



# INTERNATIONAL DATA POST

## BRINGING POST OFFICES TO THE INTERNET AGE

### KEY HIGHLIGHTS

#### Company

International Data Post ([www.idp.dk](http://www.idp.dk))

#### Industry/Market

Technology

#### Applications/Solutions

- WEB ePOST, a Web-enabled hybrid message management system

#### Products/Services

- Sun Enterprise™ 450 and 250 servers
- Java™ 2 Platform, Enterprise Edition (J2EE™)
- iPlanet™ Application Server
- iPlanet Web Server
- Solaris™ Operating Environment
- Oracle8i

#### Key Business Challenges

- Provide cost- and time-efficient mailings
- Enable postal organizations to compete in the Internet age

#### Key Business Solutions

- Services-driven architecture methodology based on RUP
- N-tier J2EE technology-based platform

#### Key Alliances

- Cap Gemini Ernst & Young
- EOS

#### Benefits

- IDP customers can cut typical printing, administration and postage costs by 50%
- Postal organizations have new revenue source
- IDP has rapid application development environment to leverage for future projects

**“Hybrid messaging secures the position of postal operators as trusted parties in the electronic communications age, creating a digital channel for efficient message delivery.”**

*Nils Overgaard,  
President and CEO,  
International Data Post*

### Executive Summary

International Data Post (IDP), a Copenhagen, Denmark-based postal technology solutions company is expanding the communications realm of postal operations by taking them to the Internet age using Java™ 2 Platform, Enterprise Edition (J2EE™) technology. The company is a pioneer of “hybrid mail,” which streamlines a letter’s delivery cycle by enabling electronic delivery from the sender to the post office. There—rather than at the sender’s site—the document is printed, stamped and physically delivered to the recipient. By using IDP’s solution, postal organizations can grow beyond providing only communication logistics services and add e-messaging to their repertoire of offerings. And organizations from a multitude of other industries can license the solution to capture new revenue opportunities.

IDP’s hybrid message management system, ePOST, was first developed in the early 1990s on a mixed infrastructure consisting of IBM mainframe computers and legacy middleware. Since then, the system has enjoyed incredible acceptance from both postal operators and corporations alike. In 2000 alone, IDP customers produced more than two billion hybrid mail letters.

A little over a year ago, IDP decided to extend ePOST by incorporating a front-end, Web-based access channel for the solution, but its engineers lacked expertise in developing Internet-based applications. IDP first consulted a half-dozen leading IT vendors to determine the type of technology and solutions that would garner the most success. After talking with Sun Microsystems, the company was convinced that the total package from Sun—including J2EE technology, for its proven reputation as a highly flexible Internet application development platform—offered the most attractive option. IDP worked with Sun Professional Services to architect and implement the application, called WEB ePOST. WEB ePOST was developed with J2EE technology-compliant iPlanet™ Application Server and iPlanet Web Server running various Java and J2EE technology components, including Enterprise JavaBeans™ (EJB™), JavaServer Pages™ (JSP™), Java servlets and Java applets.

Now, IDP customers can mail letters using a standard Web browser, cutting in half typical printing, administration and postage costs. And traditional postal operators, whose market has been under pressure from new technologies and new competitors, finally have a Web-based offering that ties into their core business and helps them exploit new markets to grow their revenues and build their business. Currently, several postal operators that represent more than 75 percent of the worldwide postal mail volume have licensed WEB ePOST. As for IDP, J2EE technology has given the company a rapid application development environment that can easily be leveraged for future projects.

**By developing its Web-enabled hybrid mail solution using J2EE™ technology on a platform infrastructure based on iPlanet™ Web Server and iPlanet Application Server, International Data Post has an e-business infrastructure that is nth ready-engineered for exponential growth.**

<http://www.sun.com/sunservice/sunps>



### Company Profile

Imagine sending colorful brochures to thousands of physical mailboxes—all with a click of the mouse. No more envelope stuffing, stamp licking or traveling to the nearest post office. Thanks to cutting-edge technology from IDP, that day has arrived. Using IDP's hybrid message management solution, which brings together electronic and physical delivery of mail, businesses are sending letters, paper invoices and other printed materials directly from their PCs. "We call this the next-generation mail system," says Nils Overgaard, IDP's President and CEO. "We're bringing the postal service to the Internet, while saving corporations substantial dollars in the process. All of this enhances the service standards and accessibility of the postal network."

IDP worked with Sun Professional Services to be at the forefront of this revolution, offering complex messaging software and related services that make Internet mailing a very practical reality. More than a dozen licenses for IDP's state-of-the-art WEB ePOST, the Internet channel for its hybrid message management system, have already been sold. As IDP continues to extend the market introduction of WEB ePOST, the company expects to substantially increase the number of licensees.

Unlike the many Web-born companies that have met their financial demise over the past year, IDP is an established postal IT solutions company with a solid foundation, having already garnered tremendous support from industry stalwarts. Shareholders include seven of the world's top public postal operators (the equivalent of the U.S. Postal Service) in Australia, Denmark, Finland, France, Germany, Norway and Sweden. IDP has 50 employees, half of which are technical support, customer service and testing staff. The other half of the workforce includes staff from product management, consulting, sales and administration.

