MeadWestvaco

IBM

MeadWestvaco Papers Group:

On a Roll with an IBM Technology Solution

An IDC e-business Case Study

THE SUBJECT

Based in Stamford, CT, MeadWestvaco Corporation is a leading global producer of packaging, coated and specialty papers, consumer and office products and specialty chemicals The company has annual sales of $8 billion and approximately 30,000 employees worldwide. The company's Papers Group is profiled in this case study.

THE GOAL

Having recently deployed SAP in the Papers Group, MeadWestvaco resolved to build a Web-based order management solution that could better leverage SAP's rich functionality—while at the same time delivering more flexibility and scalability as e-business volume grows.

THE SOLUTION

Powered by IBM WebSphere Application Server, MeadWestvaco's Order Center provides Web-based order entry and realtime access to information on product availability, customer-specific pricing, production schedules, product reservations, and order status. The solution also allows customers to view bill of ladings, production documents, and invoices online. All functions are enabled through the solution's direct linkages to SAP running in MeadWestvaco's backend.

WHY IBM

"In a high-volume transaction environment, very few products stack up with WebSphere Application Server in terms of performance, scalability and reliability."

IDC
Analyze the Future

Table of Contents

Executive Summary 1

Situation Analysis 2

Background 2

The Need: A Scalable e-business Infrastructure for the Future 2

The First Stage: Testing the Waters of e-business 3

Action Plan and Decision Process 4

First Steps 4

Challenges 5

Exhibit: Challenges Encountered in MeadWestvaco's e-business Evolution 5

Solution Profile and Implementation Strategy 6

The Solution: Core Functionality and Architecture 6

Exhibit: Basic Architecture of the MeadWestvaco Solution 7

Security Profile 7

The Solution in Action 8

The Project: Development Approach and Timetable 9

Exhibit: Development Timetable for MeadWestvaco's e-business Solution 9

Business Results 10

Exhibit: Overview of MeadWestvaco's Business Results Achieved 10

Case Epilogue 12

Executive Summary

MeadWestvaco's Papers Group had long provided its customers with advanced order management services over a proprietary, dial-up solution. However, by mid-2000, MeadWestvaco began planning a Web-based solution that could fully capitalize on its recently completed deployment of SAP, and would provide a foundation for its future e-business initiatives. MeadWestvaco contracted with IBM Business Partner Meritage Technologies to help design and deploy an XML- and Java-based order management solution running on IBM WebSphere Application Server—with integration to SAP enabled by WebSphere MQ.

Since introducing the solution in June 2001, MeadWestvaco has begun leveraging its open, flexible XML-based architecture by developing a B2B transactional platform that enables seamless "system-to-system" transactions from customers' ERP systems to MeadWestvaco's order entry system.

MeadWestvaco's Solution

e-business Stage

Enterprise Integration

Core Functionality

MeadWestvaco's solution—a Java-based order management platform known as Order Center—enables customers to place orders and provides realtime access to product availability, customer-specific pricing, production schedules, product reservations, and order status. The solution also allows customers to view bill of ladings, production documents, and invoices online. The solution employs Lotus Notes and Domino for content management as well as for the delivery of e-mail-based order notification.

Software

IBM WebSphere Application Server, IBM DB2 Universal Database, Lotus Notes, Lotus Domino, IBM WebSphere MQ, IBM HTTP Server

Servers

IBM AS/400, IBM eServer zSeries (formerly IBM S/390)

Business Partner

Meritage Technologies

Key Benefits

- The Papers Group's online transactional volume has increased 200 percent since its WebSphere-based solution was rolled out.
- By eliminating the need to support the hardware, software and dial-up connectivity at its customers' sites, MeadWestvaco has avoided more than $500,000 in annual costs.
- Through process automation, 95 percent of online orders flow into MeadWestvaco's ERP system with no intervention by a customer service representative.
- The use of reusable components enables the company to extend the solution's functionality to other divisions of the company quickly and cost-effectively.
- The separation of the business logic and presentation layers in the solution enables MeadWestvaco to avoid significant application support costs.

Situation Analysis

Background

Based in Stamford, CT, MeadWestvaco Corporation is the company behind one of the best known brands in the paper products market. With revenues of $8 billion and customers in roughly 100 countries, MeadWestvaco has approximately 30,000 employees. The company's operations are divided among four business segments:

- *Packaging*—This business segment provides packaging solutions to customers in the beverage, media, health care, cosmetic and personal care, and general consumer-products segments.
- *Coated and specialty papers*—This business segment's main products include coated paper (for high-end printing uses) and carbonless paper (for business forms). Other products include digital papers (for commercial and desktop printing), food and beverage labels and industrial specialty papers.
- *Consumer and office products*—This business segment produces and distributes a broad portfolio of school and office supplies, and time-management products.
- *Specialty Chemicals*—The business segment's carbon-based products include activated carbons (for automotive emissions controls), products used to purify chemicals, pharmaceuticals and food products, and products used for solvent recovery and air purification applications.

