HeadTrax 5.11

Technical Case Study

Published: May 2004

HeadTrax 5.11 is a centralized, intranet-based application that Microsoft business units use to manage human resources (HR) information. Based on an architecture that takes advantage of the Microsoft .NET Framework, BizTalk® Server 2002, XML-based Web services, and other Microsoft technologies, the application provides an intuitive user interface and a cost-effective method for enhancing functionality. Additional benefits include the automation of business processes, a robust security model, and a reduction in deployment costs in a dynamic business environment.

Overview

HeadTrax 5.11 is an internally developed solution that consolidates HR database information and provides HR personnel and other employees a centralized source for accessing and modifying information about people and positions worldwide.

Solution

HeadTrax 5.11 represents a redesign of the application architecture that takes advantage of several Microsoft technologies, including the .NET Framework, BizTalk® Server 2002, SQL Server™ 2000, and Message Queuing. Improvements include a better user interface; implementation of a middle tier based on XML Web services; and a robust architecture that is flexible, maintainable, and easy to deploy.

Products & Technologies

- Microsoft .NET Framework, Web services
- Microsoft Visual Studio® .NET
- BizTalk Server 2002
- Microsoft Internet Information Services (IIS) version 6.0
- Microsoft SQL Server™ 2000
- Microsoft Internet Explorer 6.0
- Microsoft Windows® XP Professional
- Microsoft Windows Server™ 2003
- Microsoft Visual Basic® .NET
- The Active Directory® directory service

Benefits

- Enables integration of standalone tools at a 25 percent savings as compared with an ActiveX environment.
- Supports retirement of the standalone tools for a $365,000 annual savings in training and support costs.
- Enables process and workflow automation for a savings of $10 million annually.
- Improves client satisfaction through streamlined recruiting and faster fulfillment of open positions.

Overview

With more than 55,000 employees worldwide, Microsoft Corporation depends on a flexible and robust approach to the management of human resources (HR) information. Characterizing that approach is HeadTrax 5.11, an internally developed solution introduced in 1997 by Microsoft IT that consolidates HR database information and provides HR personnel and other employees a centralized source for accessing and modifying information about people and positions worldwide.

In an effort to reduce costs and enhance usability, HeadTrax was completely rearchitected in 2002 and is enhanced on a quarterly basis. This rearchitecture and the regular enhancements rely on the rich client functionality, the robust security model, and the efficiencies in development afforded by a full Microsoft platform. In the case of HeadTrax, that platform includes the Microsoft .NET Framework, the Microsoft Visual Studio® .NET development system, Windows Forms, XML-based Web services, and selected components of Microsoft Office Professional 2003.

Solution

Migrating to the Microsoft .NET Framework, an integral Microsoft Windows® component that supports building and running the next generation of applications and Extensible Markup Language (XML) Web services, was the cornerstone of the HeadTrax architecture redesign. Migrating to the .NET Framework paved the way for continuous improvements, such as small-scale changes to business rules or to the HeadTrax user interface, without affecting the rest of the solution.

The migration to the .NET Framework also provides a foundation for Web services, which rely on open Internet standards to enable communication between applications written in different languages on different platforms. By using Web services, the HeadTrax team has standardized the use of person and position data across Microsoft and integrated a number of standalone tools to further enhance the solution's functionality. For example, in the past

"Empowering the workforce is an expectation at Microsoft, and HR has supported this through various 'data at your fingertips' initiatives. HeadTrax is a key component of this process, as it offers efficient and comprehensive data capture and reporting to a variety of audiences including HR and Finance at all levels of the organization."

Joel Kneisley
General Manager
Human Resources IT
Microsoft Corporation

Microsoft relied on a standalone tool to manage the workflow, documentation, and modeling of the promotion process. Now, using Web services the team has integrated that tool into HeadTrax, which applies current business rules to the tool's functionality, integrates it with review and planning capabilities, and adds full auditing and search capabilities. Through the Web service interface, HeadTrax also feeds updated promotions information into an SAP R/3 enterprise resource-planning solution that serves as the Microsoft HR transaction engine.

Another enhancement was the integration of HeadTrax with tools supporting the posting and filling of staffing positions. For full-time staffing, developers integrated HeadTrax with an internal recruiting application known as XPTen. As part of this integration they used an object model created in Office 2003 to build a template for each of the seven foreign languages supported by the application. With these templates HeadTrax leverages the dictionaries in Microsoft Word and any custom client dictionaries to support the posting of job descriptions in French, German, Italian, Polish, Portuguese, Russian, and Spanish.

