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Customers.com® Case Study

United Parcel Service

Leveraging IT Investments to Win in e-business

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United Parcel Service

Leveraging IT Investments to Win in e-business

By Patricia B. Seybold

Executive Summary

United Parcel Service (UPS) currently offers the broadest range of package delivery services (air, ground, same-day, next-day, domestic, international) and handles the largest volume of packages (averaging more than 12 million per day) in the world. In the mid-'80s UPS began to invest heavily in information technology in order to remain competitive. In the late '90s the company has been able to leverage that information technology infrastructure to gain and to retain leadership in global package and document delivery as e-business changes the structure of the supply chain. UPS knows that its customers are beginning to use the Internet as a routine part of their inter-organizational data communications infrastructure. Therefore, the company has been aggressive in staying in the forefront of Internet and Web technology. The result is that UPS has become the logistics partner of choice for manufacturers and retailers worldwide.

UPS's core package tracking system is built on the world's largest IBM DB2 database. Its call center operations and customer service centers are built on IBM's AS/400 systems. UPS has been able to build its Web-based infrastructure on top of these core technologies to offer seamless, multi-channel customer self-service. While offering customers better service, UPS is saving more than $450,000 per day!

Customers.com Critical Success Factors in the UPS Story			
✓	Target the right customers	✓	Let customers help themselves
	Own the customer's total experience	✓	Help customers do their jobs
☆	Streamline business processes that impact the customer		Deliver personalized service
	Provide a 360º view of the customer relationship		Foster community
☆	= Featured in this discussion	✓	= Touched on in this discussion

CUSTOMERS.COM CRITICAL SUCCESS FACTORS ADDRESSED BY THE UPS STORY

✓ Target the Right Customers

UPS targeted business customers as its primary target market. UPS makes it easy for businesses to provide their business and consumer customers with real-time package-tracking information proactively via e-mail, the Web, and Touch-Tone phone.

☆ Streamline Business Processes That Impact the Customer

By making it easy for its business customers to ship packages, clear customs, track shipments and proactively notify their end customers, UPS streamlines the end-to-end business processes for its own customers and its customers' customers. Purchasers of goods shipped via UPS no longer even have to remember their tracking numbers or log onto the UPS Web site. Instead customers can simply check on the status of the order at the seller's Web site to receive an update on the current shipment tracking.

✓ Let Customers Help Themselves

UPS's customers can avail themselves of all UPS services electronically, many of them via the Internet. They can also use their Touch-Tone phones, use an integrated voice response (IVR) system, or talk to a customer service representative. In each case, these different customer touchpoints are linked directly into UPS's massive package-tracking database, which is housed on IBM mainframes in the world's largest DB2 application.

✓ Help Customers Do Their Jobs

UPS makes it easy for its business customers to select the correct shipping options, to track packages, and to proactively alert end customers about package deliveries.

UPS LAYS THE FOUNDATION FOR E-COMMERCE

Three parallel processes underly every supply chain: the flow of information, the flow of goods, and the flow of funds. Although flows of information and funds can be handled electronically, the movement of physical goods still needs to be handled in the physical world. In order to gain and to retain a leadership position in this essential service area, UPS had to track all its packages—from the high-margin air packages to its lowest-margin ground delivery—from pick-up, through transit to delivery. In the mid-'80s, UPS began investing in the IT infrastructure that would allow it to jump into a leadership position in electronic commerce.

Company Background

UPS is the world's largest express carrier and largest package delivery company, serving more than 200 countries and territories around the world. UPS delivers more than $3.2 billion worth of goods annually, which is more than 6 percent of the GDP. At more than $24 billion in annual revenues, UPS is also one of the largest privately held companies in the world. The company has 326,800 employees and runs a fleet of 157,000 trucks and 224 airplanes.

UPS is committed to being the leading player in logistics support, electronic commerce, and package and information distribution in the global marketplace. It provides a broader range of package delivery options than any other carrier, including guaranteed date and time-of-day deliveries, customs brokerage, and detailed status-tracking information for its more than 12 million packages per day.

UPS's telecommunications and transportation networks span the globe, and its information technology (IT) infrastructure is the glue that enables UPS to proactively serve its customers' needs. Let's take a look at how the company got that way.