It is no wonder hybrid message management systems are attractive to postal operators. Hybrid messaging presents a way for an old industry to continue profiting in the new economy. And the timing could not be better: Competing with a range of electronic communications in today's connected society—email, electronic attachments, faxes and cellular phones, to name a few—postal operators are facing significant competition in an ever-expanding communications market. Reliable TCP/IP connections and emerging technology such as digital signatures enable companies to send and receive corporate invoices and purchase orders—once the bastion of the physical letter—in the domain of the Internet. And for letters that still find their way into a mail carrier's sack, the contrast with email messages that arrive in minutes, or even seconds, after the writer hits the "send" button is enough to make any postal operator want to go electronic. According to IDP, more than 70 percent of postal letters are originally created on computers and then printed out, placed in an envelope, stamped and dropped off in a mailbox—an operation that can be deemed inefficient, especially when mass mailings are concerned.

For postal operators, hybrid message management systems are fast becoming their high-tech tools of choice for breaking into new market opportunities. “Hybrid messaging secures the position of postal operators as trusted parties in the electronic communications age, creating a digital channel for efficient message delivery,” explains Overgaard. “For customers, our solution is attractive because it provides them with the ability to conduct high-volume mailings at lower prices and with shorter delivery times. What were once cumbersome mailing projects, particularly in terms of the logistics and resources needed, now become a streamlined communication process.” Indeed, IDP studies show that corporations using WEB ePOST cut mailing costs nearly in half, replacing time- and cost-intensive manual labor with lightening-fast, Internet-based automation.

IDP licenses its software to corporations, telecommunication carriers, Internet portal operators, application service providers (ASPs) and, of course, postal administrators. More than just a technology solutions provider, IDP also offers an array of professional services, ranging from strategy consulting and marketing to technology implementation and operation. “We are a center of expertise for e-messaging solutions, technology and markets,” says Jacob Johnsen, Vice President of Research and Development at IDP.

## Hybrid Mail: The Technology Evolution

Hybrid mail systems emerged on the high-tech scene in the 1980s with little fanfare. The slow start had much to do with the fact that postal operators traditionally thought of themselves as logistics carriers, rather than as having a role in electronic communications. Still, a handful of Scandinavian countries saw the seeds of something spectacular. In 1992, Nordic Data Post, which included postal operators in Denmark, Finland, Norway and Sweden, began developing its own hybrid mail offering. Intrigued by the solution’s potential, postal operators in France, Germany and Australia jumped on board, and Nordic Data Post became International Data Post within its first year of existence.

Shortly thereafter, postal operators in 18 countries, including Italy, the United States, Singapore and Portugal, started licensing ePOST. These international companies realized they could suddenly and cheaply conduct mass mailings in countries where postal operators embraced ePOST. In other words, companies could send documents electronically to a country—possibly overseas—and have these documents printed there, rather than paying hefty charges for shipping bulky paper.



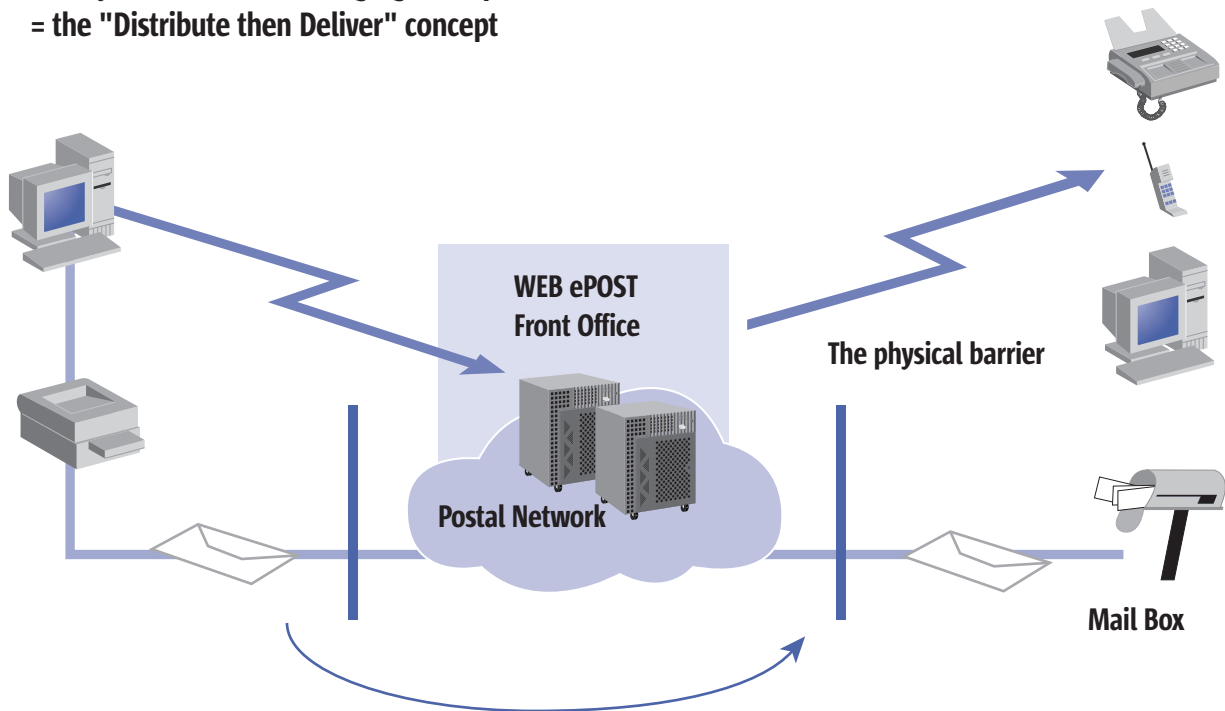
*Hybrid message management systems are the high-tech tools of choice for postal operators that want to compete and grow in the electronic communications age.*