For contingent staffing, developers integrated HeadTrax with an internal application known as the Agency Position Tracking Tool, whose primary purpose was to notify external staffing resources of temporary positions when they become open and when they are filled. To integrate this application into HeadTrax, developers used Web services and Message Queuing within BizTalk Server 2002. Developers also added photo-viewing functionality to HeadTrax by leveraging the role-based permission structure afforded by the .NET Framework to restrict access to selected individuals. Typically, these are receptionists and security personnel who must determine whether an employee who has forgotten to wear his or her security badge can be admitted access to a given building.

HeadTrax also uses the .NET Framework to provide a rich user experience through a smart client. For example, using Windows Forms class libraries in the .NET Framework, developers redesigned the user interface to include transaction wizards, a more intuitive way of navigating through the search and change-submission processes, and a workflow model that enhances visibility into the state of a transaction at any given time and reduces the need for requests to remain in a pending state.

Figure 1 shows the user interface of HeadTrax 5.11.

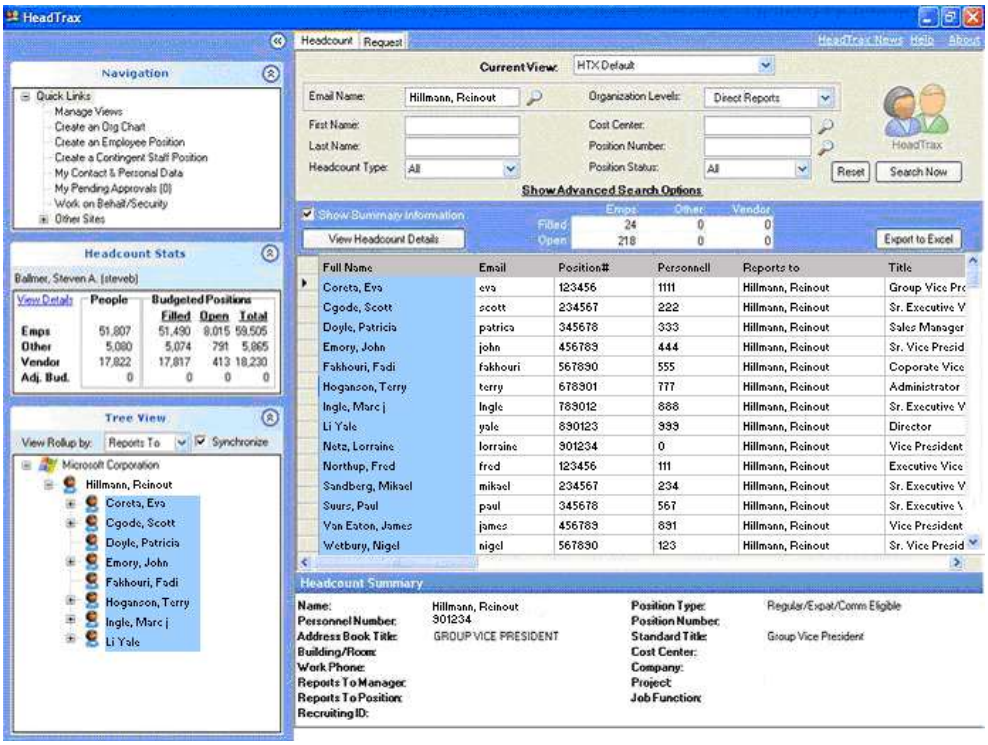

Figure 1: HeadTrax 5.11 user interface

Using the .NET Framework developers also added the following to the rearchitected HeadTrax:

- **Views and filters**. Users can choose the data to display and the filters to use on that data in one area. Users can name, save, and share custom views to create a common view of HeadTrax data across a business unit. This gives units and teams a customized view of data without their having to develop custom code.
- **Security.** HeadTrax features a role-based security model that can be managed by the business units (rather than their having to rely on IT). One of the chief functions of the model is to map permission levels to implicit and explicit roles within the application. Implicit roles are mapped automatically so that, for example, a manager can view basic HR and compensation information about employees without the overhead of daily maintenance. Explicit roles (for example, HR Administrator and HR Recruiter), are assigned and managed through a security tool that also helps to reduce overhead and enhance flexibility. In addition, the creation of new roles is as simple as adding a new line in a table. That is all it took for developers to create a role known as Security User, which supports the enhancement enabling receptionists to view an employee photo within HeadTrax.
- **Workflow**. A robust and flexible workflow and e-mail transaction notification module enables Microsoft business units to customize the way they manage their businesses and provides a means for HeadTrax to quickly adapt to changes within the business environment. Workflow automation, especially in terms of approval routing and notification and the maintenance of audit trails, is a significant benefit of HeadTrax.
- **Task visibility**. HeadTrax exposes all functionality, even if a user's access to a task is

restricted by his or her security permissions. For example, all users can see that new positions can be created in HeadTrax, but only users with sufficient permissions can perform such tasks.

- **Complete transaction audit trail**. HeadTrax now provides continuous visibility into the status of requests, from submission through workflow and the publication process.

