



# Delta Air Lines: Customer Service Reaches New Heights Via Wireless Technology

## An IDC e-business Case Study

### THE RESULTS

*“Great customer service is what Delta has been known for historically, and that's what we want to continue to be known for. Our wireless solution places us squarely in the role of industry leader, which is where we want to be.”*

### THE GOAL

NEAR-TERM:	Maximize customer satisfaction through a broader range of customer information channels.
LONG-TERM:	Establish Delta Air Lines as a leader in providing value-added customer service solutions.

### THE COMPANY

VITALS:	Based in Atlanta, Delta Air Lines employs more than 80,000 worldwide. Its operations include Delta, Delta Express, the Delta Shuttle, and the Delta Connection.
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### THE SOLUTION

PROFILE:	Wireless Web-based Customer Information System
DEPLOYMENT TIME:	Approximately 2 months
IMPLEMENTATION TEAM:	IBM Global Services, IBM Global Services Pervasive Computing Group, and Delta Technology



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In today's hotly contested airline industry, increasing customer retention has emerged as a key strategic imperative, and top-notch customer service programs designed to achieve this have become an absolute requirement. By providing its customers with best-of-breed, Web-based customer care capabilities, Delta has emerged as the industry's customer service innovator. Delta's most recent customer service initiative was the development of an interactive wireless platform for delivering customer service data over the Web. Delta moved toward interactive as a result of rapid advances in wireless technology, which enabled Delta to offer customers information through a broad array of delivery devices, such as Web-enabled wireless telephones and wireless handheld devices.

### The Solution

#### Software

- IBM VisualAge for Java

#### Services

- IBM Global Services
- IBM Global Services Pervasive Computing Group

#### Benefits

- Higher customer satisfaction
- Increased customer retention
- Reduced customer service costs.
- More efficient allocation of customer service resources.

In addition to the opportunities inherent in being a first-mover in wireless customer service space, Delta was also cognizant of the challenges involved, especially those related to the technology's relative immaturity. Despite these risks, Delta opted to move aggressively—developing expertise and working out kinks along the way. With these risks in mind, Delta was acutely aware of the strategic significance of choosing a Pervasive Computing solutions provider with a sufficient depth of resources and expertise to guide Delta at a critical juncture. Delta ultimately selected IBM Global Services because of the strength of their Pervasive Computing Group, which it regarded as a thought leader in the area of wireless computing and communications.

Known as Delta Wireless, the solution delivers access to personal travel itineraries, flight arrival/departure and gate information, and Delta flight schedules from the Delta Web site to a variety of devices, including Web-enabled wireless telephones, and the Palm VII™ hand-held organizer. The solution was developed by IBM Global Services and Delta Technology, with the latter performing the business coding portion of the development effort. The IBM Global Services development effort used IBM's VisualAge for Java, and was heavily reliant on Java servlets and Extensible Markup Language (XML) technology. The IBM/Delta team chose XML technology to streamline its future development efforts by eliminating the need to write code specifically for different kinds of devices.

Improved customer satisfaction, and the derivative benefit of increased customer retention, represent the most significant top-line benefits of the Delta Wireless solution. Delta also sees the Delta Wireless solution as improving the efficiency—and ultimately reducing the cost-of its internal customer service infrastructure. Delta expects alternative information delivery vehicles such as wireless to enable it to offer more tiered and targeted levels of service, consistent with its strategy of offering its customers to choose from the maximum number of information options. Overall, Delta sees its initial trust in IBM's depth and expertise as well-founded and—by virtue of the success of the engagement—strengthened. Going forward, Delta expects IBM to play a major role in its ongoing evolution as an e-business.

### ► Business Environment

With major hubs in Atlanta, Cincinnati, Dallas/Fort Worth, New York City (Kennedy), and Salt Lake City, Delta Air Lines ("Delta") has consistently been a top performer in the hyper-competitive U.S. airline industry. While lauded as "Airline of the Year" (Air Transport World magazine) and "Best-Managed Major Airline for 1999" (Aviation Week & Space Technology magazine), Delta has also excelled in the eyes of its customers, largely on the strength of its innovative customer service programs.

