Case Study

The Bekins Company Moves into the Future with e-business

Connects to Partners with Web Services

By David S. Marshak
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Prepared for IBM Corporation

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Executive Summary

For over 100 years, The Bekins Company has been one of the United States' best known names in moving goods and households. One of Bekins business units—HomeDirectUSA—specializes in delivering and installing high-value consumer goods (such as appliances and large-screen TVs) from retailers to purchasers' homes. Over the past four years, Bekins has turned to leading-edge technologies to implement an e-business strategy that provides information directly to customers and consumers, enables online ordering by agents and customers, and creates a virtual marketplace for offering shipping jobs to Bekins agents.

Bekins' e-business strategy has been developed and rolled out in three specific applications: a Shipment Tracking System, which provides online order status to shipping customers and consumers; COMIS, an online ordering and inventory management system that enables customers and agents to create orders online; and Tonnage Broadcast Exchange, a virtual marketplace for agents to bid on shipping jobs.

Tonnage Broadcast Exchange (TBE)—the focus of this case study—solves a long-standing problem of how to tender shipping jobs to Bekins agents. In the past, jobs had to be tendered by phone or fax, often causing delays and sometimes a feeling of unfairness on the part of the agents. TBE automates this process by offering the opportunity to all qualified agents at the same time and enabling an agent to instantly claim the job (making it no longer available to anyone else).

The results have been significant in both qualitative and quantitative terms. Agents are happier because they have an easy and fair method of claiming jobs. Shipping customers are happier because they have more confidence that items will arrive at consumers' homes when promised. For Bekins, this translates into direct financial benefits of increased revenue by $75 million, reduced operating costs by $1 million, and IT development savings of $100,000.

In addition to its notable payback, TBE is particularly interesting since it was built from scratch as a Web Services application. Built with key technologies—such as IBM WebSphere Application Server, IBM WebSphere Portal Server, IBM DB2 Universal Database, IBM WebSphere MQ, and IBM WebSphere Studio Application Developer—TBE represents a new breed of applications that will take advantage of emerging standards to bring high-value applications that connect across company boundaries.

Bekins Solution at a Glance	
Core Functionality	Tonnage Broadcast Exchange (TBE) enables Bekins to provide instant notification of brokered shipping opportunities that meet each of its agent's specific criteria, enabling Bekins to provide faster response times on its end-customers' shipping requests. For internal users, TBE automates a largely manual process, reducing cycle time, improving productivity, and building customer and agent loyalty and satisfaction with Bekins. TBE enables Bekins to broker lower-margin shipping opportunities—using Web Services and the Internet—to agents or independent third-party transportation companies. Business partners can view tenders by selected categories and register their acceptance of a tender immediately.
Software	IBM WebSphere Application Server, Advanced Edition IBM WebSphere Portal Server IBM DB2 Universal Database IBM WebSphere MQ IBM WebSphere Studio Application Developer (formerly called IBM VisualAge for Java) RationalRose/Erwin Modeling Tools OS/390 and Windows NT Operating Systems
Servers	IBM eServer zSeries Windows NT
Benefits	Bekins estimates that TBE has resulted in direct financial benefits that include: • Increased revenue by $75M • Reduced operating costs/improved profitability by $1M • Reduced cycle time 25 percent and improved customer satisfaction and loyalty • 12-month ROI • Enabled IT development savings of $100,000

BUSINESS CONTEXT: DELIVERING HIGH-VALUE PRODUCTS TO THE HOME

Bekins has been a well-recognized name in the moving business for over 100 years. While primarily known for its nationwide home-moving business, The Bekins Company has a growing business—HomeDirectUSA—in home delivery and inventory management for what it calls high-value products—large consumer items such as big screen TVs, mattresses, and appliances. These high-value products not only are large, but frequently require set up and installation in the home.

Bekins customers for HomeDirectUSA include some of the largest manufacturers and distributors of consumer goods.

Background

The Bekins Company, Hillside, IL, includes Bekins Worldwide Solutions, Inc., and Bekins Van Lines, LLC. Bekins Van Lines, founded in 1891, provides quality household-goods-relocation services for corporate accounts and private relocation customers. Bekins Worldwide Solutions is one of the largest North American integrated logistics networks. The company pro-

vides logistics services and solutions to manufacturers, distributors, and retailers of electronics and other high-value products.

Bekins Van Lines operates through a vast network of agents in North America with a combined fleet of over 1600 operators. Bekins Van Lines is the seventh largest provider of household goods relocation services to corporations, individuals, and the U.S. government. The household goods network is comprised of agents located throughout the U.S. with hauling capacity provided by 150 independent owner operators and 1,450 agent drivers. Bekins Worldwide Solutions (BWS) utilizes its dedicated agency network of over 60 distribution centers with a combined Bekins fleet of over 2,100 tractor/trailers and straight truck units to provide a variety of specialty transportation services. BWS also provides comprehensive logistics services and home delivery through 75 plus agent distribution centers, which supply in excess of four million square feet of warehouse space for the transportation, distribution, and warehousing of high-value products.

The first two phases were built with Java Servlets using IBM WebSphere Application Server and IBM WebSphere Studio Application Developer. The third phase—the focus of this study—is built on pure J2EE and Web Services.

Bekins also has specialized divisions that move household goods, provide tradeshow services, warehousing, inventory management, distribution, delivery, set-up and light installation for computer companies, telecommunications, and office imaging equipment suppliers. HomeDirectUSA is one of these divisions that provides logistics and fulfillment for e-tailers as well as brick-and-mortar retailers who offer direct-to-home delivery for their customers

New Ownership Structure

In January, 2002, The Bekins Company was purchased by members of its network of agents from GeoLogistics Corporation, becoming a totally agent-owned corporation. The purpose of the purchase was to enable faster growth by tying the agents more closely to the corporate mission and strategy, as well as to enhance Bekins local and regional presence.

THE e-business INITIATIVE

Overview

Bekins embarked on an aggressive e-business initiative in 1998. According to Randy Mowen, Bekins Director of Data Management & e-business Architecture, the overall goal was to be "the premier e-commerce transportation company in North America."

