

E-COMMERCE

Electronic commerce (e-commerce or EC) is a combination of EDI and EFT. It is a method to seek, manage, and operate business transactions applying computers and telecommunications networks. It provides business partners with the following advantages:

1. Price optimization,
2. Time minimization of business transactions,
3. Shorter procurement cycle,
4. Cost minimization through savings on inventory and the use of the just-in-time (JIT) technique,
5. Quick response business practice (QR),
6. Shorter product life cycle,
7. Accelerated time-to-market through the e-collaboration among the business partners,
8. Other.

E-commerce has become a buzz word for consumers and companies during the last few years of the 1990's. Increased awareness about the use of computer and telecommunications networks simplifies business procedures and increases efficiency.

E-commerce combines the following systems:

- Electronic Data Interchange (EDI)
- Electronic Fund Transfer (EFT)
- E-mail (EM)
- Web applications

E-commerce provides ways to exchange information - among individuals, companies from different countries, and among computers that support the whole system.

During the 1970's pilot systems of e-commerce were set up. Two of the most successful, DISH and SHIPNET, are applied by some sea ports (Southampton, Felixstove, Rotterdam, and Amsterdam). They support the total set of import/export processes.

During the 1980's, a number of Value Added Networks (VAN) emerged as public telecommunications networks that began to support the first applications of e-commerce. Subsequently, smaller VAN's have emerged to cater to the requirements of specific sectors, such as education. The airline and motor industries have created networks for the transportation of EDI and e-mail messages. EDI had reached a respectable level of awareness among businesses. A few newsletters and magazines were dedicated to it. The X.400 standard for e-mail and fax was created to support the EDI systems. However, large organizations have found it difficult to extend their trading communities beyond their main business partners.

Since 1997, the term "electronic commerce" has rapidly broadened to encompass business conducted over the Internet and the World Wide Web. If EDI systems are characterized by defined relationships among business partners, the Web systems are characterized by ad hoc relations among business participants.

E-Commerce Applications

Most companies conducting Web-driven commerce are doing one or more of the following processes:

- a) Selling products and services:
 - i) consumer entertainment
 - ii) leisure products, such as music CD's
 - iii) books
 - iv) airline tickets
 - v) computers
 - vi) other
- b) Selling advertising:
 - i) advertisements on the most popular home pages and application systems,

- a) so-called “flat ads,” and
 - b) dynamic ads, blinking or video type
- ii) advertisements “pushed” to customers’ e-mails
- c) Selling fee-based information:
 - i) Customized information about news and business events, trends,
 - ii) E-periodicals, such as Microsoft’s “Slate.”

The e-commerce applications are still evolving and gaining strength as the Internet applications continue to develop.

E-Commerce Business Models

E-commerce business models are still evolving; however, according to Rappa (2000) and Timmers (1998) one can distinguish their following classifications:

- The **Brokerage Model** firms act as market makers who brings buyers and sellers together and charge a fee for the transactions that they enable. They can be: B2B, B2C, C2C. For example: online travel agents (*www.priceline.com*), online brokerage firms (*www.etrade.com*), and online auction houses (*www.eBay.com*).
- In the **Advertising Model**, the owner of a website provides some content and services that attract visitors. The website owner makes money by charging advertisers for fee for banners, permanent buttons, and so forth. For example: consumer portals such as *www.Yahoo!.com* which among many services provides very popular maps and driving directions or *www.Altavista.com*.
- The **Infomediary Model** is applied by firms collecting valuable information on consumers and their buyers’ habits and sells it to firms, who in turn can data mine it for important patterns and rules and other useful information to help them better serve their customers.
- The **Merchant Model** is the “e-tailer” model in which wholesalers and retailers sell goods and services over the Internet. These include a virtual merchant, catalog merchant, surf-and-turf, and bit vendor. For example: “brick & mortars”; furniture retailer - *www.ethanallen.com* and grocer-

ies retailers *www.kroger.com*, catalog merchants of everything for cooking and chefs – *www.cooking.com* or *www.tavolo.com* or a bookstore such as *www.Amazon.com*.