Business Environment: Competitive Challenges

In the early '80s UPS's package delivery franchise was being challenged by competitors, such as Federal Express in the air shipping business and Roadway Package System (RPS) in ground delivery. At the same time, UPS was expanding its international operations. Because of this competition and Federal Express's aggressive marketing campaign, customers were becoming more demanding. Business customers, in particular, liked the ability of being able to track their shipments to their end customers—the business people and consumers they served.

Competitors like Federal Express were winning customers in the air freight segment of the transportation business by using their package-tracking technology as a competitive advantage.

CHALLENGE: TRACK LOW-MARGIN, HIGH-VOLUME TRAFFIC. Yet in the early '80s, it still wasn't obvious to UPS executives that their lower-margin, high-volume ground shipment business needed to be tracked in the same way that higher-margin air shipping was tracked. "After all," they said, "we deliver 99.9 percent of our packages on time to the delivery address that it's supposed to be delivered to. If you get your package where it's supposed to be and it's undamaged, why would you need to know where it is en route?" Before 1985 if you needed to check on the delivery of a package, you'd call the UPS customer service center and they'd put a "trace" on it. The trace resulted in having someone in the field office check the delivery sheets (which were filed by day/by driver/by location), "trace" the piece of paper that was signed, and then get back to the customer. At the time UPS was receiving trace requests for approximately 40,000 packages per day, only 0.4 percent of the 10 million packages they were delivering per day.

Business Benefits

- UPS saves almost $450,000 per day in customer support costs. 700,000 tracking requests are processed via the Internet. It costs UPS 10¢ per piece to serve that information via the Web vs. $2 to provide it over the phone. If only 1/3 of the customers who are checking the status of their deliveries on the Web called instead, the costs would be $443,333 per day.
- Business customers have become more loyal to UPS by using UPS's Web-based tools to let *their* customers select their shipping options and track their shipments. More than 10,000 companies have downloaded and integrated UPS's Web tools into their e-commerce offerings.

Meeting the Challenge by Investing in IT

Because of the competitive challenges UPS was facing in the '80s, and despite the conventional wisdom within the company that tracking domestic ground packages didn't make sense, United Parcel Service's then-chairman, Oz Nelson, decided that, for the company to continue to excel in operations, it was going to need to be a technology leader, not a follower.

Nelson decreed that UPS would invest whatever it took in information technology to assume a leadership position. He wanted UPS to become a high tech company. He wanted UPS to remain the leader in global package distribution. And he recognized that big investments in information technology would be required.

In the early '80s UPS had 90 people in its information technology operation. As soon as Oz Nelson raised the bar, Frank Erbrick, who was CIO at the time, began recruiting the lieutenants he would need to mount the required technology assault. In 1987 John Nallin, now UPS vice president in charge of Corporate Architecture, signed on as one of 12 systems managers, each of whom was given responsibility for a different set of IT initiatives.

UPS'S IT ORGANIZATION. As of 1998 UPS's IT staff had grown to 4,000 people. UPS has spent more than $10 billion on its information technology infrastructure since the early '80s. It is currently spending $1 billion per year on information technology, $100 million per year on customer automation solutions (software that is used by the customer to manage his shipping activities), and $250 million per year on telecommunications. There are typically about 800 open technology projects going at one time, ranging in size from $50,000 projects to $20 million projects. UPS has spent $14 million on its customer-facing Internet applications since 1995. This Internet investment (which is part of the $100 million per year customer automation solutions budget) has paid off handsomely, resulting in a quick-response Web site that receives more than 700,000 tracking requests daily.

International Operations: Proving Ground for New Technology

One of the first major systems initiatives the expanded IT staff undertook was to support the company's expansion into the international arena. The International Shipment Processing System (ISPS) became the proving ground for many of the concepts, such as smart scanning, that were later deployed throughout the company. Because international shipping (from the United States to foreign countries) is a higher margin business than domestic ground delivery, it made sense to begin investing

there. ISPS tracks all overseas shipments, speeds customs clearance (by pre-notifying customs of packages en route), and guarantees prompt delivery worldwide. ISPS smart scanning knows where each package is and where it's going. It tells the operator whether the package is heading in the right direction and provides sophisticated routing and tracking services.