### e-business Challenge Delta Air Lines

"We saw the combination of rapidly-increasing functionality—and a critical mass of wireless device usage—as an indicator of the viability of wireless information delivery. We saw a real strategic value in taking advantage of this new interactive technology, and we wanted to establish ourselves as a leader wireless technology innovator in the airline industry—instead of being a fast follower."

—Bill Reeves, General  
Manager of e-Commerce

With customer retention one of the key competitive differentiators in the airline industry, top-notch customer service programs have become an absolute requirement. Delta's strategy for raising the bar on customer satisfaction has been to create value-added services for its customers that enhance their overall Delta experience. As Bill Reeves, Delta's General Manager of e-Commerce explains, developing an advanced customer communications platform has been the central element of Delta's customer service strategy. "Our customer service strategy revolves around giving the customer the information they need any time they need it—and any place they need it. We see this as an essential ingredient to delivering the highest-value information to our customers."

### ► e-business Challenge

While Delta has invested heavily in developing best-of-breed, Web-based customer care capabilities, it has continually sought ways to push the limits in terms of advanced functionality. As Reeves notes, rapid advances in wireless technology have opened the door for a new generation of innovative customer information delivery vehicles, including Web-enabled wireless telephones and personal digital assistants (PDAs), such as Palm™ devices. "We saw the combination of rapidly-increasing functionality—and a critical mass of wireless device usage—as an indicator of the viability of wireless information delivery," says Reeves. "We saw a real strategic value in taking advantage of this new interactive technology, and we wanted to establish ourselves as a leader wireless technology innovator in the airline industry—instead of being a fast follower."

While embracing the role of wireless innovator, Delta was also cognizant of the challenges involved in deploying an immature technology. However, as Reeves points out, Delta's goal of deploying a cutting edge solution precluded it from sitting on the sidelines until the kinks of the technology were worked out. "Our view was that it would be important to understand the ins-and-outs of interactive wireless early, before our base of users grew to several hundred thousand," says Reeves. "This is why we decided early on to take a bold approach."

### ► First Steps

While Delta's interactive wireless initiative, known as Delta Wireless, was conceived and supported by Reeves's organization (a unit of Distribution Planning), he sees the Delta customer base as the real impetus behind the project. "We remain consistently plugged into customer feedback, and our decision to implement was a direct response to the need expressed by our customers," says Reeves. "Our customers were telling us that they wanted pertinent, reliable accurate information—anytime, anywhere, anyplace that they wanted it. The wireless devices filled that need."

### Key Decision Criteria In Selecting IBM

"We selected IBM Global Services because of the strength of their Pervasive Computing Group. We wanted to be working with a company that was not only on the leading-edge, but was also one of the thought leaders in the area of wireless computing and communications."

—Bill Reeves, General  
Manager of e-Commerce

In addition to its customer feedback, Delta also sees its central position in the "information chain" as a strategic rationale for deploying interactive wireless technology. Reeves explains: "When people are looking for information, there are two main variables that they are looking at. The first is time sensitivity—'can they wait for information or do they need it immediately?'—and the second is the number of sources," Reeves notes. "The fact that Delta knows the information first—and is one of the few information sources for information such as flight delays—ideally positions us to be the source. We see interactive wireless devices as the ideal mechanisms over which to deliver this information."

### ► Decision Criteria and Process

Given the immaturity of interactive wireless technology—and the ambitiousness of its customer service strategy—Delta viewed its choice of a wireless solutions provider as strategically critical. According to Reeves, Delta's goal of creating a robust leading-edge solution dictated that it choose a technology partner with a sufficient depth of resources and expertise—and was the leading factor behind its choice of IBM Global Services as the lead solutions provider. "We selected IBM Global Services because of the strength of their Pervasive Computing Group," says Reeves. "We wanted to be working with a company that was not only on the leading-edge, but was also one of the thought leaders in the area of wireless computing and communications."

