EDI ON THE CHEAP

A WAVE OF WEB-BASED ELECTRONIC COMMERCE SOLUTIONS PROMISES
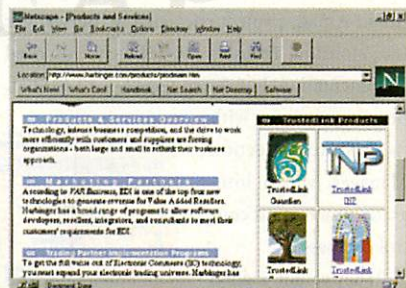
ORDER-OF-MAGNITUDE SAVINGS OVER TRADITIONAL METHODS

BY MARTY WEIL, CONTRIBUTING EDITOR

Some companies, such as Harbinger, provide a range of EDI Products for developers, resellers, integrators, and consultants.

So you've always wanted to do electronic data interchange (EDI), but felt it was too cumbersome and pricey? Well, not anymore. The Internet opened up the EDI landscape to many smaller and mid-sized manufacturing organizations. Now, the World Wide Web is the new electronic frontier for cost-effective EDI solutions in search of users with a little pioneering spirit.

Are you ready for EDI on the cheap?

Establishing a virtual Internet/intranet EDI network can be 90% less expensive than a traditional value-added network (VAN), according to analysts at Giga Information Group, Stamford, Conn. (formerly BIS Strategic Decisions). For this reason, the use of the Internet for EDI is now an established practice for many companies. With its advantage in price—and with security issues being resolved—the Internet will play an even larger role in the interchange of electronic data in the near future.

Today, there are two different forms of EDI practiced on the Internet. The most common, Internet-EDI, is an unattended batch method that enables bulk transmission of EDI transactions. The second type, Web-based EDI, is an interactive form of EDI that enables a company to access another company's Web site at any given moment, enter data on a Web-page form, and submit the data for processing.

"Web-based EDI is coming," says Richard Sherman, director of supply chain management research at Advanced Manufacturing Research (AMR), a Boston-based consulting firm. "This environment can't be stopped," he says. "It is public, pervasive, and low cost. Any company that isn't developing an extensive Internet/intranet strategy is going to find themselves at a severe competitive disadvantage in the very near future."

Rebecca Young, vice president of marketing for EDI provider Premenos Corp., Concord, Calif., concurs: "Both forms of Internet EDI are attractive, because they promise to help firms improve the quality and timeliness of information exchange, improve productivity, enhance document/data accuracy, reduce costs, promote trading partner loyalty, and improve inventory management," she says. "It also reduces the use of paper as well as paper storage requirements."

GE TradeWeb, from GE Information Services, works with all commercial Web browsers, interacts with standard Internet applications, and is accessible from virtually any desktop.

EDI FLOODGATES

"With traditional EDI, there is a tendency for each organization to establish its own rules

ses shall be completed by May 26, 1997."

"The problem is, nobody's ever been required to maintain their design basis, or design information on pressure relief," says Aman Amad, project specialist at Berwanger Inc., Houston. Translated: OSHA says you need documentation, but doesn't spell out a format. Berwanger does, with its Pressure Protection Manager, which integrates process and control databases.

"They've got a good mousetrap," says Bill Bobo, engineering manager at Sterling Chemical, Texas City, Texas. He expects to finish a 2,000-device project in about six months, and says it's saving him a lot of money. The developer claims it reduces the cost of documenting a device from $1,500 or $2,500 to "well below $1,000."

In beta version, these application development modules incorporate object-oriented expert systems and fuzzy logic (left), neural networks (right), and the tools to merge high-level decision support with regulatory documentation.

Similar Programmable Device Support (PDS) tools are rapidly gaining favor throughout batch and discrete manufacturing. MDT, Marietta, Ga., for instance, sells such systems that, like PAS' Honeywell add-on, track revisions made to controller logic for higher productivity and regulatory compliance.

"You really do see various levels of compliance out there. Some [companies] take a very proactive approach; others take it a little slower," says George Yoksas, safety specialist with the Chicago-based Region 5 of the U.S. Occupational Safety and Health Administration.

Yoksas, a PSM coordinator who inspects plants and supervises others who do, adds, "We've seen good paper programs, but the actual practice, the actual implementation lags behind in some cases."