Tracking the Delivery of Next-Day Air Packages

In 1989 UPS was ready to compete head-to-head with Federal Express by providing delivery information on its next-day/two-day air shipments. This was an incredible challenge, according to John Nallin. "The difficulty was that we didn't have one competitor. Although the most notable was FedEx, we also saw the threat of RPS and DHL. We had to try to raise the bar on all three of them." The solutions that UPS came up with had to work across the board—in its higher margin international and next-day and two-day air business, but also in its low-margin ground shipment business. "I remember arguing about the cost of a new label," Nallin recalls. The margins on ground package delivery were so low that the cost of the label, along with the labor required to do data entry or scan it, would be prohibitive."

UPS needed solutions that had to work across the board--both with its high margin air shipment business and its low margin ground shipment business.

First Step: Upgrading the Customer Support Environment

UPS began by upgrading the company's 60 customer service telephone centers with AS/400s. "We wanted to have the delivery information available to the 7,000 customer service representatives in all of our telephone centers by 8 a.m." So in parallel, Nallin's team designed customized scanning and imaging hardware and software. Package delivery records were collected and scanned at data collection centers around the country and transmitted to UPS's central data center in Mahwah, New Jersey. When a customer inquiry was received, the customer service representative could locate the delivery record online, merge it with a delivery confirmation letter, and fax it out to the customer. This delivery information system had a two-year project plan, but it paid for itself within 10 months, according to Nallin, by reducing the paper-handling that had been required to track package delivery in the past.

Second Step: Capture Delivery Data Electronically

Obviously, scanning a piece of paper for each package delivered was still not the most efficient solution, so UPS embarked on a multi-pronged effort to scan packages and to capture data at the major points of contact. The first initiative was to capture the customer's signature electronically when the package was delivered. By 1989, UPS had deployed its first hand-held wireless devices to more than 60,000 delivery personnel.

UPS was the first package-tracking company to digitize recipients' signatures and to make these available electronically for delivery verification. Business customers that are connected electronically to UPS through secure connections have access to the digitized signatures so they can pass them on to customers with inquiries.

Third Step: Capture Data at the Point of Shipment

By the early '90s UPS's technology and logistics team increased its focus on making it easy for its business customers to automate their dealings with UPS. This investment in automating customer solutions had a two-pronged benefit. First, by making it easier for customers to do business with UPS, the company could increase its business customers' loyalty. Second, by enabling customers to automate their own shipping processes, UPS would get better information at the point of shipment. Over the next several years, UPS rolled out a whole series of OnLine® Solutions for its large and small business customers. They included:

- UPS OnLine Host Access, the solutions used by the world's largest manufacturers and shippers. This is shipping and tracking software they can install on their systems to link directly into UPS's mainframe.
- UPS OnLine Professional, a complete turnkey shipping and tracking solution that is provided by UPS to its high-volume customers.
- UPS OnLine Office, shipping and tracking software that installs on a small business's local area network.

- UPS Teleship, a smart phone that UPS provides to customers who don't have a PC and modem in their shipping area. It is a phone that also provides shipping and tracking functions.

Fourth Step: Scan Packages En Route

UPS knew that, in order to be competitive in total package-tracking, tracking the pick-up and delivery of each package wasn't enough. Customers were beginning to be more demanding. For example, "The dressmaker shipped my wedding dress using your two-day air service, but my wedding is tomorrow" is the kind of request UPS was beginning to receive. So the company knew it would need to track a package at each step in its journey.

UPS began barcoding and scanning its premium air service packages in 1988. By 1996 UPS was barcoding and scanning every one of its packages at least three times during its journey through the UPS system. During the 1997 holiday season, UPS tracked close to 18 million packages per day. All of the information about each package is stored on UPS's mainframe systems and updated each time the package moves from place to place. This is the world's largest DB2 application.

In February 1997 UPS announced a new scanning capability. Not only are the packages themselves barcoded, but also everything that moves—each truck, each pallet, and each shipping container—is barcoded. As packages are moved under overhead scanners in the loading areas, they're automatically scanned. If the status of a package has changed, the scanner beeps, alerting the loader that an exception condition is associated with that package. This constant tracking technology enables shippers to catch packages and to reroute them when necessary. In addition to the overhead scanners, UPS distributed more than 17,000 wearable scanners to its shipping personnel. Unlike earlier hand-held wand scanners, this new technology, which was co-developed by UPS and Symbol, lets people load packages without wasted motion.

