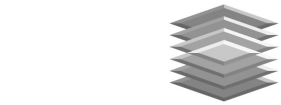

Application Transformation

Leveraging Existing IT Assets to Build Competitive Advantage

September 2004

A D.H. Brown Associates, Inc.

White Paper Prepared for

IBM

An ideas International *Company*

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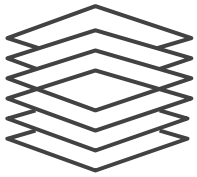

Application Transformation

Leveraging Existing IT Assets to Build Competitive Advantage

EXECUTIVE SUMMARY

Today's business environment is putting ever-increasing pressure on enterprises to be more responsive to customers and to deliver greater value for less money, in less time. This business environment drives the need for IT to take a customer and value chain view toward supporting the business. Key to IT success is the ability to deliver solutions to the business quickly while enabling longer-term flexibility. All enterprises have existing IT applications and data stores that add value to the business and support business processes. These applications house a wealth of experience and business logic that can be reused by larger integrated value chain processes in addition to supporting existing business processes. Leveraging these existing assets reduces redundancy and unnecessary development, and, more importantly, enhances the competitiveness of the business. A business that has the ability to marshal its existing IT resources as well as augment them with new development to respond to changing business conditions is an "on-demand" business. One of the fastest paths to becoming an on-demand business involves repurposing and extending existing IT applications into these on-demand business processes. This path to becoming an on-demand business is known as application transformation.

Application transformation is a mandatory initiative for businesses attempting to survive and prosper in this climate. Most businesses today do not have excellent business process execution and have a large new application development backlog as their plan to "fix" this situation. While developing new applications, consolidating older applications, and rearchitecting IT solutions can be a good strategy, these initiatives require time, money, and skills, which may not be available on a timely basis. Meanwhile, forward-looking competitors are rethinking their IT strategies and realizing that they are sitting on potential solutions to their business process pain points that are already built and being run by their IT organizations. They are developing strategies to transform these applications into modern assets through application transformation initiatives. IT must be able to develop and deploy mixed workload environments by drawing upon the best capabilities and applications from both mainframe and distributed platforms. These companies are building competitive advantage into their core business processes and are out-running lagging competitors.

D.H. Brown Associates, Inc. (DHBA) has talked with many users about their integration pain points and opportunities to improve their business processes. One consistent theme of this discussion was that there is a general lack of knowledge of the opportunities, possibilities, and tools available to enable existing IT assets to be modernized and integrated into industry-leading business processes. IBM is one leading vendor with a wealth of experience. Further, IBM

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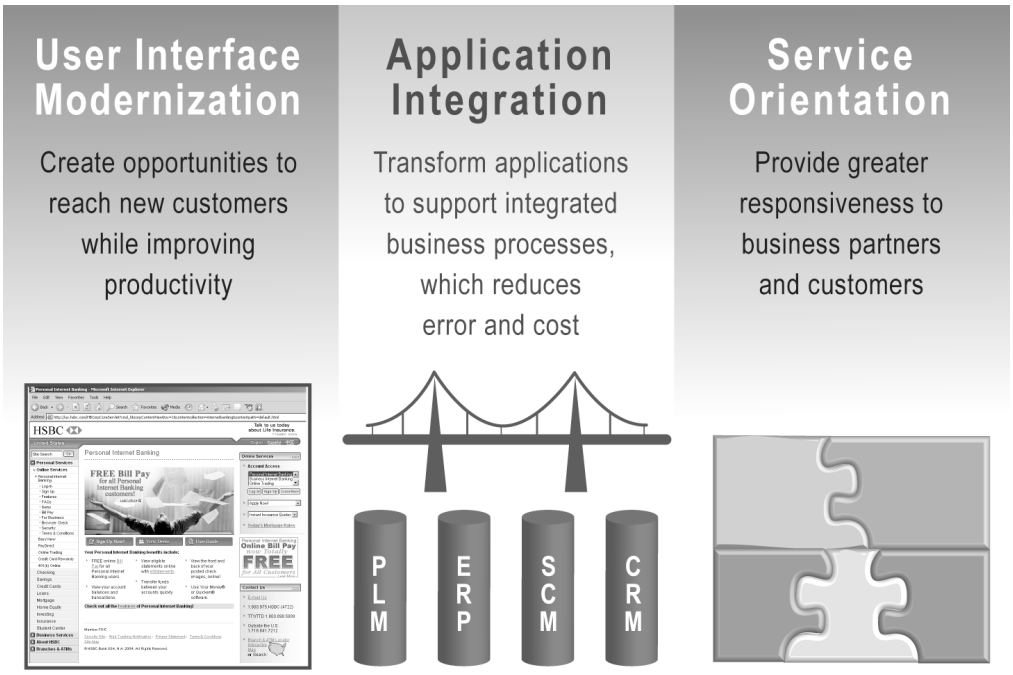
platforms host a significant existing IT application install base. IBM offers a suite of tools that enables businesses to capture these application transformation opportunities. The foundation of IBM's application transformation offerings is based on IBM's transaction processing experience, open standards, and WebSphere Business Integration. This foundation is combined with a range of tools that help with application transformation initiatives such as user interface modernization, application integration, and service-orientation. Figure 1 illustrates some of the focus areas of application transformation as well as the business benefits of using application transformation to become an on demand business.

