My approach is to use database functions to get the data into the format that the report engine needs, rather than corrupt the database design or burden the report engine."
- **Common Table Expressions.** "Common table expressions, or CTEs, are basically

We now get development done faster and at less cost. I'd estimate that I saved 20% in staff increases developing with the .NET Framework, compared to what we'd have needed using previous technologies.

Stephen Tague, CTO, InvestLink

The conversion interface form uses the SQL CLR, and permits users to upload and import data from files. The file layouts are user definable.



like temporary views: a CTE is a query with a name," said Brust. "You can use a CTE by reference, as though it were a table, in other queries. In addition, a CTE can call itself recursively, which is useful when a table is joined to itself, as happens in the classic case of an Employee table with a Direct Reports relationship."

ClickOnce deployment, which lets Windows Forms applications run from a Web page, allowed the TSM.NET back-office Windows application to be hosted, and enabled the rather complicated update scenario required by the plan administrators. TPAs like the fact that they can now host their mission critical software. The hosted architecture also allows InvestLink to install new releases at just one location versus LAN installs one by one. And TPAs like the fact also that they can view InvestLink updates at the staging area in the hosted environment. This allows them to view enhancements prior to going to production.

"To accommodate varying update schedules, we wrote policy-driven update classes," said Brust. "ClickOnce updates can be controlled programmatically, and we do that after checking a database table for the user's update policy."

"Our design called for SQL Server to double as an application server," said Paul Delcogliano, a lead consultant with twentysix New York. "The lack of a separate application server meant that SQL Server would have to integrate with our reporting server directly. The new CLR features in SQL Server 2005 played an integral role in allowing our stored procedures to communicate directly with the report server. We wrote CLR code that calls the report server's API and embedded that code directly in our stored procedures. Without the CLR we would not have been able to integrate with the report server unless we used an application server."

Benefits

TSM.NET launched in April, 2007. "All of InvestLink's customers chose to upgrade to the new system," said Tim Slavin, Founder and CEO of InvestLink. "In addition, several new customers have signed up on the strength of demonstrations of the new system."

The choice of the Microsoft Application Platform reduced the development cost of TSM.NET to less than half of what it would have cost using competing technologies. The Oracle-based quote InvestLink received was roughly 2.5 times higher than the SQL Server-based quote that they accepted.

Scalability of TSM.NET has improved by at least 100%. Hosting cost has been reduced to 50% of what it was for the previous application version, and still performance has improved.

Distribution costs have been reduced tremendously. There is no longer any need to ship CDs to customers or to send technicians to install software: even the back-office application now launches from the Web, thanks to ClickOnce deployment.

TSM.NET has improved security, thanks to several new features of SQL Server 2005 and .NET Framework 2.0, including SQL Server encryption, configuration file encryption, and the ClickOnce security subsystem.

The choice of the Microsoft Application Platform has turned out to be the right one for InvestLink in the long term as well as the short term. "Our industry is getting more complex each day," said Stephen Tague, CTO, InvestLink. "We have twice the regulatory and new business developments now than we had last year. Thankfully we are using the .NET Framework. The .NET developer tools are far superior to others we've used. The SQL development interface is easier for

The ability to present a Smart Client application to our users is a major productivity improvement.

Raj Pillai, CEO/Owner, ProInc.

Canada, please contact your local Microsoft subsidiary. To access information using the World Wide Web, go to: www.microsoft.com

For more information about twentysix New York products and services, call (212) 840-0008 or visit the Web site at: http://www.26ny.com/

For more information about InvestLink Technologies, LLC products and services, call (212) 220-4141 or visit the Web site at: http://www.invlink.com/

developers; it provides better standards, as well as a true way forward. Our developers picked up .NET easily. We now get development done faster and at less cost. I'd estimate that I saved 20% in staff increases developing with the .NET Framework, compared to what we'd have needed using previous technologies."

Customers love the new user interface. "Our users find the InvestLink interface experience extremely elegant," said Paul Smith, CEO, Benefit Strategies-New England. "The fact that the presentation is exactly like any Windows product, but the system is hosted and it takes those IT hardware worries off me, is fantastic. I have overheard on a number of occasions since our conversion users exclaim how 'cool' and 'fast' the new experience is. One user claims it increases her productivity by 1 hour a day. If I extrapolate that across my entire recordkeeping team I am increasing productivity by 12.5%. I've also noticed that our end-of-day reporting is getting done 30 to 45 minutes earlier. This extra time allows us to assign revenue- and customer-centric tasks to our team. That's a big deal, for a firm of fifty people."

Customers also love the enhanced access offered by ClickOnce.

"The ability to present a Smart Client application to our users is a major productivity improvement," said Raj Pillai, CEO/Owner, ProInc. "We run our business globally, 24/7. Our administrators are in India and Chicago, so we need access that is fast and very readable. We get that now with InvestLink's TSM.NET platform. I canvassed my team and they all said they are saving about 90 minutes each day with the Smart Client application. As a business that has multiple locations this is a big productivity increase for us. I'm anxious to see more productivity improvements in the future."

Microsoft .NET

Microsoft .NET is software that connects people, information, systems, and devices through the use of Web services. Web services are a combination of protocols that enable computers to work together by exchanging messages. Web services are based on the standard protocols of XML, SOAP, and WSDL, which allow them to interoperate across platforms and programming languages.

.NET is integrated across Microsoft products and services, providing the ability to quickly build, deploy, manage, and use connected, secure solutions with Web services. These solutions provide agile business integration and the promise of information anytime, anywhere, on any device.

For more information about Microsoft .NET and Web services, please visit these Web sites: www.microsoft.com/net msdn.microsoft.com/web services

Software and Services

- Products
  - Microsoft Visual Basic .NET
  - Microsoft Visual Studio 2005
  - Microsoft SQL Server 2005
- Technologies
  - Microsoft .NET Framework
  - Microsoft ASP.NET
  - Microsoft Windows Forms
  - ClickOnce Deployment

Partners

- twentysix New York

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