An early hybrid message management application, ePOST/VM, was built on the IBM VM mainframe platform and ran on IBM S/370- and IBM S/390-compatible hardware (this version is being phased out). The next system, ePOST/Open 1—and later ePOST/Open 2, which was released in late 1998—is a UNIX®-based system supporting printer servers such as IBM InfoPrint Manager, IBM PSF/6000 and Oce Prisma APA. ePOST/Open 2 utilizes Oracle middleware as well as IBM MQSeries. Its major hybrid message management system runs on IBM AIX, HP-UX and Sun's Solaris™ Operating Environment.

IDP then decided to build an access solution for PCs, called PC ePOST. It is a Microsoft Windows-based application that acts as a virtual printer; namely, PC ePOST users can submit print jobs directly into a hybrid message management system, sending electronic versions of their mailings through cyberspace and eventually to a printing company. (The carrier in this system is SMTP, or standard email transport system.)

The eventual rise of the Internet and the ubiquity of Web browsers triggered a momentous milestone in the evolution of IDP's hybrid message management system application. In its quest to become the worldwide leader in postal e-messaging, IDP knew it needed to provide a Web channel for ePOST. This newest iteration of its solution eventually became known as WEB ePOST.

**The Hybrid Mail and messaging concept = the "Distribute then Deliver" concept**



**Figure 1. End users can save substantially by sending hybrid mail through WEB ePOST.**

To develop WEB ePOST, IDP recognized it required powerful Internet-based software built on standard components and protocols that would enable customers to prepare sizeable electronic documents for safe and reliable transport over the Internet. The software would need to work with just about any production tool or word processor and connect to both enterprise-scale server infrastructures and legacy mainframe environments. Moreover, IDP officials saw this as a big opportunity to brand the company and its postal operators as Web-savvy organizations. It was at this moment in its evolution that IDP remembered the promise of Java technology.

### Why J2EE Technology?

The decision to extend ePOST using Java technology and a multi-tier architecture was based on the need for flexibility and scalability, as well as the ability to speed up future application development. WEB ePOST also needed to integrate easily into customer IT infrastructures and work seamlessly with nearly every production tool used for creating documents and graphics.

Since a company might possibly send thousands of mission-critical documents daily, IDP needed a multi-tier architecture, enabling it to add servers quickly, and moreover, to handle sudden and massive transaction spikes. Early on, IDP also envisioned organizations other than postal operators licensing WEB ePOST, so it wanted to be sure its solution could be customized for a variety of industries, thereby allowing it to capitalize on new business opportunities. An office services chain could, for example, customize WEB ePOST to enable users to send postcards, birthday cards or registered mail. In adding the various reusable components of the J2EE platform, IDP could save some time and effort, creating a customized service based on the existing platform infrastructure.

For WEB ePOST to be a practical, attractive solution, it had to require little or no end-user training. The fewer barriers to adoption, the more likely corporations—long familiar with traditional mailing methods—would switch over to hybrid message management systems, all without concern about overcoming challenges that any new technology can bring. This meant WEB ePOST had to connect seamlessly with popular Web browsers such as Microsoft Internet Explorer and Netscape. It also needed to work with packaged address books such as Microsoft Outlook, with a MAPI interface or in conjunction with a database based on lightweight directory access protocol (LDAP) or open database connectivity (ODBC), for other common address books such as Lotus Notes.

After speaking to several vendors, IDP found the flexible development environment for building its multi-tier enterprise application—J2EE technology. By basing enterprise applications on standardized, modular components and managing many details of application behavior without complex programming, J2EE technology simplifies the development of such applications. “Java technology offers the most flexible platform to use for this kind of development, because it can operate on any platform whatsoever,” notes Johnsen. “In addition, from a marketing perspective, the Java brand has a lot of power with our customer base—Java technology was a natural choice.”

But even with the promise of application development ease, IDP engineers knew little about Java technology and the J2EE architecture—only that the technology was fast becoming the de facto standard for developing flexible applications, as well as extending existing applications to the Web. What the engineers desperately needed were experienced professionals who could work with them to tackle the challenges they encountered. “We were very, very new to the world of Internet development,” says Overgaard. “We had developed on big UNIX servers, built production-class software that ran 24x7 and even made some PC developments. But these were largely unconnected to architecting, building and deploying a J2EE platform. We needed someone to guide us through the design and implementation phases.”