- In the **Manufacturing Model**, producers try to sell products directly via the Internet to end users instead of going through a wholesaler or retailer (dealer). By doing so, they can save costs and better serve customers by finding directly what they want. For example: computer manufacturers – *www.dell.com* or *www.compaq.com*.
- In the **Affiliate Model**, a merchant has affiliates whose websites have click-through to the merchant. Each time a visitor to an affiliate's site clicks through to the merchant's site and buys something, the affiliate is paid a fee, usually a percentage of the revenue. The most popular websites and portals apply this model; for example: *www.WebMED.com*, *www.MSN.com*, *www.Lycos.com*, *www.cometsystems.com*.
- The **Community Model** is based on members' loyalty rather than traffic. Users have invested in developing relationships with members of their community and are likely to visit the website frequently. Members of such a community can be very good market targets. For example: *www.iVillage.com*.
- The **Subscription Model** – members pay a subscription price and in return receive high-quality content. For example: America Online (AOL) which offers an access to the Internet but whose service is provided by the private network which is leased from the public Value Added Network service.
- The **Utility Model** – activities are metered and users pay for service that they consume.
- Other.

An Internet business model explains how a firm is going to make money using the Internet capabilities. As events in 2000 have shown, making money on the Internet is trickier than anyone suspected. We will discuss this issue later in this chapter, when we describe the nature of so-called “dot.com” business.

E-Commerce Architecture

E-commerce covers any form of computerized buying and selling, both by consumers and from company to company. There are two basic types of e-commerce modes:

- consumer-to-business (C2B)
- business-to-business (B2B)

Consumers spent \$700 million online in 1996 vs. more than \$7 billion in 1998, about \$14 billion in 1999, and more than \$20 billion in 2000. E-commerce increases sellers' ability to know their buyers, and buyers to know more than ever. Comparison shopping has never been easier, thanks to such business as *www.priceline.com* and *www.eLoan.com* and such services as *www.mySimon.com* that will crawl the Web as a robot or individualized "bot" looking for the best price for a consumer.

Consumer advocates speak cheerily of how sites that match buyers with the lowest price available are facilitating a "frictionless" economy or "perfect capitalism," where the prices are set by a perfect agreement between what a buyer wants and the seller can afford to sell for. Sounds ideal, doesn't it? Almost anything you may want to buy is available online today. The virtual auction house - *www.eBay.com* - even has a listing for people who might be interested in purchasing a best friend.

Brick-and-mortar outlets, to justify the cost of rent, salespeople and other real-world necessities, cannot afford to have people just look. They must turn mere sneaker *shoppers* into sneaker *buyers*, a conversion process that market researchers measure by calculating what percentage of people who visit a store wind up purchasing an item. This percentage is called "sell-through" rate, and most have sell-through rates around 50% (though some supermarkets have much higher rate). By contrast, the highest of any online retailer is only 7%. E-commerce B2C sites will have to address the shoppers-into-buyers problem if they want to move far beyond their current niches.

An example of a new approach to online buyers offers *www.Alloy.com* for young consumers. This site provides a virtual chat room, user home pages, and auctions to enliven shopping portal, where kids can buy anything from backpacks and miniskirts to games. A site - *www.wine.com* - offers for mature consumers e-mail service and chat boards to encourage a kind of a virtual wine-testing party.

A result of B2C is so called disintermediation—a word for direct marketing built on the idea of companies manufacturing directly and selling directly to customers out of a factory, without dealing through indirect channels.

For instance, *www.CipShot.com* is a golf-club manufacturer that takes orders on the Web. When customers go to the company's website, they describe their swing and certain proportions of their bodies. Chip Shop then builds the clubs in the factory and ships them out. Customers get their clubs within a couple of days, totally guaranteed. This method of doing business represents a very big change from the customer having to go a specialty shop, deal with a pro, which can be intimidating, and wait six to eight weeks for delivery of clubs. Chip Shot's strategy is very much like the strategy that *www.Dell.com* used to achieve its position of prominence in the PC industry.