Since late 1994 UPS has been using the Internet aggressively to reach out to customers and to enable electronic commerce. UPS's Web presence is heavily reliant on the company's massive back-end, real-time database systems and applications.

UPS GAINS THE LEAD IN e-business

UPS executives see electronic commerce and e-business as a gigantic opportunity to reap the benefits of the billions of dollars they've already invested in a comprehensive information infrastructure. Why? Because the vast majority of commerce still centers on the exchange of physical goods. Whether manufacturers sell through distributors and retailers on the 'Net or sell directly to the end consumer, the raw materials still have to reach the manufacturer and the finished goods still have to reach the end customer. There is no way to disintermediate the transportation of physical goods. So UPS feels it is assured a long and healthy tenure as a premier supplier of global package distribution services. As John Menna, Marketing Services manager, explains, "The faster we can get everyone doing business electronically, the better it is for us."

However, in order to ensure that UPS remains the shipper of choice for goods purchased electronically, the company has to meet the demands of e-business customers to give them the information and control they need to offer highly customized service to their customers via the 'Net.

Using the Web for Customer Service

UPS has had a state-of-the art customer service Web site since late 1994. Like most companies, it began by posting on the site all of the information that customers needed most frequently. By mid-1995 UPS had enabled real-time package tracking, which quickly became the most popular use of the Web site. In 1995 the site received an average of 15,000 package tracking requests each day. By mid-1996 there were more than 30,000 requests per day. "Each of these Web requests saves me $3," reported then-CIO Frank Erbrick. By the end of 1998 package tracking requests were averaging 600,000 per day, and, in the peak of the 1998 holiday season, package tracking requests soared to more than 1 million per day! In the first quarter of 1999, package tracking requests on the Web were averaging 700,000 per day. Each tracking request costs about 10¢ compared with $2 for an operator-assisted call. However, UPS estimates that only

about one-third of the Internet requests would have gone through an operator if Internet tracking were unavailable. Therefore, UPS estimates conservatively that it saves roughly $450,000 per day!

UPS Web Site's Interactive Applications

What functionality has UPS added to its Web site over time?

- **PACKAGE TRACKING.** Each package is scanned at least three times en route. This information is available on the site within 30 minutes after each barcode scan.

- **TRACKING BY REFERENCE NUMBER.** The reference number is a shipper-supplied number that is stored in UPS's DB2 database, along with the UPS-supplied package-tracking number.

- **COST CALCULATOR.** The cost calculator is a Web-based application that lets the shipper calculate the cost of shipping packages based on the level of service, the weight of the package, and the origin and destination points.

- **TIME-IN-TRANSIT CALCULATOR AND MAP.** Customers can enter the origin and destination zip codes or postal codes and receive a guaranteed calculation of how long it will take a package shipped by regular ground delivery to arrive. The map lets customers enter the zip code for the point of origin and then actually see how soon the package would arrive in different parts of the country.

Two-thirds of all visitors to the UPS.com Web site are business users. Although package-tracking remains the most frequently used application (90 percent of visitors come to track their packages), 40 percent of visitors use the site to get shipping information, 50 percent of visitors to the site use the cost calculator, and 25 percent use the site to find a UPS drop-off location.

Status-checking is often the most popular Web-based application for customers (see Illustration 1). UPS's massive investment in tracking package-level detail for tens of millions of packages a day, from the least expensive ground deliveries to the higher margin air freight, gives the company a strong competitive advantage. UPS's competitors track a small percentage of their packages compared with the number of packages that UPS ships and tracks each day. By making that massive amount of detailed data available from its Web site in near-real-time, UPS has gained a competitive advantage—one it hopes to keep!

IBM's Value

IBM's definition of e-business is IT + Internet, that is, leveraging the power of existing systems and the opportunity of the Internet to transform a company's business.

IBM identifies four specific areas of value that it provides to its e-business customers:

✓	It's about business, not just technology.
✓	Start simple. Grow fast.
✓	Build on what you have.
✓	Expertise you can trust.

UPS was confronted with a serious competitive business issue: to offer package tracking to meet customers' expectations, even though its margins for ground shipment were much lower than competitors that were tracking air shipments.