Delta's choice of IBM Global Services to lead the Delta Wireless initiative was also influenced by its existing relationship with IBM. "IBM's long record of successful engagements with Delta further reinforced our confidence in their ability to understand our business," says Reeves. "It also instilled confidence in IBM's ability to interact closely with our Delta Technology team [which was expected to play a key role in helping to build the solution] as well as any other vendors that would be contributing to the development of the solution. From the very start of the implementation, our instincts in this area proved sound."

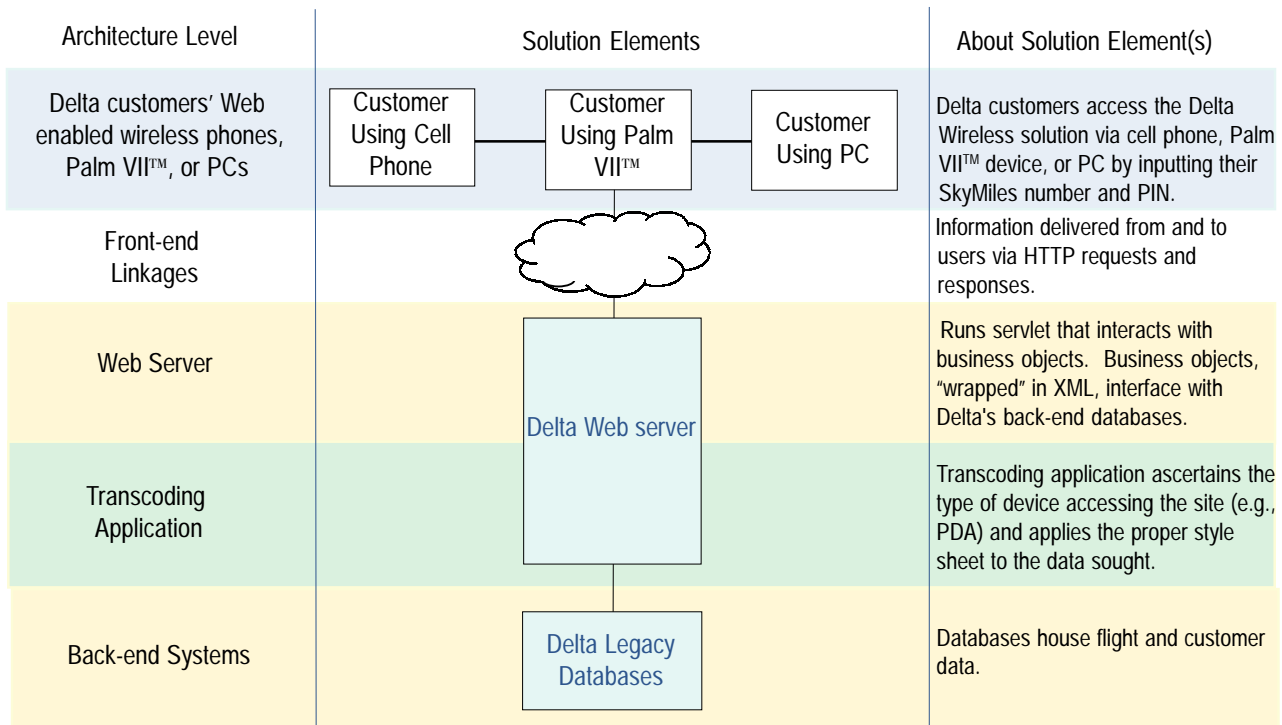
## Solution Profile and Implementation Strategy