Document management is becoming less and less of a luxury for more and more areas of a manufacturing site. Why? Because today's regulations are just too complex to trust to the old-fashioned paper, clipboard, and sneakernet system.

DECISION SUPPORT MEETS DOCUMENTATION

At higher, supervisory levels of the manufacturing operation are decision support systems like Cambridge, Mass.-based Gensym Corp.'s G2

platform. The company has, for the first time, coordinated the development cycle for three products: G2 Diagnostic Assistant (GDA), a partially preconfigured application developer; NeurOn-Line, which adds modeling capabilities; and G2 Statistical Process Control module (GSPC).

In addition to other enhancements, the system, now in beta, adds online documentation linked to the company's Web site. Because it's a development platform, the same Internet/intranet capability that brings Gensym documents to the user, lets the user develop his own site-specific documentation system.

Beta user Bob Wojewodka, an engineer with Lubrizol Corp. in Wickliffe, Ohio, looks forward to accessing online documentation. "Part of my vision is to use the system, plus the knowledge we have in-house, to predict abnormal or atypical situations such as a runaway reaction...and to link HTML documents directly to our ISO documents. Through this new functionality, we can create live documents that are interactive when needed, based upon the real-time analysis of a situation."

When applications and documents are merged into a strategic framework, John Wilson, product manager, says, "Now not only are you tracking products, but you're using the intelligent tools to start doing decision support." He says several users have integrated electronic batch record tracking and historical database information to help manage operations while complying with U.S. Food and Drug Administration recordkeeping requirements.

Windows NT is making great inroads as an integrated decision support and documentation platform. Whereas Gensym was once primarily a Unix house, Wilson says, "Now it's more Windows, and more NT than 95. NT has the capability because it's designed as a multithreaded real-time system rather than sequentially organized like Windows 3.x." And with hardware platforms opening up to multiple operating systems, he adds, "The whole distinction between workstations and PCs, and between OSs like Unix and NT, is blurring, on a performance and stability level."
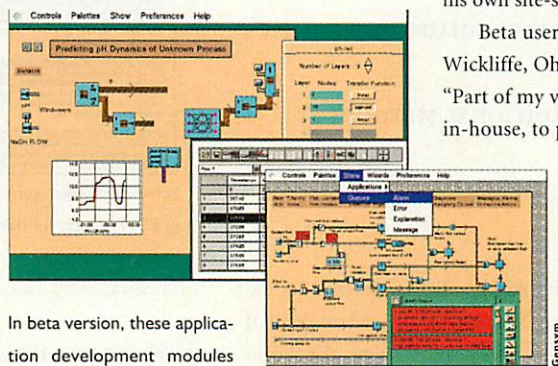
Windows compliance makes data import/export "minimal exercise," says Berwanger's Amad. "In everything we do, it just makes sense to hang our hat on Bill Gates."
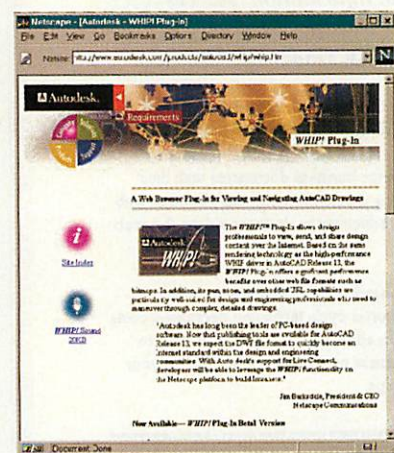
WHERE IT'S GOING

Asked about her viewpoint on the EDMS market she once researched, one former analyst says, "In a way, it's a misnomer to call it a market at all....It's many markets, and it's something we need our systems to hook into," says Julie Fraser, a recent defector from the Boston analyst firm Advanced Manufacturing Research, and now vice president of market strategy at enterprise solution provider Berclain Group Inc., Cummaquid, Mass.

The analysts across the river at Gartner Group, Cambridge, Mass., are selling their paradigm of integrated document management (IDM). Others, like some who are affiliated with the Kalthoff International consortium, Cincinnati, often change the term EDMS to mean "enterprise" document or "enterprise data" management system.

Autodesk's WHIP! is a wow. The new Drawing Web Format (DWF) lets users view and manipulate 2-D vector drawings using a standard browser.