On a strategic level, the need to harmonize MeadWestvaco's mission-critical business systems via a common ERP platform reflected the central importance of operational efficiency within the paper and packaging industry.

Within MeadWestvaco's Dayton, Ohio-based Papers Group (the focus of this case study), the importance of continuous process improvement through investment in technology is embedded in its quality-centric culture. This is seen on the production side in the division's investments in state-of-the-art paper mills and machines, which are intended to keep quality high and production costs low. On the IT side, MeadWestvaco has also invested aggressively—as exemplified by its recent company-wide deployment of the SAP ERP platform. Similarly, the commitment to IT-based innovation is evidenced by its early (and highly successful) investment in an online order entry and management infrastructure. This case examines how the Papers Group upgraded this older platform with a state-of-the-art e-business solution that both complements and leverages its newly deployed SAP R/3 implementation.

The Need: A Scalable e-business Infrastructure for the Future

One of the key goals of MeadWestvaco's recent SAP deployment was to replace a disparate array of systems with a single, unified platform that would handle all of the company's backend processes. On a strategic level, the need to harmonize its mission-critical business systems via a common ERP platform reflected the central importance of operational efficiency within the paper and packaging industry. Put simply, a company better able to coordinate production planning, inventory management and other key areas is better able to compete in an industry where efficiency is a competitive requirement.

While the deployment of SAP integrated and streamlined MeadWestvaco's backend processes, the company's front-end, customer-facing solution remained an issue.

While the deployment of SAP integrated and streamlined MeadWestvaco's backend processes, the company's front-end, customer-facing solution remained an issue. At the time of its SAP implementation (which began in 1998), the company was employing a proprietary order management platform known as MACS (Mead Automated Customer Service). A classic "green screen" application, MACS was accessed by customers (primarily printers or paper distributors) over dial-up lines using IBM 3270 terminals that were owned and supported by MeadWestvaco. The system provided customers with a rich array of capabilities, including: the ability to perform order entry; check order status, product availability, and customer-specific pricing; and generate reports. But like most proprietary solutions, MACS's limitations related less to its core functionality than its architecture and technology components—and the implications for its future e-business activities.

Because the MACS system required the distribution and support of client software, larger customers represented the lion's share of users. This reflected the fact that the smaller customers were costly to enable, train and support, and often lacked the technological sophistication to use the system. Adopting a Web-based platform would enable MeadWestvaco to not only extend e-business to smaller companies, but also greatly reduce the support and communications costs associated with serving its larger customers.

The First Stage: Testing the Waters of e-business

Responding to the clear need for a Web-based solution, MeadWestvaco began planning its first e-business initiative in late 1999—and ultimately rolled it out in April 2000. Known as meadwestvacopapers.com, the solution provided a Lotus Domino front end to MeadWestvaco's legacy MACS system, and delivered essentially the same functionality. But as Ted Hill, Director of eBusiness Strategy for the Papers Group, points out, MeadWestvaco's first foray into e-business was seen primarily as an opportunity to learn from the experience. "We approached the first effort with a 'launch-and-learn' mentality, whereby we get a Web-based solution up and running—and in the process gain a better understanding of e-business technologies," says Hill. "This was important because we saw the move from MACS to a pure e-business platform as inevitable." Thus, in the mid-2000 timeframe, MeadWestvaco's Domino-based platform was viewed as a transitional solution. The direction of MeadWestvaco's future evolution remained a lingering question.

The answer to this question began to emerge in late 2000, when it became increasingly clear that the optimal approach was to leverage the resources of the SAP order management solution. While the Domino-based solution performed well and served its purpose, Hill and his team saw the issues of scalability and flexibility as critical given the sharp rise in e-business activity the division expected to experience. Equally important, MeadWestvaco needed a solution that could take full advantage of the SAP solution being deployed across the MeadWestvaco enterprise by integrating tightly with it. With these needs in mind, MeadWestvaco began an assessment of technology platform needs.

Action Plan and Decision Process

First Steps

While the outline of MeadWestvaco's e-business strategy was visible in 4Q2000, the products and technologies that would comprise the solution had yet to be defined. A fundamental question that would impact the company's technology choice was the method by which the SAP solution would share data with the front-end order management solution. Specifically, MeadWestvaco's team saw the nature of data flows in and out of the SAP solution as one of the key determinants of the transactional technology needed on the front end. MeadWestvaco saw two options. It could either deploy an out-of-the-box, SAP front-end solution (such as SAP Internet Transaction Server), and integrate it with the backend SAP solution. Or it could deploy a more generic application server model that would require more development, but provide better performance with more functionality.