### ► The Delta Wireless Solution

The Delta Wireless solution's core function is to transmit data from the Delta Web site to a variety of devices, including Web-enabled wireless telephones, and the Palm VII™ hand-held organizer. Examples of data transmitted via the service include personal travel itineraries, flight arrival/departure and gate information, and Delta flight schedules. The solution, developed using IBM's VisualAge for Java, is heavily reliant on Java servlets and Extensible Markup Language (XML) technology. In the case of the Delta solution, the use of XML (which, like HTML, is a markup language) allowed IBM to display the same data in a number of ways, including within a Web-enabled wireless telephone or Palm VII™ display. Within XML, IBM Global Services employed Extensible Style Language (XSL) style sheets to control design, display, and output of the data. The solution's user interface was developed by Modem Media. The application business logic was developed by Delta Technology.

According to Erik Fiedorowicz, an IBM Global Services developer that worked on the Delta engagement, the focal point of the solution is its ability to

**Figure 1:**  
**Basic Architecture of the Delta Wireless Solution**



Source: Delta and IDC



"transcode" an HTML message, that is, to convert it to a predefined format for use on a pervasive computing device (i.e., Web-enabled wireless telephone or Palm VII™). Upon logging on, the user's device sends an HTTP request to the Delta server, where the request triggers a Java servlet (created by the IBM Global Services team of developers) that resides on the Delta server. This Java servlet interacts with business objects written by Delta Technology (also on the Delta server), which in turn interfaces with Delta's back-end databases (depending on the application being used).

These business objects are then "wrapped" with an XML layer and sent to a transcoding application layer (also developed by the IBM Global Services team). At this point, the transcoding application ascertains the type of device accessing the site (e.g., a Web-enabled wireless telephone) and applies the proper style sheet to the data sought. The transcoding application then formats the data and sends the data as an HTTP response back to the client. "This solution really shows the power and versatility of XML for application developers," says Fiedorowicz.

Reeves concurs with Fiedorowicz on the value of developing the Delta Wireless solution with XML. "Our use of XML was part of a very forward-looking strategy designed to streamline our future development efforts," says Reeves. "Instead of trying to write code specifically for each device, we produced the data in XML format and used XSL style sheets to deliver the information to

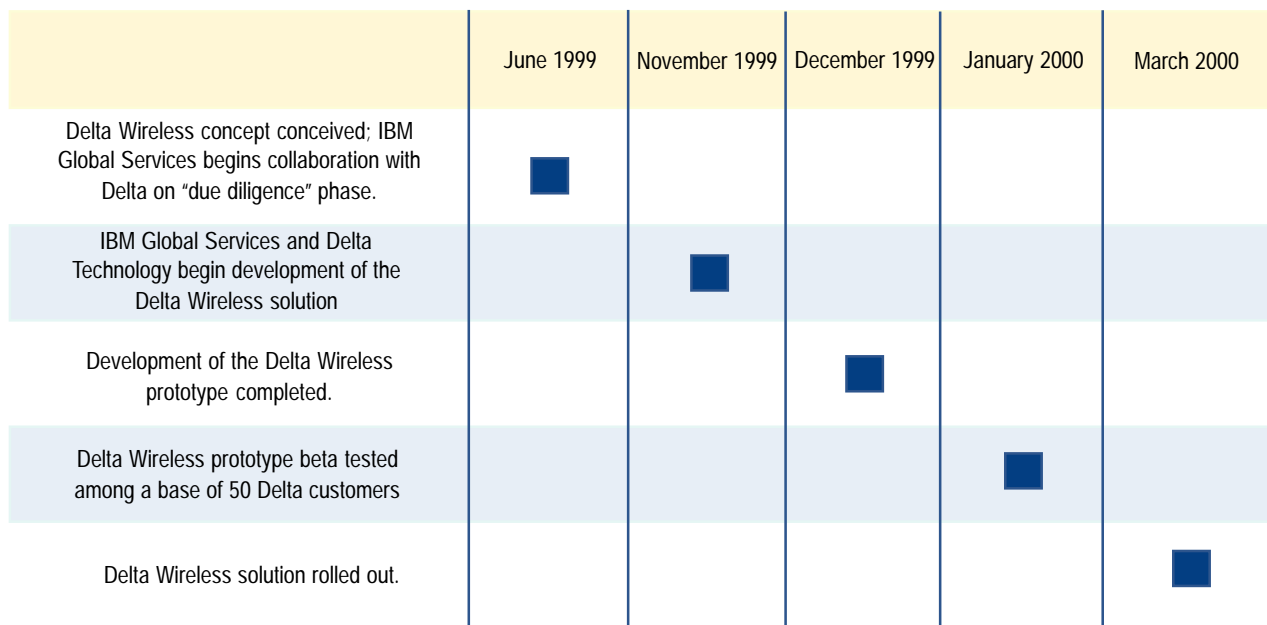
specific devices. So in the future, as devices converge and we add additional devices, we'll be able avoid having to rewrite the XML code and instead produce a new XSL style sheet that will deliver the information to the specific device."