From 1999 to 2001, the initiative evolved over three phases, each of which addressed a critical business process. These phases were:

- STS—Shipment Tracking System, which provides shipping customers and consumers with online access to order status. Rolled out in 1999.

- COMIS—an online ordering and inventory management system that enables customers and agents to create orders online. Deployed in 2000.

- TBE—Tonnage Broadcast Exchange, a virtual marketplace for agents to bid on shipping jobs. Went live in 2001.

The first two phases were built with Java Servlets using IBM WebSphere Application Server and IBM WebSphere Studio Application Developer (then called VisualAge for Java). The third phase—the focus of this study—is built on pure J2EE and Web Services.

Selecting the Platform

In 1999, Bekins made a key architectural and vendor decision—to use Java for its e-business platform and to use IBM WebSphere Studio Application Developer and IBM WebSphere Application Server as its primary development and deployment tools. Key factors in Bekins decision included:

- Integration with legacy systems
- Security
- Richness of the toolset

Ultimately, according to Mowen, creating this infrastructure was critical to all three phases of the e-business initiative. "They are all done on the same infrastructure. That's the key—leveraging the learning and leveraging the platform. We're not re-inventing the wheel anymore and can do rapid development. It can be used in so many different ways."

Shipment Tracking System (STS)

STS, deployed in 1999, is designed to provide shipment-tracking information directly to Bekins retailer customers and these customers' end-consumers. STS was built in response to customer demand—based on their experience with consumer sites that already were providing this type of information. Mowen notes, "STS was driven by e-commerce customers who were selling on the Web and needed a mechanism to enable the consumer to track the shipment from their Web site."

STS was Bekins's first foray into Java, which would later become a strategic direction. According to Mowen, "STS was the make-or-break project for Java. It was strategic from both a business and IT perspective. We were now selling our ability to provide technical solutions as well as transportation."

Since its roll-out, STS has contributed directly to the quality of customer experience by providing improved customer service and satisfaction through faster access to information. Previously, it could have taken hours for customers to get answers to their questions on shipping status via telephone or fax. With STS, HomeDirectUSA customers and their end-consumers can access shipping reports instantly. They have full supply-chain visibility and can track an order to the exact moment of delivery. Consequently, retailers can bill the end-consumer faster, improving their cash-flow position. At the same time, STS frees HomeDirectUSA customer service representatives to focus on handling exceptions, resulting in higher overall customer satisfaction.

STS has also enhanced Bekins's competitive position. According to Mowen "We have won a number of important new accounts due to our ability to deliver Web-enabled STS functionality. In fact, without this e-business solution, we would not be able to compete effectively to grow our business."

In addition, STS has resulted in total financial benefits of more than $10.3 million annually. Specific benefits include:

- More than $10 million in increased revenue annually.

- Reduced operating expenses of $250,000 annually. Information is provided electronically on the Web, rather than through HomeDirectUSA staff.

- IT development savings of approximately $100,000 through the use of advanced e-business tools and technologies, which dramatically increased developer productivity. And developers can respond more quickly to customer requests for new functionality.

At the highest level, the purpose of TBE is to reduce the cost of tendering shipments, enhance the ability of Bekins and its agents to plan and maximize their profits on shipments, and assure Bekins customers that their shipments will reach their destinations in the expected timeframe.

Customer Order Management and Inventory System (COMIS)

In 2000, Bekins rolled out the second major e-business application that enabled customers and agents to place shipping orders directly via the Web. To do this, Bekins had to create an application that provided a simple interface to users, while dealing with the complex back-end interactions with up to 13 different IMS transactions and a number of different COBOL subroutines.

COMIS was built on the same infrastructure as STS (with IBM WebSphere Application Server and IBM WebSphere Studio Application Developer continuing to be central to the development), although, now, Enterprise Java Beans (EJBs) were employed instead of Java Servlets.

The immediate results of having customers being able to directly input their orders were to improve order accuracy by up to 40 percent. This resulted in significant

efficiency improvements in addition to the obvious savings through self-service.

In parallel, Bekins decided that it needed to provide direct access to the inventory it was managing for its customers. Thus, an inventory-management system was built to provide a detailed view of the inventory to Bekins customers and their end-customers who may hold one or two line items within a larger inventory unit. According to Mowen, "This kind of information was essentially to support the self-service order-management capability we launched on the Web."

The inventory management application integrated data from agent warehouses and the Bekins DB2 database via WebSphere MQ and then presented the data to users via WebSphere Application Server. In addition, the application had to interface with EDI and XML data sources on the agent warehouse side.

TONNAGE BROADCAST EXCHANGE (TBE)

Keeping up its pace of deploying one major e-business application per year, in 2001, Bekins rolled out its TBE application. While built on the infrastructure created for the two previous applications, TBE represents two major changes. First, the application is built on Web Services and J2EE (in contrast to the Java Servlet and Enterprise Java Beans architectures of the previous applications). Second, the application is directly integrated with the systems of Bekins's independent agents. Though these systems are wide and varied, using Web Services has helped by requiring only a minimum amount of time and effort for each integration.

TBE automates a specific process that has been going on for over 50 years. As we noted above, Bekins is built on a nationwide freight network of trucks. In general, Bekins owns the network and independent agents own the trucks (as we stated, the independent agents as a

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> *– Randy Mowen, Bekins Director of Data Management and e-business Architecture*

group have now taken ownership of Bekins) and pay a fee for the network services.

One of the basic problems with the moving and logistics business is demand runs with peaks and valleys. For example, the vast majority of home moves are done in the summer months, while delivery of goods to the home may cluster around holidays (or, in the case of large-screen TVs, Super Bowl weekend).

HomeDirectUSA, which focuses on the home delivery of high-value consumer goods, faces this peaks and valleys problem as much as any Bekins division, since any of the agents and their finite number of trucks may handle personal moves, corporate moves, and delivery of consumer goods. When Bekins receives an order for customer shipment that could not be handled by the centrally-managed Bekins fleet, then Bekins will tender it out to its network of agents. Traditionally, this was done one-by-one via fax or phone call, with Bekins having to wait to hear back before committing the shipment or trying someone else. This not only was costly, it could negatively impact Bekins' retailer customers who had guaranteed delivery to their own customers.