After conducting a requirements study from October to December 2000 to explore this issue, MeadWestvaco chose the application server path—selecting IBM WebSphere Application Server as the platform on which to build the solution. As Hill points out, MeadWestvaco's decision to employ the pure application server model was seen as a major—and to some, risky—shift in the division's infrastructure strategy. "Our key decision-makers were very cognizant of the risks of bringing in what was to us a new technology," says Hill. "We were ultimately swayed by the knowledge of how much more robust and scalable the solution would be with WebSphere Application Server, given the high volume of transactions we were expecting. In a high-volume transaction environment, very few products stack up with WebSphere Application Server in terms of performance, scalability and reliability."

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— Ted Hill, Director of eBusiness Strategy, MeadWestvaco Papers Group

In moving the initiative ahead, MeadWestvaco relied on a wide range of inputs from both inside and outside the company. Internally, the planning of the initiative was driven by Hill's eBusiness organization. MeadWestvaco's Corporate Information Resources group also played a central role in the area of IT infrastructure, with responsibilities ranging from technology and vendor selection to deployment and support. Among business-level organizations, Hill's team relied on sales and marketing (for input on product line organization, brand positioning and merchandising) and order management (for input on issues related to customer service, planning and scheduling, logistics and field technical services).

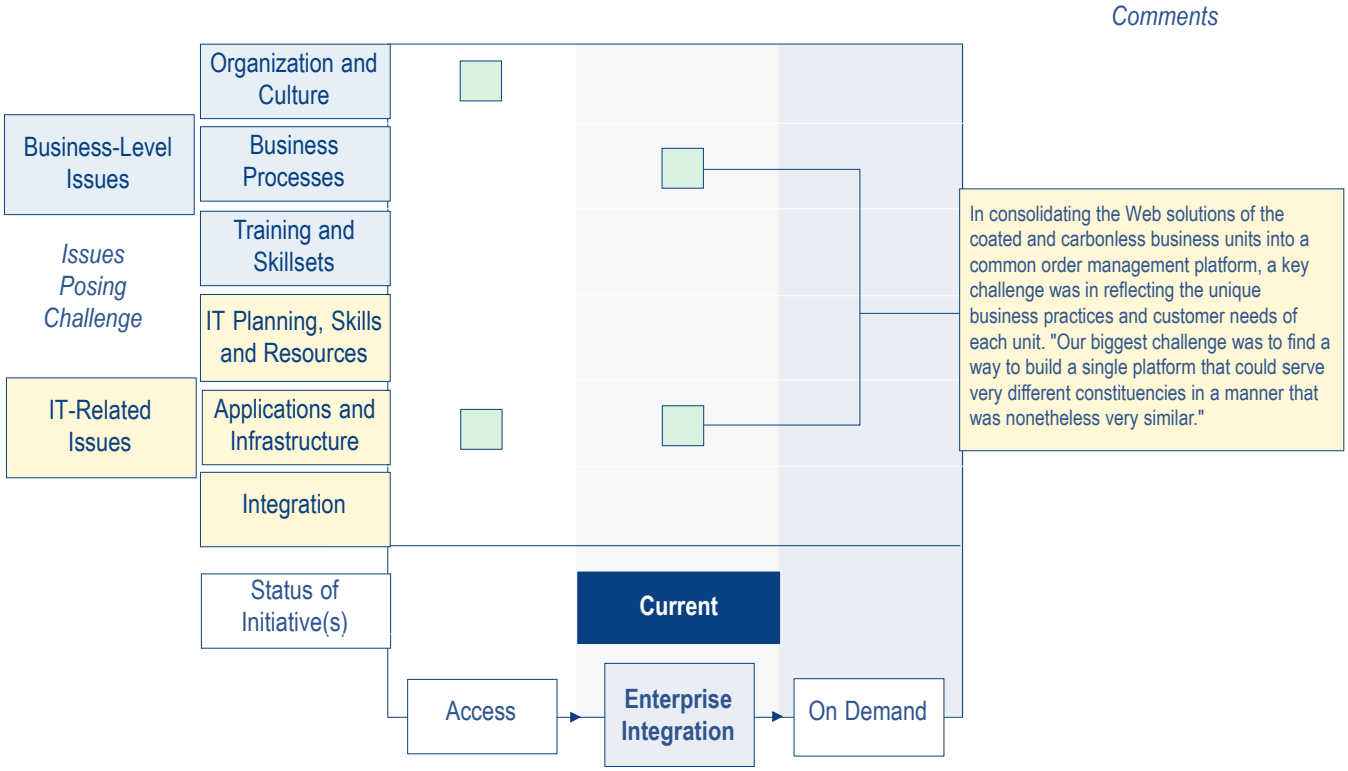
While MeadWestvaco's internal IT staff was responsible for establishing and maintaining the solution's infrastructure, the design and development of the solution were performed by external solution providers. Chicago-based VSA Partners was selected to design the solution's interface, with an emphasis on look and feel and the end-user experience. To design and implement the solution, MeadWestvaco selected Columbus, Ohio-based Meritage Technologies—an IBM Business Partner with a strong background in Lotus Notes, Domino, and WebSphere integration. Both VSA and Meritage worked closely with MeadWestvaco's internal staff throughout the planning process.