UPS began, with IBM's help, by developing a basic package tracking application, which has evolved over time to track over 12 million packages per day—each scanned at least three times en route, with digitized signatures captured for each package delivery.

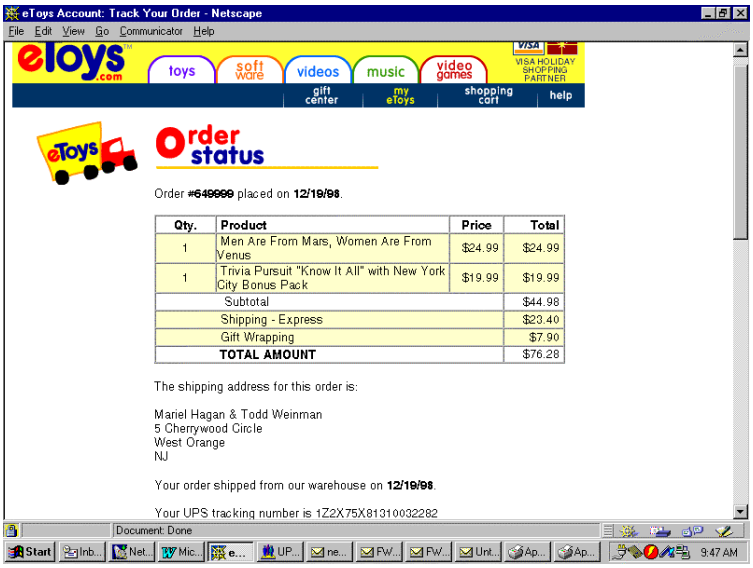
IBM's major contribution was providing the core technology and ongoing technical support for both the IBM ES/9000 systems and the DB2 database used for the package-level detail tracking that UPS provides, and for the IBM AS/400 systems used for its Customer Action and Response Systems worldwide. IBM Global Services helped UPS digitize signatures and store them in its DB2 system. IBM also provides the Internet Emergency Response Service that UPS uses to detect any Internet intrusions.

UPS was able to build on its core systems adding Web access for customers by interfacing its Web site directly to its back-end systems.

Reaching Out to e-businesses

Not content to lure end customers to its site, UPS has also aggressively recruited manufacturers and retailers to integrate its Internet-based applications into *their* e-commerce sites. UPS provides a variety of easy-to-download Internet tools that e-businesses can integrate directly into their applications (see Illustration 2). These include:

UPS Status-Tracking



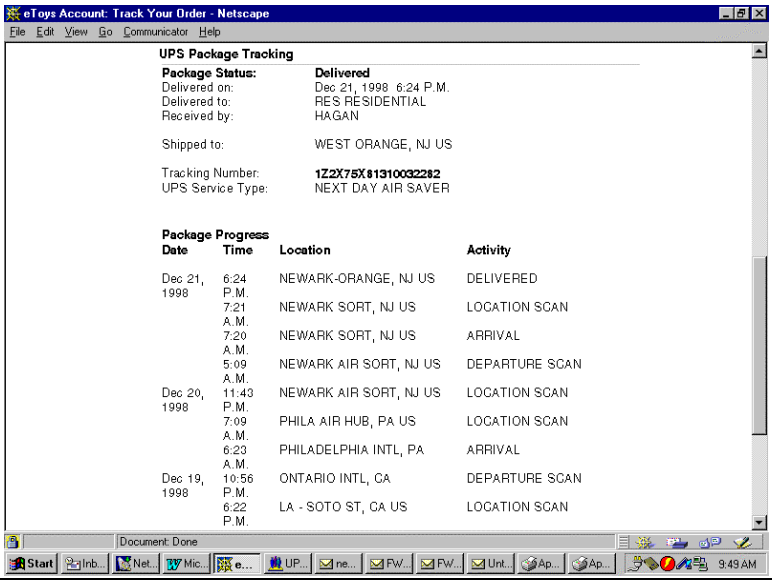


Illustration 1. Over the Christmas holidays, I bought some games from eToys (etoys.com). It was important to me to know whether or not they had arrived before my stepdaughter and her husband went away on vacation. I was delighted that I was able to go back to the eToys site and track the status of my gifts as they made their way across the country. From a customer-service standpoint, this is much better than sending the customer back to UPS with a tracking number.