TBE Goals

TBE was built to address this problem by creating a virtual marketplace for tendered shipments. New shipments are offered automatically and simultaneously to all potential agents. When an agent commits to the tender, it becomes unavailable to all of the other agents.

At the highest level, the purpose of TBE is to reduce the cost of tendering shipments, enhance the ability of Bekins and its agents to plan and maximize their profits on shipments, and assure Bekins's customers that their shipments will reach their destinations in the expected timeframe.

Specifically, there were three primary goals to the TBE initiative:

- Tap into the opportunity to grow revenues up to $75M annually with a very small investment of technology and time. Bekins would achieve this growth by building an online marketplace through which it could broker shipping orders to agents or independent third-party transportation companies.

- Deploy quickly to increase customer and business partner loyalty.

- Build a new, robust Web Services infrastructure to support future B2B applications.

According to Mowen, "TBE represents a truly groundbreaking piece of work for Bekins and for our industry. We are first to market with a robust, secure, scalable, and fully integrated brokerage solution incorporating a completely new Web Services architecture and a new development paradigm."

Involving the Agents

The impetus for the TBE initiative came from the Bekins agents who were pushing the company to provide an online brokerage capability without delay. Three of these partners—Computer Van Lines (CVL), Boyer/Rosene Transportation Services, and Columbus Crossdocking Operations—were directly involved in identifying the data requirements, developing the business logic, and integrating the Web Services with their internal transportation management applications. According to Mowen, "It would not have been possible to build TBE successfully without this level of involvement and support."

In addition, seven business partners participated as beta test sites, running live data. Based on their feedback, Bekins was able to provide enhancements to content and functionality within hours. And, as a result, Bekins was able to ensure TBE fully met its business partner requirements before moving into production. Again, Mowen notes the importance of this, "This was critical because we were only going to build the solution once for all future users—and we therefore had to get it right."

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TBE Functionality

TBE provides functionality in four main areas:

- TBE enables Bekins to tender orders online simultaneously to the multiple agents who are pre-screened and pre-selected to participate in the brokerage program.

- TBE allows business partners to view these tenders online using a personalized set of filters.

- TBE enables business partners to register their acceptance through an interface with the servlet-based Customer Order Management and Inventory System. This interface also enables users to track shipment status.

- TBE supports online payments to business partners through an additional interface with Bekins' existing e-commerce module.

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Either way, the system includes business logic that enables business partners to customize their view of the orders Bekins tenders. For example, they can view all loads that Bekins is tendering across the country or only view regional loads or loads up to a certain weight or type. This personalization feature enables each business partner to screen out requests they either cannot or choose not to fill.

Once the tender is accepted, its status changes, and other agents no longer have access to it either on the portal site or in their systems. The tender from the portal site or from the agent procurement software becomes an order in the Bekins-based Customer Order Management and Inventory System and can be tracked through STS.

Architecture and Product Selection

In planning TBE, Bekins made one critical architectural commitment and several key product decisions.

COMMITMENT TO WEB SERVICES. The critical architectural decision was to evolve the e-business applications from Java Servlets and Enterprise Java Beans to a full Web Services implementation (see Sidebar: *A Brief Web Services Primer*).

Knowing that the TBE initiative depended on seamless integration for its success, Bekins had a number of choices. The company decided not to follow the traditional path of using prepackaged middleware. Rather, according to Mowen, "We opted to use XML-based technologies to build a Web Services application. Web Services provides the open standards integration needed to bring any business partner into our online brokerage environment almost instantly, no matter what systems they use internally."

Bekins specifically decided to jump into Web Services with TBE because, according to Mowen, "The project lends itself to Web Services perfectly, since it is built on J2EE compliance and XML. This was the proof of concept for J2EE compliance and Web Services integration—which is a stated strategic goal for Bekins."

DEVELOPMENT AND DEPLOYMENT PLATFORMS. According to Mowen, "Our main business purpose was to build an online brokerage system quickly for our business partners. To achieve this goal, we chose tools and technologies that would help us deliver an open, high-performance Web Services solution.

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> — *Randy Mowen*

Due to the time and technology challenges of integrating with our business partner systems, the most important characteristics were:

- An integrated development environment offering strong productivity support (primarily IBM WebSphere Application Server, IBM WebSphere Studio Application Developer, and Rational Rose).

- A robust, open standards architecture with a flexible XML-based messaging component. We knew we could easily leverage this foundation to add new business partners and expand our brokerage business in the future.

- A reliable, totally open production environment based on J2EE-compliant WebSphere technologies."

Mowen explains the specifics of this environment and the reasons for selection:

- **IBM WebSphere Application Server.** "It offers a robust environment for e-business combined with extensive integrated functionality to support our use of Web Services."

- **IBM WebSphere Portal Server.** "It provides us an easy way to enable portal-based access to our application for agents whose infrastructures are not ready for Web Services." Bekins is now planning to implement the recently-announced IBM WebSphere Portal Server Express for which it was an early beta test site.

- **IBM DB2 Universal Database.** "DB2 is the database of choice for Bekins. It provides a strong, scalable foundation for our entire enterprise architecture, allowing us to leverage our legacy data with great flexibility."

- **IBM WebSphere Studio Application Developer.** "It integrates seamlessly with other elements of our existing IT environment, including WebSphere and DB2. We consider its rich feature set and servlet builder to be best in class."

A Brief Web Services Primer

Web Services are a set of standards that enable applications to exchange information functionality, so that these applications can be called by other applications over the Internet. The promise of Web Services is to increase the ease of integration of existing applications while extending the scope of the new applications that will be built in the future.

There are four key standards upon which all Web Services are based:

- **XML.** XML (eXtensible Markup Language) is the universal format for structured documents and data on the Web.

- **WSDL.** WSDL (Web Services Definition Language) is an XML format for describing network services as a set of end points operating on messages containing either document-oriented or procedure-oriented information.

- **SOAP.** SOAP (Simple Object Access Protocol) is a protocol that specifies how Web Services-related messages are structured and exchanged over the Internet.

- **UDDI.** UDDI (Universal Description, Discovery, and Integration) is a directory of Web Services. UDDI directories may be either public or private.