Challenges

While creating a solution with strong links to its new SAP solution was the key goal of the initiative, MeadWestvaco also saw the project as an opportunity to integrate the separate Web solutions of the coated and carbonless business units. Consolidating the two solutions into a common order management platform would allow MeadWestvaco to present a single face to the customer, while at the same time achieve major operational efficiencies. But as Hill points out, key differences between the business units in terms of business practices and customer needs presented a significant challenge. "Our biggest challenge was to find a way to build a single platform that could serve very different constituencies in a manner that was nonetheless very similar."

One of the key distinctions between the coated and carbonless customers that presented an e-business challenge was typical order lead times. For example, carbonless customers (who purchase paper for business forms) typically need very quick turnaround for their orders. By comparison, coated customers (which purchase for higher-end printed materials) tend to order larger, customized orders with a turnaround time of anywhere from two weeks to two months. Despite a longer average order lead time, customized coated paper orders are difficult to plan for because the width of the roll (the key customization parameter) is typically not known until a short time before delivery. Hence, while the quantity (e.g., 100,000 lb.) and type (e.g., 60-pound Sterling Ultra® Gloss

Challenges Encountered in MeadWestvaco's e-business Evolution



Source: MeadWestvaco and IDC

Text) of an order may be known well in advance, MeadWestvaco will not know the final dimensions of the product until late in the order's life.

Another less critical but still significant distinction is in an order's terminology and basic units of measurement. For example, a roll of carbonless paper is called a "roll" while the equivalent for coated paper is called a "web." Further complicating this is the fact that while coated paper is available in a single color with quantity delineated by the diameter, carbonless paper comes in multiple colors with orders delineated in lineal feet. As Hill sees it, the need to accommodate the unique needs of both customer groups within a single solution presented a challenge but also compelled the team to take a fresh look at underlying business processes. "We thought it was critical for each unit to keep its essential uniqueness," notes Hill. "But our resolve to unify the platforms forced us to be more creative—and to better understand each business unit's order processes."