Consequently, IDP turned to the consultants that logically had the most Java technology expertise—Sun Professional Services. “Our main reason for choosing Sun Professional Services was that their proof of concept seemed to be a solid solution that met our criteria for reliably bringing our hybrid message management system to the Web,” says Johnsen. “Another key reason was the reputation of Sun Professional Services in architecting sophisticated platform infrastructures based on Java technology.” He adds, “And the brand name of Sun was also an obvious factor.”

**“From a technical standpoint, we found Sun Professional Services to be very skilled and extremely professional in their understanding of Java™ technology and therefore in mentoring our Java technology engineers.”**

*Flemming Skov Hansen,  
Senior Project Manager,  
International Data Post*

Of course, providing a Web front-end access point for an application such as ePOST using Java technology—or any other technology, for that matter—isn’t as simple as it sounds. To begin, powerful functionality needed to be built into the front end for users to send any kind of document to IDP’s hybrid message management system, where addresses could be inserted and the completed file routed to a post operator’s paper-based distribution system. In addition, there was a need for a complex server-side portion of the Web application to handle business logic and transaction processing.

### **Problem/Opportunity Profile: The Applet Dilemma**

The biggest challenge in developing WEB ePOST was building the client-side Java technology-based applet—the lynchpin to the entire system. The Java applet performs complex tasks and also interfaces with different Web browsers. The problem was, this applet kept growing because IDP wanted it to be packed with functionality. As the development of the application ensued, and more and more functionality was embedded into this applet, it reached a little more than a megabyte. At the same time, the company did not want the Java applet’s size to become a barrier to adoption.

The Java applet provides the graphical user interface (GUI) and a rich array of functionality for the WEB ePOST user to send postscript files and select postal delivery options as well as letter and envelope formats. Users can select a set of standard enclosures—residing at the core printing system—to be added with each letter. For example, a pitch letter offering a credit card with low interest rates might be paired with a flier describing a free gift for those who sign on. The applet also has a built-in calculator that enables users to pre-calculate the cost for sending the letters, depending on the formats and delivery options chosen. In addition, the Java applet is also responsible for generating the Hybrid Mail Language (HML) file that is wrapped around the postscript file. (HML takes into account delivery attributes, such as addresses, document layout and enclosures.)

The applet integrates seamlessly with a variety of address databases: Microsoft Outlook, through MAPI; Lotus Notes, through LDAP; or Microsoft Access, through ODBC. This enables users to select any number of recipients and enter data fields into the letter. Users could also preview a bit map of the letter, including recipient addresses, reserved fields and other information, via the applet. The remaining functionality for WEB ePOST, such as document management and security, resides within the solution’s application server—iPlanet™ Application Server.



Sun and IDP decided to identify an alternative that would help ameliorate the challenges associated with using a large Java applet. Instead of having users download the applet over the Web every time they wanted to use WEB ePOST, they would only download it once and store it on their hard drives. Simply put, a megabyte would take too long to download many times over narrow bandwidth, such as dial-up lines. By downloading the applet once and storing it on a hard drive, a user could have ready access to the application whenever needed.

Still, the size of the applet somewhat limited WEB ePOST, in terms of the platforms it supports. The applet can run from two major browsers—Microsoft Internet Explorer and Netscape—and on Windows 95, 98 and NT. It should also work on any operating system (such as Macintosh and UNIX) that supports these browsers. “Our customers’ IT environments vary incredibly, but the one thing they have in common is a browser,” says Paul Donohoe, director of product management and professional services at IDP. “That’s why developing WEB ePOST was vital to the future success of our company.”

### **Collaboration with Sun Professional Services**

The Sun Professional Services Java Center™ in Stockholm, Sweden was initially engaged to provide an architectural assessment for WEB ePOST. The proof of concept and other accompanying documents used IDP’s service level requirements as the basis to architect a multi-tier platform infrastructure with layers containing the various J2EE components. And after developing an implementation plan, Sun Professional Services worked with IDP to build and deploy WEB ePOST. And while Sun Professional Services was an important component in architecting and building WEB ePOST, Flemming Skov Hansen, Senior Project Manager at IDP, notes that its biggest contribution was in knowledge transfer: “From a technical standpoint, we found Sun Professional Services to be very skilled and extremely professional in their understanding of Java technology and therefore in mentoring our Java technology engineers.”

Part of the services-driven methodology used by Sun Professional Services is based on the Rational Unified Process (RUP) methodology for software development, which was leveraged in the development of WEB ePOST. RUP is a case-driven software development process; in essence, it provides a roadmap that helps ensure that the development of certain applications coincide with end-user requirements, not to mention coalesce with other applications in development. With RUP, you can focus on eliminating risks early by implementing and testing the most critical use cases first—typically during the inception phase—and then building out the bulk of the application during the elaboration and construction phases. Since each RUP iteration results in an executable part of an application, performance testing can start as soon as the first iteration. Johnsen notes, “The consultants from Sun Professional Services trained our engineers in the RUP methodology, something that helped us stay on track to deliver the product in a timely manner. Now our IT staff has both a practical and theoretical understanding of the RUP methodology.”