"The capabilities of the .NET Framework have had a dramatic impact on our ability to deliver internal business solutions."

Joel Kneisley
General Manager
Human Resources IT
Microsoft Corporation

Architecture

A team of six people completed the rearchitecture of HeadTrax using Visual Studio .NET, Microsoft Visual Basic® .NET, and the Microsoft ASP.NET and Microsoft ADO.NET class libraries (for Web services and data access, respectively). The team operates HeadTrax on an ongoing basis with one project manager, two testers, three developers, and one support analyst.

HeadTrax serves about 55,000 users worldwide, 24x7x365, with a peak of about 3,000 users a day (200 concurrent), and averaging 20,000 distinct users per month. As an example of a transaction load, in December 2003, HeadTrax successfully uploaded 54,280 transactions—including office moves, new position creations, and position moves—into the SAP module.

Users access person and position information in HeadTrax through Internet Explorer 6.0, from desktop computers running the Microsoft Windows XP Professional SP2 operating system. In addition, HeadTrax supports desktops running Windows 2000 and Windows 98. On the server side, HeadTrax runs on Windows 2003 Server SP2, Internet Information Services (IIS) 6.0, and Microsoft SQL Server™ 2000. Three Web servers are managed by Microsoft Application Center 2003 in a clustered environment, and each server is based on a 2-way Intel Pentium III processor running at 1.4 GHz with 2 GB of RAM and 100 GB of storage. The SQL Server 2000 database server is based on a 4-CPU Intel Xeon processor system running at 1.4 GHz with 7 GB of RAM. To protect confidential information HeadTrax uses a combination of Windows 2000 Advanced Server Authentication, Secure Sockets Layer (SSL) and a business-defined application security model that restricts data access on a need-to-know basis.

The HeadTrax database uses Message Queuing functionality within BizTalk Server 2002 to communicate with the SAP Interface Handler, which is an internally created tool that supports an XML interface and creates SAP-ready upload files in the form of Intermediate Documents (IDocs). The SAP Interface Handler passes the IDocs to a file-share interface for incoming SAP data. This system reduces the number of teams that require detailed SAP knowledge. The system is further enhanced by the SAP Interface Hander to pass back XML-based status to systems that submit transactions for auditing. An SAP administrative user interface, which resides on top of the SAP Interface Handler, monitors the state management process, enabling system and business administrators to easily research inquiries around transactions.

Figure 2 shows the architecture of HeadTrax 5.11.