Solution Profile and Implementation Strategy

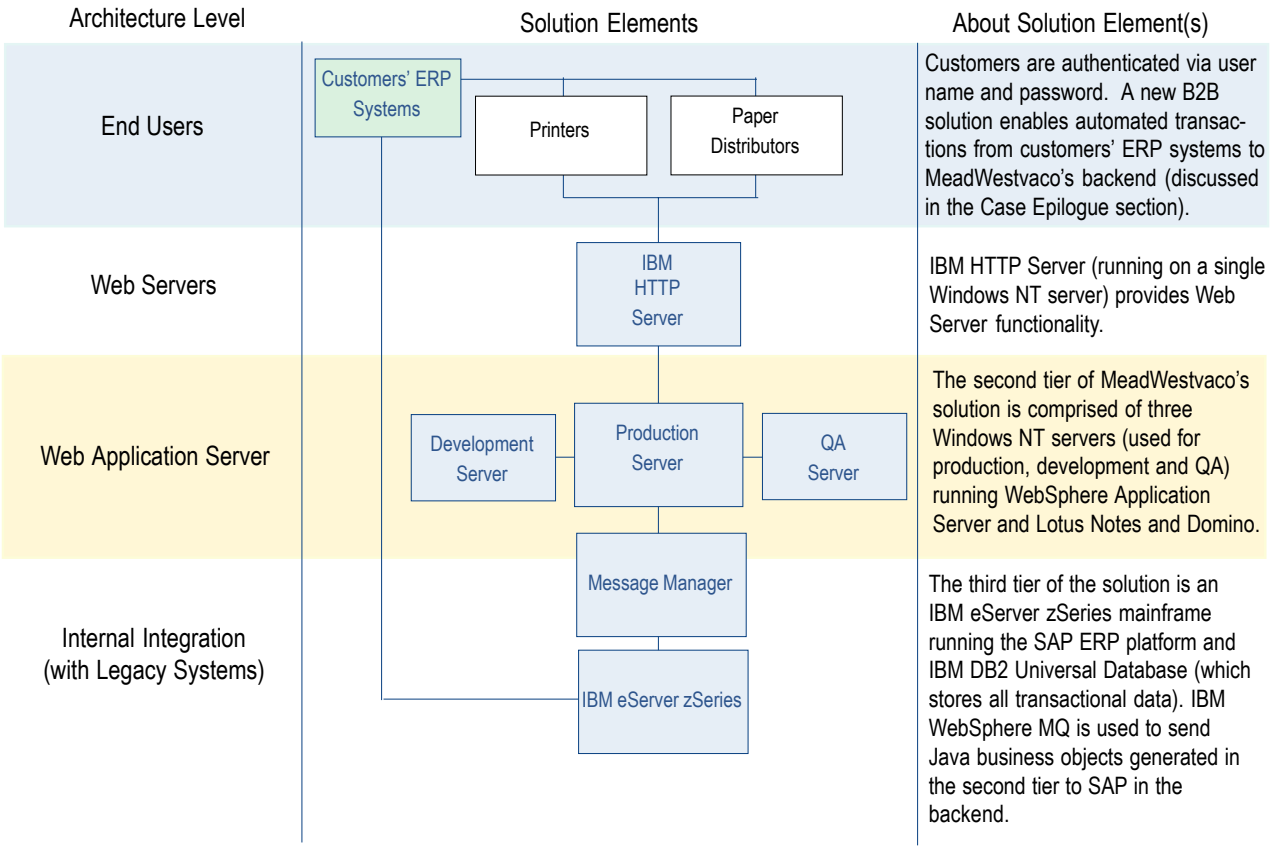
The Solution: Core Functionality and Architecture

MeadWestvaco's e-business solution, known as Order Center, enables customers to place orders and provides realtime access to product availability, customer-specific pricing, production schedules, product reservations, and order status. The solution also allows customers to view bill of ladings, production documents, and invoices online. All functions are enabled through the solution's direct linkages to SAP running in MeadWestvaco's backend. The solution employs Lotus Notes and Domino for content management as well as for the delivery of e-mail-based order notification.

The architecture of MeadWestvaco's solution is configured in three tiers. In the top tier, IBM HTTP Server (running on a single Windows NT server) provides Web Server functionality. The second tier of the solution is comprised of three Windows NT servers (used for production, development, and QA, respectively) running WebSphere Application Server and Lotus Notes and Domino. The third tier of the solution is an IBM eServer zSeries (formerly S/390) mainframe running the SAP ERP platform and IBM DB2 Universal Database (which stores all transactional data). Another component of the third tier is a message manager that sits atop SAP, whose primary function is to convert XML-based requests into IDOCs (SAP's standard file format for exchanging information) before sending them back as transactions to SAP (discussed below).

At the core of the solution's transactional capabilities are Java Business Objects (running in the WebSphere environment) whose function is to interact with SAP and backend databases. In the course of a transaction, client requests (i.e., transactions) are submitted via HTML and are converted within the presentation layer to XML. These XML requests are then sent to the business logic layer, where they invoke Java Business Objects. The Java Business Objects are then converted to IDOCs (essentially text strings containing all critical transaction information), which are then sent via IBM Web-

Basic Architecture of the MeadWestvaco Solution



Source: MeadWestvaco and IDC

Sphere MQ back to SAP R/3 running on the zSeries. Responses to requests are then sent back from SAP in IDOCs format (via WebSphere MQ) to the message manager, where they are converted to XML messages. In the final leg of the transaction, these XML messages are transformed to HTML via an XSL processor [XSL, or Extensible Stylesheet Language, is a language used to render XML as HTML] and delivered to the user's desktop Web browser.