Are you ready for EDMS II? **SS**

Harbinger's Web-based EDI product will be designed to run on Harbinger's Internet Value-Added Server (IVAS) as well as any secure Web server. The company's IVAS will convert any incoming EDI message, such as a purchase order sent by a large Fortune 500 company using traditional EDI technology, into a human-readable document that the trading partner can retrieve via the Internet and read or print. Users of Harbinger's new service can also generate EDI documents such as electronic invoices using their browser.

"Network-based EDI translation is not a trivial undertaking," says Howle. "Because, although EDI is standards-based, typically each EDI trading community requires data to be organized in slightly different ways. But, Harbinger has considerable experience in meeting the needs of different industries and trading groups and currently provides more than 800 different Trading Partner Packs to our EDI customers."

Harbinger is currently undergoing a pilot test of Web-based EDI and will begin rolling out the service for specific trading communities soon. General availability is anticipated in the first quarter of 1997.

SELF-SERVICE

From the types of products being offered, it's apparent that small to mid-sized companies are the primary market for Web-based EDI. "Web-based EDI is most appropriate for small companies that do not send a lot of EDI documents," says Dennis Freeman, senior director of product marketing for Harbinger. "A Web-based EDI system could not handle large batches of documents that many big companies typically send out using a mainframe EDI system," he says. "Similarly, Web-based EDI documents are not easily integrated with a company's accounting system."

AMR's Sherman sees other roadblocks for Web-based EDI. "Web-based EDI is not a computer-to-computer interaction," he says. "It primarily provides the capability to deploy forms and order transactions." Sherman describes Web-based EDI as "transaction interfaces in a self-service mode." Furthermore, Sherman sees the inability to handle large volume as the most critical shortcoming of Web-based EDI. For instance, if buyers have to interact on a volume basis, then they might as well be sending faxes.

"In other words," says Sherman, "if large volumes of small orders are transacted, it could create a logistical nightmare. We have the capability to get a lot of transactions into the system, but the ability to supply and ship product is still an unresolved issue."

For companies already doing parcel shipping to smaller accounts, Web-based EDI could offer some promise, although Sherman is not aware of any that are doing this today.

Another tricky question for Web-based EDI users is: How much real-time interface can it support?

"Web-based EDI is just not configured to handle real-time transaction management on a large scale," says Sherman. "In a Web-based EDI environment, there is the need for a host processor to handle large volumes. In other words, the capability might be there for every consumer to place individual orders direct with Procter & Gamble, but does Procter & Gamble have the cost capabilities to ship to 200 million shipping locations? That's the big question."

What is no longer a question, however, is security. Internet security measures can be placed in two broad categories: protecting the system from intruders and protecting the content and integrity of the messages. With respect to the latter, Internet-EDI transactions of nominal value and sensitivity do not require special security requirements. However, if the information has any sensitive aspects, appropriate precautions are necessary. Today, companies like GE offer secret key cryptology in a mutual

EDI will even make web shopping more marketable.

authentication (double challenge) environment to permit secure transmission of highly sensitive data over the Internet. According to Anne Biehl, GE manager of market development, GE InterBusiness provides a dynamic session key that encrypts the session itself to secure all information passed from sender to receiver.

Most of the Internet-EDI products coming to market offer some form of security. Trading partners are responsible for satisfying existing rules and regulations relating to computer security and privacy. For example, bid data received by government systems is subject to the appropriate controls. Trading partner financial account data is likewise subject to disclosure restrictions. To thwart those who might tamper with a message to divert delivery by changing the "ship-to" address, digital signature can attest to the integrity of the message. Digital signatures can also authenticate messages, preventing pranksters or rivals from submitting false orders.

TRADITIONAL VALUES

Even with the same question marks surrounding Internet and Web-based EDI, it seems clear that the paradigm has already begun to shift from traditional value-added networks (VANs) to the Internet.

Aside from the clear cost benefits of the Internet, what's causing the exodus from traditional VANs? "In the past, companies would go to an EDI provider who would create a VAN for them," says Steve Mann, director of product strategy at Computer Associates, Islandia, N.Y. "The VAN would be dictated by the largest business pattern in the hub. On the spokes, would be hundreds of suppliers who would trade with the large partner. The result of that arrangement was that the large partner in the middle would dictate the standards. On the Internet, that system dissolves as multiple, smaller Web trading partners replace the tradi-

and administrative policies, which leads to the rising cost of dealing with multiple trading partners," says Deborah Miller, manager of EDI Marketing for GE Information Services, Rockville, Md. "Therefore, new technologies and business practices, like Web-based EDI, are necessary if EDI is to move beyond the [30,000 to 40,000] organizations presently using it."