This business model will transform other industries in the future. It can be summed up as follows:

- Configure a product by a consumer,
- Make a product of standard, name-brand components,
- Sell by yourself online,
- Sell other manufacturers' goods as a by-product service.

E-retailers perform many of the functions of dealing directly with the consumers, such as customer service, and consumers love the virtual alternative. The Internet works not simply because producers save costs but because consumers want to make business with those manufacturers and merchants.

The e-commerce business-to-consumer architecture is depicted on Figure 6-2.

At the heart of online retail business is the electronically supported selling of goods and services by vendors to consumers. The components of the business-to-consumer e-commerce system are as follows:

Personalization. This is one part of a marketing effort to present specific contents to specific types of customers. By implementing a target marketing concept, every single customer can be provided with his/her personal scope of interest in a given product/service line. This type of information is taken from data warehouses of search engines, customer databases, and marketing research centers.

Order Taking. The subject of retail transaction can be a physical good, service or digital goods or services. Key solutions include: an e-shopping cart subsystem, a credit card-based payment, an order status traffic and notification subsystem, and so forth.

Customer Service. This service is provided either by e-mail to the customer or through a Bulletin Board System (BBS).

Search Engines. This includes the popular Internet search engines, such as Yahoo, Info-Seek, Altavista and others.

Bots. These components are software “robots” that do the customer’s bidding. Among the more sophisticated are digital bargain-hunters.

The e-commerce business-to-business architecture is depicted on Figure 6-3.

The business-to-business sector is characterized on one hand by traditional long-term business relationships but on the other hand also by new kinds of ad hoc deals facilitated by the increased transparency in electronic markets. The components of such a system are as follows:

Association of Members. The association member pays a fee to enter a system of thousands of potential contractors and subcontractors in the world. The system provides global marketing for offered products and services and also facilitates the search of potential partners.

Customization. This part of the marketing effort presents specific contents to specific types of customers. By implementing a target marketing concept, every single customer/company can be provided with its customized scope of interest in a given product/service line. This type of information is taken from data warehouses of search engines, customer databases, and marketing research centers.

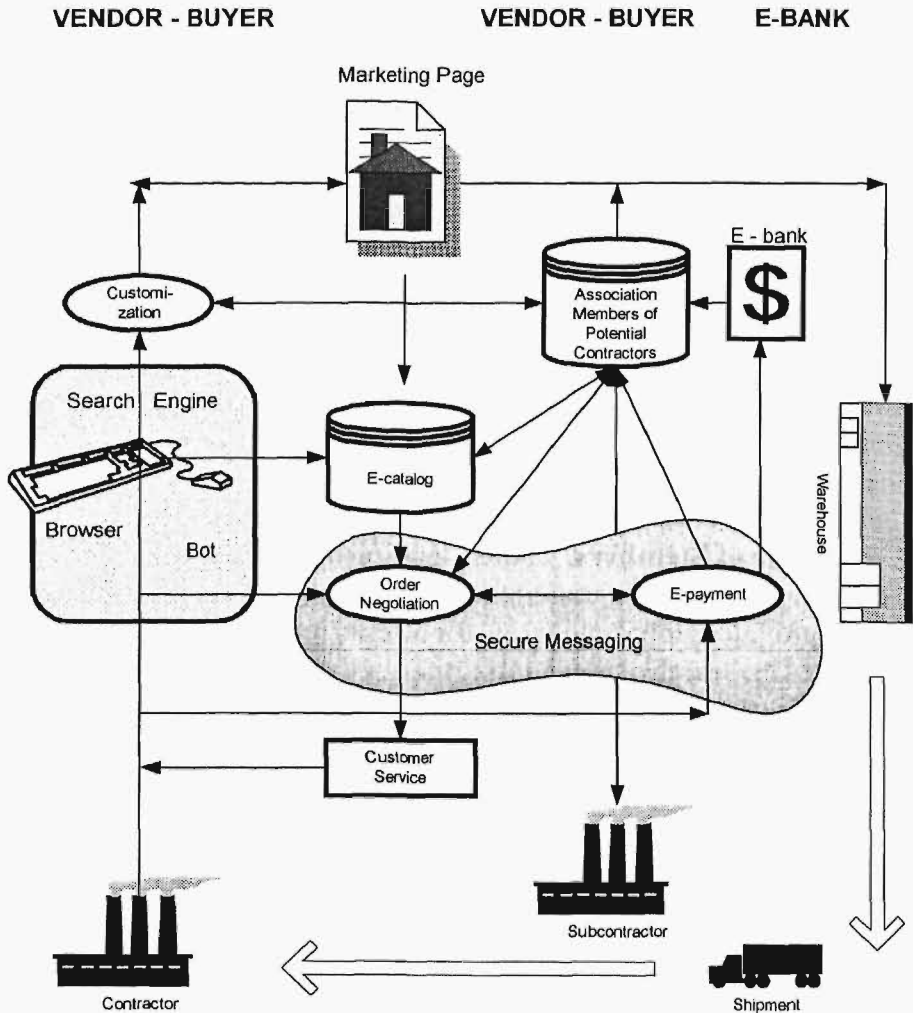
Marketing/Purchasing Message. This is a given message about sought-for buyers or partners. It is distributed by the system administration.