Along the way, IDP and Sun overcame the challenges that can come with any first-time collaboration and built a strong working relationship that promises to continue delivering benefits well into the future. Other technology providers played smaller roles in the development and enhancement of WEB ePOST. For instance, Cap Gemini Ernst & Young subcontracted with Sun to design the front-end GUI. EOS, a Danish IT startup, developed JAD’K, a Java technology/RMI server for credit card authorizations that IDP used in the solution’s testing phases.

After working with consultants from Sun Professional Services for more than a year, IDP engineers say they now have a strong understanding of Java technology—and this has opened the doors to other revenue streams, namely joint professional services. In addition to being a product company, IDP offers consulting, systems integration and even custom-development of WEB ePOST's Java applet. "There is an opportunity for us to offer consulting services to our installation base," says Donohoe. "And Sun Professional Services may be able to play a role in this future as well."

**"Our vision includes both wired and wireless connectivity, bringing greater efficiency to the way in which people do business. And the flexibility of J2EE™ technology is key to enabling us to evolve WEB ePOST to meet ever-changing needs of consumers and businesses."**

*Paul Donohoe,  
Director of Product Management  
and Professional Services,  
International Data Post*

### **Solution Analysis: The Lifecycle of a "Hybrid" Letter**

The way in which hybrid mail is created by the end user is quite simple: A company (or organization) visits a participating postal operator's site and registers its name, address, credit card information or other payment method, and then downloads the Java technology-based applet to run WEB ePOST. This large applet carries a myriad of functionality, such as calculating mailing costs and previewing copies of the letter before shipping.

After creating a document, the user starts the applet from a Web browser with a built-in Java Virtual Machine and enters various criteria—such as recipients, paper choice, speed of delivery and envelope format—which is then sent to iPlanet Web Server. It routes the file to the business logic tier, where a Java servlet running on iPlanet Application Server prepares the document for delivery, inserts the appropriate addresses and sends a copy back to the user for review. This process is repeated until the user is satisfied and a final version of the letter is ready internally; it is then sent over the Web and to the postal operator's system for processing and delivery.

The Java servlet has four primary functions: management of communication between the user and the application server; communication with the UNIX-based application server that renders JPEG images from HML documents with embedded postscript files and passes these back to the applet for preview; storing postscript documents on the file system; and calling up stateless session EJB components, which keep track of users' actions with WEB ePOST in real time. IDP also worked with Sun Professional Services to map several Data Access Objects (DAO), which are responsible for inserting data into the Oracle8i database, handling searches of items by end users and managing the Java Database Connectivity (JDBC™) connection to the database tier.

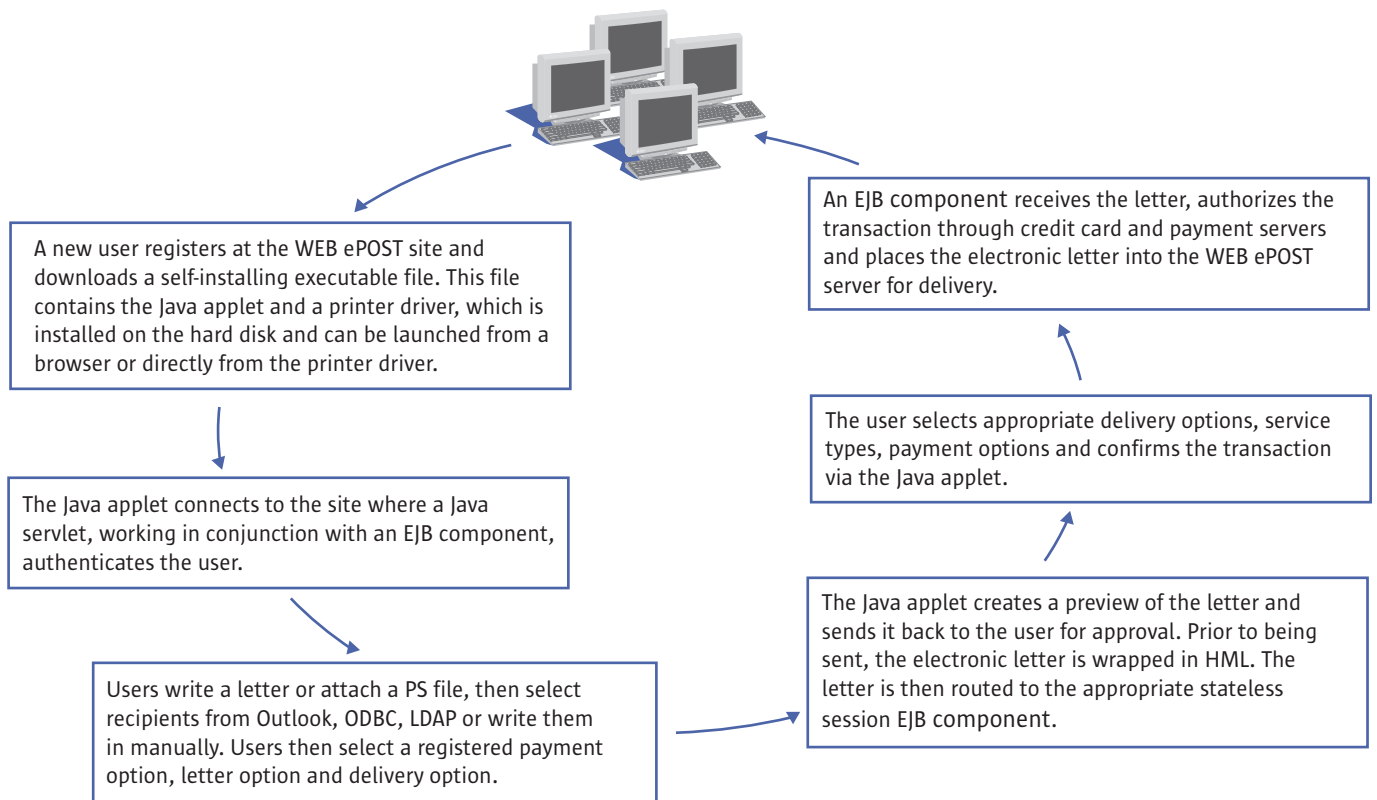
The EJB components verify users and credit cards, maintain their security, authorize special functions and register completed transactions. As soon as a transaction is validated, WEB ePOST notifies the end user using the Java applet, which also provides document previewing. IDP also offers an administration system that can be hosted at a customer's location. The system essentially transfers HTML forms via JSP components from the postal operator's system to a company's site, enabling new users to create profiles, existing users to change names and addresses and hybrid mail jobs to be tracked—all while staying within their company's firewall.