FIGURE 1
IT Initiatives Supporting Application Transformation



Companies that have completed one or more initiatives in these areas report significant benefits including better responsiveness to customers, less business process friction and cost, faster time to market for new products and service offerings in the range of months instead of years, and return on investment (ROI) in as little time as a couple of months. Some have reported a 50% improvement in user productivity with user interface modernization. Others have seen a three- to six-fold improvement in development productivity due to componentization and reuse. One business reported the ability to create a new transaction in ninety minutes versus the one week it took in traditional COBOL. Business process leaders see a significant reduction in the number of errors caused by manual integration pain points as these pain points are relieved in their application transformation initiatives.

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APPLICATION TRANSFORMATION LEADS TO BECOMING AN ON DEMAND BUSINESS

Competitive pressures are forcing organizations to become more agile – often on a global level – and to more strongly leverage IT solutions to support business initiatives and operations. Building and deploying applications that allow for the integration of business processes – within the electronic walls of a company as well as outside those walls – represents a key piece of the puzzle. The flexibility to change those applications and adapt business processes to respond to the changing market and competitive pressures that a company faces also represents a key success factor. Finally, leveraging existing IT assets, including applications and databases, can speed the implementation of improved business processes and enhance competitive advantage. Customers, partners, and other communities that make up the value chains of an organization will demand solutions that can readily adapt to their needs.

The current business environment drives the need for IT to take a different approach to supporting the business. Key to IT success is the ability to deliver solutions to business and process changes quickly while enabling downstream flexibility. Existing IT applications and data stores add value to the business and support business processes. These applications house significant experience and business logic that can be reused by larger integrated value chain processes in addition to supporting existing business processes. The value in this is readily apparent – reduced time-to-integration of a business process and lower development costs. A business that has the ability to marshal its existing IT resources as well as augment them with new development to respond to changing business conditions is an "on-demand" business.

THE VALUE OF "ON-DEMAND" COMPUTING

An on-demand business is an enterprise whose business processes – integrated end-to-end across the company and with key partners, suppliers, and customers – can respond with speed to any customer demand, market opportunity, or external threat. Business leaders recognize that they need to sense, analyze, and respond more effectively to continuously changing market conditions and risks. While responsiveness is a high priority, most executives would not rate their companies very high in their ability to react to changing business conditions. Many of their customers would agree. Most agree that IT is a critical enabler of responsiveness and that lagging behind is a serious competitive weakness.

On-demand computing creates significant business value. The value proposition of on-demand computing concerns the ability to:

- Differentiate quickly and easily for competitive advantage
- Engage with complete customer context
- Respond and adapt to changing customer needs and demands
- Deploy prebuilt intelligent and extendable business processes

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This value, deployed quickly and with technology that enables agility, can significantly improve the competitiveness of a business. Further, other business benefits such as greater customer satisfaction, cross- and up-selling opportunities, reduced costs, and speed of value delivery can all be realized through an on-demand business model.

INTEGRATE MISSION-CRITICAL LEGACY APPLICATIONS INTO NEW BUSINESS PROCESSES

Many of the IT assets required to enable an on-demand business already exist and have been supporting the business for years or even decades. Enabling these IT assets to participate in integrated business processes is key to improving responsiveness. These applications and data sets may be hosted on a wide range of platforms. The most common seen by DHBA include mainframe applications hosted in CICS and on IMS. AS/400 and iSeries-based applications represent another large install base, particularly upstream in the value chains within medium-sized suppliers.

Integrating these legacy applications into a modern business process eliminates manual pain points, which are the primary causes of business process friction, delays, errors, and costs. These manual pain points include:

- Retyping information from one system to another
- Faxing information between one party to another leaving it outside of the automated business process
- Using CDs and "sneaker net" or Fed-EX to move data from point to point in a business process
- Repeating business logic many times, once in each application, increasing the likelihood of error and reconciliation issues

These pain points are inhibitors to an on-demand business. Eliminating non-value-add human involvement in business processes is a critical focus area for an agile business. These points are opportunities for failure and error that impact customer satisfaction, responsiveness, and profitability.

Rather than build a multi-year plan to replace existing applications with new designs, an on-demand business looks to leverage these existing applications and the knowledge and expertise contained within them. The best approach to integrating these assets is to build a staged plan whereby near-term benefit may be realized by using what the business already has. When connected into new business process flows, these legacy applications take on new life and add further value to the business as they continue to contribute as they have been for years. Further, there is a lower risk of failure and a faster time to deployment associated with using existing applications. Despite these advantages, there are still some unique challenges associated with integrating legacy applications and data into on-demand business processes.

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CHALLENGES TO INTEGRATE IT ASSETS INTO AN ON-DEMAND ENVIRONMENT

Horizontal integration across stovepipe applications is the new challenge. Most business processes span customer relationship management (CRM), enterprise resource planning (ERP), product lifecycle management (PLM), procurement, and supply chain management (SCM). These functional areas are supported by custom and/or packaged applications, many of which may have been deployed years or even decades ago. Horizontal integration represents the bridge that connects these IT systems to support a business process end-to-end.