Negotiation Message. A process of negotiation is supported by a set of interactive hypertext documents that are interexchanged forward/backwards among partners. Most negotiations take place within the first 15 minutes of the e-contact. The negotiations are about price, delivery conditions, warranty, and so forth. These negotiations can be conducted automatically or “manually.” A derivative of the negotiation message is the next level of negotiations about the transport and shipment intermediaries.

E-payment. The system administration arranges e-payments through associated electronic financial institutions.

Customer Service. This service is provided either by e-mail to the customer or through a Bulletin Board System (BBS).

Figure 6-3: E-commerce B2B in the Association Business Model



Business-to-business (B2B) e-commerce is the richest vein of commerce opportunity, accounting for more than 70% of transaction values in 2000, and in 2004 it will reach \$2.2 trillion as an 87% portion of the e-commerce total. B2B models can be classified as follows:

1. **Supplier-controlled e-commerce** – in markets dominated by brand-names, such as Cisco, that sell complex goods and services and provide

quality customer service for their customers and channel partners. They want to build websites and Extranets with subcontractors which ensure that customers return to buy goods and services. Therefore these suppliers want to maintain tight control through CRM (Customer Relation System).

2. **Buyer-controlled e-commerce (e-procurement)** – the buyer is the driving force. For example: companies such as Ford and General Motors and Wal-Mart set up e-commerce systems for their huge number of suppliers which compete for an order. In this case the buyer is the policy setter. The critical functions in this model are transaction performance and integrity.
3. **Suppliers-buyers controlled e-commerce** – is a combination of systems for big suppliers and buyers who want to reduce logistic cost and be more efficient.
4. **Digital markets** – include trading associations (third parties), exchanges, and online marketplaces for small and medium-sized buyers and suppliers. Third party associations bring buyers and suppliers to exchange information, conduct transactions, and use e-legal and e-banking services provided for association members.

The future of B2B is the interconnection among all the above models.

Person-to-person payment is a way to send money through the Web to an individual who is not set up to accept credit-card payment. This fast growing area of the Web payment systems owes its success almost entirely to *www.eBay.com*. Now that we are all buying from each other's attics, the need for a payment system that does not require credit card authorization capability has arisen. This system works like escrow accounts, but without some of protections offered by escrow, a legal term for an agreement that is put in the care of a third party and won't get executed until certain conditions are met. The sender of money sets up an account with a credit-card number attached. The recipient must "pick up" his/her money by visiting the website and giving a physical address or a bank account. PayPal, a unit of *www.X.com*, is by far the best-known person-to-person payment system online, with 4 million registered users. It processes about 130,000 transactions a day, with an average payment of \$50. The user needs a password to collect a payment. eBay applies Billpoint solution, and Yahoo! uses Paydirect utility. This way of

paying empowers the entrepreneur in all of us. Most of these systems charge no fee to users, because they make their money on the interest earned on the accounts. Some charge fees to small businesses that want to accept payments.