WEB ePOST users fall into three primary categories. There are those who create and send letters (the end users). There are administrators who run the WEB ePOST server in their own IT environment (IDP's licensees). And there are help desk personnel from the IDP licensee organization who monitor usage. All of these users utilize JSP components that generate HTML forms to keep track of information and enable users to conduct their respective administrative tasks.

Since postal mail has a history of security and reliability—"through rain, sleet or snow"—IDP wanted to bring these high standards to its Web-enabled system. WEB ePOST uses Secure Sockets Layer (SSL) encryption, which encrypts the transmission of the document from the client to the application server. All the data retrieved from the client, such as credit card numbers and passwords, is encrypted with up to 128-bit algorithmic technology, so it can traverse the Internet securely.



## Following a Transaction through the Infrastructure Tiers



**Figure 2: Steps for Sending Hybrid Mail**

### Future of Hybrid Mail

IDP and Sun have only scratched the surface of this nascent market—a world of opportunity awaits. According to the “Hybrid Mail in the Third Millennium” report, the potential of hybrid mail messaging (in computer mail processing markets) will increase more than 460 percent between 1978 and 2005. And thanks to an aggressive first-mover advantage, IDP stands to become the de facto standard hybrid message management system provider. Moreover, it is not just the technology that gives the company its edge; rather, it is also the fact that IDP was heavily involved in the development of HML, which was approved by the European Committee for Standardization (CEN) in January 2001. IDP serves as a technical advisor to the committee.

HML is a superset of Extensible Markup Language (XML), the standard protocol for describing Web documents. J2EE technology defines a set of descriptors in XML, making it easy to implement customizable components and to develop custom tools. HML allows applications to exchange mail or messages according to a specific standard—the “electronic envelope.” In this way, any document format can be exchanged between systems. HML is already being adopted by major postal operators as the industry’s standard document type definition (DTD).

“IDP has been a major driver in defining hybrid mail language,” says Johnsen. “We have helped introduce HML as the interface language between Java technology-based transactions, which were developed by Sun Professional Services, and the back office system that we developed.” Messages are collected in WEB ePOST and transferred from the customer to the application server using HML. These messages are then routed by an appropriate EJB component through the JDBC layer to the back-end systems. Explains Johnsen, “HML gives us the flexibility to draw from, create and exchange documents in multiple formats. This means that our customers can count on WEB ePOST to support most any business or personal communications.”

### **A Multi-Tier Architecture**

The platform infrastructure for WEB ePOST reflects a multi-tier architecture: client, Web, application and database. There are industrial-strength printing servers connected to the infrastructure as well. Corporations also have the option of hosting the application in their own IT infrastructures. Physically, all these servers can run anywhere—within a corporation’s firewalls.

To Web-enable IDP’s ePOST application, IDP and Sun Professional Services utilized three different EJB components—an Administrative Service Bean, a Customer Service Bean and a Hybrid Mail Service Bean. Each of these EJB components is a stateless session bean running on iPlanet Application Server, which, in turn, is based on EJB 1.0 specifications. The use of stateless session beans provides IDP with high scalability, since a user’s request can be executed in any application server process in such a replicated system. Two subsequent requests from the same user can be executed in two different processes on two different hosts. So, if the WEB ePOST licensee has integrated the solution into a clustered environment, the application server always directs requests to the host with the least load. “With stateless session beans,” notes Michael Olsen, a software engineer at IDP, “our customers can accommodate as many hosts as they need without affecting user response time.” The initial suggested production hardware comprises any number of Sun Enterprise 450 servers running Solaris Operating Environment (the number of servers is dictated by the WEB ePOST licensee).