Web Services are generally built on either a Java 2 Enterprise Edition (J2EE) platform or a .NET platform. Web Services built on either platform should interoperate if they adhere to the XML, WSDL, SOAP, and UDDI standards.

- **Rational Rose/Erwin. "**These powerful modeling tools integrate seamlessly with our development environment and work well together, creating a lot of added synergy to boost developer productivity."

- **IBM eServer zSeries.** "We chose these operating systems primarily for their scalability and flexibility. The mainframe operating system allows us to leverage our existing enterprise zSeries data and business logic and also to take advantage of the system's extremely high reliability and performance as a server.

Windows NT effectively complements zSeries as an application server."

In addition, IBM WebSphere MQ was used to provide connectivity to Bekins's other internal systems.

Development, Testing, and Rollout

Bekins put together a project team (a mix of seven full- and part-time developers) that was able to build TBE in roughly 25 person months—just five calendar months! In addition to the critical role the agent involvement played (as described above), key factors that contributed to this very fast completion included the experience of the project team and the specific set of tools and techniques employed by the team.

PROJECT TEAM. The team included one XML lead (MQ certified); a senior and junior Java developer; a lead solution architect (DB2 and WebSphere certified); and two COBOL programmers. All team members had at least two years' worth of Java development experience; the COBOL programmers each had more than 15 years' experience. Despite the newness and complexity of the Web Services technologies, team members did not require any additional formal training**.**

PRODUCTIVITY TOOLS AND TECHNIQUES. Bekins designed the TBE architecture to reduce complexity and improve developer productivity by having developers focus on specific components of the overall solution and allowing the architect to help them put the pieces together. A very complex architecture overall could be broken down to smaller and more easily-managed components in which each developer now specializes.

According to Mowen, "Our development environment enabled us to take advantage of the productivity support of a number of tools and techniques to reduce our development cycle by an estimated 60 percent, compared to building TBE from scratch. For example, we took advantage of the productivity support available to us within IBM WebSphere Application Server and WebSphere Studio Application Developer, the Rational Rose Unified Process (with UML modeling), and the Web Services toolkit available through IBM PartnerWorld. They provided a framework, together with sample code, that we were able to leverage and adapt to our specific needs. We merely had to overlay our business logic and methods, and the work was done."

Bekins had already made considerable use of the WebSphere Application Server testing environment in previous projects. Mowen notes that this continued for the TBE project, "We have found it to be an outstanding first-step testing tool, and we used it for unit testing on TBE. It makes it easy and seamless for developers to test their code due to its tight integration with our development environment, WebSphere Studio Application Developer. We also find that since WebSphere Studio Application Developer gives us an excellent debugging tool in the first place, our retesting requirements are generally minimal; the initial code produced is typically of very high quality."

Bekins also made extensive use of a formal development methodology, assuring a consistency across the application. Again, Mowen comments, "We used a formal software development lifecycle methodology, using the Rational Rose Unified Process. We broke the project down into five main phases, which served as major checkpoints along the way:

The agents are finding that they benefit from TBE because they perceive the process to be fairer, because of the time savings they accrue by the integration with their internal transportation management systems, and by the better visibility they get into the whole process.

- Java application programming phase

- Conversion of Java application objects to Web Services

- Deployment of Web Services

- Creation of Client side application code

- Integration testing

Finally, the whole initiative was managed with a brand-new project management process that was designed to define and deliver not only a business solution, but also to redefine the way in which Bekins will design, implement, and manage technical projects in the future. Mowen emphasizes, "This was an academic as well as a strategically-driven project every step of the way, backed by an iterative design process. The project management and project structure was the truly academic component of the initiative. All J2EE standards that applied to our specific application had to be discovered, documented, understood, and complied with, so project management took on the additional task of compliance management as well."

Uptake By Agents

Currently, about 10 percent of the Bekins agents have signed up, and Mowen expects up to 30 percent of Bekins' 1,000 agents to subscribe to the service within a year. Within two years, Bekins plans to make the service available to trading partners who want to integrate with other Bekins order management and inventory management applications.

The agents are finding that they benefit from TBE because they perceive the process to be fairer, because of the time savings they accrue by the integration with their internal transportation management systems, and by the better visibility they get into the whole process. This last factor is enabling them to better plan their own operations in terms of what business would be most profitable for them to tender.

THE BEKINS TBE ARCHITECTURE

From a technology perspective, TBE features a robust, J2EE-compliant Web Services architecture that is extremely easy to integrate. According to Mowen, "With this architecture, we can easily link any business partner system to TBE, no matter what base technologies they use. This was a key factor in our design."

TBE uses Java Beans and XML methods to send data to and from the client server, e.g., all orders are wrapped in XML.

The solution leverages the existing Bekins e-business environment and features several all-new components, including:

- The core Web Services application developed using IBM WebSphere Studio Application Developer servlets and EJBs. It runs under the WebSphere Applica-

Bekins Architecture

Bekins's TBE System Architecture
(Service Provider Side)