Virtual Escrow ensures that the buyer receives the item and that the seller receives payment. Prior to conducting the transaction, both parties agree to register the same escrow service and agree to its terms. The buyer then transmits payment via credit card, check or bank transfer to the escrow service. Once the escrow service verifies the payment, the seller sends the merchandise to the buyer for inspection. If items are acceptable to the buyer, the escrow service transmits payment to the seller. The market leader is i-Escrow, Inc. of Redwood (California) whose services are used by eBay and Amazon's auctions.

Digital Wallets are the way to speed checkout and avoid setting up separate accounts at different Web merchants. Users download software that stores their credit card numbers and personal information. Participating sites download software that enables them to receive payment from the wallet. The process is very similar to digital cash, except that the retailer actually receives a credit-card number rather than a form of the Internet currency. The wallet also stores shipping and billing addresses. Yahoo! is the leader in electronic wallets, with a roster of more than 11,000 merchants, and it accepts only one credit card number. AmericaOnline's wallet, called Quick Checkout, stores 10 credit card numbers and 15 shipping addresses but is accepted at only 30 merchants. Microsoft's wallet is called Passport, and is without any limit to the number of credit-cards.

Virtual Credit Card allows one to use a credit card online without having to disclose the actual credit-card number. A bank asks its credit card customers to download some software onto their computers. Whenever they shop, that software generates a one-time credit card number for the purchase. The merchant does not know it is not the real credit card number because when the merchant checks with the bank, the bank confirms that it is tied to the customer's account. This system applies to American Express.

Electronic Payment Systems

The Internet environment of e-commerce triggered the development of several innovative payment systems (Price Waterhouse, 1997):

1. Credit-based payments:
 - a) small transactions <\$5

- Visa, MasterCard, FirstVirtual, IBM InfoMarket, ClickShare
- b) large transactions >\$50
 - CyberCash credit card, CyberFee credit card
- 2. Debit-based payments
 - a) small transactions <\$5
 - NetCheque, CyberCash Check, CyberCash CyberCoins
 - FSTC Electronic Check
- 3. Digital currency
 - a) small transactions <\$5
 - DigiCash, NetCash
 - b) large transactions >\$50
 - Citibank

The most popular consumer e-payment is provided by MasterCard and Visa cards, whose ID and numbers are submitted via an e-mail or encrypted response message. The payments are also provided by trusted third parties such as the Net Banking Consortium, consisting of more than 20 large banks, using IBM's Global Network Internet Access service and website hosting capabilities to facilitate e-commerce transactions among partners associated with this Consortium.

Payment in the form of a digital check replaces a paper check with an electronic one for the same purpose of existing inter-bank clearing systems.

The digital cash is based on digital tokens that represent secure currency (without double spending) and allow direct buyer-to-seller transfer of value.

Smart cards, popular in France, Germany and Australia are another e-payment system. A memory chip is implanted into a piece of plastic that is almost indistinguishable from a credit card. The chip can store any kind of data, and can process data and execute algorithms. The Mondex card is owned by 17 major banks and organizations from several countries. Visa Cash smart cards are available in 15 American cities. The Wells Fargo Bank of San Francisco provides a VeriFone smart card, which can obtain virtual cash by the phone.

Micropayments are another kind of e-commerce payment. They provide a merchant with a mechanism to charge as little as between \$0.08 to \$0.30 per transaction. In this range, CyberCash and CyberCoin are applied. To use this system, a consumer must have a credit card and an account with a participating. In addition, both the vendor and consumer must have installed special software. Money can be transferred from the account to the CyberCoin "wallet" in increments of \$20. To make a purchase, a consumer clicks on a Web page and

is queried about the purchase and payment amount; when the customer approves the purchase, money is then transferred from the wallet to the merchant (Price Waterhouse, 1997).