The use of iPlanet Application Server and iPlanet Web Server was a recommendation by Sun Professional Services—a recommendation that IDP does not take lightly. iPlanet Application Server is a J2EE technology-based e-commerce platform that extends the reliability and portability of the J2EE environment through its failover capability, container managed persistence and transaction monitoring. iPlanet Web Server features a high-performance Java application platform that supports Java servlet extensions, JSP components and in-process, pluggable Java virtual machines. “We’re pleased with this recommendation because together, these iPlanet solutions provide a reliable backbone to support our J2EE technology-based solution. As we grow our customer base and, in turn, the transaction volume, we’re confident we have a platform that will keep pace with us,” notes Johnsen.

Each EJB component handles requests from one of the different types of clients: hybrid mail administration, customer administration and postal office administration. The EJB components authorize the request from the client, based on the user ID and password obtained during log in. They then read and write to the database. The hybrid mail EJB also communicates with the credit card verification and payment server provided by the WEB ePOST licensee.

The GUIs for the customer administration, postal office administration, operator and help desk are provided through HTML pages generated by JSP components. These pages reside on the application server, along with servlets and EJB components. JSP components consist mainly of forms and tables filled with data from the database. Each of WEB ePOST's 111 JSP components provides unique functionality:

- The postal administrator can view and modify customer data, as well as register new customers.
- The operator can view logs and update application-server configurations, and the help desk can view customer data. The operator and help desk are not included in the Java applet; rather, they are functions accessible through HTML pages for use by the postal organization or other IDP customer.
- The customer administrator can view and modify select data concerning the company, and also add new users belonging to the same company.

In terms of tiers, WEB ePOST's underpinnings were distributed along these lines:

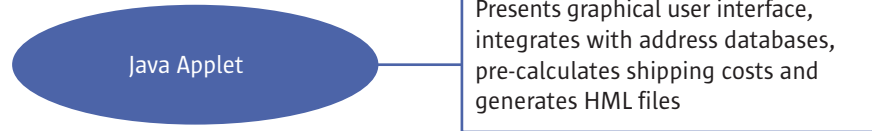
- **Client tier:** Java applet and Web browser running from a PC. The Java applet presents the graphical user interface, integrates with address databases, pre-calculates shipping costs and lets users send HML files with embedded postscript.
- **Web tier:** A client PC running Netscape, Microsoft Internet Explorer or another Web browser downloads the Java applet. iPlanet Web server also resides on this tier. Firewalls and SSL encryption provide security.

- **Application tier:** Java servlets and JSP components running on iPlanet Application Server. Java servlets perform previews, store HML documents on the file system and locate stateless session EJB components using Java Naming and Directory Interface™ (JNDI). JSP components consist mainly of generated HTML forms and tables with data read from the database using DAO, enabling postal operators to update application-server configurations. EJB components, JDBC and postscript parser/JPEG renderer (the postscript files are parsed and rendered as JPEG images) also reside on the application tier. EJB components authorize requests from the client, read/write to the database via DAO and communicate with the credit card verification and payment server. JDBC 2.0-compliant Oracle OCI drivers are used to retrieve information stored in Oracle8i for the requesting EJB component.

- **Database tier:** When iPlanet Application Server receives an HML letter, this spawns a process that takes the HML document and places it in a directory in Oracle8i database. EJB components put a record in a certain table, called hybrid mail transact, and also trigger payment functions. A UNIX-based process then goes into the transaction table to check for new print jobs as well as timestamps. If jobs exist, an EJB component then evokes the printing process. Also residing on the database tier is JAD'K, the credit card authorization application that IDP used when testing WEB ePOST.

## J2EE Platform Tiers

### Web (Presentation) Tier



### Application Tier

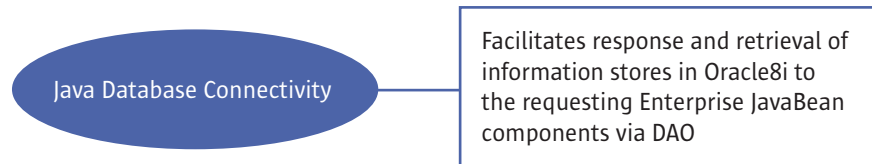
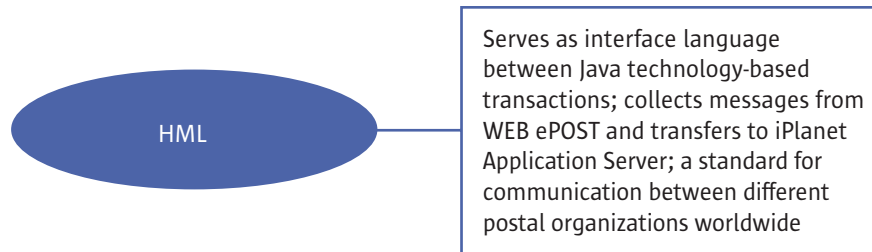
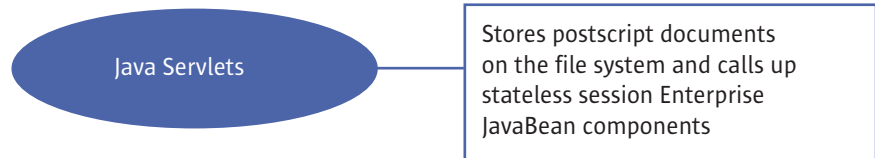
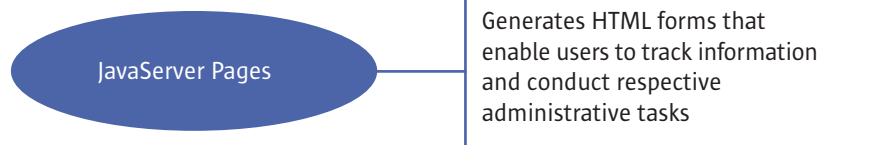