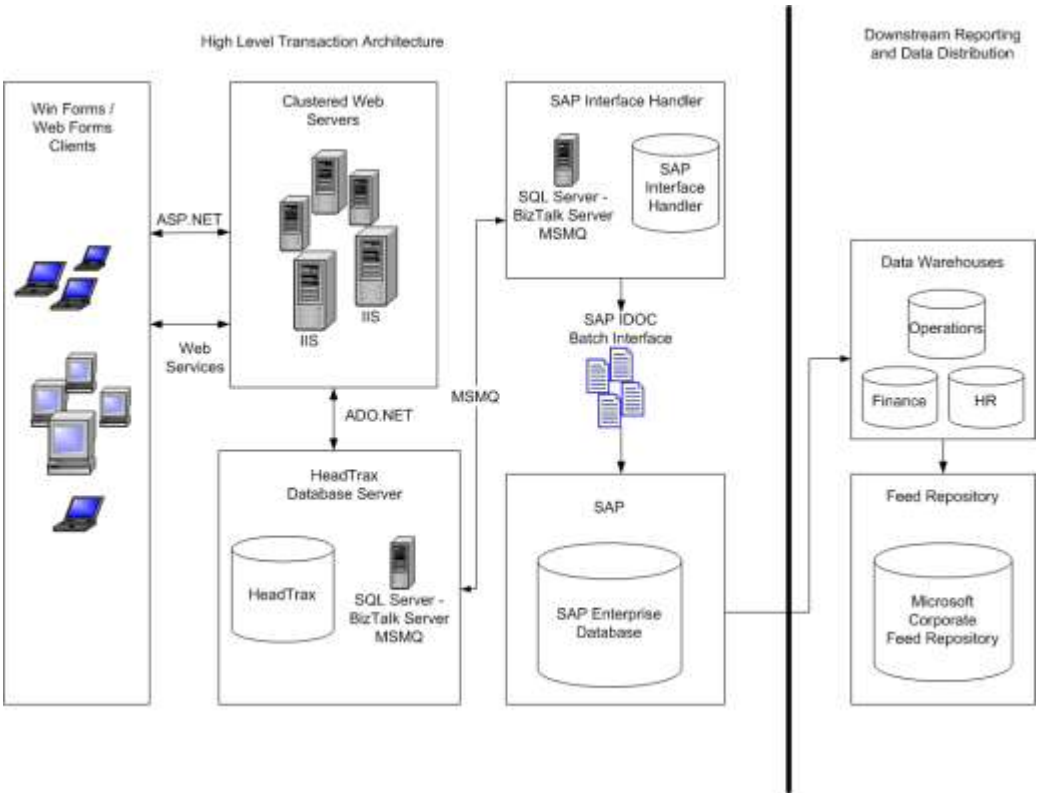

Figure 2: HeadTrax 5.11 technical architecture

Benefits

Since the initial launch of HeadTrax in 1997, the application has saved an estimated $10 million annually in development and operational costs, thanks largely to the solution's versatility. For example, with HeadTrax each Microsoft business unit can customize views of person and position information as needed. Moreover, the migration to a Web services architecture provides a cost-efficient framework enabling people from disparate teams to respond to a dynamic business environment. For example, in 2003 more than 5,000 custom views were created—one for every six users.

In addition, because the .NET Framework was used for the rearchitecture, ongoing upgrades to HeadTrax are very cost-efficient. To integrate the promotions tool, for example, required just one developer working one month at 75 percent capacity. To integrate the internal staffing and external staffing tools, developers found it comparatively easy to match new data points, build in new business rules, and build in separate flows and custom business logic without having to duplicate development effort. For these integrations, Microsoft IT estimates development savings of 25 percent.

Windows Forms in particular played a central role in helping developers to address the challenges of creating a rich client functionality more easily than they could have in an ASP.NET environment. Specifically, Windows Forms supported the management of data states within a wizard scenario and specifications requiring grids of 1,000 rows or more. Support for building and inheriting top-level controls was particularly important because it

freed developers from having to create custom controls and enabled them to focus instead on the user experience and the implementation of complex business rules.

The ease of integrating HeadTrax with other HR applications also helps to boost the original functionality of the standalone applications by expanding drilldown capabilities into data stores and ensuring more accurate data throughout the transactional databases. With the capabilities of the promotions tool now part of HeadTrax, managers and HR administrators enjoy direct visibility into data being uploaded into the SAP module for improved auditing capabilities and workflow. The integration of the internal staffing tool (XPTen) streamlines international recruiting, helping candidates to learn sooner about open positions and helping management to process more than 6,000 staffing requests for a savings of $118,000 the first year.

The integration of the external staffing tool (Agency Position Tracking Tool) has enabled managers and agencies to learn of status changes in positions in just one hour—down from the 24 to 48 hours it used to take. This enables Microsoft to fill open positions sooner and enables the agencies to avoid the problem of continuing to recruit for positions that may be closed, thus improving the business relationships between Microsoft and the agencies and between the agencies and recruited employees. The integration of these standalone tools—the promotions, staffing, and photo-viewing applications—has saved the company an estimated $365,000 annually in training and support costs.

Joel Kneisley, General Manager of Human Resources IT at Microsoft, summarizes the benefits of HeadTrax to the company. “Empowering the workforce is an expectation at Microsoft, and HR has supported this through various ‘data at your fingertips’ initiatives,” he says. “HeadTrax is a key component of this process, as it offers efficient and comprehensive data capture and reporting to a variety of audiences including HR and Finance at all levels of the organization.”

Lessons Learned

The decision to build key functionality components of HeadTrax as Web services enables other project teams to take advantage of the investment made in the HeadTrax architecture redesign. As Kneisley points out, “The capabilities of the .NET Framework have had a dramatic impact on our ability to deliver internal business solutions.”

For example, the New Hire system—a tool developed by another Microsoft operations group to automate the new-hire process—used the HeadTrax SAP Interface Handler and reduced development time on the project by four weeks, saving $37,000. These savings were a direct result of having the SAP Interface Handler available for communication with SAP through the XML interface. Similarly, all new HR applications will soon use a role-based security service to allow seamless access for all business users.

Another important decision in the architecture redesign of HeadTrax was the use of Windows Forms as the development platform. By choosing Windows Forms over dynamic Hypertext Markup Language (DHTML), the HeadTrax team was able to shorten development cycles, saving 25–35 percent on user interface development alone.

In addition, in the course of the migration and upgrade project developers learned the importance of standardizing user-interface development through the use of templates and incorporating usability testing throughout the coding cycles. Together, these process

improvements resulted in a 20 percent reduction in development time and tier 1 support costs.

For More Information

For more information about Microsoft products or services, call the Microsoft Sales Information Center at (800) 426-9400. In Canada, call the Microsoft Canada information Centre at (800) 563-9048. Outside the 50 United States and Canada, please contact your local Microsoft subsidiary. To access information via the World Wide Web, go to:
http://www.microsoft.com/
http://www.microsoft.com/technet/itshowcase

For any questions, comments, or suggestions on this document, or to obtain additional information about Microsoft IT Showcase, please send e-mail to:
showcase@microsoft.com