E-Commerce Security

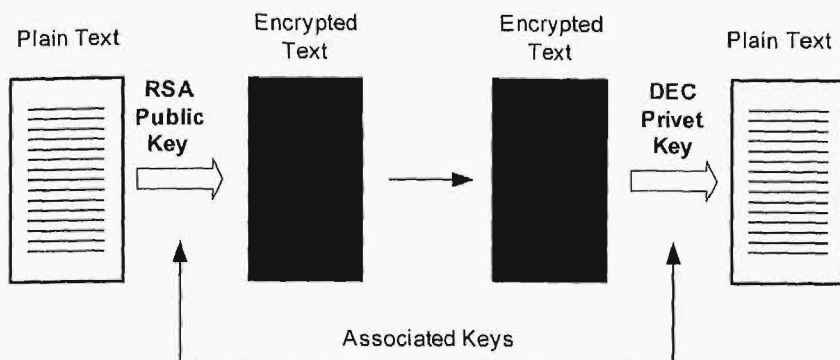
Essential security solutions are based on the following functions:

- A user authentication service which provides log-in identification (ID) and password verification
- An authorization engine which makes decisions to grant or deny access to protected resources on the net
- An administrative interface to determine the authorized association of users and protected resources on the net
- An audit service to record attempted security incidents and administrative changes
- A cryptographic service to protect the confidentiality of the user's passwords

Security of e-commerce is based on the following standards:

- RSA (named after inventors Rivest, Shamir, and Adleman from MIT) algorithm introduced in 1978 to provide public-key encryption in peer-to-peer secure transactions, authentication of user by passwords, and digital signature. This standard is widely implemented in hardware and software products. The standard is based on 129 or more digits.
- DES (Data Encryption Standard) is a private-key encryption system which is based on two keys, one to encrypt the data and another to decrypt the data.

The net security system is depicted on Figure 6-4. Its solution is based on the publicly known public key, which the sender applies to encrypt its own data, and the receiver has the private key which is applied to decrypt the received

Figure 6-4: Public-Key Encryption Architecture

Source: SET Specification 1996

data. A public-key is distributed by the trusted third party, which certifies its authenticity.

Good-Bye to Fixed Pricing

Today, the first signs of a new fluid pricing can be found mostly on the Internet. Online auctions allow cybershoppers to bid on everything from collectibles to treadmills. Electronic exchanges, on the other hand, act as middlemen, representing a group of sellers of one type of product or service—for example, long distance service - that is matched with buyers.

The pricing revolution, though, goes beyond the Net. Companies also are creating private networks, or “extranets,” that link them with their suppliers and customers. These systems make it possible to get a precise handle on inventory, costs, and demand at any given moment - and adjust prices instantly. In the past, there was a significant cost associated with changing prices, known as the “menu cost.” For a company with a large product line, it could take months for price adjustments to filter down to distributors, retailers, and salespeople. Current streamlined networks reduce menu cost and time to near zero.

This will clearly benefit consumers. Already, many are finding bargains at the hundreds of online auction sites that have cropped up. And on the Net, it is a cinch to check out product information and compare prices—thanks to a

growing army of shopping helpers called “bots.” This shifts the bargaining power to consumers.

But that does not mean sellers get a raw deal. Businesses can gather more detailed information than ever before about their customers and run it through powerful database systems to glean insight into buying behavior. Suddenly, marketers can communicate directly with prospective buyers, offering them targeted promotions on an individual basis.

As buyers and sellers do battle in the electronic market, the struggle should result in prices that more closely reflect their true market value. The future of e-commerce is in implicit one-to-one negotiation between buyer and seller. An individual can get a spot price on everything. Some day, you may haggle over the price of just about anything, the way you would negotiate the price of a carpet in a Turkish bazaar. However, it is likely to take place on an electronic exchange, and it may be a computer bidding against another computer on your behalf.