- **GLOBAL PACKAGE TRACKING.** End customers can track any package shipped anywhere in the world without leaving the merchant's Web site.

- **QUICK COST CALCULATOR.** Customers in the continental US can use the cost calculator from the merchant's Web site to estimate the cost of shipping packages using UPS service to worldwide destinations.

As of December 1998 more than 10,000 companies had downloaded the Internet tools software from the UPS site.

PROACTIVE E-MAIL NOTIFICATION. One of the most popular tools that business customers value from UPS is the ability to offer their customers proactive e-mails notifying them of the status of their packages. Any UPS customer can opt to use UPS's free proactive e-mail notification service, which will send advance shipment notifications, actual shipment notifications, and delivery notifications to the end customer by e-mail.

EVOLVING THE TECHNICAL INFRASTRUCTURE: ENABLING TECHNOLOGIES

UPS's first tracking system, the International Shipment Processing System (ISPS), was implemented as a centralized system, running on IBM mainframes using DB2, and it has been running in production since 1988. The application won the *ComputerWorld* Smithsonian award for excellence in 1991, and it is still considered to be an advanced system.

The early image-capture technology that UPS developed for deployment in 1989 consisted of Bell & Howell cameras attached to PCs. These PCs transmitted the images of the scanned labels from hundreds of locations around the country to UPS's data center, then in Paramus, New

UPS Internet Tools

Illustration 2. From UPS's Web site businesses can download Web-based applications that will enable their customers to estimate shipping costs and track their shipments without ever leaving the merchant's Web site.

Jersey. At the time IBM's DB2 database didn't handle images, but, with the help of scientists from IBM and Technikron Communications in Berkeley, California, the UPS team figured out a workaround that broke each image into small, bite-sized chunks that could be transmitted, stored in the database, and re-assembled on the customer service representatives' AS/400 systems at the receiving end.

In 1993 UPS's DB2-based TotalTrack system went live. This system contains the package-level detail for every package shipped worldwide. The world's largest DB2 application, this package-level detail database is housed on three IBM ES/9000 systems, Model 9672. It is mirrored and load-balanced across UPS's two data centers (Mahwah, New Jersey and Atlanta, Georgia), using a tiered T3 connection that lets UPS increase bandwidth dynamically. UPS's 14 mainframe systems process 80 million transactions per day and use more than 33 terabytes of DASD. The TotalTrack system provides real-time package tracking information to UPS and its customers worldwide. Customers are connected to the UPS mainframe systems through UPS-supplied host access software, through UPS-supplied application programming interfaces, and via the Internet.

Deploying a Mobile Radio Network

Starting in 1988 UPS began building and deploying what has become the most comprehensive mobile radio network available today. The company equipped each delivery truck with a cellular antenna, a cellular telephone modem, and a hand-held Delivery Information Acquisition Device (DIAD). UPS convinced a number of large cellular suppliers to band together into a virtual organization that could serve UPS's needs for seamless wireless service and integrated billing. Several telecommunications companies put together a consortium to serve UPS's business and recruited additional wireless carriers to complete US coverage. This consortium also provide a consolidated billing system and a single contract for maintenance.

Evolving the Delivery Information Acquisition Devices

UPS has gone through three generations of hand-held devices since 1989 and has spent more than $500 million to date on these DIADs. The company expects to spend an additional $50 million per year over the next five years. The first version, DIAD I, was essentially an electronic clipboard. It enabled the delivery personnel to log each package they delivered and picked up and to collect and digitize a signature from the customer representative who received and signed for each shipment. The second version, DIAD II, was introduced in 1993. It was smaller, lighter, and much more reliable. More than 100,000 of these devices are in use today by UPS personnel; about 8,500 of them are used by drivers outside the United States.

The next model, DIAD III, jointly developed by Motorola and UPS, will be deployed in 1999. DIADs communicate with UPS via data radio and link into UPS's worldwide network. The DIAD III is the first device to contain a radio providing two-way communications. So, in addition to transmitting the package delivery information, each driver can now receive new instructions, emergency messages, and requests for additional pick-ups and deliveries through his or her DIAD. Digital signatures are uploaded at the end of each day.