According to U.S. Dept. of Labor and Internal Revenue Service statistics, there are about 6.2 million entities with employees and about 14 million other "business" entities. This vast, untapped market is precisely the one GE Information Services hopes to capture with the launch of its GE TradeWeb, an Internet-based EDI service targeted at small businesses, which make up the 60% of trading communities that do not participate in electronic commerce.

"WEB-BASED ELECTRONIC COMMERCE WILL MAKE THE COMPLEXITIES OF EDI DISAPPEAR ALTOGETHER FOR SMALLER COMPANIES."

TYCHO HOWLE, CHAIRMAN AND CEO, HARBINGER CORP.

GE TradeWeb, works with all commercial Web browsers, interacts with standard Internet applications, and is accessible from virtually any desktop. "GE TradeWeb is an innovative solution that helps business leverage the World Wide Web to expand the trading partner community," says Haskell Mayo, vice president of marketing for GE Information Services. "As companies increase their electronic trading community, they geometrically expand their productivity gains, such as decreased cycle times, reduced costs, and improved customer satisfaction."

According to GE's Miller, trading partners using the system can expect bottom-line results by streamlining the exchange and tracking of business documents, expanding their trading communities, and reducing order-processing and payment cycles.

ADVANTAGE INTERNET! WHAT MAKES THE INTERNET USEFUL FOR EDI?

The greatest benefits of using the Internet and World Wide Web for electronic data interchange (EDI) include:

- ◆ Adoption of common standards and proven interoperable systems.
- ◆ Adoption and deployment of a distributed Directory Service capability, so that one can readily contact electronically any other organization in the world.
- ◆ Explicit commitment by participating organizations to cooperatively route traffic, work to resolve addresses, and meet required standards.
- ◆ Ubiquitous network coverage from many service providers. (This allows the customer to choose the level of service needed.)
- ◆ Layering of applications (such as EDI) over existing, proven, applications.
- ◆ A standards process with reference implementations to which all vendors have equal access (a level playing field).
- ◆ Widely available public domain software including, but not limited to, applications, protocol/transports, and multiple platform development tools.

Bottom-line benefits are also being promised by Electronic Commerce Systems (ECS), an Atlanta-based company that is pioneering new ways to extend the supply chain via electronic commerce. ECS has introduced "The Retail Catalog," which allows consumers, suppliers, manufacturers, and anyone else involved in the supply chain to choose items—raw materials, parts, or consumer goods—from online catalogs offered by multiple suppliers. These catalogs have optional color photos of each item, along with a brief description. After the buyer has indicated color, quantity, size, etc., the order is transformed into an EDI document. The EDI-standard document is then securely transmitted via the Internet to the appropriate supplier.

This represents a significant advance over traditional Internet ordering techniques, according to ECS. Currently, online orders are E-mailed to the supplier, which then prints out the order for entry into an order processing or other system. This, essentially, is not much more efficient than receiving a faxed order. But since EDI is optimized for business-to-business transactions, an order in EDI format can move directly into the appropriate financial system. By eliminating data entry, errors are reduced, cycle times are improved, and labor and other costs are eliminated.

Potential users of an EDI-enabled catalog over the Internet include retail chains and their suppliers, third-party fulfillment houses, sales configuration departments, and catalog houses. It can also be used by firms to add ordering and fulfillment capabilities to their intranets. Additionally, the technology can be used in any industry using EDI, including health care, transportation, and government.

ROLLING OUT

Another Internet-EDI powerhouse, Harbinger Corp. of Atlanta, has announced that it will offer a service that will allow companies to send or receive EDI transactions via the World Wide Web. The service will allow companies to transmit and receive routine business documents such as purchase orders and invoices using only a Web browser.

"We are now taking electronic commerce one step further by introducing Web-based EDI, which will make the complexities of EDI disappear altogether for smaller companies," says Tycho Howle, chairman and CEO of Harbinger. "Customers will be able to conduct business electronically without having to install separate EDI translation software, as is the case today."

tional hub and spoke arrangement, and all of the partners have a stronger say in how the transmission process works."

