Overview

Solution provider profile
Greenfield Software, Inc.
  - Durham, North Carolina
  - Founded in 1981
  - Solutions for temporary staffing
  - 75 clients

Challenge
Extend a proven application
  - 800,000+ lines of code
  - 30+ application modules

Needed
  - 300 programs; 800,000 lines of code
  - Replace green screens
  - Build Web interface to RPG code
  - Leverage iSeries and ILE RPG skills
  - Avoid burdening the client base

Solution
  - Preserve ILE RPG applications
  - Dynamically serve DB2 UDB data to Web pages
  - Offer several licensing options

Key components
  - IBM WebSphere Studio Client for IBM iSeries
  - IBM WebFacing Tool
  - IBM WebSphere Application Server
  - JavaServer Pages
  - JavaScript and HTML
  - Modified DDS specifications
  - Red Hat Linux

Benefits to solution provider
  - Offers a more competitive solution
  - Opens door to new revenue streams
  - Supports ASP and traditional deployment models
  - Leverages existing RPG IV code
  - Provides single-source solution and continuity

Benefits to Greenfield customers
  - Fast and easy implementation
  - Simple-to-use graphical interface
  - Unparalleled reliability
  - Single-source continuity

IBM WebFacing Tool not only eliminated competition from graphical fat clients, it set up the application for ASP deployment and pricing

When faced with a problem, good business managers first look inside their organizations for the right solution. If one cannot be found, they venture outward. If a shortage of manpower is the problem, then a well-respected agency that specializes in temporary employment can be an ideal first step. However, if the fix is in the form of new computing technology, and so many options and opinions are crowding the waiting room, whose opinion do you trust?

Greenfield Software, a 25-year-long IBM® Business Partner in Durham, North Carolina, develops modularized front- and back-office temporary employee software that runs on the IBM System i™ (System i5™, eServer™ i5, iSeries™, and AS/400®) platform. Because of the robust functionality built into TempServ, Greenfield’s full-featured staffing solution, the company boasts a remarkable client retention rate of 98%, losing longtime business relationships only to acquisitions and mergers.

Fluff sells
In 2000, Gene Johnson, founder and president of Greenfield Software, worried that his company’s position in the temporary staffing space would atrophy because of the non-graphical, 5250 interfaces that dressed the applications. His concerns were well founded, despite the fact that TempServ had markedly matured and muscular feature sets. Historically, text-based screens were ubiquitous, but the irreversible trend away from this green-character-on-black interface had begun.

Organizations were choosing graphical user interfaces (GUIs) and browser-based presentations because of their wide familiarity and intuitive nature. End users rarely wonder what lies behind the curtain; their opinion of a system turns almost solely on the interface itself. Perhaps more tellingly, graphical interfaces create the perception that the application is more modern. This was an enormous frustration for Johnson, whose company had spent 15 years perfecting the features and flexibility of its application engine to support the most precise needs of the temporary-staffing niche industry.

"Function-for-function, TempServ can compete with the largest application providers on the planet," Johnson states, “However, as our demo-to-order ratio began to indicate, ‘Fluff is what sells!’ ”

Johnson formed Greenfield Software in 1981 as a custom programming house that developed applications for the iconic IBM System/36® minicomputer. Understanding Johnson’s heritage puts his angst into context as he considered what he had earlier deemed inherently illogical: What if the PC-based fat client is the wave of the future?
ILE RPG: Reusable and extensible

Even earlier than the dilemma with the graphical competition, Johnson had always ensured that his application conformed to the latest programming standards. This had included a migration to RPG IV and development within the IBM Integrated Language Environment® (ILE). This transition was actually rather easy because, in earlier RPG releases, TempServ had been written to use procedure calls and subroutines for processing I/O tasks and business rules.

Although the process of completely rewriting the interfaces for nearly 300 programs and between 600,000 to 800,000 lines of code represented a monumental undertaking, Johnson thought he needed to take this step to stay competitive, even though he had reservations about jumping to a PC-based client/server architecture.

Client/server was unsupportable

The important questions were, "Would the transition to a Windows environment ensure the competitiveness of TempServ and Greenfield Software into the future? Would the transition be manageable with the resources the company had available?" The answer to these questions and others became evident in the first weeks of development. Johnson explains, "I knew early on that this direction was going to drive us absolutely nuts. With several PC operating system releases out there and the need to test in all of these environments while keeping countless servers and clients up-to-date, we felt that the client/server model was frivolous, compared to a centralized-server proposition. The additional overhead was going to be huge. It clearly wasn’t the miracle that some people made it out to be, so we walked away from it and never looked back."

Recommitting to the System i platform

With no hesitation, Johnson recommitted his development organization to System i technologies. Now in search of a browser-based GUI interface to serve as a dynamic front end to Greenfield’s RPG ILE applications, he evaluated using Common Gateway Interface (CGI) programming techniques. CGI is a Web technology that enables a client Web browser to request data from a program that executes on a Web application server. However, because CGI can be difficult to learn and represents server performance and security issues, Johnson determined that it was a cumbersome and inelegant solution.

Now desperate for a graphical browser solution, Johnson went back to IBM. “I had learned over the years that if we were going to bet our business on any development tool, it would be best to depend on IBM tools.” As fate would have it, IBM had just launched WebSphere®, its cross-platform Web application development environment, which includes in the WebSphere Development Studio Client for iSeries.

WebSphere offers many solutions

WebSphere Development Studio Client is an integrated development environment (IDE) and tool set that lets programmers use their existing RPG and COBOL skills to build Java™, Web, client/server, and IBM i5/OS® (OS/400®) server applications, as well as Web services. It contains two browser-generation tools.