For a preview of what is to come, let’s just look to the financial markets. The NASDAQ stock market is a model for e-commerce. NASDAQ, for example, uses a system of dealers, or market makers, who trade shares of stock for brokers or individuals. The dealers are linked by computer networks that match buy orders with sell orders, and thus arrive at the value of a stock for that moment in time.

Like NASDAQ dealers, the new Internet market makers must set up mechanisms for clearing transactions and for making sure that both buyers and sellers are satisfied. As electronic exchanges are established to trade everything from advertising space to spare parts, the true market value of products should emerge.

The most widely used form of this is an online auction. In the world of virtual gavels, Onsale makes a good business. The website runs seven live options a week where people outbid one another for computer gear, electronics equipment, and even steaks. Onsale buys surplus or distressed goods from companies at fire-sale prices so they can weather low bids. And the customer loves it. He/she can buy, for example, an eight-year-old model desktop computer for his business via Onsale. They saved 40% over what they would have paid in a store. So far, the lure of a bargain has proved powerful: more than 4 million bids have been placed in the period from 1995 to 1998. It sold \$115 million worth of goods in 1997, up 30% from 1996. In such a manner, customers are active participants in price-setting, so it is almost an infinity of economic Democracy.

For every couple dozen online auctions, though, there is an entrepreneur applying the Net economics in ways that will ultimately transform entire industries—from telecommunications to energy. These companies are setting an example for tracings commodities such as phone minutes, gas supplies, and electronic components. Their approach is a departure from the old mode of commerce. This is “the third wave” of commerce on the Net—companies, which are moving beyond simple marketing and online ordering, now create an entirely new electronic marketplace.

You might not think of a stodgy utility as being in the vanguard of cyberspace, but that is exactly where Southern California Gas is. A couple of years ago, it saw an opportunity in the dove-tailing of two sweeping trends - the deregulation of the energy industry, which lets customers shop for energy suppliers the way they shop for long-distance phone service, and the rise of the Web. So, last fall, it launched Energy Marketplace, a Web-based exchange that lets customers shop for the best gas prices.

The system has something for everyone. Small and midsize gas providers list their prices on the exchange. That lowers their marketing costs and gives them access to a broader market - putting them on equal footing with big energy suppliers. Customers, mostly businesses, save money by shopping for the best price, or locking in long-term deals when prices are low. And Southern California Gas, as a distributor, increases its volume of business and collects a subscription fee from gas providers that use the exchange. Solaces offers residential customers the same opportunity and has expanded the service to include electricity.

Does it work? Using Energy Marketplace, Summoned Wire Product Corporation in Stockton, California, found a new supplier, Intermarket Trading Co., and now saves \$500 a month—about 20% of its \$3,000 a month energy bill.

New York-based ArbiNET (short for Arbitrage Network) is building an exchange for routing phone calls over the lowest-cost network on the fly. Most telecommunications carriers have built massive networks to handle peak loads. The problem is, much of the

capacity goes unused. AT&T, for example, typically uses just 20% of its global network capacity, in a fiercely competitive market that has seen margins erode. Unused capacity can be the difference between making money and losing money. ArbiNET's exchange lets carriers optimize their capacity by accepting lower cost calls over their networks during off-peak hours. There are other companies that broker long-distance minutes, but ArbiNet is the only one attempting it in real-time. ArbiNet Clearing Network works this way: work carriers, such as AT&T, supply information about their network ability and price at a given time. Carrier customers send calls through ArbiNet's clearing house - say, a phone call from New York to Hong Kong that must travel over secure lines. ArbiNet's powerful computers and phone switches match the request with the lowest-cost carrier for the particular call - all in milliseconds. ArbiNET plans to open service for consumers. Then, a smart phone, for example, could automatically check for the lowest carrier on each call that is placed. Naturally such a scenario is unnerving the giant phone companies, because it will undercut their prices.