According to Mann, the Internet is the ideal environment for establishing a sophisticated electronic quilt that weaves a group of trading partners together. Just as a quilt binds many individual and sometimes disparate threads into a unified whole, the Internet can integrate organizations and provide business benefits to each individual.

Todd F. Ellwood, director of marketing services for the Network Services Group of Sterling Commerce, Dublin, Ohio, concurs. "Managing trading partner relationships, especially during the sometimes grueling initial implementation period, is consistently rated as the single biggest traditional EDI headache," he says. "For large companies, dealing with a potentially huge number of small techno-phobic partners can be expensive and a genuine strain on resources. Communications set-up and testing has been no small contributor to this frustration for both the company and its trading partners. The perception is the Internet can ease this process, because it is a 'standard' method of communications; it is everywhere; and people are becoming more familiar with it."

The Industrial Technology Institute's Center for Electronic Commerce is one of several organizations looking to improve EDI.

Harbinger's Freeman adds another reason for the move away from VANs: "There is a perception that VAN-based EDI is expensive, and indeed, we believe that the user can potentially save money by using the Internet instead of the VAN, because VAN operators typically charge EDI users a per-message fee that varies with the size of the message. Internet service providers often charge a flat fee regardless of number of

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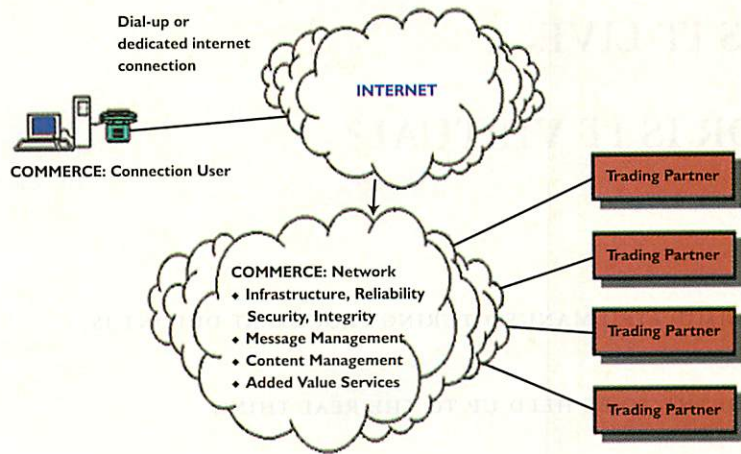
When applicable, Internet-enabled EDI products are a fast-track alternative to traditional investments in hardware, software, and internal technical resources.

(Source: Sterling Commerce)

messages sent."

Another limitation of traditional EDI is the limited "store and forward" architecture, where most transactions occur in batch mode. Ellwood explains: "The traditional EDI systems and supporting business systems have been built to process in a batch mode. Most companies did not require or want EDI transactions going directly and immediately into their business applications. A batch processing approach provides an extra step and time to perform validation checking and verification," he says.

"Over the past several years, more real-time EDI systems have been developed based on demand. Quick response, vendor-managed inventory, and just-in-time EDI applications are examples of this. Today more businesses wish to implement real-time systems, because their trading communities are more comfortable with basic EDI and computers in general, and it gives them an opportunity to extend the reach of their EDI program."

"Many businesses," Ellwood continues, "view the Web as a way to directly reach their end consumer markets and lower their cost of sales. To effectively reach them, they will require the pizzazz of the Web, and the infrastructure to perform real-time EDI and feed their business systems. To support this, many companies are facing serious re-engineering of their legacy systems."

"Finally," Ellwood adds, "the cost of traditional EDI cannot be ignored as a major issue. The reality is: big and small companies alike wish to control and cut their costs whenever they can, and the perception is the Internet might be an affordable alternative to existing methods."

Even though the move to the Internet is sure and swift, Ellwood doesn't forecast the death of the value-added network just yet. "Traditional EDI isn't going away anytime in the near future," he says. "Every report indicates the continuance and growth of EDI. As with any technology, it will certainly continue to change based on the demands and needs of the marketplace. The Internet will play a huge role in shaping those changes, but it's not simply a matter of saying, 'Oh look, the Internet is here—now we can do all of our EDI business on the Web, instead of the way we've been doing it for years.'"