Back-end Systems

DB2   IMS

Developer

Develops

TBE
Java Bean

Generates WSDL

WSDL ●
•Describes
•Web Service
  •URN
  •Methods
  •Parameters

Packaged as   WAR

EAR File

•Contains Java
Service Bean in
WAR file

Deploy
Code

**Websphere
Application
Server AE v4.0**

WAR ●
•Contains TBE
Service Bean .jar

**Java SOAP
Servlet**

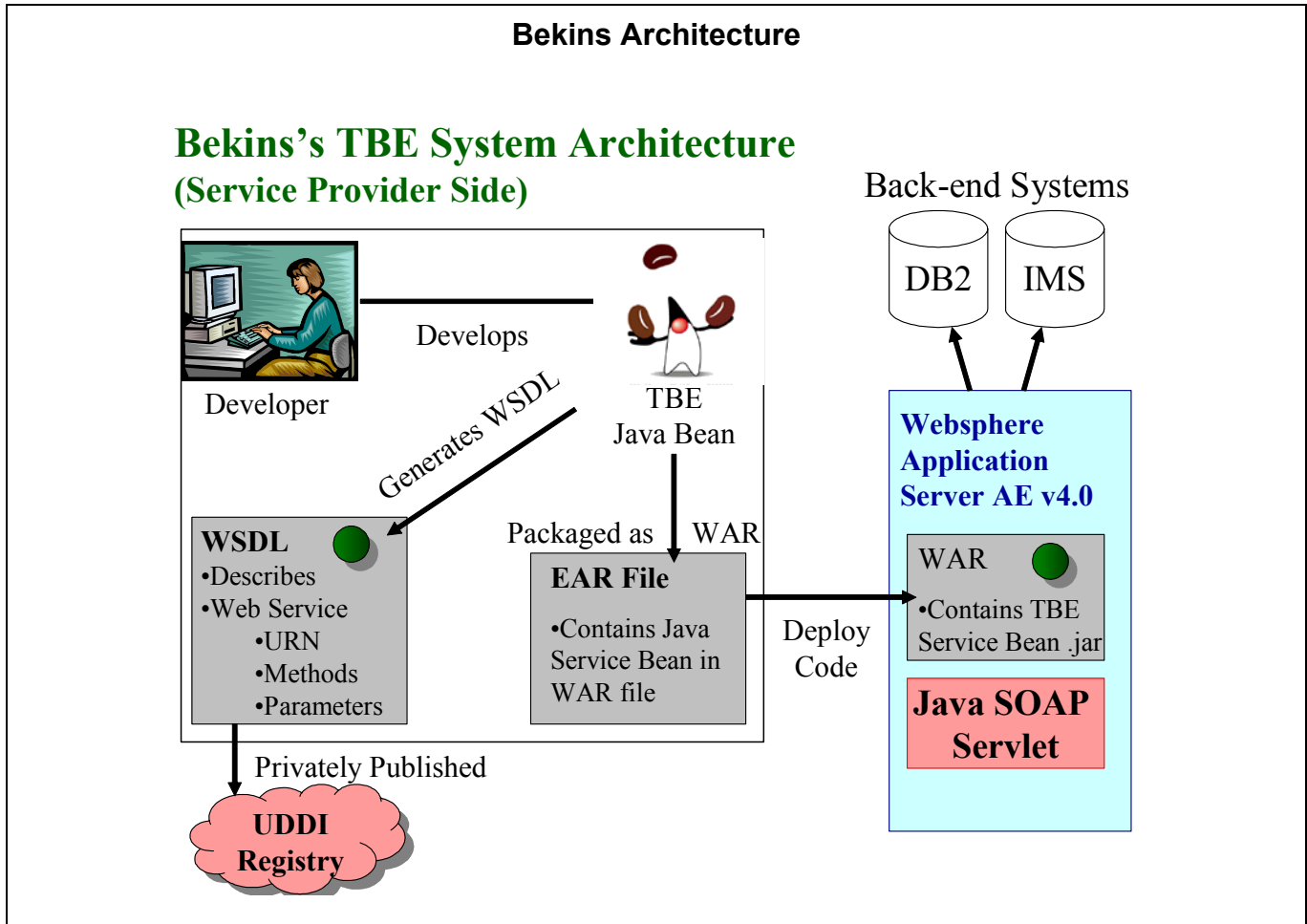Privately Published

**UDDI
Registry**

Illustration 1. Bekins's internal architecture uses JavaBeans and Web Services to deploy TBE as a Java SOAP servlet that can be called by an external application. Authorized applications (those of Bekins' partners) can use the UDDI registry to locate the servlet.

tion Server environment on a Windows NT server at Bekins.

- A Java client layer that resides on the business partner server. It is designed to run on virtually any server and any operating system.

- A SOAP Servlet that communicates between Bekins's and its business partners' servers.

- XML parser that translates the data coming from the business partner as it accepts a tender and passes it to a Java interface within the Bekins order management system. This mission critical back-end system runs on the Bekins zSeries server, supporting DB2 databases.

- A private UDDI registry that tells the client application how to communicate with the SOAP servlets.

- An alternate WebSphere Portal Server piece, which provides access to TBE via the Bekins Web site. It allows each business partner to customize its Web entry point.

We can see the visual representations of this architecture as follows:

- Illustration 1 depicts the internal architecture at Bekins. Note the use of Web Services such as UDDI and WSDL.

Partner Architecture

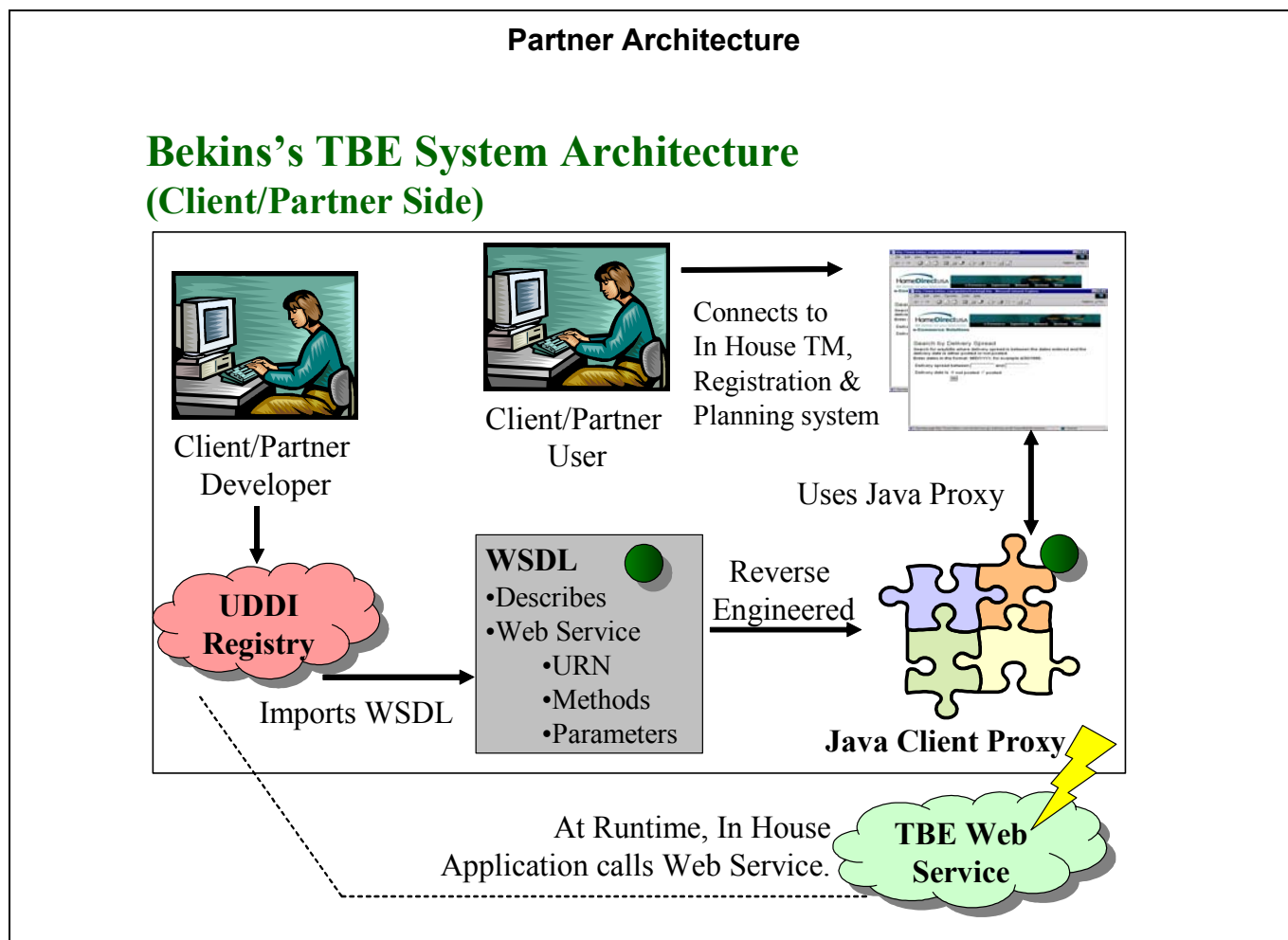**Bekins's TBE System Architecture**
(Client/Partner Side)