Enterprises today face a daunting integration challenge. Understanding the magnitude of this charge requires recognizing the extent to which organizations have deployed a mix of back-end systems, middle-tier business logic, and user interfaces. For many organizations, for instance, back-end systems operating on mainframes and based on CICS and IMS (and associated legacy applications and databases) may need to interoperate with J2EE applications running on application servers. Modern IT architectures combine J2EE user-oriented session management with back-end systems that support business processes. This structure may offer the greatest speed to solution and downstream flexibility. However, this must be developed and deployed leveraging existing IT skills. The need to interoperate with services and applications outside the enterprise introduces another layer of complexity. Keep in mind that legacy assets may be large, numerous, and implemented using a variety of technologies and languages.

INFLEXIBLE "GREEN SCREEN" USER INTERFACES

Many of these existing applications were deployed on earlier generations of technology that predated the graphical user interface (GUI) and Web browser. As such, they displayed results through a character-based interface or "green-screen." These interfaces served their purpose, however, due to their lack of flexibility and cumbersome nature they hardly enable applications to support an on demand business. Existing "green screen" applications may have thousands of screens that were designed to support business processes in place years ago. These business processes likely have evolved, perhaps dramatically, and workarounds to the static legacy application have been instantiated. These workarounds tend to be inefficient. Further, these interfaces typically force a user to walk through a complex set of screens that are hard to populate with the correct data. Finally, users typically must print, fax, or retype information to get data out of these applications and into another part of a business process. This cumbersome process creates many opportunities for errors, missed deadlines, and other business implications.

Integrating such an application into a modern business process can offer significant benefits (as described previously). However, there are technical challenges to implementing such integration. These include understanding the application interface flow, sorting through thousands of screens, and generating

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modern interface and/or business logic to present the application to the modern business user and process.

BUSINESS LOGIC OF EXISTING APPLICATIONS CAN BE DIFFICULT TO REPLICATE/REUSE

In order to reuse and integrate existing applications, developers must understand the nature of how the application and data is structured. These applications have many different parts and may have been developed using prestructured programming techniques, making the business logic more difficult to parse and understand. The dependencies may be complex and could span technologies and environments. Application data may be stored in different formats and locations, making it more difficult to track down and access. Documentation may be missing or non-existent and it is a time consuming and manual process to wade through the code by hand or with primitive tools. These are many of the barriers that prevent businesses from getting maximum use of their existing IT assets. Such barriers force IT to plan new applications, which may take years to bring to deployment.

SUPPORTING CROSS-ORGANIZATIONAL BUSINESS PROCESSES WITH "SILO" APPLICATIONS

As described above, horizontal integration is a key goal of the on-demand business. However, these "silo" applications were not designed to work together to support business processes. Rather, they were designed to support a functional area to improve its productivity. Manual intervention, some requiring significant investment of time and resource, is required to "integrate" information and workflows across these "siloed" applications. These pain points create significant friction across business process execution.

THE GOAL

However, new application and integration platforms, such as those based on J2EE, offer relief from these pain points. These new tools and platforms enable application transformation, i.e., the ability to become an on-demand business by leveraging existing IT assets while supplementing them with new development.

In order to provide the best return to its stakeholders, a business must maximize the effective use of its assets. IT assets make up a key foundation of many businesses and these assets are generally underutilized due to the fact that many remain isolated from other parts of the business processes they support. By transforming their enterprises into on demand businesses, enterprises gain competitive advantage in terms of speed and quality of execution. This transformation is enabled by a set of initiatives that allow IT to bridge between existing IT assets and newer applications based on the Internet, J2EE, and Microsoft .NET. Figure 2 illustrates the application transformation bridge connecting IT assets to remove the manual business process pain points and friction common in many businesses today.