### ► Implementation Approach and Timetable

In deciding to work with IBM Global Services on its wireless initiative, Delta sought a solutions provider that could help it navigate the still-young field of interactive wireless data over the Web. After Delta Wireless was conceived in the early summer of 1999, IBM became involved in the project with its initial role being to help identify and examine the range of device options at Delta's disposal. As Reeves points out, one of the big questions that needed to be answered in this due diligence phase was the nature and range of the devices to be supported.

Another key function of IBM Global Services in Delta's due diligence process was to survey various departments across the Delta organization to gauge understanding of the Pervasive Computing concept as well as to solicit input from throughout the company. According to Toby Pratt, Delta's Project Coordinator, the interviews—conducted by IBM Global Services personnel—led to a more effective implementation process because it secured valuable input from throughout the company. "The findings from this interview phase were critical in helping us come up with the right solution," says Pratt. "It also really helped Delta to both establish and get out the message of what it was doing in

**Figure 2:**  
**Implementation Timetable for the Delta Wireless Solution**



Source: Delta and IDC





the Pervasive Computing space."

After the due diligence phase, which lasted for approximately three months, IBM Global Services and Delta Technology began the actual development of the solution in early November 1999. The IBM Global Services implementation team included members of the Travel and Transportation Industry and Pervasive Computing Groups, respectively, each addressing different segments of the project. According to Fiedorowicz, IBM's implementation strategy was to break into two teams, each with a separate focus, under the management of a single project manager who would matrix the two teams. "The first team focused on setting up the existing Web environment to prepare for the introduction of wireless services delivered via XML," says Fiedorowicz. "The second team, using VisualAge for Java, actually wrote the XML interfaces and servlets to interact with the existing services already deployed on the site."

The first Delta Wireless application to be developed was delivery of flight information to a Web-enabled wireless telephone, Palm VII™, and Web browser. This was followed soon after by the flight schedule and flight itinerary applications. For each of these applications, the team's approach was to develop an XSL style sheet to format the data for the wireless devices, port the application onto the server and then test it on emulators. By early December,

1999, the applications had been thoroughly tested by Delta Technology and Delta e-Commerce, and then ported to a production server, allowing them to be tested on real devices. The development process was completed at the end of December, representing an overall development cycle of approximately two months.

As Delta's Pratt points out, integrating the Delta Wireless solution with Delta's legacy systems proved to be a challenging aspect of the implementation process. A big part of the challenge, he says, stems from the complexity of Delta's legacy databases. "From a data standpoint, airlines in general are a unique breed because their core reservation systems have been around for many, many years," says Pratt. "So we knew that it would be a challenge for IBM to understand how our databases worked, and how they would need to be integrated to make the solution successful. With the help of Delta Technology, IBM was able to gain a clear understanding of the Delta infrastructure in a short time and build a superior solution. The team was able to reuse existing logic to interact with the infrastructure."