Security Profile

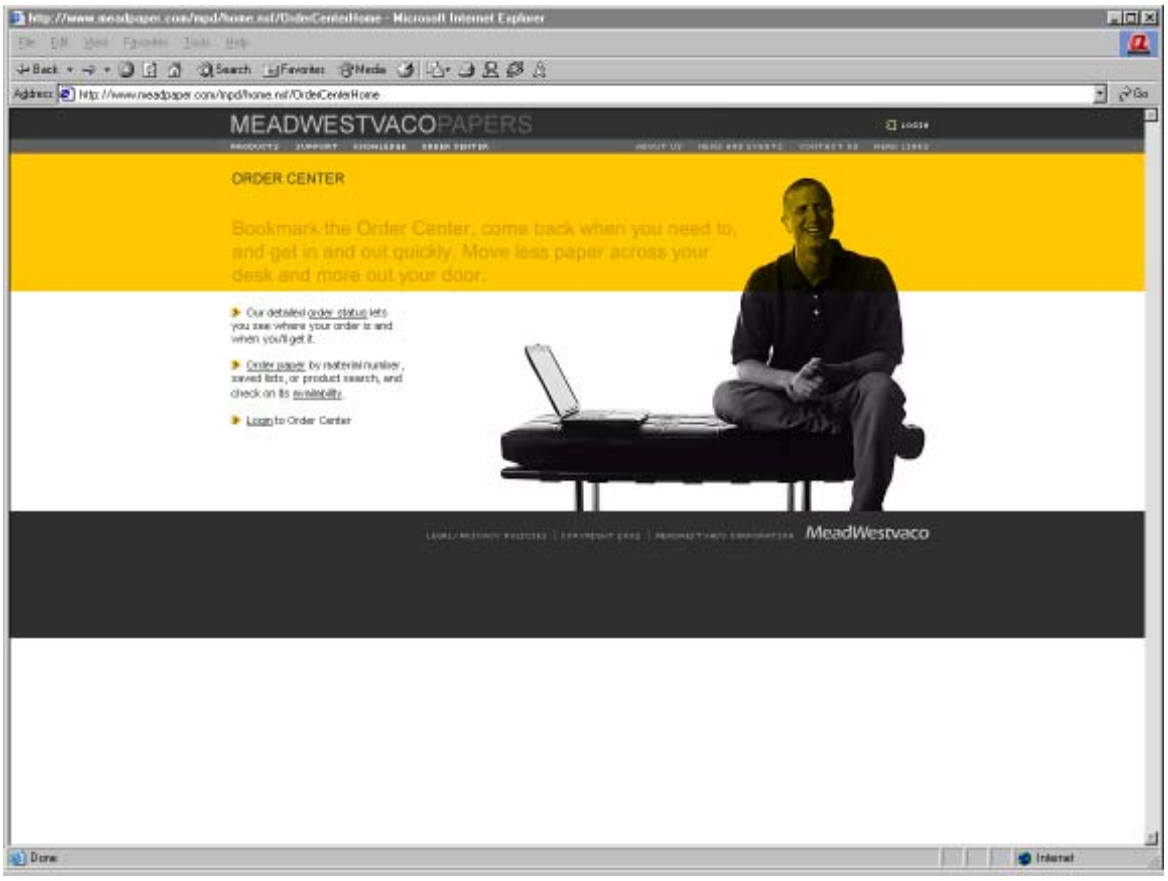
With customer-specific pricing a core element of MeadWestvaco's business model, one of the key challenges in developing the Order Center solution was to protect the confidentiality of each customer's pricing structure. To achieve this, an access control scheme was developed using Domino's LDAP directory capability. Under this scheme, customers are provided group-level access rights. To provide more granular access control within each customer's base of users, the solution employs customized security profiles operating within the WebSphere Application Server environment (stored in a DB2 database). Through this capability, a customer can (for example) allow an employee to view realtime pricing, but not allow him to add products to a shopping cart—effectively providing "read-only" functionality (discussed in greater detail in the following section).

While Domino and WebSphere provide authentication for the transactional portion of the solution, authentication for the content portion of the solution is governed by Lotus Notes' (through Reader's Fields). Network security for the MeadWestvaco solution is provided through a single firewall placed between the second (application server) and third tier (legacy systems).

The Solution in Action

Customers using the solution's order entry feature log into the system via a user name and password, which are stored in a Lotus Name and Address Book database. Upon a user's logging in, the system reads a series of data tables that provide a basic customer profile: who the customer is, and what they are allowed to purchase based on prearranged agreements. After reading the customer's identity, the solution displays a customized catalog and a shopping cart. In the course of gathering basic order-entry information (such as ship-to data), the solution may also gather information on the end-user of the product, the identity of which triggers specific pricing agreements.

To find a product on the Order Center site, customers can either conduct a search or use an ordering template (known as My List) that lists a customer's frequent purchases. The solution also enables custom orders, with the key parameters being roll diameter, quantity, grade, basis weight and finish/color. Once a product has been selected, a customer selects a transaction type by clicking on an icon (e.g., product availability). The request is then sent back



to SAP, where it invokes the appropriate SAP R/3 application (the list of which includes Order Creation, Product Availability, and Run Schedules). After generating a response, the application sends the data back to the requestor. In cases where customers enter orders through the solution, SAP sends an order acknowledgment to WebSphere Application Server and stores the order information in a DB2 database. Upon receiving this notification, the solution automatically e-mails an order confirmation to the customer via Lotus Notes.