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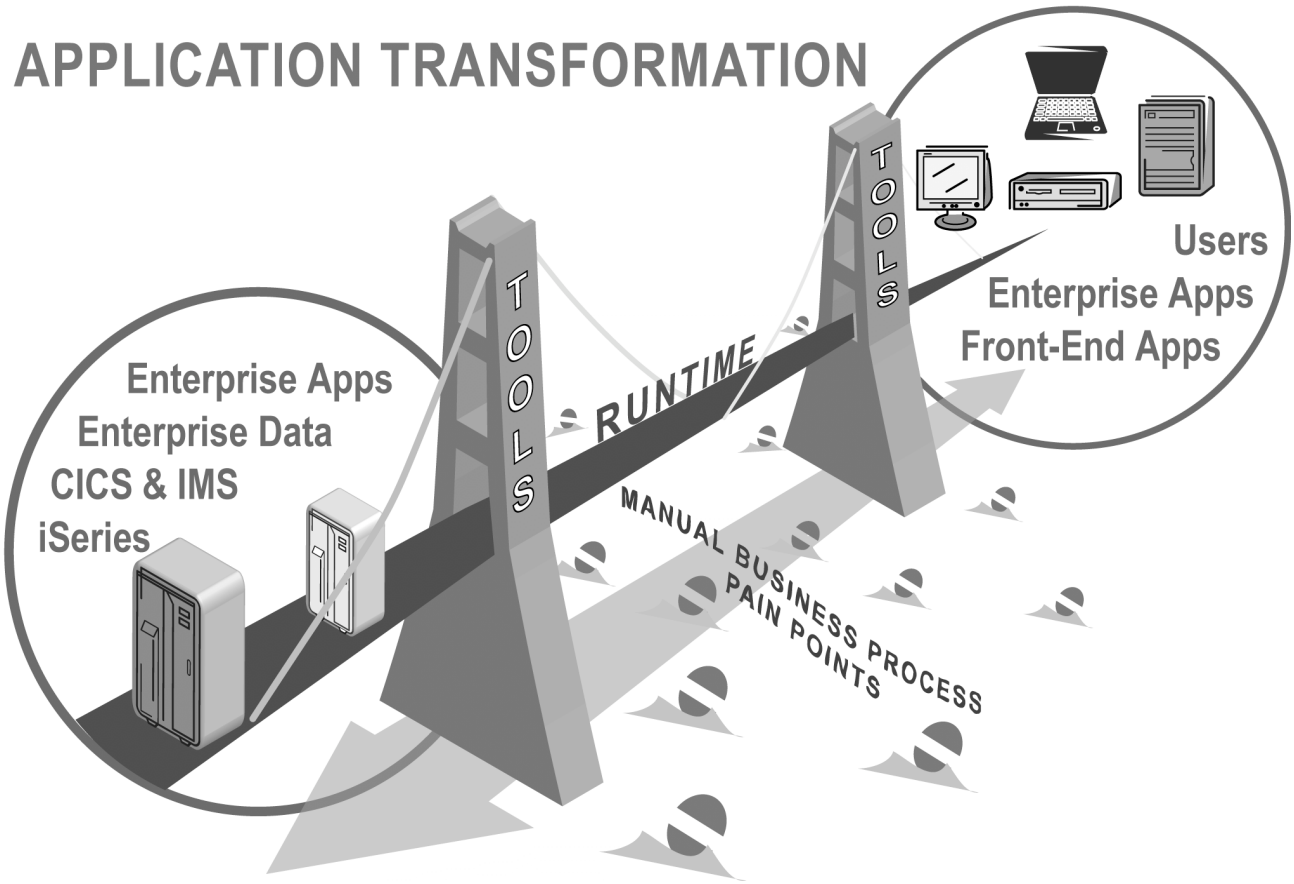

FIGURE 2: *Application Transformation Transcends Manual Business Process Pain Points*

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THE "APPLICATION TRANSFORMATION" CONCEPT

Business requirements, customers, suppliers, and the competitive landscape drive the need for application transformation. Given that businesses cannot throw away their existing applications and databases, IT is under pressure to upgrade these systems to meet the needs of an on-demand business and value chain. A key foundation of the on-demand business is integration within itself and across the value chain. Evolving these legacy IT assets from standalone, stovepipe applications into a service-oriented architecture is the essence of application transformation.

IT INITIATIVES SUPPORTING APPLICATION TRANSFORMATION

There are several steps that IT organizations need to take to enable their existing systems to support an on-demand business. In many cases, long-existing mainframe- and midrange-based applications present information to end users in character-oriented "green screens." These applications were designed long ago to support workflows that have long since changed. Further, most legacy applications are not programmatically connected to anything. Data must be printed and faxed to a person or retyped into another system – this is known as "swivel chair" integration and it is an error-prone manual pain point. Finally, these applications must be integrated up and down the value chain so that they may do their job in real time and significantly improve the responsiveness of the business.

These IT issues may be resolved through one or more of the following initiatives: user interface modernization, application integration, and service orientation.

USER INTERFACE MODERNIZATION

Many existing mainframe applications contain business logic and data that could become the foundation for valuable customer services. For example, a customer's bank account portfolio could be repurposed for online banking to enable the customer to directly access his or her information and perform banking transactions online. Many of these accounts are managed in mainframe applications with green screens that would not reflect well on the bank, nor would they be easy enough to use by its clientele. Further, it would be difficult and painful for a bank customer to see the entirety of the application. However, by employing user interface modernization tools, a bank can modernize its interfaces into a pleasant user experience for its customers, thereby adding customer value and improving customer satisfaction and retention.

User interface reengineering is an extension of modernization whereby IT combines multiple legacy screens into one that is relevant to today's user. This reengineering eliminates hard to fill in data entry fields and updates the workflow to support current business processes. Replacing data entry fields with prepopulated lists eliminates the requirement to repeatedly enter the same data,

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such as user name or address, in different screens and improves the navigation flow. Hence, IT can significantly improve employee productivity. Further, this new user interface offers the business's customers and partners a productive and intuitive way to access and interact with the business information they need. This creates opportunities for low-cost self-service customer interactions that may improve customer satisfaction and offer up- and cross- selling opportunities, e.g., revenue growth in a profitable manner. It also lowers the bank's cost of doing business.