Following the completion of the development process, the Delta Wireless solution was beta tested among a group of approximately 50 Delta frequent fliers. After approximately two months, Delta surveyed the beta testers to gain their feedback on areas of possible improvement. After subsequent modifications (mainly related to the order in which data was presented to the user), the system was rolled out on March 27, 2000. "Given the complexity of the solution, we put it together very quickly," says Pratt, "which is a complement to all parties involved."

## Business Results

While Delta's Reeves expects the Delta Wireless solution to provide a wide range of benefits, he clearly sees the area of customer satisfaction as ground zero. "Airline travel is an extremely competitive business, and we are trying to provide superior customer service," says Reeves. "Great customer service is what Delta has been known for historically, and that's what we want to continue to be known for. Our wireless solution places us squarely in the role of industry leader, which is where we want to be."

While customer satisfaction represents the core goal of Delta Wireless, Delta also sees numerous related benefits. Among them: "Customer retention will absolutely be strengthened," says Reeves, "and this of course will have implications on the cost side—since it's always less expensive to keep existing customers than to acquire new customers—as well as the revenue side."

Reeves also sees the Delta Wireless solution as improving the efficiency—and ultimately reducing the cost—of Delta's internal customer service infrastructure. "By providing our customers with an alternative information delivery channel, and even more options [than our Web site] to do self-service, we're making it less necessary to make a phone call, which is the least convenient and efficient way of getting information," notes Reeves. While Reeves is quick

**Figure 3:**  
**Overview of the Delta's Business Results Achieved**

Business Process Area	Nature of Benefit	Description or Metric
Customer Service	Improved Relationship	Increased satisfaction among Delta customers
Customer Service	Cost reductions	Lower call center costs resulting from fewer telephone-based queries
Customer Service	Increased efficiency	Improved allocation of Delta's internal customer service resources
Sales and Marketing	Improved Relationship	Increased loyalty resulting in increased customer retention

*Source: Delta and IDC*

to point out that Delta has no expectations of eliminating telephone-based customer service, he expects alternative information delivery vehicles such as wireless to enable Delta to offer more tiered and targeted levels of service. "A key element of Delta's customer service strategy is to offer as many options as possible to our valued customers, and to allow them to make the choice of information channels."

Since being introduced to Delta's customer base in March, 2000, Delta Wireless has experienced a continuous growth in usage. Reeves notes that arrival and departure information has thus far proven to be the most heavily used application. "We find it very encouraging that utilization of the wireless solution shows a clear up-tick when there is severe weather coming through, especially in the number arrival departure queries coming through," says Reeves. "This gives us a clear indication that our customers recognize the value of the solution."

**Figure 4:**  
**Expected Contribution to Delta ROI by Value Chain Segment**

Cost Reduction or Cost Avoidance	■	
Improved Productivity	■	
Reduced Cycle Time	■	■
Strengthened Relationship/ Increased Satisfaction		■
Enhanced Revenue Opportunity		■
<b>Value-Chain Segment =&gt;</b>	<b>Employees</b>	<b>Customers</b>