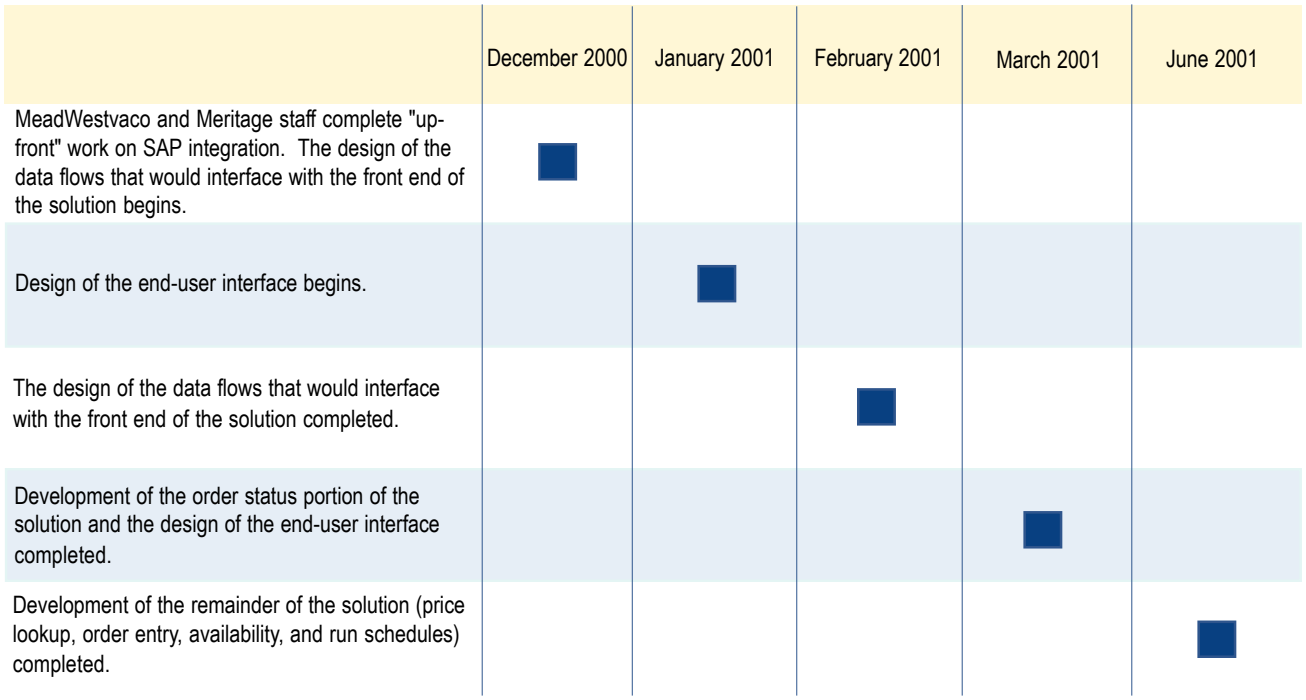
The Project: Development Approach and Timetable

The design and development of MeadWestvaco's core solution architecture followed three fundamental tracks:

- "up-front" work on SAP integration;
- end-user interface design; and
- development of the front-end transaction architecture in WebSphere Application Server and Lotus Domino.

Having established which data was to be shared with the SAP backend, the bulk of the up-front work consisted of creating the actual APIs in and out of SAP (completed in December 2000) and designing the data flows that would interface with the front end of the solution (completed February 2001). The design of the end-user interface—building on the up-front SAP work—began in January and was completed in March 2001. The design of the core solution

Development Timetable for MeadWestvaco's e-business Solution



Source: MeadWestvaco and IDC

architecture began in December 2000. After completing the design phase in February 2001, Meritage began developing the solution in sequential fashion—completing the order status portion in March 2001, and the remainder of the solution (Price Lookup, Order Entry, Product Availability, and Run Schedules) in June 2001.