Illustration 2. The developer on the partner side creates a Java proxy that talks directly to the WSDL services (or could find it via UDDI). Currently Bekins assists most of its partners in creating this stub. The user simply accesses the request for tender via his or her own internal application.

- Illustration 2 depicts the architecture at the Bekins partner sites from both developer and user points of view.

- Illustration 3 shows the resulting seamless connection between Bekins applications and partner applications.

RESULTS OF TBE

The results of the TBE application have been highly positive for both Bekins and its agent/partners. According to Mowen, "The response to TBE has been overwhelmingly enthusiastic. Our business partners are de-lighted with the ease of integration and the amount of personalization it offers. It's revolutionizing our business, opening up a major area of opportunity to improve our operating margins and continues to provide outstanding customer service."

And, in a quantitative sense, "the solution is expected to deliver financial benefits of more than $75 million annually. We are looking for a 12-month ROI, with the added bonus of being able to leverage much of the architecture for future initiatives."

Specifically, Bekins is experiencing both cost savings and increased revenue from TBE.
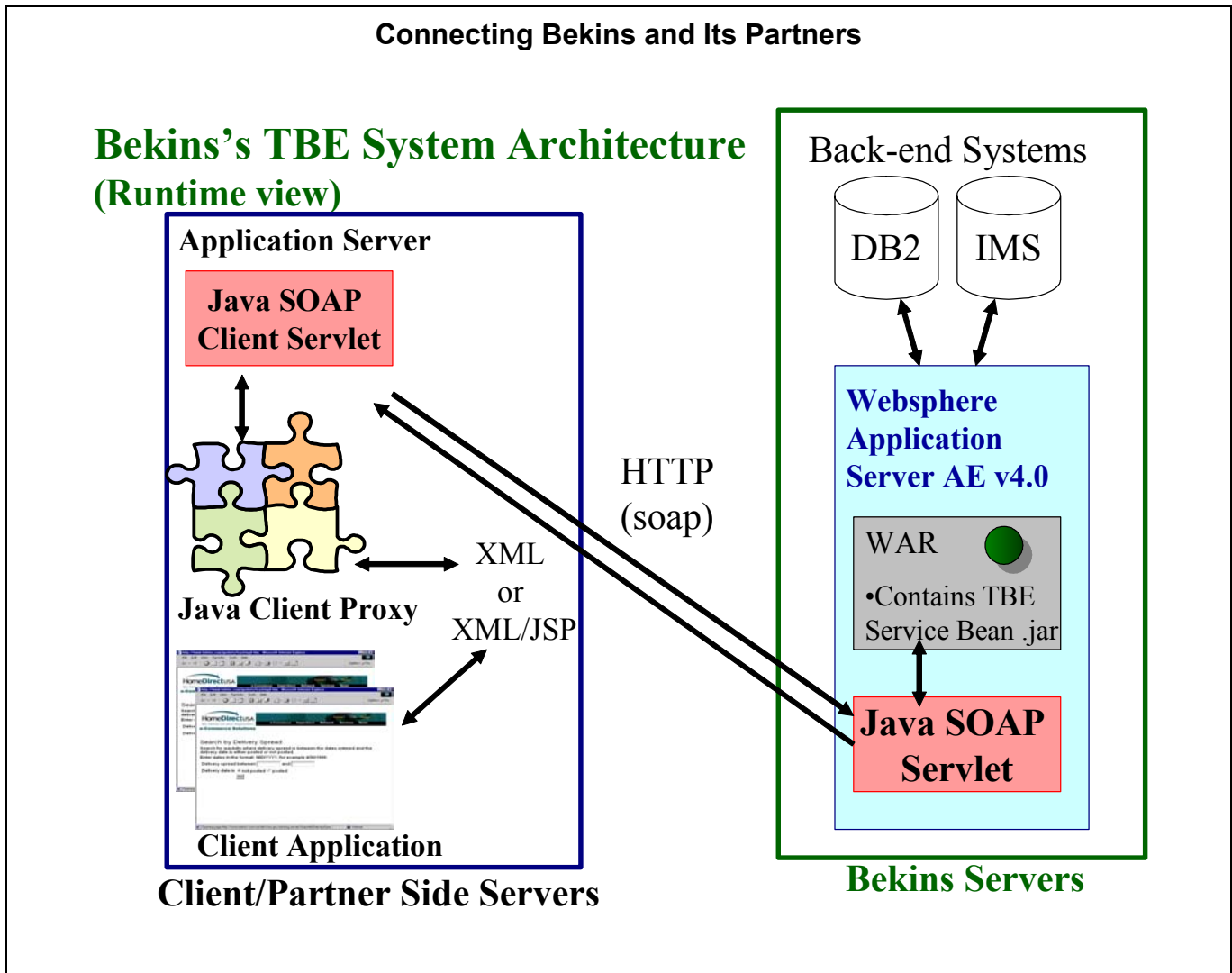
Connecting Bekins and Its Partners

Illustration 3. Bekins partners' (agents') internal systems directly talk to the TBE application via standard Web Services protocols including HTTP, SOAP, and XML.