While there is still much work to be done before Internet- and Web-based-EDI supplant value-added networks, the benefits of the Internet cannot be ignored. The era of cheap, plentiful bandwidth has arrived, and enterprising companies are rushing to fill the void with sporty alternatives to the old VAN. **SS**

IS IT LIVE,
OR IS IT VIRTUAL?

A SIMULATED MANUFACTURING PROCESS AT DUPONT IS

WORTHY TO BE HELD UP TO THE REAL THING

BY BRIAN PELLETIER, ASSOCIATE EDITOR

IT wasn't enough that Hank Graeser had a real non-woven sheet manufacturing facility—he wanted a simulated one, too.

"We planned a control system retrofit, and we wanted a simulation to help us develop the control strategy and familiarize the operators with the new system," says Graeser, senior research associate at E.I. DuPont de Nemours in Richmond, Va. "We're unable to take periods of long outages and high waste, and a simulation is a low-risk way to test. Our objective is that when the machine comes up, it runs right."

Working with EnTech Control Engineering of Toronto, Graeser and his team set some goals for the simulation. First, the simulator needed to be able to completely test and tune the machine startup controls, grade change controls, and lower level operating controls prior to commercial startup. Looking further ahead, though, Graeser saw the simulator as a "life-cycle tool," a way to train operators, develop new control strategies off-line, and explore possible design changes to enhance control.
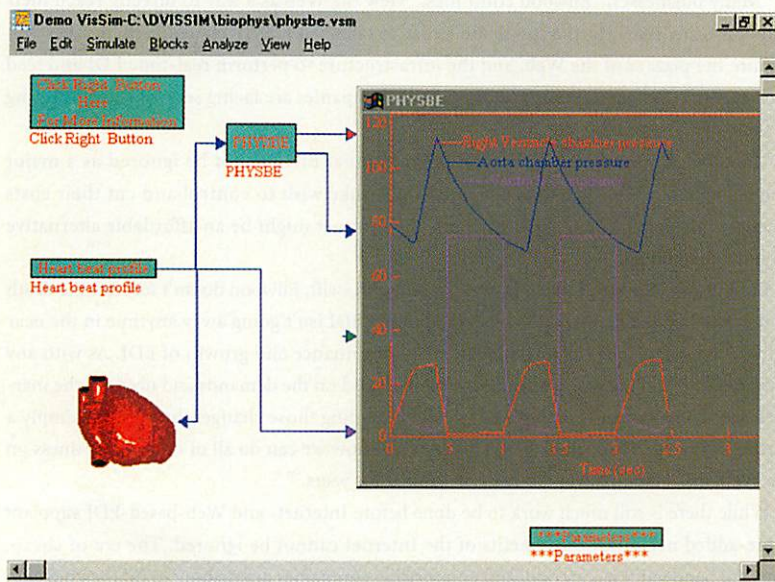
VisSim can be used to simulate dynamic processes from process control to human blood flow.

UNDER THE COVERS

The business of manufacturing non-woven sheets is a tricky one. The polymeric is used for electric insulation in high-temperature transformers, motors, and wires, and is formed much like a sheet of paper. And although certain product grades are unique to certain machines, some machines make as many as 40 different grades, sometimes switching between grades once a day or more. Demand is high, so waste at startup is unacceptable.

The facility itself is made up of a half dozen interrelated processes using 15 tanks; 20 sets of pumps, lines, and valves; refiners; a headbox and drainage table; and vacuum devices, dryer cylinders, and scanning sensors. A high-integrity process model would require solving more than 250 simultaneous differential equations. The laundry list of requirement for the simulator was intimidating to say the least (see sidebar, A Simulator's Checklist).

"DuPont has a long history of process simulations," explains Graeser, "some developed in-house and others from third parties. In this case, though, we didn't have the depth of expertise in this process, and we basically looked to Entech as our vendor for the simulation. The company has a lot of experience with paper and paper-type machines, and it had already standardized on the VisSim engine for its simulator."

The choice of VisSim, by Visual Solutions Inc. of Westford, Mass., didn't come easy, however the Entech team knew that no single product could meet all the immediate needs, and the general objective of quickly simulating a complex process with high