Figure 3: WEB ePOST, A Multi-tier Architecture

## A Bounty of Benefits

After a little more than a year of development and testing, IDP's Web-enabled hybrid message management system is up and running, and will eventually handle multiple channel delivery protocols, such as SMS, WAP, HTML, XML and PDF. Several postal operators—who collectively reach more than one billion addresses and represent more than 75 percent of the worldwide postal mail volume—have already licensed WEB ePOST. And the solution portends to cut mailing costs in half, compared to traditional mailing processes. “The driving principle behind all of our development efforts is interoperability,” explains Johnsen. “And it has paid off.”

J2EE technology gives IDP flexibility and ease of use. The company expects that licensees will market the solution for direct marketing, business-to-business communications and other needs. And IDP envisions selling its solution to other ASPs for even greater penetration into corporations, thereby growing sales revenues outside its core base of postal operators.

“Since WEB ePOST is an Internet application, it can be used in a variety of environments, not just within the postal industry,” Donohoe says. “We are on our way to fulfilling our vision of really being an end-to-end electronic messaging systems company.”

IDP also wants to leverage the Java applet in WEB ePOST by reusing and customizing an appearance for different service offerings on the Internet. For example, an oil company could conceivably place privately labeled kiosks using IDP's Java applet in its gas stations to offer simple messaging. Vacationing travelers, while pumping gas, could send a quick letter, postcard or, if a digital camera is mounted near the kiosk, even a self-portrait to multiple family members—delivered either electronically or as a paper document. In fact, with the reusability inherent in J2EE technology, IDP anticipates that it can significantly reduce development cycles for future J2EE technology-based applications—so it can get a head start in meeting the needs of a wide range of industries.

At any rate, a postal operator can play the role of message manager, taking these documents and other communications and delivering them using IDP's back-end infrastructure. In turn, this will further solidify the place and importance of postal operators in today's new economy. “An oil company may want this kiosk to be branded with its own brand, which we can easily do with Java technology,” explains Donohoe. “But in the back end, there is a postal connection.”

Value Chain Benefit →	IDP	IDP's Customers	End User
Faster Application Development	■		
New Revenue Opportunities	■	■	
Improved Productivity	■	■	■
Cost Reduction	■	■	■
Strengthened Relationships		■	■

Figure 4: Value Chain

Business Process Area	Nature of Benefit	Results
Sales Channel	New revenue opportunities	Potential revenues from customer kiosks and other newly identified opportunities
Customer Service	Enhanced service value, leading to stronger customer relationships and loyalty	Empower customers to send mass mailings over the Web to save time and money
New Product Development	Provides new Internet service offering for old-economy industry	Postal companies handled over 2 billion hybrid mail letters, which is expected to increase radically with the advent of WEB ePOST

**Figure 5: Key Business Benefits for WEB ePOST**

Kiosks are not the only interface; IDP engineers are looking at wireless implementations, too. Many J2EE technology-based application servers also support wireless communication forms. All of which has IDP excited. "In the wireless area, we could use a lot of our existing components for that application," says Overgaard. "Because of this, coupled with the knowledge transfer we received from Sun Professional Services, future development could proceed more quickly."

The hope is that someday an international business traveler sitting in an airport will be able to make a wireless connection to the Internet and send a hybrid letter to anyone in the world using his or her laptop computer or personal digital assistant. "Our vision includes both wired and wireless connectivity, bringing greater efficiency to the way in which people do business," explains Donohoe. "And the flexibility of J2EE technology is key to enabling us to evolve WEB ePOST to meet ever-changing needs of consumers and businesses."



<b>Business Process Area</b>	<b>Nature of Benefit</b>	<b>Results</b>
Application Development	Enhanced productivity	Application development with J2EE technology and RUP can be much quicker, cutting development time substantially
Site Performance	High-performance and scalability stemming from Java applet being stored on users' hard drive	Transactions processed in just seconds
IT Operations	Enhanced productivity; reduced costs	Knowledge transfer of J2EE technology leads to enhanced IT staff productivity; reusable J2EE components facilitate focus on development rather than architecture
System Integration	Reduced costs	Ability to integrate with back-end, open standards J2EE technology, speeding application development and reducing time to market

**Figure 6: Technical Advantages of WEB ePOST's J2EE Architecture**

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