APPLICATION INTEGRATION

Preparing existing applications for integration is a more significant IT initiative than user interface modernization. However, it remains a lower risk and cost option in terms of resources and time than platform and application replacement. Application integration may involve one or more techniques:

1. *Data-level integration* – Allows data to be shared between different applications. This usually involves some type of translation or connector mechanism to translate data from a representation used by application "A" to a separate representation used by application "B." XML data standards or schemas provide a newer enabler of data integration.
2. *Programmatic integration* – Translating one programming interface definition to another that allows for calls between disparate applications. Connectors are a good mechanism to implement API integration. "Wrappering" business functions within existing applications and exposing them in a more accessible format such as Java objects or EJBs is another way to integrate applications.
3. *Process-level integration* – The various systems and applications required to implement and execute a business process are integrated through software that provides a higher-level abstraction of the business process and coordinates events across the whole process. The existing applications, including mainframe and legacy applications, have been made "integration ready" using data or programmatic integration techniques previously described so that they may be "plugged into" the automated business process logic.

SERVICE ORIENTATION

A Service-Oriented Architecture (SOA) enables greater responsiveness. An SOA applies a componentized approach to application functionality, enabling composite applications and business processes to be created dynamically and in near real time. Solutions based on an SOA also deliver benefits: lower development costs, less "pain" when integrating assets across heterogeneous environments, and greater reuse of existing and legacy IT assets. Simply put, an SOA approach allows all software assets to be represented as standards-based, componentized services that can be reused and recombined in order to quickly and flexibly address changing business priorities. Services are, in effect, "building blocks" that can be assembled into composite applications, and used immediately

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to meet a specific set of business needs. A service represents a self-describing asset; therefore, any change in the implementation of a service does not affect the overall application functionality.

A service-oriented integration strategy enables organizations to innovate, creating new business processes. SOA also enables the automation of existing processes using existing IT applications and data sources and supplementing these with new business process or composite application logic. SOA-based business processes can be more easily constructed once IT has prepared existing applications to participate and integrate into these processes using application integration techniques described above.

BUSINESS BENEFITS REALIZED FROM DEPLOYING AN APPLICATION TRANSFORMATION STRATEGY

Application transformation is a critical requirement for businesses to be competitive. Failing to unlock key IT assets from their legacy status of only supporting old business processes is a sign of future trouble. Application transformation is a key stepping-stone to becoming an on-demand business. DHBA has observed significant benefits in business process execution and improved IT agility.

TIME TO MARKET FOR NEW APPLICATIONS AND CAPABILITIES

Virtually all users that have completed an application transformation project have reported quicker time to deployment and market for new capabilities versus developing new applications. With new tools to analyze existing green screen and application logic flows, IT can discover what capabilities lie within their existing assets and build plans to leverage them in new processes, services, or offerings.

For example, in six months, a financial services company completed a project to modernize its "green screen" user interfaces for client consumption. It would have taken the company two to five years to recreate the existing mainframe application from scratch. It was important for this company to get this user interface capability to its clients to be competitive in the market as other financial services firms were pushing ahead with their application transformation initiatives.

In another case, it was imperative for a services firm to revamp its primitive interfaces lest it continue to be perceived as backward and difficult to work with. Rather than drive a three- to five-year application replacement cycle, the firm executed an application modernization initiative in six months. Today, this firm can create Enterprise Java Beans to front-end COBOL functions with no business logic change in less than two hours, giving them significantly improved agility.

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COST BENEFITS OF LEVERAGING EXISTING ASSETS

By reducing time to solution, application transformation also reduces costs. Whether using connectors, wrappering, or Web services to expose existing application data and capability, companies can save a lot of development cost by avoiding duplicating what they already have in place. Longer-term cost benefits accrue from reusing these integratable functions and data to support evolving and new business process workflows.

One of the strong cost savings cases observed by DHBA involved a company that needed to allow its clients access to its mainframe applications for self-service, improved productivity, and customer satisfaction. Replacing the application would have cost about $12 million. Rather than take that approach, this IT organization decided to improve its user interfaces and present them through standard browsers. The application transformation cost less than $1 million and had significant time to solution benefits as well.

WEB SERVICES DELIVERS COST SAVINGS

Another business published some of its mainframe-based financial application capability as Web services. This allowed information to flow bi-directionally from client host applications to the company's financial application into SAP. The cost savings for this project were significant since a new integration broker platform was not deployed and the manual pain points associated with moving information from system to system across multiple organizations and companies were relieved through automation. The cost savings realized were several hundred thousand dollars for the integration project and ongoing labor costs.

END-USER PRODUCTIVITY

Application transformation relieves the business process pain points caused by manual intervention. This pain, involving everything from cumbersome user interfaces to retyping information from a fax into another business application, creates productivity bottlenecks such as errors, defects, and wasted time.

Users want information at their fingertips; they do not to look through a myriad of screens and wade through a raft of disjointed legacy applications to get to it. A large manufacturing firm found it prohibitive to replace several IMS applications. This firm used a range of integration tools and a couple of different integration platforms to create Web front-ends to these applications and integrate them into business processes along with SAP and PTC Windchill. The company saw a 50% reduction in the time it takes end users to complete a given task, which is a significant improvement in productivity. The cost of this productivity improvement was only 10% of the cost of replacing the applications. It also took much less time to complete this initiative than it would have to replace the applications. The overall results achieved exceeded the company's expectations.