Business Results

Since replacing its proprietary MACS system with a Web-based order management platform, MeadWestvaco has reaped solid results. In just a year, the Papers Group's online transactional volume has increased 200 percent since the Web solution was rolled out—signifying a clear endorsement from its customer base. Bottom line results have been equally impressive. By eliminating the need to support the hardware, software and dial-up connectivity at its customers' sites, MeadWestvaco has avoided more than $500,000 in annual costs. As Ted Hill points out, the tight integration between the Papers Group's front-end solution and its backend ERP system has also led to a dramatic rise in overall order processing efficiency. "By integrating so deeply with SAP, we're able to put a huge amount of functionality into our customers' hands in a

Overview of MeadWestvaco's Business Results Achieved

Business or Technology Issue	Nature of Benefit	Description or Metric
e-business Activity/ Transaction Volume	Increased Volume	The Papers Group's online transactional volume has increased 200 percent since its WebSphere-based solution was rolled out.
Customer Support Costs	Cost Reduction	By eliminating the need to support the hardware, software and dial-up connectivity at its customers' sites, MeadWestvaco has avoided more than $500,000 in annual costs.
Order Entry/Processing	Increased Efficiency through Process Automation	Fully 95 percent of online orders flow into MeadWestvaco's ERP system with no intervention by a customer service representative.
Application Development	Cost Avoidance	The use of reusable components in MeadWestvaco's architecture enables the company to extend the solution's functionality to other divisions of the company quickly and cost-effectively.
Application Support	Cost Avoidance	The separation of the business logic and presentation layers in the solution enables MeadWestvaco to avoid significant application support costs.

Source: MeadWestvaco and IDC

way that's completely invisible to them," says Hill. "The fact that 95 percent of orders go into the system without being touched by a customer service representative is a testament to its efficiency."

On top of its already-significant return on investment, MeadWestvaco's Order Center—by virtue of its flexible, reusable architecture—promises an even larger stream of strategic benefits in the future. Topmost among these is the ability to extend the solution's rich order management functionality to other divisions of the company quickly and cost-effectively. The key enabler, explains Hill, is the ability to leverage its key infrastructure investment—namely, the existing WebSphere/Java architecture and the existing set of transactions that flow in and out of SAP—across other divisions. "The flexibility and reusability of our core architecture means that we can roll out solutions within our other divisions with relatively low incremental costs—most of it in the area of end-user design," says Hill. "To develop comparable e-business solutions for all our divisions [that didn't leverage existing investments] could easily cost MeadWestvaco $10 million in development costs alone."

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— Ted Hill

The fact that MeadWestvaco's solution imposes (by design) a clear separation between the business logic and presentation layers is also expected to yield application development benefits on a smaller, divisional scale. The benefits of this separation are most apparent in the ongoing maintenance and modification of the solution. Take the example of a customer asking MeadWestvaco to change its price lookup or order status page to display a new data element or to present it in a new format. In applications where the business logic and presentation layer are not separated, a developer would generally need to make changes to both layers—which implies the need for a significant level of Java expertise. In MeadWestvaco's solution, a developer need only create a business object to pull already-existing information from a database and use XSL (in the presentation layer) to display the data. Hill sees faster turnaround and lower costs in the area of application support as the key benefits of its approach. "Our application architecture has enabled us to be very nimble and responsive to customer requests for customization or changes," says Hill. "In a very direct way, it's allowed us to get closer to our customers by delivering great service."

Case Epilogue

On the heels of its highly successful order management engagement, MeadWestvaco has embarked on a series of B2B initiatives designed to build on its success. The common threads linking these initiatives are two-fold. First, it's goal: establishing deeper and broader integration with MeadWestvaco's customers. Second, it's means: by capitalizing on its investment in an open, flexible XML-based architecture. The centerpiece of its efforts is a B2B transactional platform over which MeadWestvaco's customers automatically generate orders through their ERP systems and send them directly—via XML—to MeadWestvaco's order entry system. The solution is currently being pilot tested and being prepared for full deployment.

"A lot of providers focus on selling a particular technology or a solution even if it's a forced fit—which essentially places their interest above the customer. Meritage took the opposite approach: tailoring the solution to our established infrastructure and established way of doing things."

— Ted Hill

According to Hill, the move to direct "system-to-system" integration represents the first step on a path to broader integration. "Our goal as a business partner is to develop the flexibility to accept transactions from a multitude of sources—whether it's a browser or wireless device or a customer's ERP system or an e-marketplace—and make the source of that order invisible to our SAP platform," explains Hill. "One of the most prominent options we've looked at to achieve this vision is the Web Services model."

Looking back on the engagement, Hill compliments Meritage for putting MeadWestvaco's requirements above all other factors. "A lot of providers focus on selling a particular technology or a solution even if it's a forced fit—which essentially places their interest above the customer," says Hill. "Meritage took the opposite approach: tailoring the solution to our established infrastructure and established way of doing things. They were committed to helping us leverage what we already had and build a leveragable solution for the future."

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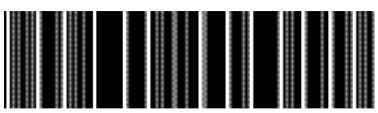

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