Cost savings comes from three areas:

- **Reduced operating costs results in improving profitability by $1M.** TBE enables Bekins to pass on lower-margin freight more efficiently to its business partners, reducing its carrying costs up to 2 percent while maintaining high levels of customer service. At the same time, brokered orders are distributed electronically on the Web, rather than through Bekins staff via phone/fax, further reducing its operating expenses. Bekins expects to achieve total annual cost savings of $1M.

- **Reduced cycle time by 25 percent and improved customer satisfaction and loyalty.** TBE has shortened cycle time for the brokering process an estimated 25 percent on average. Orders that typically took up to several hours to broker can now be broadcasted to and accepted by Bekins business partners in minutes.

- **IT development savings of $100,000** Through the use of advanced Web Services tools and technologies from IBM, which provided extensive sample code, Bekins shaved two thirds off the development cycle.

This saved an estimated $100,000 compared to building the solution from scratch. And, according to Mowen, "because TBE is based entirely on open standards technologies, including XML, it enables us to build a one-time solution that will work for all our business partners—both now and in the future. New business partners can connect into TBE almost immediately. This represents a major breakthrough in reducing the cost and time involved compared to an EDI or even a B2B e-business solution."

The anticipated results on the revenue side are even more impressive.

• **Increased revenue by $75M.** TBE enables Bekins to pursue more aggressively the opportunity to broker lower-margin customer orders to third-party shippers. It is expected to enable the company to drive significantly increased shipment volumes, growing its revenues by as much as $75M annually.

CHALLENGES AND RISKS

The greatest risk faced by Bekins was to not go ahead with an e-business solution to a major issue facing its business partners. Mowen emphasizes, "We were at risk of dissatisfying a major business partner if we did not quickly automate our prior telephone/fax-based brokerage process." In moving forward, Bekins faced both technical and relationship hurdles that it had to overcome. Mowen notes, "TBE represents a truly groundbreaking piece of work for Bekins and for our industry. The greatest challenge was to create a robust, secure, scalable, and fully-integrated solution incorporating a completely new Web Services architecture and a new development paradigm. Adding to the challenge, we had to do it in an extremely short time frame—just five months."

Mowen continues, "The major technical challenge was to ensure that all of the components of the Web Service would communicate with each other correctly, transmit-

ting the appropriate message at the appropriate time. This involved a number of things, including:

• Configuring the SOAP servlets to communicate with each other correctly.

• Learning how to define entry into the UDDI-equivalent registry.

• Learning how to create and extract the appropriate XML messages.

We addressed these issues by working with the sample code IBM provides for Web Services on the WebSphere platform. Our approach was to build a working prototype, which allowed us to learn how to orchestrate everything together, before refining and then launching our beta solution."

On the relationship side, Bekins found that involving its agents, although beneficial and necessary, delayed the actual completion of the applications. "Although the application development proceeded smoothly, on schedule, we discovered along the way that our business partners required additional training and extensive acceptance testing to become more comfortable with the new Web Services environment. Rather than launch prematurely, we postponed our beta test 30 days, launching our production version at the beginning of November, 2001."

Bekins is also facing the challenges of being a dynamic business. Recently, Bekins acquired a company that has numerous BEA WebLogic applications. After some consideration, Bekins decided to port these applications to IBM WebSphere Application Server. IBM's WebSphere Competency Center (WCC) is providing Bekins with assistance with a porting architectural review and boot camps, enabling Bekins to leverage IBM's porting methodologies, as well as the technical expertise, training, and tools of IBM's technical (services) consultants. Bekins is finding the key benefits to be less work for their IT team, lower risk, and a quicker implementation.
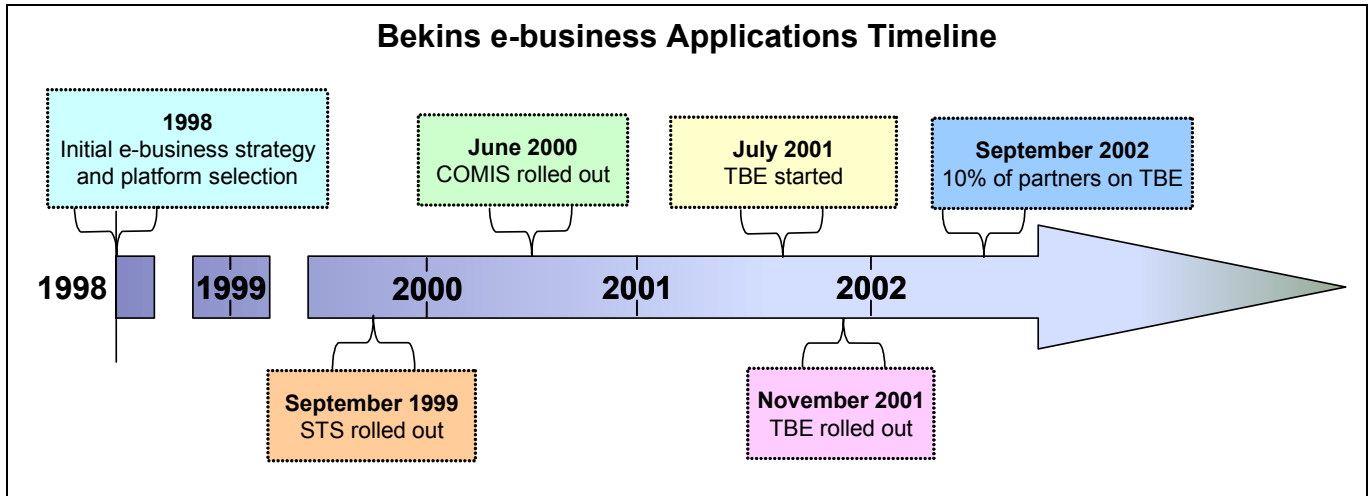
Bekins e-business Applications Timeline

1998
Initial e-business strategy and platform selection

June 2000
COMIS rolled out

July 2001
TBE started

September 2002
10% of partners on TBE

1998   1999   2000   2001   2002

September 1999
STS rolled out

November 2001
TBE rolled out

Illustration 4. The three phases of Bekins e-business applications were rolled out in 1999, 2000, and 2001.