The IBM WebFacing Tool provides a wizard to convert Data Description Specifications (DDS), which traditionally produce 5250 output, into HTML, JavaServer™ Pages (JSP™), and Java servlets so that the user interface for the RPG (or COBOL) programs can run in a browser. In contrast, Host Application Transformation Services (HATS) is a load-and-go conversion tool that makes 3270 and 5250 applications available to users through Web browsers.

Johnson felt that the IBM WebFacing Tool performed better than HATS in a production environment. “HATS converts DDS to HTML upon

“I had learned over the years that if we were going to bet our business on any development tool, it would be best to strongly consider whatever tool that IBM provided. Coincidentally, IBM had just launched WebSphere and the IBM WebFacing Tool, which for us, was clearly the right decision for providing graphical interfaces to our clients.”

— Gene Johnson, President, Greenfield Software
each initiation of the application. Because of this ongoing need to convert both the static and dynamic components of the DDS output into HTML, this solution proved slow and cumbersome,” says Johnson. “In contrast, the IBM WebFacing Tool generates its JavaScript and HTML objects prior to program execution. Thus, these objects are ready to deploy instantly each time a browser query hits the Web application server. This means a Web-faced interface can be used over and over again, without having to be regenerated each time the application starts.”

Web-based presentation with dynamic System i backend
Having seen technology he really liked, Johnson chose a two-pronged approach to achieve a graphical facelift for the TempServ suite. First, he used the IBM WebFacing Tool’s standard templates that are based on JSPs, a technology that separates the layout of the user interface from content generation, enabling developers to change the page design without altering the underlying dynamic content. This approach made it easy to modify and maintain the browser pages, such as colors and client logos. This was also valuable because many Greenfield clients prefer customized versions of TempServ that match their common look-and-feel for other applications.

Repurposed DDS coding standards
The Greenfield developers then reasoned that because the company was leaving the 5250 user interface behind, it would be most efficient to change the source DDS to better support the browser code produced by the IBM WebFacing Tool. The original DDS had been written to support green screens (function keys, 80-column displays, and other now-archaic restrictions) that were irrelevant in the HTML implementation (Figure 1). “It didn’t matter if the 5250 presentation became convoluted. No one was going to use it anymore,” says Johnson. “What mattered was that the code feeding into the IBM WebFacing Tool was organized cleanly and logically for the purposes of producing well-organized HTML.”

IBM WebFacing Tool is priced right
Discussing return on investment (ROI) is somewhat tricky, according to Johnson. He explains that the decision to use the IBM WebFacing Tool was not justified by a projected lift in revenue, it was motivated by the need to find an affordable, fast way to sustain the marketability of the company’s product line; survival was the driver.

Nonetheless, Greenfield’s investment in tooling was zero, because the WebSphere Development Studio Client for iSeries, which is provided with the i5/OS operating system, includes the IBM WebFacing Tool as a no-charge component. According to Johnson, “The other cool thing is that the IBM WebFacing Tool has no user-seat licensing issues, and our clients don’t have to buy a run-time license.”

The investment made by Greenfield was more in the form of developer headcount. Of the six developers on Greenfield’s staff, three were committed to the conversion project for about a year.
Delivering TempServ via the ASP model

Greenfield clients can use their own System i hardware to run the TempServ offering. On the other hand, if their iSeries machine has limited capacity, they can run WebSphere Application Server on a dedicated Intel® processor-driven computer with the Red Hat® Linux™ as the operating system. In either case, WebSphere Application Server handles the presentation of the browser pages between the end user and the TempServ data that resides in IBM DB2 Universal Database™ (DB2® UDB) for iSeries.

However, the unplanned, though quite important, benefit Johnson’s company received by moving to the Web-faced interfaces was the ability to offer a new pricing and deployment model as an application service provider (ASP). This offering eliminates the upfront costs of purchasing hardware and software. It also removes the hassles of maintaining a system on premises, including software updates, backups, and other related headaches.

Greenfield hosts and maintains the client’s TempServ instance remotely, which the client user accesses over a 128-bit SSL Internet link using an i5/OS user ID and password.

The ASP arrangement is an extraordinarily convenient and inexpensive option for temporary employment agencies. Greenfield currently hosts 30 such relationships. “We are very happy with the way this development effort worked out,” says Johnson. “The ASP option, which was not even part of our initial goal when moving to the browser interface model, gives us an ongoing revenue stream and allows us to sell our applications more aggressively to smaller agencies and to those that do not wish to commit their resources to on-premises equipment and application maintenance issues. ASP pricing eliminates objections related to upfront costs, preferred platform issues, required in-house skills, and commitment duration. Greenfield already has more than 30 new clients who prefer the ASP solution. “Coupled with new, easy-to-use, TempServ graphical interface, our selling job is much easier,” Johnson says.

Competing with state-of-the-art function and technology

The ILE RPG development environment and the Java components that are created by the IBM WebFacing Tool provide an excellent foundation for Greenfield’s ongoing development efforts, too. New applications and functionality are easier to integrate and always enjoy a similar look-and-feel to the user.

For example, Greenfield developers are presently working on new calendaring features and an arbitrary document storage system. According to Johnson, “Resumes and other documents can be linked to customers and employees. Then, users can retrieve these documents with a single click.” (See Figure 2.) An email system has also already been integrated with TempServ.

Johnson says, “The ongoing results of using the IBM WebFacing Tool reaffirms my philosophy of relying on IBM technologies and tools in determining the company’s strategic direction.”

For more information
Contact your IBM sales representative, Greenfield Software, Inc. (greenfieldsoftware.com), or visit IBM at: ibm.com/server

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