UPS's Customer Service Infrastructure

UPS uses IBM AS/400 systems for most of its customer-touching applications. More than 230 AS/400s are deployed throughout UPS. These are used for the company's Customer Action and Response Systems (CAReS); for its international Customer Service Telephone Centers; for the Customer Management System, which allows customers to access UPS through the Internet; and for its Flexible Data Capture system, which captures the input from the hand-held DIADs.

Connecting to the Internet

UPS has successfully interconnected its massive mainframe-based applications transparently to the Internet. The front-end Web sites are delivered on Unix servers using off-the-shelf e-commerce software and a lot of custom-coding. By using its own standard APIs into its back-end systems and by dynamically load-balancing its back-end systems, UPS has been able to handle the peak loads as hundreds of thousands of customers hit its transactional systems each day.

Internet Shipping Systems: Getting Customers Connected and Handling Transactions Electronically

In early 1998 UPS's OnLine Marketing group, headed up by John Menna, targeted a key market segment: infrequent shippers. UPS knew that it had 600,000 primarily small to medium-sized businesses that used UPS services infrequently. These were the companies whose shipment frequency and volumes didn't justify the use of one of UPS's dedicated online shipping solutions or software packages. Menna's group set out to make it easy for this target market of infrequent shippers to do business with UPS electronically via the Internet. The functionality scheduled for the first release of the Internet Shipping Solutions capability included:

- An address book with the ability to maintain up to 300 frequently used entries
- Shipping history maintained for each customer's account for up to 90 days
- Automatic calculation of shipping charges based on published rates
- The ability to customize each company's shipping preferences

The first version of the Internet Shipping software was released for internal alpha testing within UPS in April 1998, with credit card billing and air shipment. Version 1.0 of the product was made available to selected customers in March 1999. This initial release gave customers increased security, allowed them to set up account billing, and included ground as well as air service, with both scheduled pick-up and delivery options.

Summary

UPS has clearly taken the lead in e-business. By leveraging its massive investment in package tracking technology, and making all of its operational systems transparently accessible to businesses and their end customers, UPS has gained market share and increased customer loyalty.

In the past UPS has provided turnkey hardware and software solutions to its key business customers. Now, the Web provides an even more cost-effective development and deployment platform for UPS's customer automation solutions. Starting with its small business customers and moving onto larger shippers, UPS is able to leverage the Internet to cost-effectively give its business customers the ability to do their own shipping, customs clearance, proactive delivery notifications, customized billing, and package tracking.

UPS has become a leader in electronic commerce and e-business by providing Internet-based software tools that allow e-tailers and manufacturers to link their Web sites directly into UPS's back-end systems.

LESSONS LEARNED FROM THE UPS STORY

1. If you want to beat the competition in the global information economy, you have to be willing to invest heavily in information technology and to continue those investments. UPS has placed a high strategic value on its IT infrastructure since the mid-80's. By investing in and continuously evolving its IBM DB2-based core package-tracking applications, UPS has built a core set of information assets that are hard to beat (particularly with the volume of business that UPS does). As a result the company has gained and maintained its lead in global package delivery.

2. Customers value transparency. They want to be able to see into the business processes that affect them and their customers. The addition of the Web-based interface to its IBM-based back-end package-tracking systems has enabled both shippers and recipients to see into the logistics and delivery process.

3. If you are tackling a large, complex business process, like tracking packages worldwide, work on streamlining each piece of the process in an integrated fashion and continuously improving each sub-process as technology improves.

4. It's possible to build an Internet-based solution that will accommodate millions of transactions per day by layering the Web front end onto a robust, scalable, transactional back-end system that can support high volume loads.

TAKEAWAYS FROM THE UPS STORY

1. **LEVERAGE YOUR BACK-END TECHNOLOGY INVESTMENTS.** UPS provides a dramatic example of how strategic technology investments can be leveraged to gain and maintain competitive advantage by connecting those strategic back-end systems directly to the Internet. In UPS's case the company was able to leverage its investment, both in its IBM ES/9000 systems and in its AS/400 customer service systems, to let customers serve themselves. UPS customers can use the Web to estimate shipping costs, request pick-ups, track shipments, and request proof of delivery (digitized signatures) from the same back-end systems that the UPS customer service representatives use.

2. **GIVE CUSTOMERS TOOLS.** Think of ways you can provide your business customers with Internet-based tools that they can use to make it easy for *their* customers to do business with them.

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