FUTURE DIRECTIONS

Bekins's future plans are moving in both business and technical directions. According to Mowen, "We are now in the planning stage for Phase 2, where we will expand our online brokerage community to include new business partners with whom we were not able previously to do business. We also plan to provide pervasive computing capabilities in 2002, so that users can access the system from any communications device, including cellular phones and PDAs."

In addition, Bekins plans to use Web Services for integration of its internal systems. For most application integration, Mowen plans to define everything as objects and use XML for data transmission.

CONCLUSION: TBE AND THE BEKINS' CUSTOMER EXPERIENCE

TBE has been a resounding success for business partners and Bekins alike. Mowen notes, "TBE is delivering the full benefits our senior management anticipated. It is revolutionizing our business, opening up a whole new area of opportunity."

Even more important, is the branded experience of Bekins home delivery customers. Bekins promise to its customers is:

HomeDirectUSA's value-added home delivery services keep your customers happy, and you'll be looking good. After all, it's not a mere delivery that's at stake—it's your reputation and the potential for repeat orders.

TBE helps Bekins keep its promise to its customers and its customers' promises to their customers.
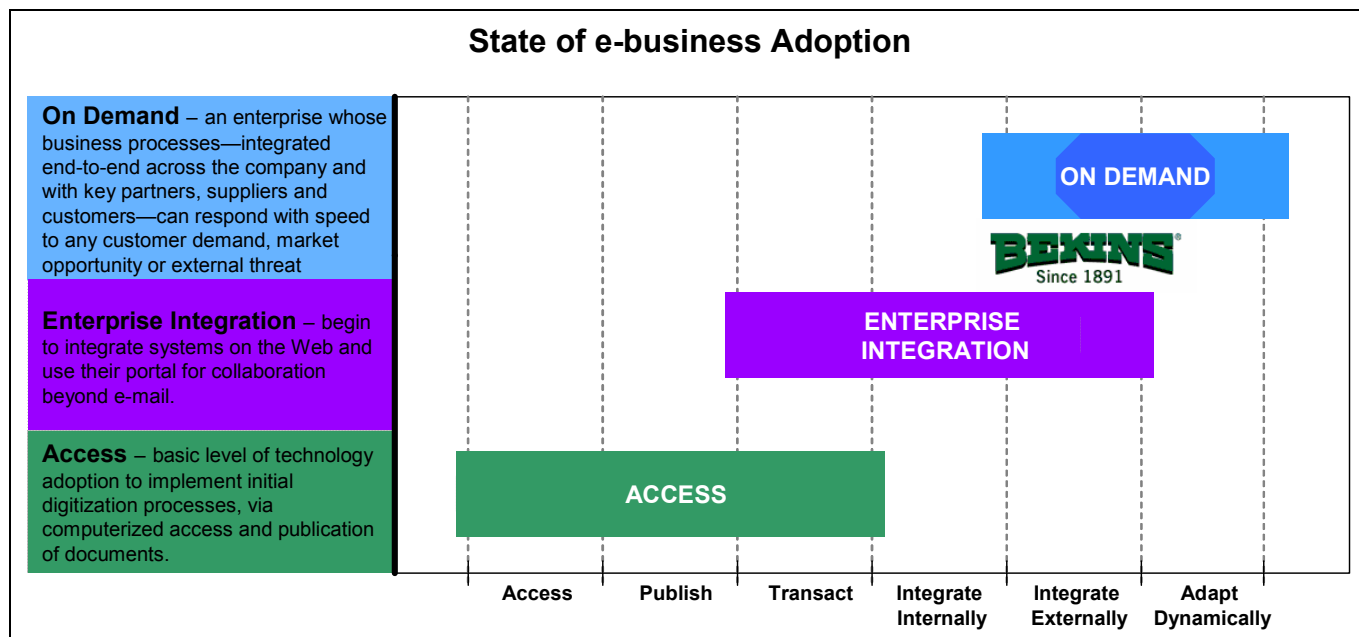
> *"TBE is delivering the full benefits our senior management anticipated. It is revolutionizing our business, opening up a whole new area of opportunity."*
> — *Randy Mowen*

State of e-business Adoption

On Demand – 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

Enterprise Integration – begin to integrate systems on the Web and use their portal for collaboration beyond e-mail.

Access – basic level of technology adoption to implement initial digitization processes, via computerized access and publication of documents.

| ON DEMAND |
| ENTERPRISE INTEGRATION |
| ACCESS |

| Access | Publish | Transact | Integrate Internally | Integrate Externally | Adapt Dynamically |

Illustration 5. Bekins has reached the On Demand stage of e-business adoption by being directly integrated with its business partners and is now creating a seamless network across its customers and business partners.

Evolving the Technical Infrastructure

- The core Web Services application developed using WebSphere Studio Application Developer servlets and EJBs. It runs under the latest release of WebSphere Application Server (Version 4) environment on a Windows NT server at Bekins.

- A Java client layer that resides on the business partner server. It is designed to run on virtually any server and any operating system.

- An XML message broker that communicates between Bekins' and its business partner's servers.

- SOAP servlets that translate the data coming from business partners as they accept a tender and pass it to a Java interface with Bekins' order management system. This mission critical back-end system runs on an IBM zSeries server, supporting DB2 databases.

- A private UDDI registry that tells the client application how to communicate with the SOAP servlets.

- An alternate WebSphere Portal Server piece, used to provide access to TBE via the Bekins Web site. It allows each business partner to customize its Web entry point.

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