■ Major Contribution  
 ■ Moderate Contribution

Source: Delta and IDC

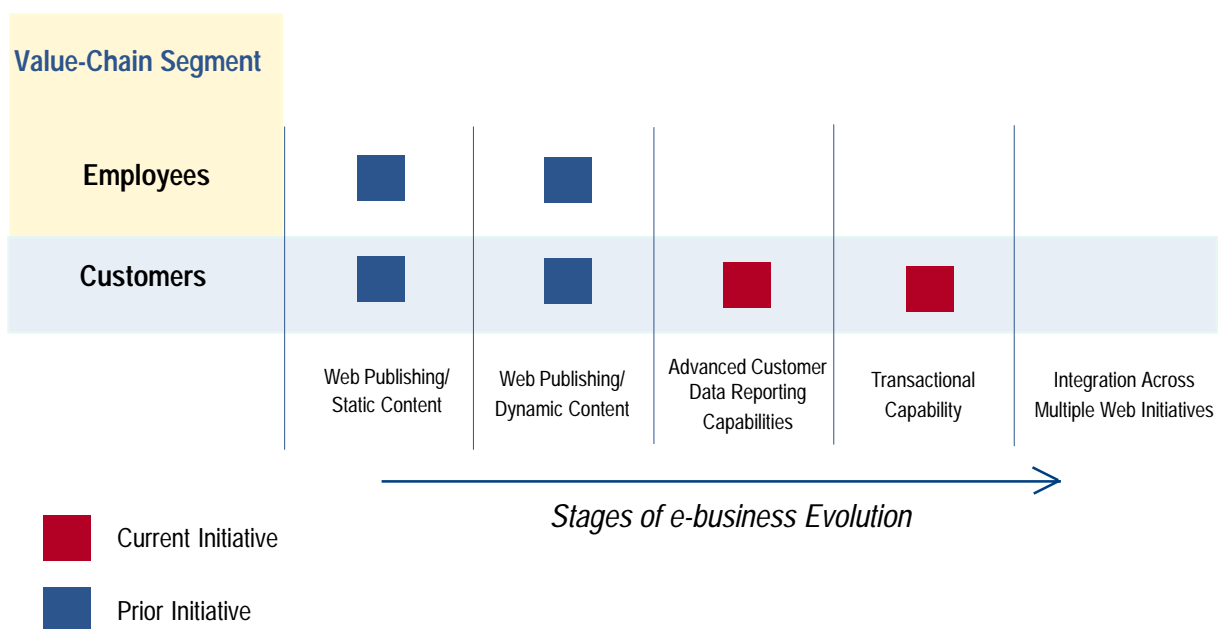
## Case Epilogue

In retrospect, Pratt sees Delta's initial trust in IBM's depth and expertise as more than well-founded and—by virtue of the success of the engagement—strengthened. "It was refreshing to work with IBM because they see Pervasive Computing as a business tool," says Pratt. "They looked beyond the gizmo aspect of wireless devices and instead focused on the practical business benefits that the technology could bring to Delta customers. We found this refreshing."

Pratt, who was Delta's main point of contact with the IBM Global Services team, was similarly impressed with IBM's project management acumen. "The IBM project manager used project management techniques that ensured that we always had a clear idea of where we stood in terms of projected timetables," says Pratt. "The project manager was in constant communication with both the IBM and Delta Technology team to be sure that all parties understood what was going on."

Pratt reserves his highest praise for the depth of IBM's Pervasive Computing expertise, arguably the single most important reason IBM was selected. "IBM was a great resource as far as the technology," says Pratt. "They were able to answer all of our technology questions on the spot or were able to quickly and vigorously find the IBM resources to get us answers."

**Figure 5:**  
Delta's e-business Evolution and Value Chain Focus



Source: Delta and IDC

**IDC Market Focus**  
**The Worldwide Market**  
**for Smart Handheld Devices**

“Worldwide shipments of handheld companions (including Palm™ devices) were estimated at 5.4 million units for 1999, driven by the extremely healthy personal companion segment, which represents over 65% of the handheld companion segment. U.S. shipments of all smart handheld devices, including handheld companions, are expected to grow at a CAGR of 28.5%, reaching 7.1 million units by 2003.”

—Abstracted from the December 1999 IDC Report *“Pocketful of Palms: The Smart Handheld Devices Market Forecast Update and Outlook, 1999-2003”*

Going forward, Delta's Reeves expects IBM to play a major role in its ongoing evolution as an e-business. "Through the help of IBM, we have established Delta as a leader in Web-enabling one of our most strategic assets—our customer service solutions," says Reeves. "I would say that IBM is really a pivotal player in our team effort to become a state-of-the-art e-business."



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