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REDUCED TRAINING COSTS

Along with an organization's installed applications is a set of skills to maintain, manage, and improve these applications to support the business. Many of the people with these skills are long-time COBOL, PL/1, or RPG programmers with deep mainframe and/or midrange systems and application experience. While many have the ability to learn Java and become productive, such a retraining process takes time. Further, the J2EE and Microsoft .NET programming models are radically different than the existing mainframe environments; developers need time to become proficient in these new environments, especially for complex mission-critical application development. Tools that work in familiar development and deployment environments to these experienced mainframe programmers while enabling these applications to integrate into newer J2EE- and .NET-based business processes and applications can save a large amount of time, reduce risk, and reduce training costs.

One financial services firm found that along with immediate project time-to-deployment gain, application transformation enabled the team to create new CICS transactions in ninety minutes using COBOL to EJB wrappering tools; the same transactions would have taken a week to develop in the COBOL environment. These tools had the dual benefit of leveraging existing code and skills while enabling the COBOL programmers to learn some J2EE in measured steps while being productive.

RETURN ON INVESTMENT (ROI)

While there are many soft benefits associated with application transformation, there are many measurable returns as well. One manufacturer has just about every imaginable system installed, ranging from IBM IMS and HP-3000 to VAX-VMS. Its transformation strategy is two-fold – modernize applications with valuable, risky to reproduce functionality and consolidate forty other applications into SAP-ERP. This manufacturer has an application transformation strategy to modernize the first group of applications by running three-month-long, $50K projects designed to provide complete ROI in one to three months. Its application selection criteria for transformation includes:

- Cost of application maintenance
- Value of functionality in application
- Technical obsolescence

This firm has completed both user interface modernization and application integration projects that have realized such results. Supporting this result is a 50% reduction in data entry time, which represents a large productivity improvement. The manufacturer is planning some Web services projects to begin its foray into SOA for larger scale integration projects as it continues its transformation.

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APPENDIX: IBM APPLICATION TRANSFORMATION TOOLS

Application transformation begins with business transformation management. Becoming an on demand business is all about business process transformation, integrating business applications to support business processes, and eliminating unnecessary manual intervention and pain points. This includes looking at the business drivers that are moving a company to make changes to existing processes and IT systems.

Portfolio analysis of existing business processes and supporting IT assets becomes the next key step. Identifying what applications need to be replaced, or better yet, leveraged and *transformed,* helps a business understand what types of projects lay before it. During portfolio analysis, new ideas for business improvements and even new revenue streams may come to the fore. Portfolio analysis sets the stage for application transformation projects.

Once an enterprise understands its processes and IT assets, it considers application transformation projects based on a variety of factors. Two of the most important are "doability" and return on investment. Doability takes into account factors like the skills available, platforms involved, existing assets, tools, and the architectural considerations of different projects (i.e., a user interface project is much different from building an SOA.) There are numerous companies that offer tools to enable existing business applications to be modernized and reused in integrated business processes to support the on-demand business. These tools support a range of projects including:

- User interface modernization
- Application integration and transformation, which includes application understanding, application development, deployment, and connectivity
- Evolving to a service-orientated architecture, which includes many of the same types of activities

IBM is a leading company that offers a broad portfolio of application transformation tools that support these transformation projects.

USER INTERFACE MODERNIZATION TOOLS

Users are not productive with older applications that were designed to support business processes as they existed long ago – where they have to interact through a series of green screens without any data entry field assistance. The workflow has been frozen so that today's users must skip over screens, enter data repeatedly, remember arcane input formats, and perform many unproductive activities to carry out their jobs.

User interface modernization tools are designed to alleviate these pain points and transform the user experience, giving new life to these legacy applications while significantly improving user productivity. These tools improve the user interface

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and workflow of these green screen applications to better support today's business processes. The benefits provided by these tools include reduced training costs, increased user productivity, and the ability to reach new users and customers with the transformed application.

WEBSPHERE HOST ACCESS TRANSFORMATION SERVICES (HATS)

IBM WebSphere Host Access Transformation Services (HATS) is an example of a user interface modernization tool. HATS is a rules-based Web-to-host transformation engine that provides customized access to one or more host applications, and dynamically creates a new Web HTML interface, while significantly improving the navigation and productivity of legacy applications. HATS utilizes a rules-based transformation engine to transform selected areas of the green screen into a variety of presentation styles such as hot links, drop down boxes, radio buttons, etc. HATS enables existing green screen applications to be extended to Web users within hours of loading the software through the templates provided. Additionally, screens from different sources can be combined into a Web page that reflects the state of the business process workflow as it exists today. This is key to achieving the dramatic user productivity improvements and reduced error that DHBA has observed in operation.

The default rules can be applied to every screen quickly after the HATS software has been installed on the developer's desk. The wizards-based development environment for HATS is based on Eclipse and integrated into WebSphere development tools. A business analyst who is familiar with the application can be the "developer" for HATS applications. Java programming is not required since the wizards generate all the Java in the background. The business analyst does not need to access or modify source code. In addition, the business analyst does not need to customize every screen, as he or she can simply apply a single rule to many screens, which improves analyst productivity and speeds time to deployment.

HATS dynamically creates a new Web HTML interface. This means that HATS delivers improved ease of use to existing 3270 and 5250 applications by dynamically transforming the screens into more Web-like HTML pages for the end user. Further, HATS-modernized interfaces may be integrated into WebSphere Portal interfaces. The only software users need on the client is a Web browser. And because HATS is a real-time, on-the-fly transformation, HATS will not break down when changes are made to the host application.