Other big players are embracing the Net to dispose of surplus goods while protecting margins on their core products. Chicago-based FastParts Inc. and FairMarket Inc. in Woburn, Mass., operate thriving exchanges where computer electronics companies swap excess parts. All U.S. industries generate some \$18 billion in excess inventory a year - around 10% of all finished goods. When Intel Corp.'s 386 microprocessor came out, one customer found himself with a boatload of 286 chips that were instantly obsolete. Afraid that he might have to write off the inventory as a loss, he made some calls and found a customer willing to buy the stock. Now, the same surplus customer at Mao Technologies Inc. sells a \$100,000 software package to companies that want to run their own auctions to generate revenue from aging merchandise.

Internet bidding exchanges are flourishing for a wide array of products - and more are sure to come. Among the most popular are:

- **Aucnet.com** - auction of used cars. Its rating system helps buyers to judge the quality of cars.

- **Narrowline.com** - an electronic exchange for net advertisers that brings together media buyers with websites looking to sell available space.
- **Eworldauction.com** - this site holds monthly online auctions of old books, maps, and medieval manuscripts.
- **Priceline.com** - mortgages, cars, and airline tickets: provide your price and terms - and Priceline will try to find you a willing seller.
- **Energymarket.com** - lets suppliers of natural gas and electricity compete for the business of big corporate energy users.
- **eBay** - the largest on the Internet auction house that provides the market for 3+ million goods, where about 2-3 million users trade daily.

“Third Wave.” These e-commerce systems pave the way for fluid pricing to reach beyond commodity products and surplus goods to popular, even premium-priced items. E-markets could be just as effective selling unique items, such as a van Gogh painting or a company’s core product line. The move away from surplus goods to primary goods is the real thrust of the third wave.

There is just one snag: when anyone on the Net can easily compare prices and features, some high-margin products could fall in price. And a strong brand name alone may not be enough to make a premium price tag stick. Some branded products may even prove to be interchangeable. You might not trust your phone service to an outfit you have never heard of on the basis of price alone. But you might be willing to swap among AT&T and MCI, or Sprint for a better deal. And do you really care if your credit card is MasterCard or Visa?

One way companies can respond is by cooking up creative ploys to differentiate their products. They could include personalizing products or offering loyalty programs that reward frequent customers. Thanks to Internet brokers, trading fees are already rock-bottom. Now, companies such as E*trade, the online brokerage firm, are mulling loyalty programs that reward frequent traders.

There are other ways to side-step the effects of the ultra-efficient Net market. Just look at the airline industry. It was one of the first industries to go online, starting with American Airlines Inc.’s Sabre automated-reservation system in the 1960’s. When airlines followed suit, American introduced the frequent flyer program to keep customers loyal. Three decades after Sabre, airlines still manage to get many passengers to pay rich fares. The secret:

knowing who to gouge - in this case, the business customer who also has perfected the science of yield management, concocting complicated pricing schemes that defy comparison. The price for an airline seat can change several times and a passenger is virtually certain that the person sitting in the next seat has paid a different fare.

Now, airlines are tapping into the Net - but mainly as a way to sell unfilled seats. They routinely send out e-mail alerts of last minute fare specials. And several airlines have signed up with Priceline, which lets customers specify when and where they want to travel, and name their price. Priceline then forwards the bids to participating airlines, which can choose to accept the request or not. The company makes its money on the spread between the bid and the lower airline price. It empowers the buyer and also the seller. They can plug in demand to empty flights.

Such e-markets produce a price that fairly reflects demand. Some companies may be surprised by the results. Look at AucNet, an online auction for used cars. Dealers and wholesalers flock to the AucNet's website to buy and sell some 6,000 cars a month. Surprisingly, sellers fetch more for their used cars than they might on a physical lot. That is partly because of the larger audience they have attracted on the Net.

E-BUSINESS

The e-business idea means more than simply creating a marketing "presence" on the Web. It represents a transformation of the business process itself, enabled by the Internet's unique combination of features:

- instant access to information,
- universal and global reach, and
- personalized delivery of information and services.

In e-business, critical business systems are connected directly to an enlarged community of users, including customers, trading partners, and employees. That means these users can:

- buy goods and services,