Users report that these user interface modernization projects are "no-brainers." For example, both manufacturing and financial services organizations report up to a 50% improvement in user productivity. Some have also seen as fast as one-month payback or return on investment, which encourages these companies to seek more application transformation benefits.

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APPLICATION UNDERSTANDING TOOLS

To go beyond modernizing the user interface and human workflow of an application requires different tools that analyze the business logic, data, and flow of an application that a human does not see. Enterprise applications are complex with a myriad of components, interdependencies, and logic flows that make it difficult for IT developers to understand how to leverage them in new business processes. Without automation or tools that assist with the application understanding process, IT staff must manually sort through printouts and out-of-date documentation to even begin to assess an application's potential for reuse. Application-understanding tools enable developers to get a clearer picture of what the application does. These tools also provide insight into what may be reusable and repurposed into business process program-to-program integrations as well as exposed as Web services for others to consume. An example of such a tool is IBM's WebSphere Studio Asset Analyzer, which facilitates the discovery phase of the enterprise application transformation process.

WEBSPHERE STUDIO ASSET ANALYZER

WebSphere Studio Asset Analyzer (WSAA) provides architects, analysts, and programmers with enterprise-wide knowledge of their applications, such as capabilities to understand application portfolios (source code including COBOL, PL/1, C++ and Java; HTML, WAR, EAR, JCL, transactions, data stores, and their relationships), as well as the ability to understand the business flow inside those applications. It also provides analysts and programmers with the ability to quickly find and assess the impact of application changes. Finally, WSAA enables businesses to both find and rate programs within their application portfolios on their ability to be used as e-business connectors. A significant amount of currently executing code can be reused in new e-business applications, saving millions in potential investment as well as helping to meet both time to market and quality expectations – time to market because the code is written, quality because it already works.

Users report significant time savings, which enables them to get new capabilities to business partners and new services to customers more quickly. WSAA has enabled some projects to become feasible by shortening the time to deployment while allowing them to retain a mainframe as the central application control point and security domain for mission critical applications. This was observed by DHBA in more than one financial service organization, for example.

APPLICATION DEVELOPMENT TOOLS

After defining an application transformation project and understanding their applications' structure and potential for reuse in a new business process flow, IT departments are ready to develop the code necessary for deploying the new application or process. WebSphere Studio Asset Analyzer provides the necessary details and application information to enable the developer to design and build

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the new application and business process flow with a transformed application. IBM provides tools for its host systems to enable this development process using modern tools while leveraging existing analyst and/or developer skills. These tools support the "develop" and "integrate" phases of the lifecycle.

WEBSPHERE STUDIO ENTERPRISE DEVELOPER

Enterprise developers seeking to transform a mainframe-based application can call upon WebSphere Studio Enterprise Developer (WSED) as their primary development environment. This business development environment combines WebSphere, Web services, and traditional development models, such as Java, Enterprise Generation Language (EGL), Enterprise COBOL, Enterprise PL/1, CICS, and IMS into one integrated toolkit. WSED is designed to enable all of the contributors to an enterprise application development effort (business analysts, architects, programmers, and testers) to work together – including traditional mainframe programmers who have outstanding mission-critical application skills but may have not learned Java. Visual support and session management is enabled with support for open frameworks, including Struts and JavaServer Faces (JSF). WSED also supports connector generation, enabling the leveraging of standards-based connectivity via JCA. This provides transactional access to business logic and Web services hosted on WebSphere, CICS, and IMS.

Users of WSED report that it has made all of these participants in the application transformation process more productive. WSED has been used to accelerate new services and capabilities to market. In addition, it allows user organizations to seek new customers ahead of competition by leveraging their existing strengths and business assets.

WEBSPHERE DEVELOPMENT STUDIO FOR iSERIES

There are thousands of IBM iSeries applications running businesses of all sizes around the world today. Most of these applications remain in traditional host environments, isolated from the other parts of the business processes that they support. IBM's WebSphere Development Studio for iSeries is a toolkit for transforming these applications. It enables these applications to support a wider range of business processes and to integrate into the enterprise ecosystem at large. This tool set is an improved environment for continuing to enhance these existing applications as well as add J2EE and Web services capabilities to them including supplementing the application logic with new interfaces, Java business logic, and Web services. The value proposition for iSeries users is faster time to new application capability and integrated business processes with reduced manual pain points.

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MIXED WORKLOAD DEPLOYMENT TOOLS

Application transformation projects leverage the host system's ability to run multiple workloads well. This capability, which remains one of the long-standing differentiators among host systems, enables a business to continue to enhance its business applications in a lower-risk manner through application transformation. As companies enhance and integrate their existing applications, new workloads are created that must be tested to ensure quality results. Further, these applications must be monitored in their mixed workload environment to ensure that they will handle widely variable and new traffic patterns correctly and perform well. IBM's mixed workload deployment tools help enterprises run their newly improved and automated business processes in these mixed workload environments.

WEBSPHERE STUDIO WORKLOAD SIMULATOR

The last thing a business needs is for its customer-facing systems to fail due to workload spikes that can occur due to unpredictably high demand for its products and access to its site. The behavior of existing applications is well known in their isolated silo status. However, before these applications are integrated into a business process and exposed to many more users, it is wise for a business to test the newly transformed applications in a variety of scenarios. WebSphere Studio Workload Simulator helps with this task by assessing the application's ability to support these mixed workload scenarios.

WEBSPHERE STUDIO APPLICATION MONITOR

Once these applications have been tested and the appropriate adjustments and tuning have been made to the deployment environment and the application itself, the environment should be monitored for unexpected behavior and performance. A business can avoid downtime and performance problems by using Workload Simulator. Nevertheless, all possibilities cannot be tested nor predicted and ongoing monitoring of the transformed environment can pay for itself in kept sales and customer satisfaction.

WebSphere Studio Application Monitor is IBM's offering to address this application management domain. This tool helps administrators resolve performance issues and unexpected results. It does not require modifications to the application code and is designed for ease of use and deployment in real-time operation. The monitored environment can include WebSphere on distributed and host platforms as well as CICS environments. IMS support is planned as well.

CONNECTIVITY TOOLS

IBM offers a range of tools and adapters to enable mainframe applications to be connected and integrated into modern business processes. These tools enable IT

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to ready these applications for reuse and integration by exposing key functionality determined by the discovery and application analyzing tools previously discussed. This process may involve wrappering business functions in existing back-end applications. The beauty of this integration capability is that businesses are not required to rewrite their applications and take unnecessary risks in order to become an on-demand business. The value of these tools is their connectivity capability as well as the fact that these adapters and connectivity techniques not only enable new application use and new business process support but also allow existing processes to continue side-by-side.

CICS TRANSACTION GATEWAY

CICS applications can become active participants in e-business applications and transactions. The CICS transaction gateway works with industry open-standard architectures, interfaces, and transports to maximize the reuse of mission-critical CICS assets. CICS Transaction Gateway is a J2EE connector for CICS applications. It enables the use of CICS applications in J2EE and Web services solutions hosted on application servers.

The CICS Transaction Gateway enables faster time to solution by leveraging existing transactions. One user in the financial services industry described the benefits of reusing these CICS assets:

- It enables the organization to maintain one point of execution and development.
- IT can keep one code base and reuse it in new business processes that were not around when the transactions were designed, which results in reduced management costs.
- The application and business process security is more solid with the critical code centralized on the mainframe.

SOAP FOR CICS

The SOAP for CICS feature allows CICS applications to service inbound requests and make outbound requests using the Simple Object Access Protocol (SOAP). These SOAP requests are transported over Hypertext Transfer Protocol (HTTP) or WebSphere Message Queuing (WebSphere MQ). The HTTP-based support employs functions provided by CICS Web Support and uses that support to manage security and transaction attributes. This includes the ability to use a Secure Sockets Layer (SSL) connection via the HTTPS protocol (an extension of HTTP running under SSL). The SOAP for CICS feature enables a user-written application layer to map the XML-based SOAP message into a COMMAREA, thus enabling access to COMMAREA-based applications using SOAP messages. This feature will help to maximize the reuse of enterprise assets via standard interfaces, enhancing the value of existing applications in the CICS environment.

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IMS CONNECT

DHBA has talked with many enterprises with CICS and IMS applications that remain in isolation due to user and/or IT lack of understanding of the integration possibilities or budget constraints. However, users that integrate these applications using connectivity aids such as the CICS transaction gateway and IMS Connect report faster and less error-prone business process execution.

IMS Connect is a JCA connector that enables developers to wrapper IMS-based applications that add new e-business capability to these existing assets. For application access, IMS provides the IMS Connector for Java development code in WebSphere Studio Application Developer Integration Edition for development. IMS has also provided IMS Connector for Java runtime code in IMS Connect for access to IMS applications and data. By being compliant with the connector standards, IMS Connector for Java can be used in component server environments that support the standard. IMS Connect improves standard TCP/IP connectivity and enables easier access to IMS applications for J2EE applications and Internet and intranet users.

IMS SOAP GATEWAY

The IMS SOAP Gateway is an XML-based connectivity solution that enables existing or new IMS applications to communicate outside of the IMS environment using SOAP to provide and request services independently of platform, environment, application language, or programming model. The IMS SOAP Gateway enables WebSphere and/or non-WebSphere customers to reuse existing and create new IMS-based business logic. The IMS SOAP Gateway can expose IMS application assets as Web services, which can assist organizations with application transformation, application development, and business integration. Generated IMS service definitions (e.g., Web Services Description Language [WSDL] files) can be published or exposed to a Universal Description, Discovery, Integration (UDDI) directory for businesses to publish their offerings, and for users to discover their needs.

WEBSPHERE BUSINESS INTEGRATION MAINFRAME ADAPTERS

One of the primary value propositions of these application transformation connectivity support products is the ability for businesses to accelerate their business process modernization efforts. This is certainly the case with the WebSphere Business Integration mainframe adapters, which allow IT to connect mainframe applications to other applications deployed in the enterprise as well as present these application assets to end users. IBM's adapters support the integration of mainframe assets such as CICS, IMS, DB2, and IDMS Database. They also span a wide range of applications, including Ariba Buyer, i2, and Oracle Applications. Finally, they support data handlers and technology such as CORBA, JMS, and ACORD XML.

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